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An SNMP MIB extension to [RFC3591](#) to manage optical interface parameters
of DWDM applications

[draft-galikunze-ccamp-opt-imp-snmp-mib-00](#)

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-galikunze-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 G.874.1 [[ITU.G874.1](#)].

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

This draft refers and supports also the [draft-kunze-q-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](#)].

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

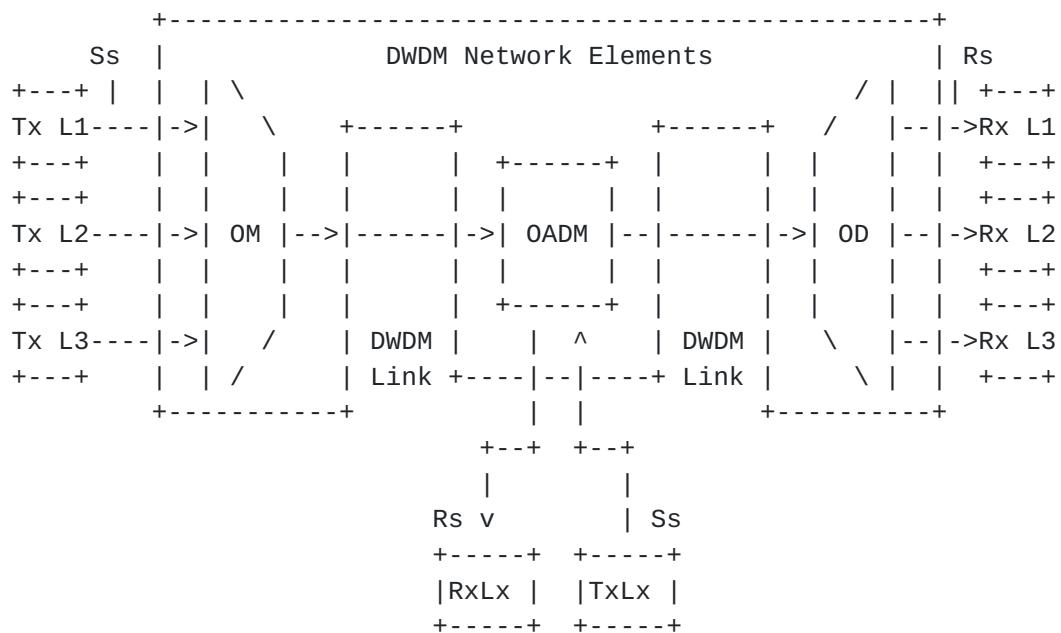
3. Conventions

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

4. Overview

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

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



Ss = reference point at the DWDM network element tributary output

Rs = reference point at the DWDM network element tributary input

Lx = Lambda x

OM = Optical Mux

OD = Optical Demux

OADM = Optical Add Drop Mux

from Fig. 5.1/G.698.2

Figure 1: Linear Black Link

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

[4.1. Optical Parameters Description](#)

The black links are managed at the edges, i.e. at the transmitters (Tx) and receivers (Rx) attached to the S and R reference points respectively. The parameters that could be managed at the black link edges are specified in G.698.2 [[ITU.G698.2](#)] for the optical interface, in G.798 [[ITU.G798](#)] for the equipment aspect, and in G.7710/Y.1701 [[ITU.G7710](#)] and G.874 [[ITU.G874](#)] for fault management and performance monitoring.

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

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

[4.1.1. General](#)

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

Minimum channel spacing:

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

Bit rate/line coding of optical tributary signals:

Optical tributary signal class NRZ 2.5G (from nominally 622 Mbit/s to nominally 2.67 Gbit/s) or NRZ 10G nominally 2.4 Gbit/s to nominally 10.71 Gbit/s. (nominally 2.4 Gbit/s to nominally 10.71 Gbit/s). 40Gbit/s and 100Gbit/s are under study (G, S).

FEC Coding:

This parameter indicate what Forward Error Correction (FEC) code is used at Ss and Rs (G, S) (not mentioned in G.698). EDITOR NOTE: Need to check whether this parameter is to be put in "vendor specific" parameter or can be a standard 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) see 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 Dispersion (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.	G, S	G.698.2 S.7.1.2
signals		
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.	G	G.698.2 S.7.2.7
OSNR penalty		
MAX side mode suppression ratio,	G	G.698.2 S.7.2.6
min channel extinction ratio, Eye mask		
Current Laser Output power	G,S	N.A.

Table 2: parameters at Ss

[4.1.3. Optical path from point Ss to Rs](#)

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

Maximum and minimum (residual) chromatic dispersion:

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

Minimum optical return loss at Ss:

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

Maximum discrete reflectance between Ss and Rs:

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

Maximum differential group delay:

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

Maximum polarization dependent loss:

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

Maximum inter-channel crosstalk:

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

Maximum interferometric crosstalk:

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

Maximum optical path OSNR penalty:

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

Maximum ripple:

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

PARAMETERS	Get/Set	Reference

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

Table 3: parameters 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)

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 SESSs.(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 Errrored bits at receiving side before the FEC function counted over one second (G)

OTN Valid Intervals :

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

FEC Valid Intervals :

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

4.1.7. Generic Parameter description

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

Interface Admin Status :

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

Interface Operational Status :

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

4.2. Use of ifTable

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

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

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

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

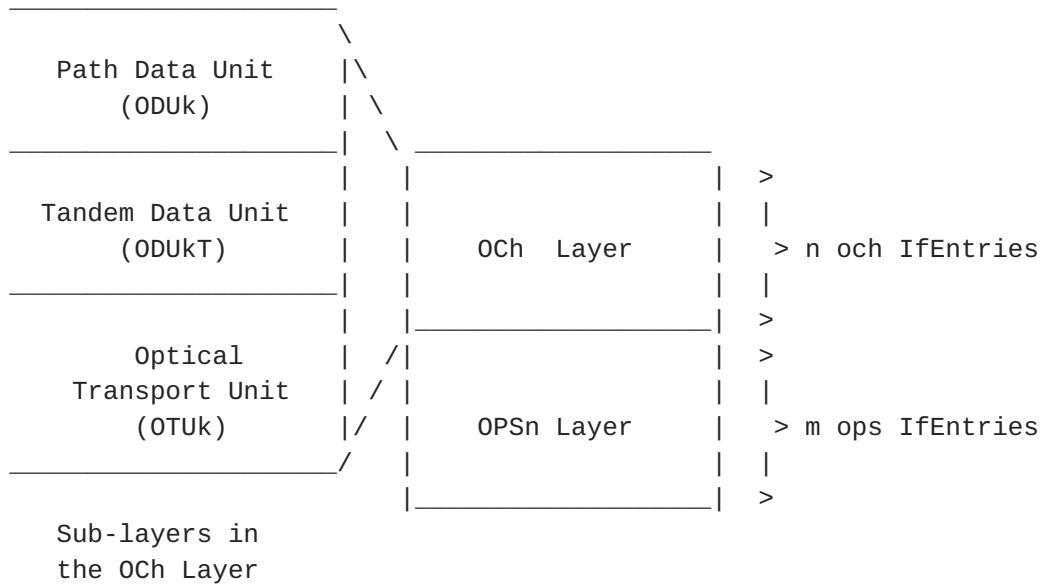


Figure 2: OTN Layers for OPS and OCh

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

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

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

When separate ifTable entries are used for the source and sink functions of a given physical interface, association between the two uni-directional ifTable entries (one for the source function and the other for the sink functions) should be provided. It is recommended

that identical ifName values are used for the two ifTable entries to indicate such association. An implementation shall explicitly state what mechanism is used to indicate the association, if ifName is not used.

4.2.1. Use of ifTable for OPS Layer

Only the ifGeneralInformationGroup needs to be supported.

ifTable Object Use for OTN OPS Layer

ifIndex The interface index.

ifDescr Optical Transport Network (OTN) Optical Physical Section (OPS)

ifType opticalPhysicalSection (xxx)

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

ifSpeed Actual bandwidth of the interface in bits per second. If the bandwidth of the interface is greater than the maximum value of 4,294,967,295, then the maximum value is reported and ifHighSpeed must be used to report the interface's speed.

ifPhysAddress An octet string with zero length. (There is no specific address associated with the interface.)

ifAdminStatus The desired administrative state of the interface. Supports read-only access.

ifOperStatus The operational state of the interface. The value lowerLayerDown(7) is not used, since there is no lower layer interface. This object is set to notPresent(6) if a component is missing, otherwise it is set to down(2) if either of the objects optIfOPSNCurrentStatus indicates that any defect is present.

ifLastChange The value of sysUpTime at the last change in ifOperStatus.

ifName Enterprise-specific convention (e.g., TL-1 AID)

to identify the physical or data entity associated with this interface or an OCTET STRING of zero length. The enterprise-specific convention is intended to provide the means to reference one or more enterprise-specific tables.

ifLinkUpDownTrapEnable Default value is enabled(1). Supports read-only access.

ifHighSpeed Actual bandwidth of the interface in Mega-bits per second. A value of n represents a range of 'n-0.5' to 'n+0.499999'.

ifConnectorPresent Set to true(1).

ifAlias The (non-volatile) alias name for this interface as assigned by the network manager.

4.2.2. Use of ifTable for OCh Layer

Use of ifTable for OCh Layer See [RFC 3591 \[RFC3591\] section 2.4](#)

4.2.3. Use of ifStackTable

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

Figure 3

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
```



```
    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 capabititues as described in G.698,
alarm and PM's."
::={ optIfMibModule 3 }
```


OptIfChannelSpacing ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"Channel spacing

1 - 100 Ghz
2 - 50GHz
3 - 25GHz
4 - 12.5GHz
5 - 6.25Ghz

"

SYNTAX INTEGER {

spacing100Ghz(1),
spacing50Ghz(2),
spacing25Ghz(3),
spacing12point5Ghz(4),
spacing6point25Ghz(5)

}

OptIfBitRateLineCoding ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"Optical tributary signal class

1 - NRZ 2.5G from nominally 622 Mbit/s to nominal 2.67 Gbit/s)
2 - NRZ 10G nominally 2.4 Gbit/s to nominally 10.71 Gbit/s.
3 - 40Gbits/s
4 - 100Gbits/s
5 - 400Gbits/s

40Gbits/s and above are under study. "

SYNTAX INTEGER {

rate2point5G(1),
rate10G(2),
rate40G(3),
rate100G(4),
rate400G(5)

}

OptIfFiberTypeRecommendation ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

" Fiber Types - ITU-T Recs G.652, G.653, G.654 and G.655

One for recommendation and one for category.

G.652 A, B, C, D
G.653 A, B
G.654 A, B, C
G.655 C, D, E
G.656
G.657 A, B


```
""
SYNTAX  INTEGER {
    g652(1),
    g653(2),
    g654(3),
    g655(4),
    g656(5),
    g657(6)
}

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

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
--
OptIfOTNOChAlarms ::= TEXTUAL-CONVENTION
STATUS current
```


DESCRIPTION

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

SYNTAX INTEGER {

- OTN Loss of signal alarm
optIfOtnLosAlarm(1),
- OTN Loss of Frame alarm
optIfOtnLofAlarm(2),
- OTN Loss of Multi Frame alarm
optIfOtnLomAlarm(3),
- OTN Server Signal Failure alarm
optIfOtnOtuSsfAlarm(4),
- OTN OTU Backward Defect Indicator alarm
optIfOtnOtuBdiAlarm(5),
- OTN OTU Trail Trace Identifier Mismatch alarm
optIfOtnOtuTimAlarm(6),
- OTN OTU Degraded alarm,
optIfOtnOtuDegAlarm(7),
- OTN OTU Fec Excessive Errors alarm
optIfOptIfOtnOtuFecExcessiveErrsAlarm(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
optIfOTNODukTcmOciAlarm(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 }
optIfOTNPMPGroup 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 {
    optIfOChMiminumChannelSpacing          OptIfChannelSpacing,
    optIfOChBitRateLineCoding               OptIfBitRateLineCoding,
    optIfOchFEC                           Unsigned32,
    optIfOChSinkMaximumBERMantissa        Unsigned32,
    optIfOChSinkMaximumBERExponent        Unsigned32,
    optIfOchMinWavelength                 Unsigned32,
    optIfOchMaxWavelength                 Unsigned32
}

optIfOChMiminumChannelSpacing 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 }

-- Transceiver (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."

::= { optIfOChSrcXcvrEntry 1}

optIfOChMaximumMeanChannelOutputPower 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."

::= { optIfOChSrcXcvrEntry 2}

optIfOChMinimumCentralFrequency 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 "

::= { optIfOChSrcXcvrEntry 3}

optIfOChMaximumCentralFrequency 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 "

::= { optIfOChSrcXcvrEntry 4}

optIfOChMaximumSpectralExcursion OBJECT-TYPE

SYNTAX Unsigned32

UNITS "0.1 GHz"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This is the maximum acceptable difference between the


```
nominal central frequency (in GHz) of the channel and the
minus 15 dB points of the transmitter spectrum furthest
from the nominal central frequency measured at point Ss."
 ::= { 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,
        optIfOChSrcSinkMaximumChromaticDispersion
                            Integer32,
        optIfOChSrcSinkMinimumSrcOpticalReturnLoss
                            Integer32,
        optIfOChSrcSinkMaximumDiscreteReflectanceSrcToSink
```



```
                                Integer32,
optIfOChSrcSinkMaximumDifferentialGroupDelay
                                Integer32,
optIfOChSrcSinkMaximumPolarisationDependentLoss
                                Integer32,
optIfOChSrcSinkMaximumInterChannelCrosstalk
                                Integer32,
optIfOChSrcSinkInterFerometricCrosstalk
                                Integer32,
optIfOChSrcSinkOpticalPathOSNRPenalty
                                Integer32
}

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

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

optIfOChSrcSinkMinimumSrcOpticalReturnLoss    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 {
    optIfOChSinkMinimumMeanInputPower           Integer32,
    optIfOChSinkMaximumMeanInputPower           Integer32,
    optIfOChSinkMinimumOSNR                     Integer32,
    optIfOChSinkOSNRTolerance                  Integer32
}

optIfOChSinkMinimumMeanInputPower 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}

optIfOChSinkMaximumMeanInputPower 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 etxension to the performance monitoring information for the current 15-minute interval."
 ::= { optIfOTNPMGroup 1 }

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

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

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


```
 ::= { optIfOChSinkCurrentExtEntry 1}

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

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

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

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

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

OptIfOTNPMConfigEntry ::=

SEQUENCE {
```



```

optIfOTNPMConfigType          OptIfOTNType,
optIfOTNPMConfigLayer         OptIfOTNLayer,
optIfOTNPMConfigTCMLevel     Unsigned32,
optIfOTNPMESRInterval        Unsigned32,
optIfOTNPMSESRInterval       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}

optIfOTNPMSERInterval 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 }

optIfOTNPM15MinSESSsThreshold  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
```


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 }

optIfOTNPM24HourSESsThreshold 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 optIf24HourThreshSEStCA. 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


```

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, optIfOTNPMCurrentTCMLevel }
 ::= { optIfOTNPMCurrentTable 1 }

OptIfOTNPMCurrentEntry ::=
  SEQUENCE {
    optIfOTNPMCurrentType          OptIfTNType,
    optIfOTNPMCurrentLayer         OptIfTNLayer,
    optIfOTNPMCurrentTCMLevel     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 =
      1x10Eminus3 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, optIfOTNPMIntervalTCMLevel,
            optIfOTNPMIntervalNumber }
  ::= { optIfOTNPMIntervalTable 1 }

OptIfOTNPMIntervalEntry ::=

SEQUENCE {
  optIfOTNPMIntervalType          OptIfOTNType,
  optIfOTNPMIntervalLayer         OptIfOTNLayer,
  optIfOTNPMIntervalTCMLevel     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

```



```
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
```



```
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}

optIfOTNPMIntervalESs    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}
```

```
optIfOTNPMCurrentDaySESS   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."
::= { optIfOTNPMCurrentDayEntry 7}
```

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

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

```
optIfOTNPMCurrentDayESR    OBJECT-TYPE
```



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

optIfOTNPMCurrentDaySESR   OBJECT-TYPE
SYNTAX Unsigned32
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
-- 
optIfOTNPMPrevDayTable OBJECT-TYPE
```



```

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

optIfOTNPMPrevDayEntry OBJECT-TYPE
  SYNTAX      OptIfOTNPMPrevDayEntry
  MAX-ACCESS  not-accessible
  STATUS     current
  DESCRIPTION
    "A conceptual entry in the Near end or Far End performance
     monitoring previous day table for the type
     'optIfOTNPMPrevDayLayer' layer."
  INDEX   { ifIndex, optIfOTNPMPrevDayType      ,
            optIfOTNPMPrevDayLayer, optIfOTNPMPrevDayTCMLevel  }
 ::= { optIfOTNPMPrevDayTable 1 }

OptIfOTNPMPrevDayEntry ::=

SEQUENCE {
  optIfOTNPMPrevDayType          OptIfOTNType,
  optIfOTNPMPrevDayLayer         OptIfOTNLayer,
  optIfOTNPMPrevDayTCMLevel     Unsigned32,
  optIfOTNPMPrevDaySuspectedFlag TruthValue,
  optIfOTNPMPrevDayBip8          Unsigned32,
  optIfOTNPMPrevDayESs           Unsigned32,
  optIfOTNPMPrevDaySESS          Unsigned32,
  optIfOTNPMPrevDayUASs          Unsigned32,
  optIfOTNPMPrevDayBBEs          Unsigned32,
  optIfOTNPMPrevDayESR           Unsigned32,
  optIfOTNPMPrevDaySESR          Unsigned32,
  optIfOTNPMPrevDayBBER          Unsigned32,
  optIfOTNPMPrevDayBIP8          Unsigned32,
  optIfOTNPMPrevDayTimeStamp     DateAndTime
}

optIfOTNPMPrevDayType      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 "
 ::= { optIfOTNPMPrevDayEntry  1}

```



```
optIfOTNPMPrevDayLayer    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."
  ::= { optIfOTNPMPrevDayEntry  2}

optIfOTNPMPrevDayTCMLevel   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."
  ::= { optIfOTNPMPrevDayEntry  3}

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

optIfOTNPMPrevDayBip8    OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "Number of pre FEC failures occurred in an observation
     period."
  ::= { optIfOTNPMPrevDayEntry  5}

optIfOTNPMPrevDayESs    OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "The number of seconds which have an error.
```


It is a one-second period in which one or more bits are in error or during which Loss of Signal (LOS) or Alarm Indication Signal(AIS) is detected."
 ::= { optIfOTNPMPrevDayEntry 6}

optIfOTNPMPrevDaySESSs 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 = 1x10Eminus3 or during which Loss of
 Signal (LOS) or Alarm Indication Signal (AIS) is detected."
 ::= { optIfOTNPMPrevDayEntry 7}

optIfOTNPMPrevDayUASSs 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 OptIfTNTType,
optIfOTNPMFECValidIntervals Unsigned32,
optIfOTNPM15MinFECUnCorrectedWordsThreshold Unsigned32,
optIfOTNPM15MinPreFECBERMantissaThreshold Unsigned32,
optIfOTNPM15MinPreFECBERExponentThreshold Unsigned32
}

optIfOTNPMFECConfigType OBJECT-TYPE
SYNTAX OptIfTNTType
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."
    ::= {optIfOTNPMFECCConfigEntry 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."
    ::= {optIfOTNPMFECCConfigEntry 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          OptIfOTNTType,
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  OptIfOTNTType
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

```



```
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}

optIfOTNPMCurrentFECKMinBERMantissa    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}

optIfOTNPMCurrentFECKMinBERExponent    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}

optIfOTNPMCurrentFECKMaxBERMantissa    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 Errorred 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 Errorred 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 Errorred bits at receiving side before
     the FEC function counted over one second .. exponent."
  ::= { optIfOTNPMFECCurrentEntry 12}

optIfOTNPMCurrentFECElapsed Time 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 minimun bit error rate at receiving side before the FEC
         function counted over one second .. mantissa. This is the
         minimum Pre FEC BER in the current 24hour period."
    ::= { optIfOTNPMFECIntervalEntry  6}

optIfOTNPMIntervalMinFECBERExponent    OBJECT-TYPE
    SYNTAX  Unsigned32
    MAX-ACCESS  read-only
    STATUS  current
    DESCRIPTION
        "The minimun bit error rate at receiving side before the FEC
         function counted over one second .. exponent. This is the
         minimum Pre FEC BER in the current 24hour period."
    ::= { optIfOTNPMFECIntervalEntry  7}

optIfOTNPMIntervalMaxFECBERMantissa    OBJECT-TYPE
    SYNTAX  Unsigned32
```



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

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

optIfOTNPMCurrentDayAvgFECBERMantissa OBJECT-TYPE
SYNTAX Unsigned32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The average bit error rate at receiving side before the FEC
function counted over one second .. mantissa. This is the
average PreFEC BER in the current 24hour period."
 ::= { optIfOTNPMFECCurrentDayEntry 9}

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

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

```



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

optIfOTNPMPPrevDayFECCorrectedErr  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}

optIfOTNPMPPrevDayFECUncorrectedWords  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}

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

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

optIfOTNPMPPrevDayMaxFECBERMantissa  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 (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}

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

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          OptIfOTNTType,
    optIfOTNOChOTUkAlarmDirection         OptIfDirectionality,
    optIfOTNOChOTUkAlarmLayer             OptIfOTNLayer,
    optIfOTNOChOTUkAlarmType              OptIfOTNOChAlarms,
    optIfOTNOChOTUkAlarmSeverity         OptIfOTNALarmSeverity,
    optIfOTNOChOTUkAlarmDate              DateAndTime
}
}

optIfOTNOChOTUkAlarmLocation OBJECT-TYPE
    SYNTAX      OptIfOTNTType
    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 'optIfOTNDUkTcmAlarms'
         of the sublayer ."
 ::= { optIfOTNODUkTcmAlarmEntry 5 }

optIfOTNODUkTcmAlarmSeverity OBJECT-TYPE
    SYNTAX      OptIfTNAlarmSeverity
    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."
 ::= { optIfOTNNNotifications 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
```


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.

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Appendix A. Change Log

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

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

Appendix B. Open Issues

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

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