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. G.Galimberti, Ed.
Cisco
. R.Kunze, Ed.
Deutsche Telekom
. Kam Lam, Ed.
Alcatel-Lucent
. D. Hiremagalur, Ed.
Juniper
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An SNMP MIB extension to [RFC3591](#) to manage optical parameters, alarms
and performance monitoring of DWDM applications
draft-galikusze-ccamp-opt-imp-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.

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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](#)]

This document further extend the [draft-galikusze-ccamp-g-698-2-snmp-mib-03](#) where the ITU-T G.698.2 "application-code" and few other parameters described.

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.

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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 black 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].

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 parameter 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 range (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. OSNR penalty | G | G.698.2 S.7.2.7 |
| MAX side mode suppression ratio, min channel extinction ratio, Eye mask | G | G.698.2 S.7.2.6 |
| 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:

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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 specifies 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 between 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 measured 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)

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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](#)].

BIP8 :

Number of BIP8's occurred in an observation period (G). BIP-8 consists of a parity byte calculated bit-wise across a large number of bytes in a transmission transport frame. BIP-8 bits are set such that the overall data stream, including the BIP-8 byte, has even parity.

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.

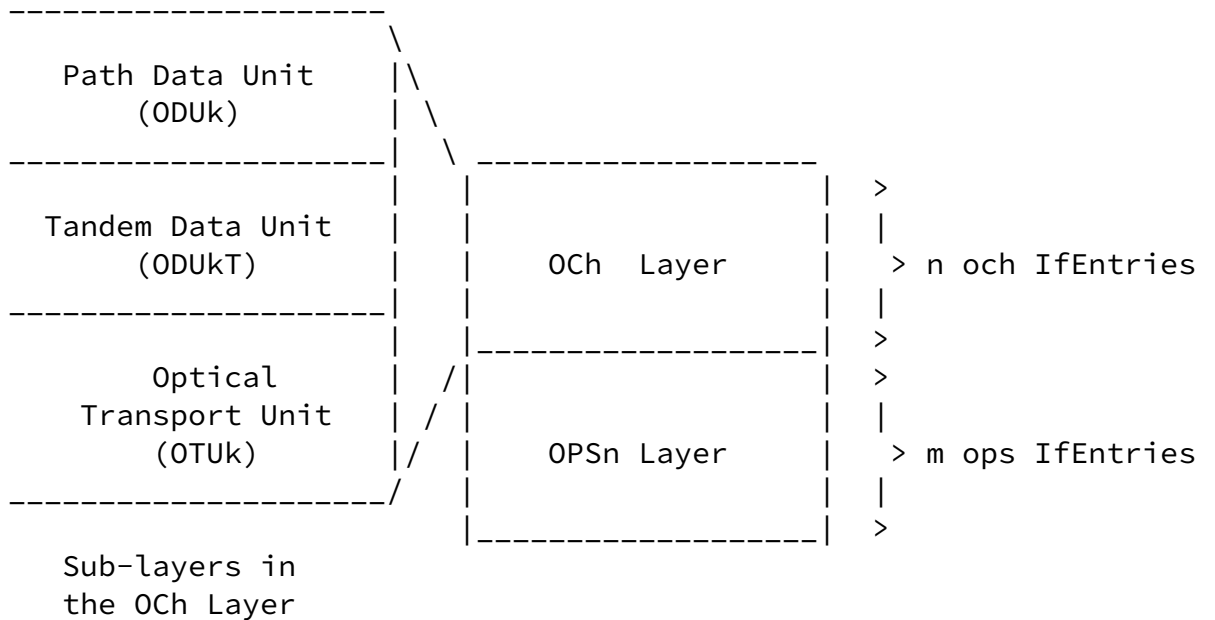


Figure 2: OTN Layers for OPS and OCh

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)

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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

| HigherLayer | LowerLayer |
|-------------|------------|
| 0 | j |
| 0 | k |
| j | i |
| k | i |
| i | 0 |

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](#). >>>

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

```
IMPORTS
```

```
    MODULE-IDENTITY,  
    OBJECT-TYPE,  
    Gauge32,  
    Integer32,  
    Unsigned32,  
    Counter64,  
    transmission,  
    NOTIFICATION-TYPE  
        FROM SNMPv2-SMI  
    TEXTUAL-CONVENTION,  
    RowPointer,  
    RowStatus,  
    TruthValue,  
    DisplayString,  
    DateAndTime
```

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```
        FROM SNMPv2-TC  
    SnmpAdminString  
        FROM SNMP-FRAMEWORK-MIB  
    MODULE-COMPLIANCE, OBJECT-GROUP  
        FROM SNMPv2-CONF  
    ifIndex  
        FROM IF-MIB  
    OptIfDirectionality,  
    optIfOChConfigEntry,  
    optIfOChSinkCurrentEntry,  
    optIfMibModule  
        FROM OPT-IF-MIB;
```

```
-  
-- This is the MIB module for the optical parameters associated with  
-- the black link end points  
-- extension for Alarms and PM
```

```
optIfExtMibModule MODULE-IDENTITY
  LAST-UPDATED "201307020000Z"
  ORGANIZATION "IETF Ops/Camp MIB Working Group"
  CONTACT-INFO
    "WG charter:
     http://www.ietf.org/html.charters/

    Mailing Lists:
    Editor: Gabriele Galimberti
    Email: ggalimbe@cisco.com"
  DESCRIPTION
    "The MIB module to describe Black Link extension to rfc3591.

    Copyright (C) The Internet Society (2013). This version
    of this MIB module is part of ; see the RFC
    itself for full legal notices."
  REVISION "201307020000Z"
  DESCRIPTION
    " Draft version 1.0
    Mib has all transceiver capabilities as described in G.698,
    alarm and PM's."
 ::= { optIfMibModule 3 }
```

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```
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)
    }
```

```
OptIfGridTypes ::= TEXTUAL-CONVENTION
    STATUS current
    DESCRIPTION
        " The types of Grid as defined by ITU-T
        "
    SYNTAX INTEGER {
        gridReserved(0),
        gridITUDWDM(1),
        gridITUCWDM(2),
        gridITUFlex(4)
    }
```

```
OptIfDataType ::= TEXTUAL-CONVENTION
    STATUS current
    DESCRIPTION
        "
        This parameter indicates the parameters for the table are for
        the Near End or Far End 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 MIBmodel is required, in particular for the indexing for
    these layers.
    "
SYNTAX INTEGER {
    optIfOTUkLayer(1),
    optIfODUkLayer(2),
    optIfTCMSubLayer(3)
}

optIfOTNAlarmSeverity ::= TEXTUAL-CONVENTION
STATUS current
DESCRIPTION
    " Severity of the notification.
    "
SYNTAX INTEGER {
    optIfCritical(1),
    optIfMajor(2),
    optIfMinor(3),
    optIfInfo(4)
}
--
-- Alarm for the OCh and OTUk layer
--
OptIfOTNNOChAlarms ::= TEXTUAL-CONVENTION
STATUS current

```

DESCRIPTION

" This is the possible alarms from the OCh and OTUk layer."

```
SYNTAX INTEGER {
    -- OTN Loss of signal alarm
    optIf0tnLosAlarm(1),
    -- OTN Loss of Frame alarm
    optIf0tnLofAlarm(2),
    -- OTN Loss of Multi Frame alarm
    optIf0tnLomAlarm(3),
    -- OTN Server Signal Failure alarm
    optIf0tn0tuSsfAlarm(4),
    -- OTN OTU Backward Defect Indicator alarm
    optIf0tn0tuBdiAlarm(5),
    -- OTN OTU Trail Trace Identifier Mismatch alarm
    optIf0tn0tuTimAlarm(6),
    -- OTN OTU Degraded alarm,
    optIf0tn0tuDegAlarm(7),
    -- OTN OTU Fec Excessive Errors alarm
    optIf0tn0tuFecExcessiveErrsAlarm(8),
    -- OTN OTU BBE Thresholdalarm
    optIf15MinThreshBBETCA(9),
    -- OTN OTU ES Thresholdalarm
    optIf15MinThreshESTCA(10),
    -- OTN OTU SES Threshold alarm
    optIf15MinThreshSESTCA(11),
    -- OTN OTU UAS Threshold alarm
    optIf15MinThreshUASTCA(12),
    -- OTN OTU Bip8 Threshold alarm
    optIf15MinThreshBip8TCA(13),
    -- OTN FEC uncorrectedwords TCA
    optIf15MinThreshFECUncorrectedWordsTCA(14),
    -- OTN Pre FEC BER TCA
    optIf15MinThreshPreFECBERTCA(15)
}
```

OptIfOTNODUkTcmAlarms ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

" This is the alarms from the ODUk and TCM layer."

```
SYNTAX INTEGER {
    -- OTN ODU/TCM Open Connection Indicator
    optIfOTNODUkTcm0ciAlarm(1),
```

```
-- OTN ODU/TCM LCK
optIfOTNOdukTcmLckAlarm(2),
-- OTN ODU/TCM Backward Defect Indicator
optIfOTNOdukTcmBdiAlarm(3),
-- OTN ODU/TCM Trail Trace Identifier Mismatch
optIfOTNOdukTcmTimAlarm(4),
```

```
-- OTN ODU/TCM Degraded
optIfOTNOdukTcmDegAlarm(5),
-- OTN ODU/TCM LTC Loss of Tandem connection
optIfOTNOdukTcmLtcAlarm(6),
-- OTN ODU/TCM CSF - Client Signal Failure
optIfOTNOdukTcmCSfAlarm(7),
-- OTN ODU/TCM Server Signal Failure
optIfOTNOdukTcmSSfAlarm(8),
-- OTN OTU BBE Threshold
optIfOTNOdukTcm15MinThreshBBETCA(9),
-- OTN OTU ES Threshold
optIfOTNOdukTcm15MinThreshESTCA(10),
-- OTN OTU SES Threshold
optIfOTNOdukTcm15MinThreshSESTCA(11),
-- OTN OTU UAS Threshold
optIfOTNOdukTcm15MinThreshUASTCA(12)
}
```

-- Addition to the [RFC 3591](#) objects

```
optIfOTNNotifications OBJECT IDENTIFIER ::= { optIfExtMibModule 0 }
optIfOPSmEntry         OBJECT IDENTIFIER ::= { optIfExtMibModule 1 }
optIfOChXcvrGroup      OBJECT IDENTIFIER ::= { optIfExtMibModule 2 }
optIfOTNPMGroup        OBJECT IDENTIFIER ::= { optIfExtMibModule 3 }
optIfOTNAlarm          OBJECT IDENTIFIER ::= { optIfExtMibModule 4 }
```

-- OPS - Optical Physical Section

```
optIfOPSmConfigTable OBJECT-TYPE
    SYNTAX SEQUENCE OF OptIfOPSmConfigEntry
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
```

```
    "A table of OPS General config parameters."
 ::= { optIfOPSmEntry 1 }
```

```
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-only
    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-only
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 }
```

```
-- Tranceiver general parameters table
-- General parameters for the Black Link Ss-Rs
```

```
optIfXcvrTable OBJECT-TYPE
SYNTAX SEQUENCE OF OptIfXcvrEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
    "A table of OCh General config extension parameters"
 ::= { optIfOChXcvrGroup 1 }
```

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

```
OptIfXcvrEntry ::=
SEQUENCE {
    optIfOChMimumumChannelSpacing      OptIfChannelSpacing,
    optIfOChBitRateLineCoding         OptIfBitRateLineCoding,
    optIfOChFEC                       Unsigned32,
    optIfOChSinkMaximumBERMantissa    Unsigned32,
    optIfOChSinkMaximumBERExponent    Unsigned32,
    optIfOChMinWavelength             Unsigned32,
    optIfOChMaxWavelength             Unsigned32
}
```

```

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

optIfOChBitRateLineCoding OBJECT-TYPE
    SYNTAX      OptIfBitRateLineCoding
    MAX-ACCESS  read-only
    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) "
    ::= { optIfXcvrEntry 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
11 - 100G FEC (for new applications)

```

12 - 100G EFEC (for new applications)
99 - Vendor Specific "
 ::= { optIfXcvrEntry 3 }

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

optIfOChMinWavelength OBJECT-TYPE
SYNTAX Unsigned32
UNITS "0.01 nm"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"This parameter indicate minimum wavelength spectrum in a
definite wavelength Band (L, C and S) "

::= { optIfXcvrEntry 6 }

optIfOChMaxWavelength OBJECT-TYPE
SYNTAX Unsigned32
UNITS "0.01 nm"
MAX-ACCESS read-only
STATUS current


```

DESCRIPTION
    "This parameter indicate maximum wavelength spectrum in a
    definite wavelength Band (L, C and S) "
 ::= { optIfXcvrEntry 7 }

-- Tranceiver (xcvr) Parameters at OCh Src (Ss)
-- OptIfOChSrcXcvrEntry

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

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

OptIfOChSrcXcvrEntry ::=
    SEQUENCE {
        optIfOChMinimumMeanChannelOutputPower Integer32,
        optIfOChMaximumMeanChannelOutputPower Integer32,
        optIfOChMinimumCentralFrequency Unsigned32,
        optIfOChMaximumCentralFrequency Unsigned32,
        optIfOChMaximumSpectralExcursion Unsigned32,
        optIfOChMaximumTxDispersionOSNRPenalty Integer32
    }

optIfOChMinimumMeanChannelOutputPower OBJECT-TYPE
    SYNTAX Integer32
    UNITS "0.01 dbm"
    MAX-ACCESS read-only
    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."

::= { optIf0ChSrcXcvrEntry 1}

optIf0ChMaximumMeanChannelOutputPower OBJECT-TYPE

SYNTAX Integer32

UNITS "0.01 dbm"

MAX-ACCESS read-only

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."

::= { optIf0ChSrcXcvrEntry 2}

optIf0ChMinimumCentralFrequency OBJECT-TYPE

SYNTAX Unsigned32

UNITS "0.01 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 19150 "

::= { optIf0ChSrcXcvrEntry 3}

optIf0ChMaximumCentralFrequency OBJECT-TYPE

SYNTAX Unsigned32

UNITS "0.01 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 19150 "

::= { optIf0ChSrcXcvrEntry 4}

optIf0ChMaximumSpectralExcursion 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."
 ::= { optIfOChSrcXcvrEntry 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. "
```

```
::= { optIfOChSrcXcvrEntry 6}
```

```
-- Optical Path from Point Src (Ss) to Sink (Rs)
```

```
-- Alternatively this can be optIfOChSsRsTable
```

```
optIfOChSrcSinkXcvrTable OBJECT-TYPE
```

```
SYNTAX SEQUENCE OF OptIfOChSrcSinkXcvrEntry
```

```
MAX-ACCESS not-accessible
```

```
STATUS current
```

```
DESCRIPTION
```

```
"A table of paramters for the optical path from Src to Sink
(Ss to Rs)."
```

```
::= { optIfOChXcvrGroup 3 }
```

```
optIfOChSrcSinkXcvrEntry OBJECT-TYPE
```

```
SYNTAX OptIfOChSrcSinkXcvrEntry
```

```
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 }
```

```
::= { optIfOChSrcSinkXcvrTable 1 }
```

```
OptIfOChSrcSinkXcvrEntry ::=
```

```
SEQUENCE {
```

```
    optIfOChSrcSinkMinimumChromaticDispersion
```

```
    Integer32,
```

```
optIf0ChSrcSinkMaximumChromaticDispersion
                                                    Integer32,
optIf0ChSrcSinkMinimumSrcOpticalReturnLoss
                                                    Integer32,
optIf0ChSrcSinkMaximumDiscreteReflectanceSrcToSink
```

```
                                                    Integer32,
optIf0ChSrcSinkMaximumDifferentialGroupDelay
                                                    Integer32,
optIf0ChSrcSinkMaximumPolarisationDependentLoss
                                                    Integer32,
optIf0ChSrcSinkMaximumInterChannelCrosstalk
                                                    Integer32,
optIf0ChSrcSinkInterFerometricCrosstalk
                                                    Integer32,
optIf0ChSrcSinkOpticalPathOSNRPenalty
                                                    Integer32
}
```

optIf0ChSrcSinkMinimumChromaticDispersion 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."

::= { optIf0ChSrcSinkXcvrEntry 1 }

optIf0ChSrcSinkMaximumChromaticDispersion 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."

::= { optIf0ChSrcSinkXcvrEntry 2 }

optIf0ChSrcSinkMinimumSrcOpticalReturnLoss OBJECT-TYPE

SYNTAX Integer32
UNITS "0.1 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."
::= { optIfOChSrcSinkXcvrEntry 3 }

optIfOChSrcSinkMaximumDiscreteReflectanceSrcToSink OBJECT-TYPE
SYNTAX Integer32

UNITS "0.1 dB"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"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."
::= { optIfOChSrcSinkXcvrEntry 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."
::= { optIfOChSrcSinkXcvrEntry 5 }

optIfOChSrcSinkMaximumPolarisationDependentLoss OBJECT-TYPE
SYNTAX Integer32
UNITS "0.1 dB"
MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The polarisation 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."

::= { optIfOChSrcSinkXcvrEntry 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."

::= { optIfOChSrcSinkXcvrEntry 7 }

optIfOChSrcSinkInterFerometricCrosstalk 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.."

::= { optIfOChSrcSinkXcvrEntry 8 }

optIfOChSrcSinkOpticalPathOSNRPenalty 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."
 ::= { optIfOChSrcSinkXcvrEntry 9}

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

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

```

```

 ::= { optIfOChSinkXcvrTable 1 }

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

optIfOChSinkMinimumMeanIntputPower OBJECT-TYPE
    SYNTAX Integer32
    UNITS "0.01 dbm"
    MAX-ACCESS read-only
    STATUS current

```

DESCRIPTION

" The minimum values of the average received power (in dbm at point the Sink (Rs))."

::= { optIfOChSinkXcvrEntry 1}

optIfOChSinkMaximumMeanIntputPower OBJECT-TYPE

SYNTAX Integer32

UNITS "0.01 dbm"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The maximum values of the average received power (in dbm) at point the Sink (Rs)."

::= { optIfOChSinkXcvrEntry 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."

::= { optIfOChSinkXcvrEntry 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)."

::= { optIfOChSinkXcvrEntry 4}

-- 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 extension 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,
            optIfOTNPMConfigTCMLLevel }
    ::= { optIfOTNPMConfigTable 1 }

OptIfOTNPMConfigEntry ::=
    SEQUENCE {

```

```
    optIfOTNPMConfigType          OptIfOTNType,
    optIfOTNPMConfigLayer        OptIfOTNLayer,
    optIfOTNPMConfigTCMLevel     Unsigned32,
    optIfOTNPMESRInterval       Unsigned32,
    optIfOTNPMSESRIInterval     Unsigned32,
    optIfOTNPMValidIntervals     Unsigned32,
    optIfOTNPM15MinBip8Threshold Unsigned32,
    optIfOTNPM15MinESsThreshold Unsigned32,
    optIfOTNPM15MinSESSsThreshold Unsigned32,
    optIfOTNPM15MinUASsThreshold Unsigned32,
    optIfOTNPM15MinBBEsThreshold Unsigned32,
    optIfOTNPM24HourBip8Threshold Unsigned32,
    optIfOTNPM24HourESsThreshold Unsigned32,
    optIfOTNPM24HourSESSsThreshold Unsigned32,
    optIfOTNPM24HourUASsThreshold Unsigned32,
    optIfOTNPM24HourBBEsThreshold Unsigned32
  }
```

optIfOTNPMConfigType OBJECT-TYPE

SYNTAX OptIfOTNType

MAX-ACCESS not-accessible

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 not-accessible

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 sublayer 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 (0..6)

MAX-ACCESS not-accessible
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}

optIfOTNPMESRInterval OBJECT-TYPE

SYNTAX Unsigned32 (1..96)

UNITS "seconds"

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This parameter indicates the measurement interval
for error seconds ratio."
::= {optIfOTNPMConfigEntry 4}

optIfOTNPMSESRIInterval OBJECT-TYPE

SYNTAX Unsigned32

UNITS "seconds"

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This parameter indicates the measurement interval
for severely error seconds ratio."
::= {optIfOTNPMConfigEntry 5}

optIfOTNPMValidIntervals OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of contiguous 15 minute intervals for which valid
PM data is available for the particular interface."
::= { optIfOTNPMConfigEntry 6 }

optIfOTNPM15MinBip8Threshold OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The number of Bip8 encountered by the interface within any given 15 minutes performance data collection period, which causes the SNMP agent to send optIf15MinThreshBip8TCA. One notification will be sent per interval per interface. A value of `0` will disable the notification."

```
::= { optIfOTNPMConfigEntry 7 }
```

```
optIfOTNPM15MinESsThreshold OBJECT-TYPE  
SYNTAX Unsigned32
```

```
MAX-ACCESS read-write  
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. A value of `0` will disable the notification."

```
::= { optIfOTNPMConfigEntry 8 }
```

```
optIfOTNPM15MinSESsThreshold OBJECT-TYPE
```

```
SYNTAX Unsigned32  
MAX-ACCESS read-write  
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. A value of `0` will disable the notification."

```
::= { optIfOTNPMConfigEntry 9 }
```

```
optIfOTNPM15MinUASsThreshold OBJECT-TYPE
```

```
SYNTAX Unsigned32  
MAX-ACCESS read-write  
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. A

value of `0` will disable the notification."
 ::= { optIfOTNPMConfigEntry 10 }

optIfOTNPM15MinBBEsThreshold OBJECT-TYPE

SYNTAX Unsigned32
MAX-ACCESS read-write
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. A value of `0` will disable the notification."

::= { optIfOTNPMConfigEntry 11 }

optIfOTNPM24HourBip8Threshold OBJECT-TYPE

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SYNTAX Unsigned32
MAX-ACCESS read-write
STATUS current
DESCRIPTION

"The number of Bip8 encountered by the interface within any given 24 Hour performance data collection period, which causes the SNMP agent to send optIf15MinThreshBip8TCA. One notification will be sent per interval per interface. A value of `0` will disable the notification."

::= { optIfOTNPMConfigEntry 12 }

optIfOTNPM24HourESsThreshold OBJECT-TYPE

SYNTAX Unsigned32
MAX-ACCESS read-write
STATUS current
DESCRIPTION

"The number of ES encountered by the interface within any given 24 hour performance data collection period, which causes the SNMP agent to send optIf24HourThreshEsTCA. One notification will be sent per 24 hour per interface. A value of `0` will disable the notification."

::= { optIfOTNPMConfigEntry 13 }

optIfOTNPM24HourSEsThreshold OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS read-write
STATUS current
DESCRIPTION
 "The number of SES encountered by the interface within any given 24 hour performance data collection period, which causes the SNMP agent to send optIf24HourThreshSESsTCA. One notification will be sent per 24 hour per interface. A value of `0` will disable the notification."
 ::= { optIfOTNPMConfigEntry 14 }

optIfOTNPM24HourUASsThreshold OBJECT-TYPE
SYNTAX Unsigned32
MAX-ACCESS read-write
STATUS current
DESCRIPTION
 "The number of SES encountered by the interface within any given 24 hour performance data collection period, which causes the SNMP agent to send optIf24HourThreshUASsTCA. One notification will be sent per 24 hour per interface. A value of `0` will disable the notification."
 ::= { optIfOTNPMConfigEntry 15 }

optIfOTNPM24HourBBEsThreshold OBJECT-TYPE

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SYNTAX Unsigned32
MAX-ACCESS read-write
STATUS current
DESCRIPTION
 "The number of BBE encountered by the interface within any given 24 hour performance data collection period, which causes the SNMP agent to send optIf24HourThreshBBEsTCA. One notification will be sent per 24 hour per interface. A value of `0` will disable the notification."
 ::= { optIfOTNPMConfigEntry 16 }

--
-- 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, optIfOTNPMCurrentTCMLLevel }
 ::= { optIfOTNPMCurrentTable 1 }

OptIfOTNPMCurrentEntry ::=

SEQUENCE {

| | |
|--------------------------------|----------------|
| optIfOTNPMCurrentType | OptIfOTNType, |
| optIfOTNPMCurrentLayer | OptIfOTNLayer, |
| optIfOTNPMCurrentTCMLLevel | Unsigned32, |
| optIfOTNPMCurrentSuspectedFlag | TruthValue, |
| optIfOTNPMCurrentBip8 | Unsigned32, |
| optIfOTNPMCurrentESS | Unsigned32, |
| optIfOTNPMCurrentSESS | Unsigned32, |
| optIfOTNPMCurrentUASS | Unsigned32, |
| optIfOTNPMCurrentBBEs | Unsigned32, |
| optIfOTNPMCurrentESR | Unsigned32, |
| optIfOTNPMCurrentSESR | Unsigned32, |
| optIfOTNPMCurrentBBER | Unsigned32, |

| | |
|------------------------------|-------------|
| optIfOTNPMCurrentBIP8 | Unsigned32, |
| optIfOTNPMCurrentElapsedTime | Unsigned32 |
| } | |

optIfOTNPMCurrentType OBJECT-TYPE

SYNTAX OptIfOTNType

MAX-ACCESS not-accessible

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 not-accessible

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 sublayer 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 (0..6)

MAX-ACCESS not-accessible

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}

optIfOTNPMCurrentBip8 OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of Failures occurred in an observation period."

::= { optIfOTNPMCurrentEntry 5}

optIfOTNPMCurrentESS OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This is the number of seconds in which one or more bits are in error or during which Loss of Signal (LOS) or Alarm Indication Signal (AIS) is detected."

::= { optIfOTNPMCurrentEntry 6}

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 bit-error ratio = $1 \times 10^{\text{Eminus}3}$ or during which Loss of Signal (LOS) or Alarm Indication Signal (AIS) is detected."

::= { optIfOTNPMCurrentEntry 7}

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 8}

optIfOTNPMCurrentBBEs OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

```
    "An errored block not occurring as part of an SES."  
 ::= { optIfOTNPMCurrentEntry 9 }
```

```
optIfOTNPMCurrentESR OBJECT-TYPE  
    SYNTAX Unsigned32  
    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 10 }
```

```
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 11 }
```

```
optIfOTNPMCurrentBBER OBJECT-TYPE  
    SYNTAX Unsigned32  
    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 12 }
```

```
optIfOTNPMCurrentBIP8 OBJECT-TYPE  
    SYNTAX Unsigned32  
    MAX-ACCESS read-only  
    STATUS current  
    DESCRIPTION  
        "The BIP8 count for this period."  
 ::= { optIfOTNPMCurrentEntry 13 }
```

```
optIfOTNPMCurrentElapsedTime OBJECT-TYPE  
    SYNTAX Unsigned32  
    UNITS "seconds"  
    MAX-ACCESS read-only  
    STATUS current  
    DESCRIPTION
```

"Time elapsed for this 15 minute 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, optIfOTNPMIntervalTCMLLevel,
            optIfOTNPMIntervalNumber }
    ::= { optIfOTNPMIntervalTable 1 }

OptIfOTNPMIntervalEntry ::=
    SEQUENCE {
        optIfOTNPMIntervalType          OptIfOTNType,
        optIfOTNPMIntervalLayer         OptIfOTNLayer,
        optIfOTNPMIntervalTCMLLevel    Unsigned32,
        optIfOTNPMIntervalNumber       Unsigned32,
        optIfOTNPMIntervalSuspectedFlag TruthValue,
        optIfOTNPMIntervalBip8         Unsigned32,
        optIfOTNPMIntervalESS          Unsigned32,
        optIfOTNPMIntervalSESS        Unsigned32,
        optIfOTNPMIntervalUASS        Unsigned32,
        optIfOTNPMIntervalBBES        Unsigned32,
        optIfOTNPMIntervalESR         Unsigned32,
```

```

    optIfOTNPMIntervalSESR          Unsigned32,
    optIfOTNPMIntervalBBER          Unsigned32,
    optIfOTNPMIntervalBIP8          Unsigned32,
    optIfOTNPMIntervalTimeStamp     DateAndTime
}

```

```

optIfOTNPMIntervalType      OBJECT-TYPE
    SYNTAX  OptIfOTNType

```

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```

MAX-ACCESS  not-accessible
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  not-accessible
    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 sublayer 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 (0..6)
    MAX-ACCESS  not-accessible
    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 (1..96)
MAX-ACCESS not-accessible
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

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DESCRIPTION
"If true, the data in this entry may be unreliable."
 ::= { optIfOTNPMIntervalEntry 5 }

optIfOTNPMIntervalBip8 OBJECT-TYPE
SYNTAX Unsigned32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Number of Failures occurred in an observation period."
 ::= { optIfOTNPMIntervalEntry 6 }

optIfOTNPMIntervalESSs OBJECT-TYPE
SYNTAX Unsigned32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"It is a one-second period in which one or more bits are in error or during which Loss of Signal (LOS) or Alarm Indication Signal (AIS) is detected."
 ::= { optIfOTNPMIntervalEntry 7 }

optIfOTNPMIntervalSESSs 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 which has a bit-error ratio =
1x10Eminus3 or during which Loss of Signal (LOS) or Alarm
Indication Signal (AIS) 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
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

```

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
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}

optIfOTNPMIntervalBIP8 OBJECT-TYPE
SYNTAX Unsigned32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "BIP8 for this period."
 ::= { optIfOTNPMIntervalEntry 14}

optIfOTNPMIntervalTimeStamp OBJECT-TYPE
SYNTAX DateAndTime
MAX-ACCESS read-only
STATUS current
DESCRIPTION

```

```

    "Time stamp of this interval."
 ::= { optIfOTNPMIntervalEntry 15}

--
-- 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 | OptIfOTNType, |
| optIfOTNPMCurrentDayLayer | OptIfOTNLayer, |
| optIfOTNPMCurrentDayTCMLevel | Unsigned32, |
| optIfOTNPMCurrentDaySuspectedFlag | TruthValue, |
| optIfOTNPMCurrentDayBip8 | Unsigned32, |
| optIfOTNPMCurrentDayESs | Unsigned32, |
| optIfOTNPMCurrentDaySESs | Unsigned32, |
| optIfOTNPMCurrentDayUASs | Unsigned32, |
| optIfOTNPMCurrentDayBBEs | Unsigned32, |
| optIfOTNPMCurrentDayESR | Unsigned32, |
| optIfOTNPMCurrentDaySESR | Unsigned32, |
| optIfOTNPMCurrentDayBBER | Unsigned32, |
| optIfOTNPMCurrentDayBIP8 | Unsigned32, |
| optIfOTNPMCurrentDayElapsedTime | Unsigned32 |

```
}
```

```
optIfOTNPMCurrentDayType      OBJECT-TYPE
```

```
SYNTAX  OptIfOTNType
```

```
MAX-ACCESS  not-accessible
```

```
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 not-accessible
    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 sublayer 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 (0..6)
    MAX-ACCESS not-accessible
    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}

optIfOTNPMCurrentDayBip8 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 in which one or more bits are in error or during which Loss of Signal (LOS) or Alarm Indication Signal (AIS) is detected."

::= { optIfOTNPMCurrentDayEntry 6 }

optIfOTNPMCurrentDaySESSs 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 which has a bit-error ratio = 1×10^E minus 3 or during which Loss of Signal (LOS) or Alarm Indication Signal (AIS) 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 current 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

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```
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
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
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}

optIfOTNPMCurrentDayBIP8 OBJECT-TYPE
SYNTAX Unsigned32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "BIP8 for this period."
 ::= { optIfOTNPMCurrentDayEntry 13}

optIfOTNPMCurrentDayElapsedTime OBJECT-TYPE
SYNTAX Unsigned32
UNITS "seconds"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "Time elapsed for current day"
```

```
::= { optIfOTNPMCurrentDayEntry 14 }
```

```
--
```

```
-- PM Prev Day Entry
```

```
--
```

```
optIfOTNMPPrevDayTable OBJECT-TYPE
```

```
SYNTAX SEQUENCE OF OptIfOTNMPPrevDayEntry
```

```
MAX-ACCESS not-accessible
```

```
STATUS current
```

```
DESCRIPTION
```

```
"A Performance monitoring Previous Day Table."
```

```
::= { optIfOTNPMGroup 6 }
```

```
optIfOTNMPPrevDayEntry OBJECT-TYPE
```

```
SYNTAX OptIfOTNMPPrevDayEntry
```

```
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  
'optIfOTNMPPrevDayLayer' layer."
```

```
INDEX { ifIndex, optIfOTNMPPrevDayType  
optIfOTNMPPrevDayLayer, optIfOTNMPPrevDayTCMLevel }
```

```
::= { optIfOTNMPPrevDayTable 1 }
```

```
OptIfOTNMPPrevDayEntry ::=
```

```
SEQUENCE {
```

| | |
|--------------------------------|----------------|
| optIfOTNMPPrevDayType | OptIfOTNType, |
| optIfOTNMPPrevDayLayer | OptIfOTNLayer, |
| optIfOTNMPPrevDayTCMLevel | Unsigned32, |
| optIfOTNMPPrevDaySuspectedFlag | TruthValue, |
| optIfOTNMPPrevDayBip8 | Unsigned32, |
| optIfOTNMPPrevDayESs | Unsigned32, |
| optIfOTNMPPrevDaySESSs | Unsigned32, |
| optIfOTNMPPrevDayUASs | Unsigned32, |
| optIfOTNMPPrevDayBBEs | Unsigned32, |
| optIfOTNMPPrevDayESR | Unsigned32, |
| optIfOTNMPPrevDaySESR | Unsigned32, |
| optIfOTNMPPrevDayBBER | Unsigned32, |
| optIfOTNMPPrevDayBIP8 | Unsigned32, |
| optIfOTNMPPrevDayTimeStamp | DateAndTime |

}

optIfOTNMPPrevDayType OBJECT-TYPE
SYNTAX OptIfOTNType
MAX-ACCESS not-accessible
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 "
 ::= { optIfOTNMPPrevDayEntry 1}

optIfOTNMPPrevDayLayer OBJECT-TYPE
SYNTAX OptIfOTNLayer
MAX-ACCESS not-accessible
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 sublayer PM is not related to the black link PM
 ODU/TCM management, but since this is a common PM model for
 the layer, we may include it here."
 ::= { optIfOTNMPPrevDayEntry 2}

optIfOTNMPPrevDayTCMLevel OBJECT-TYPE
SYNTAX Unsigned32 (0..6)
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "This parameter indicates the TCM level (1-6)
 if the PM is of the type TCM."
 ::= { optIfOTNMPPrevDayEntry 3}

optIfOTNMPPrevDaySuspectedFlag OBJECT-TYPE
SYNTAX TruthValue
MAX-ACCESS read-only

STATUS current
DESCRIPTION
"If true, the data in this entry may be unreliable."
 ::= { optIfOTNPMPPrevDayEntry 4}

optIfOTNPMPPrevDayBip8 OBJECT-TYPE
SYNTAX Unsigned32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Number of pre FEC failures occurred in an observation
period."
 ::= { optIfOTNPMPPrevDayEntry 5}

optIfOTNPMPPrevDayESs 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 in which one or more bits are in
error or during which Loss of Signal (LOS) or Alarm
Indication Signal(AIS) is detected."
 ::= { optIfOTNPMPPrevDayEntry 6}

optIfOTNPMPPrevDaySESSs 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 which has
a bit-error ratio = 1×10^E minus 3 or during which Loss of
Signal (LOS) or Alarm Indication Signal (AIS) is detected."
 ::= { optIfOTNPMPPrevDayEntry 7}

optIfOTNPMPPrevDayUASSs 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

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

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

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}

optIfOTNPMPrevDayBIP8 OBJECT-TYPE
    SYNTAX Unsigned32
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "BIP8 for this period."
 ::= { optIfOTNPMPrevDayEntry 13}

optIfOTNPMPrevDayTimeStamp OBJECT-TYPE
    SYNTAX DateAndTime
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "Time stamp of this interval."
 ::= { optIfOTNPMPrevDayEntry 14}

--
-- 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          OptIfOTNType,
    optIfOTNPMFECValidIntervals      Unsigned32,
    optIfOTNPM15MinFECUncorrectedWordsThreshold Unsigned32,
    optIfOTNPM15MinPreFECBERMantissaThreshold Unsigned32,
    optIfOTNPM15MinPreFECBERExponentThreshold Unsigned32
}

```

```

optIfOTNPMFECConfigType          OBJECT-TYPE
SYNTAX  OptIfOTNType
MAX-ACCESS  not-accessible
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. A value of `0'
    will disable the notification."
 ::= {optIfOTNPMFECConfigEntry 3}

```

```

optIfOTNPM15MinPreFECBERMantissaThreshold OBJECT-TYPE
    SYNTAX Unsigned32
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "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}

optIfOTNPM15MinPreFECBERExponentThreshold 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 | OptIfOTNType, |
| optIfOTNPMFECCurrentSuspectedFlag | TruthValue, |
| optIfOTNPMCurrentFECCorrectedErr | Counter64, |
| optIfOTNPMCurrentFECUncorrectedWords | Counter64, |
| optIfOTNPMCurrentFECBERMantissa | Unsigned32, |
| optIfOTNPMCurrentFECBERExponent | Unsigned32, |
| optIfOTNPMCurrentFECMinBERMantissa | Unsigned32, |
| optIfOTNPMCurrentFECMinBERExponent | Unsigned32, |
| optIfOTNPMCurrentFECMaxBERMantissa | Unsigned32, |
| optIfOTNPMCurrentFECMaxBERExponent | Unsigned32, |
| optIfOTNPMCurrentFECAvgBERMantissa | Unsigned32, |
| optIfOTNPMCurrentFECAvgBERExponent | Unsigned32, |
| optIfOTNPMCurrentFECElapsedTime | Unsigned32 |

}

optIfOTNPMFECCurrentType OBJECT-TYPE
 SYNTAX OptIfOTNType
 MAX-ACCESS not-accessible
 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 Counter64
 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 Counter64
MAX-ACCESS read-only
STATUS current

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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 .. mantissa."

::= { 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."

::= { optIfOTNPMFECCurrentEntry 6 }

optIfOTNPMCurrentFECMinBERMantissa OBJECT-TYPE

SYNTAX Unsigned32
MAX-ACCESS read-only
STATUS current

DESCRIPTION

"The minimum number of Errored bits at receiving side before the FEC function counted over one second .. mantissa."

::= { optIfOTNPMFECCurrentEntry 7 }

optIfOTNPMCurrentFECMinBERExponent OBJECT-TYPE

SYNTAX Unsigned32
MAX-ACCESS read-only
STATUS current

DESCRIPTION

"The minimum number of Errored bits at receiving side before the FEC function counted over one second.. exponent."

::= { optIfOTNPMFECCurrentEntry 8}

optIfOTNPMCurrentFECMaxBERMantissa OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The maximum number of Errored bits at receiving side before the FECfunction counted over one second .. mantissa."

::= { optIfOTNPMFECCurrentEntry 9}

optIfOTNPMCurrentFECMaxBERExponent OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The maximum number of Errored bits at receiving side before the FEC function counted over one second .. exponent."

::= { optIfOTNPMFECCurrentEntry 10}

optIfOTNPMCurrentFECAvgBERMantissa OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The average number of Errored bits at receiving side before the FEC function counted over one second .. mantissa."

::= { optIfOTNPMFECCurrentEntry 11}

optIfOTNPMCurrentFECAvgBERExponent OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The average number of Errored bits at receiving side before the FEC function counted over one second .. exponent."

::= { optIfOTNPMFECCurrentEntry 12}

```

optIfOTNPMCurrentFECElapsedTime    OBJECT-TYPE
    SYNTAX      Unsigned32
    UNITS       "seconds"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Time elapsed for this 15 minute interval."
    ::= { optIfOTNPMFECCurrentEntry 13 }

--
-- 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, optIfOTNPMFECIntervalType,
            optIfOTNPMFECIntervalNumber }
    ::= { optIfOTNPMFECIntervalTable 1 }

OptIfOTNPMFECIntervalEntry ::=
    SEQUENCE {
        optIfOTNPMFECIntervalType          OptIfOTNType,
        optIfOTNPMFECIntervalNumber        Unsigned32,
        optIfOTNPMFECIntervalSuspectedFlag TruthValue,
        optIfOTNPMIntervalFECCorrectedErr  Counter64,
        optIfOTNPMIntervalFECUncorrectedWords Counter64,
        optIfOTNPMIntervalMinFECBERMantissa Unsigned32,
        optIfOTNPMIntervalMinFECBERExponent Unsigned32,
        optIfOTNPMIntervalMaxFECBERMantissa Unsigned32,
        optIfOTNPMIntervalMaxFECBERExponent Unsigned32,

```

```
    optIfOTNPMIntervalAvgFECBERMantissa      Unsigned32,
    optIfOTNPMIntervalAvgFECBERExponent     Unsigned32,
    optIfOTNPMFECIntervalTimeStamp          DateAndTime
}
```

```
optIfOTNPMFECIntervalType      OBJECT-TYPE
    SYNTAX  OptIfOTNType
    MAX-ACCESS  not-accessible
    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  not-accessible
    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  Counter64
    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 Counter64
    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 minimum 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 minimum 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 maximum 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 maximum 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}

optIfOTNPMFECIntervalTimeStamp    OBJECT-TYPE
    SYNTAX      DateAndTime
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Time stamp of this interval."
    ::= { optIfOTNPMFECIntervalEntry  12 }

--
-- 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 OptIfOTNType,
 optIfOTNPMFECCurrentDaySuspectedFlag TruthValue,
 optIfOTNPMCurrentDayFECCorrectedErr Counter64,
 optIfOTNPMCurrentDayFECUncorrectedWords Counter64,
 optIfOTNPMCurrentDayMinFECBERMantissa Unsigned32,
 optIfOTNPMCurrentDayMinFECBERExponent Unsigned32,
 optIfOTNPMCurrentDayMaxFECBERMantissa Unsigned32,
 optIfOTNPMCurrentDayMaxFECBERExponent Unsigned32,
 optIfOTNPMCurrentDayAvgFECBERMantissa Unsigned32,
 optIfOTNPMCurrentDayAvgFECBERExponent Unsigned32,
 optIfOTNPMFECCurrentDayElapsedTime Unsigned32
 }

optIfOTNPMFECCurrentDayType OBJECT-TYPE
 SYNTAX OptIfOTNType
 MAX-ACCESS not-accessible
 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 Counter64
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 Counter64
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 minimum 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 minimum 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 maximum 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 maximum 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 }

optIfOTNPMFECCurrentDayElapsedTime OBJECT-TYPE

SYNTAX Unsigned32

UNITS "seconds"

```

MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "Time elapsed for current day."
 ::= { optIfOTNPMFECCurrentDayEntry 11}

--
-- 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 OptIfOTNType,
        optIfOTNPMFECPrevDaySuspectedFlag TruthValue,
        optIfOTNPMPrevDayFECCorrectedErr Counter64,
        optIfOTNPMPrevDayFECUncorrectedWords Counter64,
        optIfOTNPMPrevDayMinFECBERMantissa Unsigned32,
        optIfOTNPMPrevDayMinFECBERExponent Unsigned32,
        optIfOTNPMPrevDayMaxFECBERMantissa Unsigned32,
        optIfOTNPMPrevDayMaxFECBERExponent Unsigned32,
        optIfOTNPMPrevDayAvgFECBERMantissa Unsigned32,
        optIfOTNPMPrevDayAvgFECBERExponent Unsigned32,
        optIfOTNPMFECPrevDayTimeStamp DateAndTime
    }

```

optIfOTNPMFECPrevDayType OBJECT-TYPE
SYNTAX OptIfOTNType
MAX-ACCESS not-accessible
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

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STATUS current
DESCRIPTION
 "If true, the data in this entry may be unreliable."
 ::= { optIfOTNPMFECPrevDayEntry 2 }

optIfOTNPMPrevDayFECCorrectedErr OBJECT-TYPE
SYNTAX Counter64
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 Counter64
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 maximum 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 minimum 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

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 "The maximum 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 maximum 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}

optIfOTNMPPrevDayAvgFECBERExponent 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}

optIfOTNPMFECPrevDayTimeStamp OBJECT-TYPE
SYNTAX DateAndTime
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "Time stamp for the Prev day."
 ::= { optIfOTNPMFECPrevDayEntry 11}

```

--

```

-- OTN OTUk Alarm Table
--
optIfOTNOChOTUkAlarmTable OBJECT-TYPE
SYNTAX SEQUENCE OF OptIfOTNOChOTUkAlarmEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
    "A table of OCh/OTUk alarm entries."

 ::= { optIfOTNAlarm 1 }

```

```

optIfOTNOChOTUkAlarmEntry OBJECT-TYPE
    SYNTAX      OptIfOTNOChOTUkAlarmEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A conceptual entry in the OCh/OTUk alarm table."
    INDEX { ifIndex }
    ::= { optIfOTNOChOTUkAlarmTable 1 }

OptIfOTNOChOTUkAlarmEntry ::= SEQUENCE {
    optIfOTNOChOTUkAlarmLocation          OptIfOTNType,
    optIfOTNOChOTUkAlarmDirection        OptIfDirectionality,
    optIfOTNOChOTUkAlarmLayer            OptIfOTNLayer,
    optIfOTNOChOTUkAlarmType              OptIfOTNOChAlarms,
    optIfOTNOChOTUkAlarmSeverity         OptIfOTNAlarmSeverity,
    optIfOTNOChOTUkAlarmDate              DateAndTime
}

optIfOTNOChOTUkAlarmLocation OBJECT-TYPE
    SYNTAX      OptIfOTNType
    MAX-ACCESS  accessible-for-notify
    STATUS      current
    DESCRIPTION
        "The object identifies indicates if this entry was for
        Near end/Far end."
    ::= { optIfOTNOChOTUkAlarmEntry 1 }

optIfOTNOChOTUkAlarmDirection OBJECT-TYPE
    SYNTAX      OptIfDirectionality
    MAX-ACCESS  accessible-for-notify
    STATUS      current
    DESCRIPTION
        "The object identifies indicates if this entry was for
        for the Tx/Rx or both."
    ::= { optIfOTNOChOTUkAlarmEntry 2 }

optIfOTNOChOTUkAlarmLayer OBJECT-TYPE

```

```

SYNTAX      OptIfOTNLayer
MAX-ACCESS  accessible-for-notify
STATUS      current
DESCRIPTION

```

```

        "This specifies which sublayer this alarm is for."
 ::= { optIfOTNOChOTUkAlarmEntry 3 }

optIfOTNOChOTUkAlarmType OBJECT-TYPE
    SYNTAX      OptIfOTNOChAlarms
    MAX-ACCESS  accessible-for-notify
    STATUS      current
    DESCRIPTION
        "This specifies the type of alarm of the sublayer
         'optIfOTNAlarmLayer' ."
 ::= { optIfOTNOChOTUkAlarmEntry 4 }

optIfOTNOChOTUkAlarmSeverity OBJECT-TYPE
    SYNTAX      OptIfOTNAlarmSeverity
    MAX-ACCESS  accessible-for-notify
    STATUS      current
    DESCRIPTION
        "The object identifies the severity of the last alarm/alert
         that most recently was set or cleared."
 ::= { optIfOTNOChOTUkAlarmEntry 5 }

optIfOTNOChOTUkAlarmDate OBJECT-TYPE
    SYNTAX      DateAndTime
    MAX-ACCESS  accessible-for-notify
    STATUS      current
    DESCRIPTION
        "This specifies the date and time when this alarm occurred."
 ::= { optIfOTNOChOTUkAlarmEntry 6 }

--
-- OTN ODUkTcm Alarm Table
--
optIfOTNODUkTcmAlarmTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF OptIfOTNODUkTcmAlarmEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A table of ODUk/Tcm alarm entries."

 ::= { optIfOTNAlarm 2 }

optIfOTNODUkTcmAlarmEntry OBJECT-TYPE
    SYNTAX      OptIfOTNODUkTcmAlarmEntry
    MAX-ACCESS  not-accessible

```

```
STATUS      current
DESCRIPTION
    "A conceptual entry in the ODUk/Tcm alarm table."
INDEX { ifIndex }
 ::= { optIfOTNODUKTcmAlarmTable 1 }

OptIfOTNODUKTcmAlarmEntry ::= SEQUENCE {
    optIfOTNODUKTcmAlarmLocation      OptIfOTNType,
    optIfOTNODUKTcmAlarmDirection    OptIfDirectionality,
    optIfOTNODUKTcmAlarmLayer        OptIfOTNLayer,
    optIfOTNODUKTcmAlarmTCMLevel     Unsigned32,
    optIfOTNODUKTcmAlarmType         OptIfOTNODUKTcmAlarms,
    optIfOTNODUKTcmAlarmSeverity     OptIfOTNAlarmSeverity,
    optIfOTNODUKTcmAlarmDate        DateAndTime
}

optIfOTNODUKTcmAlarmLocation OBJECT-TYPE
SYNTAX      OptIfOTNType
MAX-ACCESS  accessible-for-notify
STATUS      current
DESCRIPTION
    "The object identifies indicates if this entry was for
    Near end/Far end."
 ::= { optIfOTNODUKTcmAlarmEntry 1 }

optIfOTNODUKTcmAlarmDirection OBJECT-TYPE
SYNTAX      OptIfDirectionality
MAX-ACCESS  accessible-for-notify
STATUS      current
DESCRIPTION
    "The object identifies indicates if this entry was for
    for the Tx/Rx or both."
 ::= { optIfOTNODUKTcmAlarmEntry 2 }

optIfOTNODUKTcmAlarmLayer OBJECT-TYPE
SYNTAX      OptIfOTNLayer
MAX-ACCESS  accessible-for-notify
STATUS      current
DESCRIPTION
    "This specifies which sublayer this alarm is for ODUk/TCM."
 ::= { optIfOTNODUKTcmAlarmEntry 3 }

optIfOTNODUKTcmAlarmTCMLevel  OBJECT-TYPE
SYNTAX      Unsigned32
MAX-ACCESS  accessible-for-notify
STATUS      current
DESCRIPTION
```

"TCM level 1-6 of the alarm. It will be 0 if alarm sublayer

```
        is ODUk."
 ::= { optIfOTNODUkTcmAlarmEntry 4 }

optIfOTNODUkTcmAlarmType OBJECT-TYPE
SYNTAX      OptIfOTNODUkTcmAlarms
MAX-ACCESS  accessible-for-notify
STATUS      current
DESCRIPTION
    "This specifies the type of alarm 'optIfOTNODUkTcmAlarms'
    of the sublayer ."
 ::= { optIfOTNODUkTcmAlarmEntry 5 }

optIfOTNODUkTcmAlarmSeverity OBJECT-TYPE
SYNTAX      OptIfOTNAlarmSeverity
MAX-ACCESS  accessible-for-notify
STATUS      current
DESCRIPTION
    "The object identifies the severity of the last alarm/alert
    that most recently was set or cleared."
 ::= { optIfOTNODUkTcmAlarmEntry 6 }

optIfOTNODUkTcmAlarmDate OBJECT-TYPE
SYNTAX      DateAndTime
MAX-ACCESS  accessible-for-notify
STATUS      current
DESCRIPTION
    "This specifies the date and time when this alarm occurred."
 ::= { optIfOTNODUkTcmAlarmEntry 7 }

--
-- OTN Notifications
--

optIfOTNOChOTUkAlarmSet NOTIFICATION-TYPE
OBJECTS { optIfOTNOChOTUkAlarmLocation,
          optIfOTNOChOTUkAlarmDirection,
          optIfOTNOChOTUkAlarmLayer,
          optIfOTNOChOTUkAlarmType,
          optIfOTNOChOTUkAlarmSeverity,
```

```
        optIfOTNOChOTUkAlarmDate }
STATUS current
DESCRIPTION
    "Notification of a recently set OTN alarm of OCh/OTUk Layer."
 ::= { optIfOTNNotifications 1 }
```

```
optIfOTNOChOTUkAlarmClear NOTIFICATION-TYPE
OBJECTS { optIfOTNOChOTUkAlarmLocation,
```

```
        optIfOTNOChOTUkAlarmDirection,
        optIfOTNOChOTUkAlarmLayer,
        optIfOTNOChOTUkAlarmType,
        optIfOTNOChOTUkAlarmSeverity,
        optIfOTNOChOTUkAlarmDate }
STATUS current
DESCRIPTION
    "Notification of a recently clear OTN alarm of OCh/OTUk
    Layer. "
 ::= { optIfOTNNotifications 2 }
```

```
optIfOTNODUkTcmAlarmSet NOTIFICATION-TYPE
OBJECTS { optIfOTNODUkTcmAlarmLocation,
        optIfOTNODUkTcmAlarmDirection,
        optIfOTNODUkTcmAlarmLayer,
        optIfOTNODUkTcmAlarmTCMLevel,
        optIfOTNODUkTcmAlarmType,
        optIfOTNODUkTcmAlarmSeverity,
        optIfOTNODUkTcmAlarmDate }
STATUS current
DESCRIPTION
    "Notification of a recently set OTN alarm of OTUk/Tcm
    Layer. "
 ::= { optIfOTNNotifications 3 }
```

```
optIfOTNODUkTcmAlarmClear NOTIFICATION-TYPE
OBJECTS { optIfOTNODUkTcmAlarmLocation,
        optIfOTNODUkTcmAlarmDirection,
        optIfOTNODUkTcmAlarmLayer,
        optIfOTNODUkTcmAlarmTCMLevel,
        optIfOTNODUkTcmAlarmType,
        optIfOTNODUkTcmAlarmSeverity,
        optIfOTNODUkTcmAlarmDate }
```

```
STATUS current
DESCRIPTION
    "Notification of a recently cleared OTN alarm of OTUk/Tcm
    Layer. "
 ::= { optIfOTNNotifications 4 }

END
```

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[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:

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.

11. Contributors

Arnold Mattheus
Deutsche Telekom
Darmstadt
Germany
email a.mattheus@telekom.de

Manuel Paul

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Deutsche Telekom
Berlin
Germany
email Manuel.Paul@telekom.de

Frank Luennemann
Deutsche Telekom
Munster
Germany
email Frank.Luennemann@telekom.de

Scott Mansfield

Ericsson Inc.
email scott.mansfield@ericsson.com

Najam Saquib
Cisco
Ludwig-Erhard-Strasse 3
ESCHBORN, HESSEN 65760
GERMANY
email nasaquib@cisco.com

Walid Wakim
Cisco
9501 Technology Blvd
ROSEMONT, ILLINOIS 60018
UNITED STATES
email wwakim@cisco.com

Ori Gerstel
Cisco
32 HaMelacha St., (HaSharon Bldg)
SOUTH NETANYA, HAMERKAZ 42504
ISRAEL
email ogerstel@cisco.com

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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.

Authors' Addresses

Gabriele Galimberti (editor)
Cisco
Via Philips,12
20052 - Monza
Italy

Phone: +390392091462
Email: ggalimbe@cisco.com

Ruediger Kunze (editor)
Deutsche Telekom
Dddd, xx
Berlin
Germany

Phone: +49xxxxxxxxxxx
Email: RKunze@telekom.de

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Hing-Kam Lam (editor)
Alcatel-Lucent
600-700 Mountain Avenue, Murray Hill
New Jersey, 07974
USA

Phone: +17323313476
Email: kam.lam@alcatel-lucent.com

Dharini Hiremagalur (editor)
Juniper
1194 N Mathilda Avenue
Sunnyvale - 94089 California
USA

Phone: +1408
Email: dharinih@juniper.net

