DOCSIS® Provisioning of GPON Specifications DPoGv1.0

DPoG Operations Support System Interface Specification

DPoG-SP-OSSIv1.0-C01-160830

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Work in Progress	An incomplete document, designed to guide discussion and generate feedback that may include several alternative requirements for consideration.
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1 INTRODUCTION

DOCSIS Provisioning of GPON (DPoG) version 1.0 specifications are a joint effort of Cable Television Laboratories (CableLabs), cable operators, vendors, and suppliers to support GPON technology using existing DOCSIS-based back office systems and processes. Gigabit-capable Passive Optical Networks (GPON) as defined in the ITU-T G.984 series defines a standard for the use of passive optical networks for delivery several different bit rates. This architecture is based only on the 2.488 Gigabits per second (Gb/s) of downstream bandwidth, and 1.244 Gb/s of upstream bandwidth. Further, GPON Encapsulation Method (GEM) is required for all user traffic.

Similarly, 10-Gigabit-capable Passive Optical Networks (XG-PON) defines a standard for the use of PON to deliver 9.95328 Gb/s downstream and 2.48832 Gb/s upstream, as per ITU-T G.987. XG-PON encapsulation method (XGEM) is the data frame transport scheme required for all user traffic.

This document will not provide a primer on GPON, XG-PON or the associated ITU standards. It is expected that the reader will refer to those documents as needed.

DPoG specifications are focused on DOCSIS-based provisioning and operations of Internet Protocol (IP) using DOCSIS Internet service (which is typically referred to as High Speed Data (HSD)), or IP(HSD) for short, and Metro Ethernet services as described by Metro Ethernet Forum (MEF) standards. DPoG Networks offer IP(HSD) services, functionally equivalent to DOCSIS networks, where the DPoG System acts like a DOCSIS CMTS and the DPoG System and DPoG Optical Network Unit (D-ONU) together act like a DOCSIS CM.

1.1 Scope

This specification identifies requirements for the adaptation or additions to DOCSIS specifications that are required to support DPoG Networks related to the Operations Support System functional area.

This specification also:

- Provides interoperability with existing DOCSIS-based back-end provisioning and management systems for GPON-based devices;
- Specifies interoperable implementations for various DPoG vendors;
- Supports IPDR functionality for DPoG Networks, including enhancements to the existing DOCSIS 3.0 object model to instrument features and capabilities specific to DPoG Networks;
- Supports IPv4 and IPv6 for DPoG Networks, substantively the same as DOCSIS 3.0;
- Extends the object model defined in the DOCSIS 3.0 SNMP Management Information Bases (MIBs) to address new capabilities introduced by DPoG specifications.

1.2 DPoG OSSI Specification Goals

The DPoG OSSI specification is motivated by the following objectives:

- To adapt GPON based OLT to operate with the DOCSIS-based back office provisioning and operations models in order to leverage the investment in existing management systems and accelerate time to market.
- Re-use as much of the existing DOCSIS OSSI specification as possible, while providing requirements that document how existing OSSI requirements for CMTS and CM devices are mapped to the DPoG System and DPoG ONU devices.

1.3 Requirements

Throughout this document, the words that are used to define the significance of particular requirements are capitalized. These words are:

"MUST"	This word means that the item is an absolute requirement of this specification.
"MUST NOT"	This phrase means that the item is an absolute prohibition of this specification.
"SHOULD"	This word means that there may exist valid reasons in particular circumstances to ignore this item, but the full implications should be understood and the case carefully weighed before choosing a different course.
"SHOULD NOT"	This phrase means that there may exist valid reasons in particular circumstances when the listed behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.
"MAY"	This word means that this item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because it enhances the product, for example; another vendor may omit the same item.

1.4 DPoG Version 1.0 Specifications

A list of the specifications included in the DPoGv1.0 series is provided in Table 1. For further information please refer to: http://www.cablelabs.com/specs/specification-search/?cat=dpog&scat=dpog-1-0 .

Table 1 - DPoGv1.0 Series of Specifications

Designation	Title
DPoG-SP-ARCHv1.0	DPoG Architecture Specification
DPoG-SP-OAMv1.0	DPoG OAM Extensions Specification
DPoG-SP-PHYv1.0	DPoG Physical Layer Specification
DPoG-SP-SECv1.0	DPoG Security and Certificate Specification
DPoG-SP-MULPIv1.0	DPoG MAC and Upper Layer Protocols Interface Specification
DPoG-SP-OSSIv1.0	DPoG Operations and Support System Interface Specification

1.5 Reference Architecture

The DPoG reference architecture is shown in Figure 1. Refer to [DPoG-ARCH] for a discussion of this architecture. This document focuses on the requirements for DPoG system to interface towards OSS systems. It addresses the required interface options, features and the MIBs.

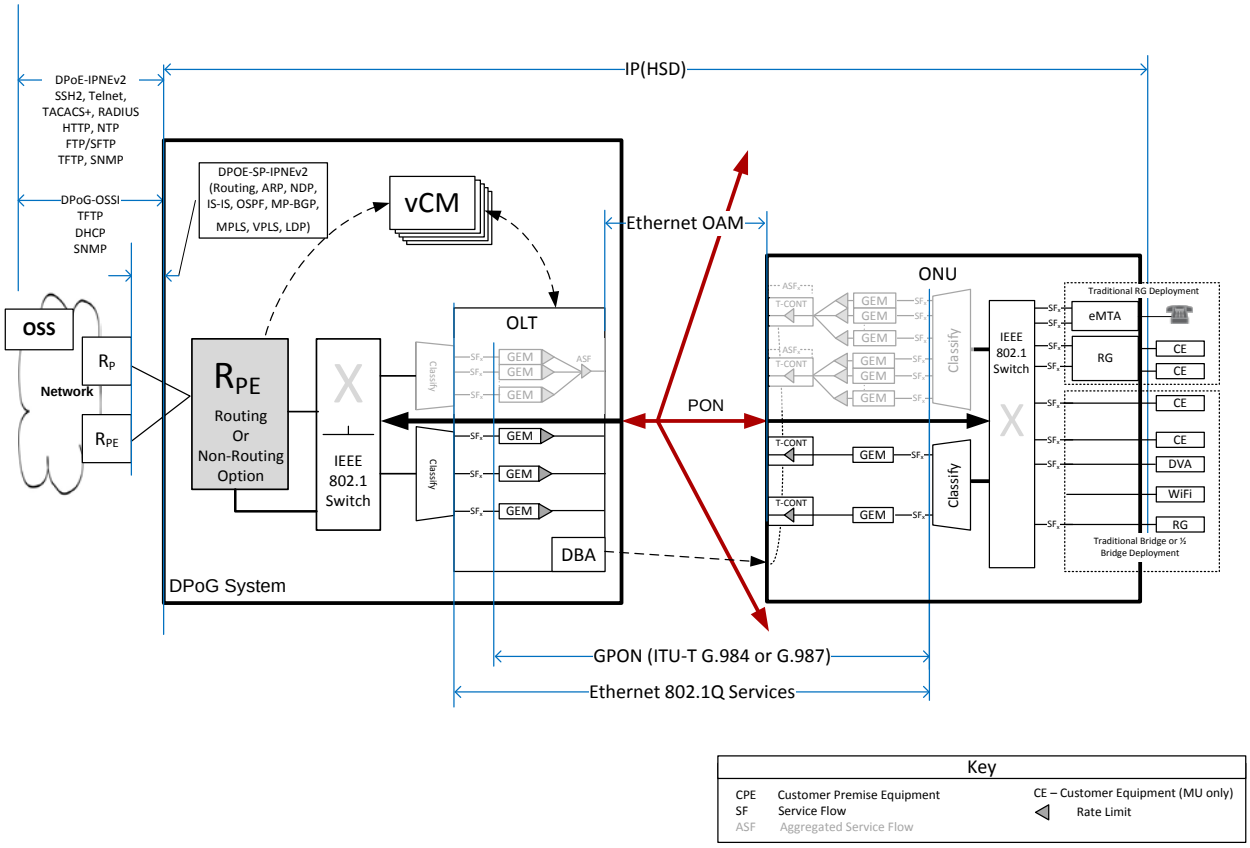

Figure 1 - DPoGv1.0 Reference Architecture

1.6 DPoG Interfaces and Reference Points

The DPoG interfaces and reference points shown in Figure 2 provide a basis for the description and enumeration of DPoG specifications for the DPoG architecture. Refer to [DPoG-ARCH] for a discussion of these interfaces and reference points.

This document focuses on the requirements for interactions to the OSS through the “D” interface point. It defines the requirements for the “D” and the required supported management interfaces.

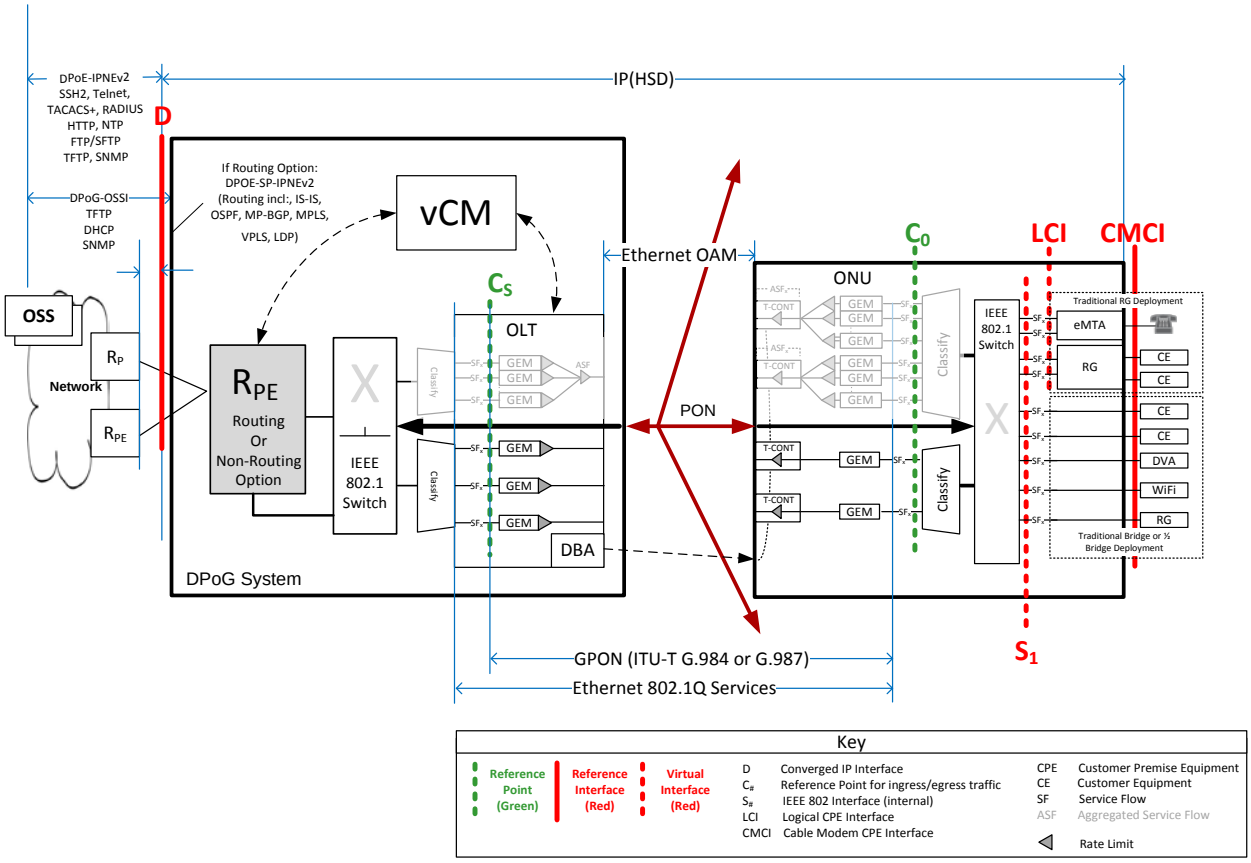

Figure 2 - DPoGv1.0 Interfaces and Reference Points

2 REFERENCES

2.1 Normative References

This specification uses the following normative references.

In order to claim compliance with this specification, it is necessary to conform to the following standards and other works as indicated, in addition to the other requirements of this specification. Notwithstanding, intellectual property rights may be required to use or implement such normative references. At the time of publication, the editions indicated were valid. All references are subject to revision, and users of this document are encouraged to investigate the possibility of applying the most recent editions of the documents listed below. References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific. For a non-specific reference, the latest version applies.

In this specification, terms "802.1ad" and "802.1ah" are used to indicate compliance with the [802.1ad] and **[**802.1ah] standards, respectively, now incorporated as part of [802.1Q]. For all intents and purposes, claiming compliance to [802.1Q], [802.1ad], or **[**802.1ah] in the scope of this specification will be treated as claiming compliance to IEEE Std. 802.1Q-2011. Unless otherwise stated, claiming compliance to 802.1Q-2005 requires a specific date reference.

[DPoG-MULPI] DOCSIS Provisioning of GPON Specifications, DPoG MAC and Upper Layer Protocols Interface Specification, DPoG-SP-MULPIv1.0, Cable Television Laboratories, Inc.

[DPoG-OAM] DOCSIS Provisioning of GPON Specifications, OAM Extensions Specification, DPoG OAM Extensions Specification, DPoG-SP-OAMv1.0, Cable Television Laboratories, Inc.

[DPoE-IPNE] DOCSIS Provisioning of EPON Specifications, DPoE IP Network Element Requirements, DPoE-SP-IPNEv2.0, Cable Television Laboratories, Inc.

[IPDR/BSR] IPDR Business Solution Requirements - Network Data Management Usage (NDM-U), Version 3.5.0.1, IPDR.org, November 2004.

[OSSIv2.0] Data-Over-Cable Service Interface Specifications, Operations Support System Interface Specification, CM-SP-OSSIv2.0, Cable Television Laboratories, Inc.

[OSSIv3.0] Data-Over-Cable Service Interface Specifications, Operations Support System Interface Specification, CM-SP-OSSIv3.0, Cable Television Laboratories, Inc.

[RFC 2579] IETF RFC 2579, Textual Conventions for SMIv2, April 1999.

[RFC 2790] IETF RFC 2790, Host Resources MIB, March 2000.

[RFC 2863] IETF RFC 2863, The Interfaces Group MIB, June 2000.

[RFC 2933] IETF RFC 2933, Internet Group Management Protocol MIB, K. McCloghrie, D. Farinacci, D. Thaler, October 2000.

[RFC 3164] IETF RFC 3164, C. Lonvick, The BSD syslog Protocol, August 2001.

[RFC 3411] IETF RFC 3411/STD0062, An Architecture for Describing Simple Network Management Protocol (SNMP) Management Frameworks, December 2002.

[RFC 3413] IETF RFC 3413/STD0062, Simple Network Management Protocol (SNMP) Applications, December 2002.

[RFC 3414] IETF RFC 3414/STD0062, User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3), December 2002.

[RFC 3415] IETF RFC 3415, View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP), December 2002.

[RFC 3416] IETF RFC 3416, Version 2 of the Protocol Operations for the Simple Network Management Protocol (SNMP), December 2002.

[RFC 3418] IETF RFC 3418, Management Information Base (MIB) for the Simple Network Management Protocol (SNMP), June 2000.

[RFC 3433] IETF RFC 3433, Entity Sensor Management Information Base, December 2002.

[RFC 3584] IETF RFC 3584, Coexistence between Version 1, Version 2, and Version 3 of the Internet-standard and Network Management Framework, March 2000.

[RFC 3635] IETF RFC 3635, Definitions of Managed Objects for the Ethernet-like Interface Types, September 2003.

[RFC 3826] IETF RFC 3826, The Advanced Encryption Standard (AES) Cipher Algorithm in the SNMP User-based Security Model, June 2004.

[RFC 4022] IETF RFC 4022, Management Information Base for the Transmission Control Protocol (TCP), March 2005.

[RFC 4113] IETF RFC 4113, Management Information Base for the User Datagram Protocol (UDP), June 2005.

[RFC 4131] IETF RFC 4131, Management Information Base for Data Over Cable Service Interface Specification (DOCSIS) Cable Modems and Cable Modem Termination Systems for Baseline Privacy, September 2005.

[RFC 4133] IETF RFC 4133, Entity MIB (Version 3), August 2005.

[RFC 4188] IETF RFC 4188, Definitions of Managed Objects for Bridges, September 2005.

[RFC 4293] IETF RFC 4293, Management Information Base for the Internet Protocol (IP), April 2006.

[RFC 4546] IETF RFC 4546, Radio Frequency (RF) Interface Management Information Base for Data over Cable Service Interface Specifications (DOCSIS) 2.0, June 2006.

[RFC 4639] IETF RFC 4639, Cable Device Management Information Base for Data-Over-Cable Service Interface Specification (DOCSIS) Compliant Cable Modems and Cable Modem Termination Systems, December 2006.

[RFC 4837] IETF RFC 4837, Managed Objects of Ethernet Passive Optical Networks (EPON), July 2007.

[RFC 5519] IETF RFC 5519, Multicast Group Membership Discovery MIB, April 2009.

2.2 Informative References

This specification uses the following informative references.

[802.1] Refers to entire suite of IEEE 802.1 standards unless otherwise specified.

[802.1ad] IEEE Std 802.1ad™, -2005 IEEE Standard for Local and Metropolitan Area Networks – Virtual Bridged Local Area Networks Amendment 4: Provider Bridges, May 2006. Former amendment to 802.1Q, now part of 802.1Q-2011.

[802.1ag] IEEE Std 802.1ag™-2007, IEEE Standard for Local and metropolitan Area Networks – Virtual Bridged Local Area Networks Amendment 5: Connectivity Fault Management, December 2007.

[802.1ah] IEEE Std 802.1ah-2008, IEEE Standard for Local and Metropolitan Area Networks – Virtual Bridged Local Area Networks – Amendment 6: Provider Backbone Bridges, January 2008. Former amendment to 802.1Q, now part of 802.1Q-2011.

[802.1Q] IEEE Std 802.1Q-2011, IEEE Standard for Local and Metropolitan Area Networks – Media Access Control (MAC) Bridges and Virtual Bridge Local Area Networks, August 2011.

[802.3] IEEE 802.3-2008, Carrier Sense Multiple Access with Collision Detection (CSMA/CD) access method and Physical Layer specifications, January 2008.

[802.3ah] IEEE 802.3ah™-2004: Amendment to IEEE 802.3™-2005: Media Access Control Parameters, Physical Layers, and Management Parameters for Subscriber Access Networks, now part of [802.3].

[DOCSIS] Refers to entire suite of DOCSIS 3.0 specifications unless otherwise specified.

[DPoG-ARCH] DOCSIS Provisioning of GPON Specifications, DPoG Architecture Specification, DPoG-SP-ARCHv1.0, Cable Television Laboratories, Inc.

[DPoG-SEC] DOCSIS Provisioning of GPON Specifications, DPoG Security and Certificate Specification, DPoG-SP-SECv1.0, Cable Television Laboratories, Inc.

[DPoE-MEF] DOCSIS Provisioning of EPON Specifications, DPoE Metro Ethernet Forum Specification, DPoE-SP-MEFv2.0, Cable Television Laboratories, Inc.

[eDOCSIS] Data-Over-Cable Service Interface Specifications, eDOCSIS Specification, CM-SP-eDOCSIS, Cable Television Laboratories, Inc.

[G.984] ITU-T Recommendation G.984, Series G: Transmission Systems and Media, Digital Systems and Networks, Gigabit-capable Passive Optical Networks (GPON) – This is a series of requirements

[G.987] ITU-T Recommendation G.987,10-Gigabit-capable passive optical network (XG-PON) systems. A series of Requirements: General Requirements, Physical media dependent (PMD) layer specification, Transmission convergence (TC) specifications – This is a series of requirements.

[G.988] ITU-T Recommendation G.988,Digital sections and digital line system – Optical line systems for local and access networks Series G: Transmission Systems and Media, Digital Systems and Networks, Digital sections and digital line system – Optical line systems for local and access networks ONU management and control interface (OMCI) – ITU-T-G.988

[IPDR/SP] IPDR/SP Protocol Specification, Version 2.1, IPDR.org, November 2004.

[L2VPN] Data-Over-Cable Service Interface Specifications, Layer 2 Virtual Private Networks, CM-SP-L2VPN, Cable Television Laboratories, Inc.

[MULPIv3.0] Data-Over-Cable Service Interface Specifications, MAC and Upper Layer Protocols Interface Specification, CM-SP-MULPIv3.0, Cable Television Laboratories, Inc.

[PC EMv1.0] PacketCable 1.0 Event Messages Specification, PKT-SP-EM, Cable Television Laboratories, Inc.

[RFC 3014] IETF RFC 3014, Notification Log MIB, November 2000.

[RFC 3417] IETF RFC 3417/STD0062, Transport Mappings for the Simple Network Management Protocol, December 2002.

[RFC 3419] IETF RFC 3419, Textual Conventions for Transport Addresses, December 2002.

[RFC 3927] IETF RFC 3927, Dynamic Configuration of IPv4 Link-Local Addresses, May 2005.

2.3 Reference Acquisition

- Cable Television Laboratories, Inc., 858 Coal Creek Circle, Louisville, CO 80027;
  Phone +1-303-661-9100; Fax +1-303-661-9199; http://www.cablelabs.com
- Internet Engineering Task Force (IETF) Secretariat, 48377 Fremont Blvd., Suite 117, Fremont, California 94538, USA, Phone: +1-510-492-4080, Fax: +1-510-492-4001, http://www.ietf.org
- Institute of Electrical and Electronics Engineers (IEEE), +1 800 422 4633 (USA and Canada);
  http://www.ieee.org
- IPDR, 13 Mizzenmast Road, Nantucket, MA, 02554; Phone: +1-508-325-6169; Fax +1-508-325-6169. Internet:
  http://www.ipdr.org
- ITU: International Telecommunications Union (ITU), http://www.itu.int/home/contact/index.html
- ITU-T Recommendations: http://www.itu.int/ITU-T/publications/recs.html
- SCTE, Society of Cable Telecommunications Engineers Inc., 140 Philips Road, Exton, PA 19341
  Phone: +1-800-542-5040, Fax: +1-610-363-5898, Internet: http://www.scte.org/

3 TERMS AND DEFINITIONS

3.1 DPoG Network Elements

This specification uses the following terms and definitions.

DPoG Network	This term means all the elements of a DPoG implementation, including at least one DPoG System, one or more D-ONUs connected to that DPoG System, and possibly one or more DEMARCs.
DPoG System	This term refers to the set of subsystems within the hub site that provides the functions necessary to meet DPoG specification requirements.
DPoG ONU (D-ONU)	This term means a DPoG-capable ONU that complies with all the DPoG specifications. An D-ONU can optionally have one or more eSAFEs.
DEMARC	Short form of "Demarcation Device." This term means the device, owned and operated by the operator that provides the demarcation (sometimes called the UNI interface) to the customer. Some architectures describe this device as the CPE (as in DOCSIS) or the NID (as in the MEF model).

3.2 Other Terms

GPON	GPON as defined in [G.984]
XG-PON	10G/2.5G XG-PON as defined in [G.987]
Cable Modem CPE Interface	CMCI as defined in [MULPIv3.0]
Customer Premise Equipment (CPE)	Customer Premise Equipment as defined in [DOCSIS]
Multi-Layer Switching (MLS)	A switch that can switch based on Layer 2, Layer 3, Layer 4, etc.
Gigabit-capable Passive Optical Network (GPON)	Refers to 2.5G/1.25G GPON (same as 2.5G-GPON)
Logical CPE Interface	LCI as defined in [eDOCSIS]
mGEMID	Multicast GEM ID
Network Interface Device (NID)	A DEMARC device in DPoG specifications

4 ABBREVIATIONS AND ACRONYMS

This specification uses the following abbreviations:

BPI	Baseline Privacy Interface
BSoD	Business Services over DOCSIS
BWP	Bandwidth Profile
CM	Cable Modem
CMCI	Cable Modem to CPE Interface
CMTS	Cable Modem Termination System
CoS	Class of Service
CPE	Customer Premise Equipment
DBC	Dynamic Bonding Changes
DCC	Dynamic Channel Changes
DCID	Downstream Channel Identifier
DHCP	Dynamic Host Configuration Protocol
DPoG	DOCSIS Provisioning of GPON
DPoG-OAM	DOCSIS Based GPON OAM
eCM	embedded Cable Modem
eDVA	embedded Digital Voice Adapter
ENNI	External Network to Network Interface
GPON	Gigabit-capable Passive Optical Network
eSAFE	embedded Service/Application Functional Entity
EVC	Ethernet Virtual Connection
FEC	Forward error correction
Gbps	Gigabits per second (as used in the industry)
INNI	Internal Network to Network Interface
IP	Internet Protocol
IPDR	Internet Protocol Detail Record
LCI	Logical CPE Interface as defined in [eDOCSIS]
LED	Light Emitting Diode
LLID	Logical Link Identifier
L2VPN	Layer 2 Virtual Private Networks
MAC	Media Access Control
MEF	Metro Ethernet Forum
MEN	Metro Ethernet Network
MI	MEF INNI Interface at a customer premise
MN	MEF INNI Interface to operators MEN
MPCP	Multi-Point Control Protocol
MSC	Maximum Scheduled Codes
MU	MEF UNI Interface
NE	Network Element

NID	Network Interface Device
NNI	Network to Network Interface
NSI	Network Systems Interface
OAM	EPON Operations Administration and Maintenance messaging
ODN	Optical Distribution Network
OLT	Optical Line Termination
ONU	Optical Network Unit
OSC	Optical Splitter Combiner
OSS	Operations Support System
OSSI	Operations Support System Interface
PHY	PHYsical Layer
PLOAM	Physical Layer OAM
PON	Passive Optical Network
QoS	Quality of Service
R	IP Router
RCC	Receive Channel Configuration
RCP	Receive Channel Profiles
RFC	Request For Comments
RS	Reconciliation Sublayer
SAMIS	Subscriber Accounting Management Interface Specification
SLA	Service Level Agreements
SSD	Secure Software Download
UCC	Upstream Channel Changes
UCD	Upstream Channel Descriptors
UCID	Upstream Channel Identifier
UDC	Upstream Drop Classifiers
UNI	User Network Interface
vCM	virtual Cable Modem
X	IEEE Ethernet Switch (Generic)

5 DPOG OSSI

The primary goal for the DPoG OSSI is for the GPON components to appear as much as possible as existing DOCSIS components to the existing DOCSIS Operations Support System (OSS) infrastructure.

Figure 3 summarizes the primary systems and elements involved in existing DOCSIS networks. The OSS infrastructure contains the servers used to provision, manage, authorize, and control the network.

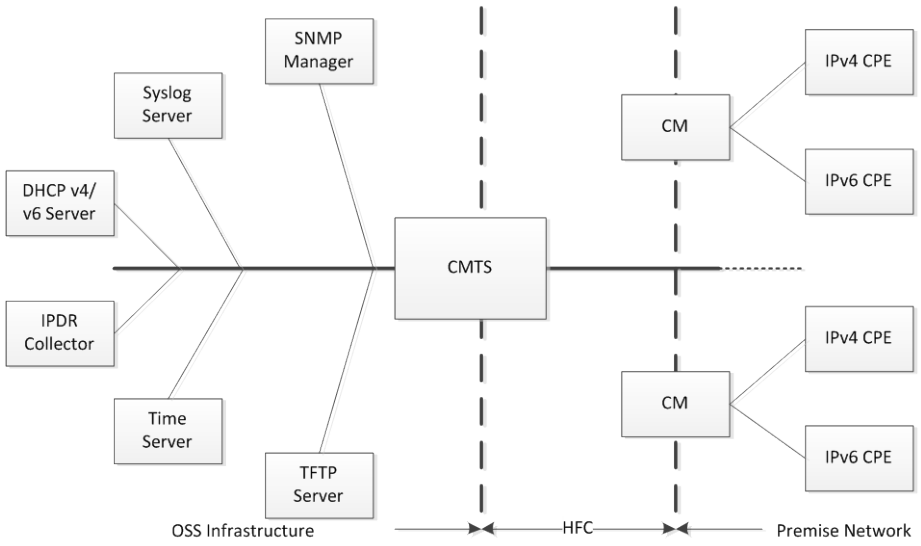

Figure 3 - DOCSIS OSSI Overview

In the DPoG Network, shown in Figure 4, the same OSS infrastructure components are used to manage and provision the DPoG headend device (the DPoG System containing the OLT with PON interfaces), as well as the D-ONU devices.

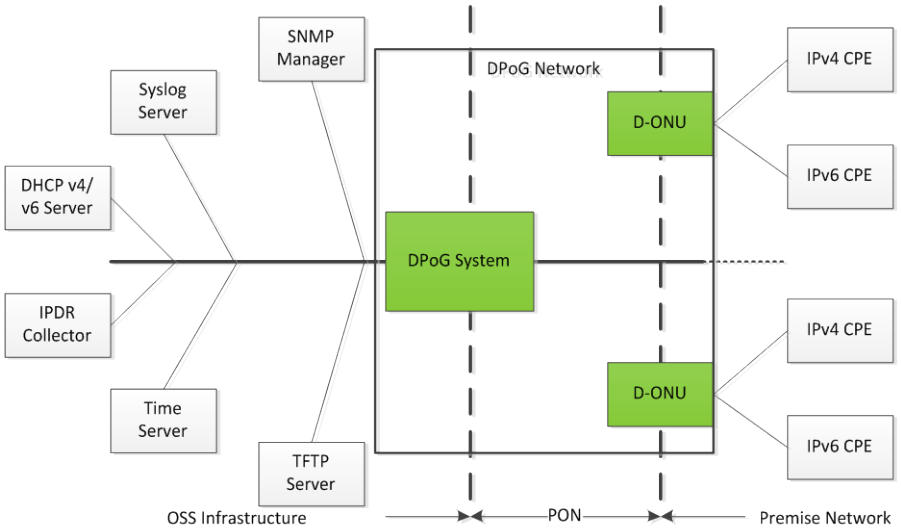

Figure 4 - DPoG OSSI Overview

Because the DPoG specifications were designed to support an existing market of ONUs that do not contain an IP stack, D-ONUs need not be directly addressable using IP. This specification requires that the DPoG System MUST obtain an IP address and modem-provisioning file from the OSS provisioning systems on behalf of the ONU as part of the modem registration process outlined in [DPoG-MULPI].

Further, the DPoG System MUST provide management capabilities on behalf of the ONU for all IP-based management functions when the OSS management systems direct management requests to a given D-ONU. The concept of a "virtual CM" (vCM) is introduced in this specification to represent the IP-addressable management entity maintained and controlled within the DPoG System. When the DPoG System receives management requests for a vCM, it converts those requests into the appropriate DPoG OAM /PLOAM requests and sends the OAM / PLOAM requests to the D-ONU as needed. See [DPoG-OAM] for a full description of the DPoG OAM messaging. The vCM is used to map requirements that were previously required of the DOCSIS CM to requirements on the DPoG System.

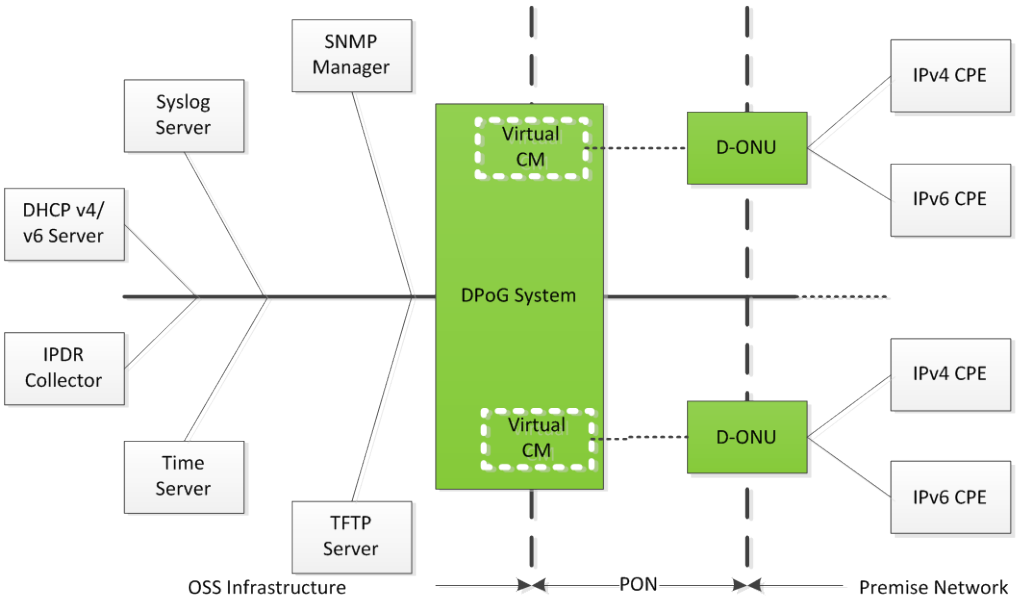

Figure 5 - DPoG Virtual CM (vCM) Concept

6 OSSI REQUIREMENTS

This section captures all of the requirements on the DPoG System and D-ONU based on the existing DOCSIS OSSI specification, along with GPON-specific requirements.

Requirements in this specification may also be introduced based on requirements from other DPoG specifications, when those specifications need to modify the existing DOCSIS management model. This specification, in turn, also generates requirements on the DPoG OAM/PLOAM specification [DPoG-OAM] for those OAM/PLOAM messages transmitted between the DPoG System and D-ONU used to satisfy OSSI requirements.

6.1 DOCSIS OSSI Requirements

The following sections summarize the requirements on the DPoG System and the D-ONU as specified in the DOCSIS 3.0 Operations Support System Interface Specification [OSSIv3.0].

These sections include summary requirements, explicit non-requirements (those items that are not applicable to DPoG), and notable differences between the [OSSIv3.0] specification and the DPoG System.

The following sections conform to the outline and section headings found in the [OSSIv3.0] document to more clearly provide a mapping of the DPoG OSSI requirements to the [OSSIv3.0] requirements. When references are made in this specification to the "corresponding section in [OSSIv3.0]", the corresponding section is the section with the same section heading or title, but not necessarily the same section number.

6.2 Overview

[OSSIv3.0] describes the key management features introduced in DOCSIS 3.0 and categorizes the features into the five conceptual categories of management, which are typically referred to as the FCAPS model, represented by the management categories of Fault, Configuration, Accounting, Performance, and Security.

6.2.1 DOCSIS 3.0 OSSI Key Features

[OSSIv3.0] provides management support for the major features summarized in the following table. The table has been modified with italicized text to note which features are applicable to the DPoG Network. References to the CMTS NE (Network Element) imply requirements on the DPoG System, and references to CM imply requirements on the DPoG System and vCM acting as a proxy for the D-ONU.

Table 2 - DOCSIS 3.0 OSSI Key Features

Features	Management Functional Area	OSI layer	NE	Description
Multiple Upstream Channels per port	Configuration	PHY	CMTS	*The Multiple Upstream Channels feature is not supported in the current version of DPoG Networks*
Enhanced Diagnostics	Fault	PHY MAC Network	DPoG System	Detailed log of different conditions associated with the vCM registration state and operation that may indicate plant problems affecting service availability. *Diagnostics related to the modem registration state is supported by DPoG Networks to ensure compatibility across the DOCSIS infrastructure.*
Enhanced Performance Data Collection	Performance	PHY MAC Network	CMTS	IPDR streaming of large statistical data sets, such as DPoG System vCM Status information, with less performance impact on the DPoG System resources.
Enhanced Signal Quality Monitoring	Performance	PHY	CMTS	*As this applies to the monitoring of the RF network, this feature is not applicable to DPoG Networks. There are complementary physical layer attributes for GPON that can be used by operators in monitoring the quality of the GPON network. The specification of these attributes is presently considered outside the scope of this version of DPoG specifications.*

Features	Management Functional Area	OSI layer	NE	Description
Usage-Based Billing	Accounting	PHY MAC Network	CMTS	Update SAMIS to 3.0 specification requirements.
Enhanced Security	Configuration Fault Performance Security	MAC Network	CM CMTS	Updates to management models to support the DOCSIS 3.0 security features. *As documented in [DPoG-SEC], a subset of these features will be supported by DPoG Networks.*
IPv6	Configuration Fault Performance	Network	CM CMTS	Updates to management models to support IPv6 provisioning, vCM IP stack management, DPoG System, and vCM IP Filtering requirements.
Channel Bonding	Configuration Fault Performance	PHY MAC	CM CMTS	*There is currently no need for channel bonding in GPON networks and will not be supported by DPoG specifications.*
IP Multicast	Configuration Fault Performance	MAC Network	CM CMTS	Update existing management modes to support new multicast capabilities such as SSM, IGMP v3, MLD v1 and MLD v2.

6.2.1.1 Fault Management Features

The DOCSIS 3.0 fault management requirements were extended to include:

- Detailed events for the new DOCSIS 3.0 features.
- A new diagnostic tool that enables detection of unstable CM operations (repeated CM registrations or station maintenance retries).

The list of DOCSIS events supported by DPoG Networks is listed in Section 10.

Support for the managed objects defined in the DOCS-DIAG-MIB, as specified in [OSSIv3.0], is identified in Section 7.4.

6.2.1.2 Configuration Management Features

The configuration of DOCSIS features use CM configuration files and CMTS policies. The reporting of configuration state information is done via SNMP MIB objects. This model provides a CM standard configuration with minimal operator intervention. The DPoG specifications support the same provisioning model by re-using the existing CM configuration files and CMTS configuration objects/policies, and mapping those objects and attributes to the corresponding GPON objects and attributes. In a similar fashion, DPoG specifications support DOCSIS state information by mapping GPON state information to the DOCSIS SNMP MIBs.

The DOCSIS 3.0 configuration requirements include:

- Updates to CM configuration parameters to support IPv6 and channel bonding, enhanced security, and IP multicast.
- Updates to CMTS configuration in support of multiple upstream channels per port, HFC plant topology, channel bonding, security, IPv6, and IP multicast.
- Security enhancements for the CM provisioning process, such as TFTP proxy, configuration file learning, certificate revocation list, etc.

As mentioned previously, this version of the DPoG specifications does not support all DOCSIS 3.0 features, such as channel bonding, so the corresponding TLVs and CM SNMP MIB objects are not supported in this version of the DPoG specifications. For the same reason, the DPoG System also will not support the configuration of those features.

This version of the DPoG specifications will NOT cover the support for the configuration of a Metro Ethernet Service Profile (MESP) to be used to provision QoS attributes for Metro Ethernet services such as EPL, EVPL, and E-LAN across the Service Flows and similarly Aggregate Service Flows are not supported.

6.2.1.3 Performance Management Features

The DOCSIS 3.0 performance management requirements include:

- An efficient mechanism for collecting large data sets as described above. The data sets supported are the CMTS resident CM status information.
- Minimizing redundant information collection associated with differing services provided by the CMTS (statistics for PacketCable™ voice may incorporate large data sets for DOCSIS PHY and MAC).
- Support for CM and CMTS host resource statistics, such as memory and CPU utilization.

6.2.1.4 Security Management Features

DOCSIS 3.0 added new features to strengthen the confidentiality of user data over the HFC network, and the authenticity of CMs using features such as software upgrade, to improve the protection of the DOCSIS network against theft of service and denial of service attacks.

Support for the DOCSIS-related security features is documented in [DPoG-SEC].

[OSSIv3.0] was also updated to replace the use of NmAccess configuration objects to support SNMPv1and v2c management of CMs, because the NmAccess framework had been deprecated by the IETF. [OSSIv3.0] defined new configuration file TLVs (TLV 53 sub-TLVs) that are compatible with the SNMPv3 framework, while still supporting SNMP v1 and v2c access controls.

Support for the SNMP Coexistence TLVs is specified in [DPoG-MULPI].

6.2.1.5 Accounting Management Features

[OSSIv3.0] defines the support for the collection of usage information for use in a billing interface known as Subscriber Accounting Management Interface Specification (SAMIS). SAMIS uses the business model defined by the TeleManagement Forum (formerly IPDR.org) and IPDR streaming protocol [IPDR/SP], for the reliable and resource-efficient transmission of accounting data. Extensions are required for SAMIS to support IPv6, and IP Multicast.

6.3 OSSI Management Protocols

6.3.1 SNMP Protocol

The SNMP protocol was selected by [OSSIv3.0] as the primary communication protocol for management of data-over-cable services. Although SNMPv3 offers certain security advantages over previous SNMP versions, many existing management systems do not fully support SNMPv3, necessitating support of the theoretically less secure but more ubiquitous SNMPv1and SNMPv2c protocols.

The DPoG System MUST provide an SNMP Agent to provide management access to supported DPoG System MIBs. The DPoG System, on behalf of the attached D-ONUs, MUST provide an SNMP Agent to provide management access to the supported CM MIBs for the vCM. Each vCM MUST appear as a separate management entity to external management applications. Each vCM MUST respond to management requests using the IP address assigned to the vCM during address assignment as specified in [DPoG-MULPI].

The vCM MUST support restrictions on the ability to set CM MIB object values based on modem configuration file attributes.

The DPoG System SHOULD implement the SNMPv3 protocol.

The vCM SHOULD implement the SNMPv3 protocol.

The DPoG System MUST implement the SNMPv1 and SNMPv2c protocols.

The vCM MUST implement the SNMPv1 and SNMPv2c protocols.

6.3.1.1 Requirements for IPv6

Several transport domains were initially defined for SNMP (see [RFC 3417]). To support IPv6, [RFC 3419] adds a new set of transport domains, not only for SNMP, but also for any application protocol.

6.3.2 IPDR Protocol

The IPDR protocol model used in the DPoG System will follow the model described in [OSSIv3.0]. When interpreting this text, the following should be considered.

When referring to the Service Definitions Instance Documents section of [OSSIv3.0], the namespace should also include the following:

Xmlnsxmlns =

6.3.2.1 Introduction

The IPDR protocol was selected by [OSSIv3.0] as a scalable solution for the collection of high volume management data related to performance, usage, and operational status of cable networks.

The DPoG System MUST provide an IPDR Exporter including support for all IPDR protocol requirements as described in [OSSIv3.0].

The vCM MUST NOT provide support for IPDR protocols.

6.3.2.2 Use of IPDR Standards

This specification defines new IPDR Service Definitions for management instrumentation beyond those specified in [OSSIv3.0]. Additional IPDR Service Definitions have been described to represent new capabilities of the DPoG specification.

6.3.2.3 IP Detail Record (IPDR) Standard

The DPoG System MUST implement all IPDR Standard requirements as described in the corresponding sections of [OSSIv3.0].

6.4 OSSI Management Objects

6.4.1 SNMP Management Information Bases (MIBs)

This section in [OSSIv3.0] defines the set of managed objects required to support the management of a CM or CMTS, as well as general requirements for expected SNMP Agent behavior for DOCSIS devices.

The [OSSIv3.0] specification has priority over the IETF MIBs and all objects. Though deprecated or optional in an IETF MIB, an object can be required by the [OSSIv3.0] specification as mandatory.

For the list of DOCSIS OSSI MIBs that will be supported by the DPoG System and vCM, see Section 7 in this document.

The following requirements were adapted from the [OSSIv3.0] specification.

The DPoG System MAY augment the required MIBs with objects from other standard or vendor-specific MIBs where appropriate.

The vCM MAY augment the required MIBs with objects from other standard or vendor-specific MIBs where appropriate.

The DPoG System MUST implement the MIB requirements in accordance with this specification, regardless of the value of an IETF MIB object's status (e.g., deprecated or optional). If not required by this specification, deprecated, obsolete, or additional objects are optional. If the DPoG System implements a deprecated, obsolete, or additional MIB object, the DPoG System MUST implement the MIB object correctly according to the MIB definition.

The vCM MUST implement the MIB requirements in accordance with this specification, regardless of the value of an IETF MIB object's status (e.g., deprecated or optional). If the vCM implements a deprecated, obsolete, or additional MIB object, the vCM MUST implement the MIB object correctly according to the MIB definition.

If the DPoG System does not implement a deprecated, obsolete, or additional MIB object, the following conditions are required to be met:

- The DPoG System MUST NOT instantiate the MIB object.
- The DPoG System MUST respond with the appropriate error/exception condition, such as noSuchObject for SNMPv2c, when an attempt to access the MIB object is made.

If the vCM does not implement a deprecated, obsolete, or additional MIB object, the following conditions are required to be met:

- The vCM MUST NOT instantiate the MIB object.
- The vCM MUST respond with the appropriate error/exception condition, such as noSuchObject for SNMPv2c, when an attempt to access the MIB object is made.

6.4.1.1 IETF Drafts and Others

The corresponding section in the [OSSIv3.0] specification contains a table listing the new DOCSIS MIBs (Annexes) that were introduced for DOCSIS 3.0. Rather than repeat the table here, Section 7 in this document contains the support expectations for the DPoG System and vCMs.

6.4.1.2 IETF RFCs

The corresponding section in the [OSSIv3.0] specification contains a table listing the IETF RFCs that need to be supported for DOCSIS 3.0. Rather than repeat the table here, Section 7 in this document contains the support expectations for the DPoG System and vCMs.

6.4.1.3 Managed Object Requirements

The corresponding section in the [OSSIv3.0] specification contains a few general requirements on the expectations for MIB compliance for DPoG Systems (CMTS in DOCSIS) and D-ONU or vCM (which resides in the DPoG System) devices.

The following requirements were adapted from the [OSSIv3.0] specification.

The DPoG System MUST implement the compliance and syntax of the MIB objects as specified in Section 7 in this document.

The vCM MUST implement the compliance and syntax of the MIB objects as specified in Section 7 in this document.

The DPoG System MUST support a minimum of 10 available SNMP table rows, unless otherwise specified by the RFC or DOCSIS specifications.

A vCM MUST support a minimum of 10 available SNMP table rows, unless otherwise specified by the RFC or DOCSIS specifications.

The DPoG System's minimum number of available SNMP table rows SHOULD mean rows (per table) that are available to support device configuration.

The vCM’s minimum number of available SNMP table rows SHOULD mean rows (per table) that are available to support device configuration.

The DPoG System used (default) SNMP table row entries MUST NOT apply to the minimum number of available SNMP table rows. The vCM used (default) SNMP table row entries MUST NOT apply to the minimum number of available SNMP table rows. That is, if the device instantiates a certain number of table rows as part of its default configuration, it must support an additional number of minimum rows beyond the default number of rows.

Additional subsections in the corresponding section of [OSSIv3.0] contain detailed implementation requirements for each of the DOCSIS 3.0 MIBs. For the DPoG System, these requirements are captured in Section 7.

6.4.2 IPDR Service Definition Schemas

The specification of IPDR service definition requirements for the DPoG System to be adapted from [OSSIv3.0] is described in Section 10 of this document.

6.5 OSSI for PHY, MAC and Network Layers

6.5.1 Fault Management

This section of the [OSSIv3.0] specification defines the requirements for remote monitoring/detection, diagnosis, reporting, and correction of problems.

6.5.1.1 SNMP Usage

The use of SNMP is defined as the primary mechanism to achieve the goals of fault management: remote detection, diagnosis, reporting, and correction of network faults. The DPoG System MUST support SNMP management for vCMs as long as the CM has become operational. However, there is no requirement to support SNMP management on the CMCI interfaces on the D-ONU.

The DPoG System MUST be able to generate SNMP Notifications to one or more trap receivers.

The DPoG System MUST be able to generate events to a syslog server.

The vCM MUST be able to generate SNMP Notifications to one or more trap receivers.

The vCM MUST be able to generate events to a syslog server.

6.5.1.2 Event Notification

A DPoG System is required to generate asynchronous events that indicate malfunction situations and notify about important events. The three methods for reporting events are defined as:

- Local Log storage (docsDevEventTable from [RFC 4639])
- SNMP Notifications
- Syslog messages

The [OSSIv3.0] specification defines the support of DOCSIS specific events as well as IETF events. DOCSIS specific events are usually delivered in the form of SNMP notifications. The delivery of IETF Notifications to local log or syslog servers is optional.

Event notifications are enabled and disabled by configuration. The generation of IETF SNMP notifications is usually controlled by separate SNMP MIB objects (e.g., ifLinkUpDownTrapEnable).

The generation of DOCSIS specific events and the method used to report the events are controlled by the docsDevEvControlTable from [RFC 4639] as well as the CmEventCtrl and the CmtsEventCtrl objects defined in the DOCS-IF3-MIB.

When the DPoG System generates an event on behalf of a vCM, the source address for the event is the address associated with the vCM, not the source address of the DPoG System.

The vCM MUST generate events using the source address for the vCM and not the source address for the DPoG System. Source Addressing requirements for the vCM are described in [DPoG-MULPI].

6.5.1.2.1 Format of Events

This section of the [OSSIv3.0] specification details specific requirements on how the three mechanisms are used by DOCSIS devices.

6.5.1.2.1.1 Local Logging

Local logging refers to the ability of a network device to store events in both volatile and non-volatile storage within the device. The contents of the local logs also need to be made available to management systems via SNMP queries. Storing events in local, persistent storage also can be used when failed equipment is returned for analysis (e.g., RMA).

A vCM MUST maintain Local Log events in both local-volatile storage and local non-volatile storage. The actual implementation of the non-volatile storage for the vCMs is vendor-specific (i.e., each vCM need not have a separate log file).

The DPoG System MUST maintain Local Log events for system-specific events in local-volatile storage or local non-volatile storage, or both. The DPoG System MAY retain in local non-volatile storage events designated for local volatile storage. The DPoG System MAY retain, in local volatile storage, events designated for local non-volatile storage.

A vCM MUST implement a Local Log as a cyclic buffer with a minimum of ten entries. The DPoG System MUST implement its Local Log for system-specific events as a cyclic buffer. A vCM's Local Log for non-volatile storage events MUST persist across reboots. The DPoG System Local Log for system-specific events MAY persist across reboots. The vCM MUST provide access to the Local Log events through the docsDevEventTable [RFC 4639]. The DPoG System MUST provide access to the Local Log events through the docsDevEventTable [RFC 4639].

The vCM MUST implement event descriptors that are no longer than 255 characters. The DPoG System MUST implement event descriptors that are no longer than 255 characters.

Each DOCSIS event is identified by a 32-bit unsigned integer. Events are identical if their EventIds are identical. For identical events occurring consecutively, the vCM MAY choose to store only a single event. If the vCM stores as a single event multiple identical events that occur consecutively, the vCM MUST reflect in the event description the most recent event. For identical events occurring consecutively, the DPoG System MAY choose to store only a single event. If the DPoG System stores, as a single event, multiple identical events that occur consecutively, the DPoG System MUST reflect in the event description the most recent event.

- The docsDevEvIndex object from [RFC 4639] provides relative ordering of events in the log. When the DPoG System reboots, the contents of the non-volatile log MUST be synchronized with the contents of the non-volatile log in the following manner:
- The values of docsDevEvIndex maintained in the non-volatile log are renumbered starting at one.
- The local volatile log is initialized with the contents of the non-volatile log.
- The value of the last restored non-volatile docsDevEvIndex plus one will be used as the first value for events recorded in the new active session's local volatile log.

When a vCM reboots, the contents of the non-volatile log MUST be synchronized with the contents of the non-volatile log in the following manner:

- The values of docsDevEvIndex maintained in the non-volatile log are renumbered starting at one.
- The local volatile log is initialized with the contents of the non-volatile log.
- The value of the last restored non-volatile docsDevEvIndex plus one will be used as the first value for events recorded in the new active session's local volatile log.

A vCM MUST support the ability to empty the contents of the volatile and non-volatile event log based on operator request.

6.5.1.2.1.2 SNMP Notifications

A vCM operating in SNMP v1/v2c NmAccess mode MUST support SNMPv1 and SNMPv2c traps as defined in [RFC 3416].

The DPoG System operating in SNMP Coexistence mode MUST support the SNMP notification types 'trap' and 'inform' as defined in [RFC 3416] and [RFC 3413].

A vCM operating in SNMP Coexistence mode MUST support the SNMP notification types 'trap' and 'inform' as defined in [RFC 3416] and [RFC 3413].

The DPoG System MUST support the SNMP Notifications defined in DOCS-IF3-MIB [OSSIv3.0].

The DPoG System MUST support the SNMP Notifications defined in DOCS-DIAG-MIB [OSSIv3.0].

A vCM MUST support the SNMP Notifications defined in DOCS-IF3-MIB [OSSIv3.0].

6.5.1.2.1.3 SYSLOG Message Format

When a vCM sends a syslog message for a DOCSIS-defined event, it MUST use the following format:

<level>CABLEMODEM[vendor]: <eventId> text vendor-specific-text.

When the DPoG System sends a syslog message for a system-specific event, it MUST use the following format:

<level>TIMESTAMP HOSTNAME CMTS[vendor]: <eventId> text vendor-specific-text.

Where:

- level is an ASCII representation of the event priority, enclosed in angle brackets, which is constructed as an OR of the default Facility (128) and event priority (0-7). The resulting level ranges between 128 and 135.
- TIMESTAMP and HOSTNAME follow the format of [RFC 3164]. The single space after TIMESTAMP is part of the TIMESTAMP field. The single space after HOSTNAME is part of the HOSTNAME field.
- vendor is the vendor name for the vendor-specific syslog messages or DOCSIS for the standard DOCSIS messages. When generating events for the vCM, the D-ONU's vendor name MUST be used.
- eventId is an ASCII representation of the INTEGER number in decimal format, enclosed in angle brackets, which uniquely identifies the type of event. The DPoG System MUST set the eventId with the value stored in the docsDevEvId object in docsDevEventTable. For the standard DOCSIS events, this number is converted from the error code using the following rules:
- The number is an eight-digit decimal number.
  - The first two digits (left-most) are the ASCII code for the letter in the Error code.
  - The next four digits are filled by 2 or 3 digits between the letter and the dot in the Error code, with zero filling in the gap in the left side.
  - The last two digits are filled by the number after the dot in the Error code, with zero filling in the gap in the left side.
- text contains the textual description for the standard DOCSIS event message.
- vendor-specific-text contains vendor-specific information. This field is optional.

The DPoG System MAY report non-DOCSIS events in the standard syslog message format [RFC 3164] rather than the defined DOCSIS syslog message format.

6.5.1.2.2 Bit Values for docsDevEv Reporting

The following BIT values are defined for the docsDevEvReporting object in [RFC 4639] to control the reporting mechanism for a particular event:

BIT	Value	Description
0	local(0)	Indicates non-Volatile Local Log
1	traps(1)	Indicates SNMP Notifications
2	syslog(2)	Indicates Syslog
8	localVolatile(8)	Indicates Volatile Local Log
9	stdInterface(9)	Indicates that [RFC 3413] and [RFC 3014] are being used to control event reporting

The DPoG System MAY support the use of bit-9 in docsDevEvReporting to control event reporting.

The DPoG System MUST also report an event via the Local Log (volatile or non-volatile) when generating an event using SNMP Notification or syslog.

The DPoG System MUST reject and report a 'Wrong Value' error for SNMP v2c/v3 PDUs or a 'BadValue' error for SNMPv1 PDUs if a set to docsDevEvReporting is tried while setting traps(1) and/or syslog(2) with no Local Log bits also set.

The DPoG System MUST ignore any undefined bits in docsDevEvReporting on SNMP Set operations and report a zero value for those bits.

If the DPoG System supports both volatile and non-volatile storage, the DPoG System MUST maintain non-volatile storage when both non-volatile Local Log and volatile Local Log bits are set for a specific docsDevEvReporting event priority. The DPoG System MAY maintain the volatile storage when both non-volatile Local Log and volatile Local Log bits are set for a specific docsDevEvReporting event priority. When both non-volatile Local Log and volatile Local Log bits are set for a specific docsDevEvReporting event priority, the DPoG System MUST NOT report duplicate events in the docsDevEventTable.

6.5.1.2.3 Standard DOCSIS Events for CMs

The DOCS-CABLE-DEVICE-MIB [RFC 4639] defines the following eight priority levels for use by DOCSIS devices.

Event	Priority	Description
Emergency	1	Reserved for vendor-specific 'fatal' hardware or software errors that prevents normal system operation and causes the reporting system to reboot.
Alert	2	A serious failure, which causes the reporting system to reboot, but it is not caused by hardware or software malfunctioning.
Critical	3	A serious failure that requires attention and prevents the device from transmitting data, but could be recovered without rebooting the system.
Error	4	A failure occurred that could interrupt the normal data flow, but will not cause the modem to re-register.
Warning	5	A failure occurred that could interrupt the normal data flow, but will not cause the modem to re-register. 'Warning' level is assigned to events for which both CM and CMTS have information.
Notice	6	The event is important, but is not a failure
Informational	7	The event is of marginal importance and is not failure, but could be helpful for tracing the normal modem operation.
Debug	8	Reserved for vendor-specific non-critical events.

During vCM initialization, the vCM MUST support the following default event reporting mechanisms:

Event Priority	Local Log Non-volatile	SNMP Notification	Syslog	Local Log Volatile
Emergency	MUST	MAY	MAY	MAY
Alert	MUST	MAY	MAY	MAY
Critical	MUST	MAY	MAY	MAY
Error	MAY	MUST	MUST	MUST
Warning	MAY	MAY	MAY	MAY
Notice	MAY	MUST	MUST	MUST
Informational	MAY	MAY	MAY	MAY
Debug	MAY	MAY	MAY	MAY

A vCM MAY implement default reporting mechanisms above the minimum reporting requirements.

A vCM MUST support the modification of the default reporting mechanism by using the docsDevEvReporting object defined in DOCS-CABLE-DEVICE-MIB [RFC 4639].

A vCM MUST format notifications in accordance with Annex D of the [OSSIv3.0] specification.

6.5.1.2.4 Standard DOCSIS Events for CMTS

The [OSSIv3.0] specification uses the same event priorities for CMTS-generated events as CM-generated events; however, it specifies additional restrictions on the use of the priorities.

The 'Error' priority level is used by the DPoG System to indicate problems with a group of D-ONUs.

The 'Critical' priority level indicates a problem that affects the whole system operation but is not a faulty condition of the DPoG System.

During initialization of the DPoG System, the DPoG System MUST support the following default event reporting mechanisms for SNMP and Syslog:

Event Priority	SNMP Notification	Syslog
Emergency	MAY	MAY
Alert	MAY	MAY
Critical	MUST	MUST
Error	MUST	MUST
Warning	MUST	MUST
Notice	MUST	MUST
Informational	MAY	MAY
Debug	MAY	MAY

During initialization of the DPoG System, the DPoG System MUST support the following default event reporting mechanisms for Local Logging. The requirements on Local Logging vary depending on whether the DPoG System supports a volatile or non-volatile Local Logging mechanism:

Event Priority	Local Log Non-volatile (if only present)	Local Log Volatile (if only present)	Local Log Non-volatile (if both present)	Local Log Volatile (if both present)
Emergency	MUST	MUST	MUST	MAY
Alert	MUST	MUST	MUST	MAY
Critical	MUST	MUST	MUST	MAY
Error	MUST	MUST	MAY	MUST
Warning	MUST	MUST	MAY	MUST
Notice	MUST	MUST	MAY	MUST
Informational	MAY	MAY	MAY	MAY
Debug	MAY	MAY	MAY	MAY

The DPoG System MAY implement default reporting mechanisms above the minimum reporting requirements.

The DPoG System MAY support the modification of the default reporting mechanism by using the docsDevEvReporting object defined in DOCS-CABLE-DEVICE-MIB [RFC 4639].

The DPoG System MUST format notifications in accordance with Annex D of the [OSSIv3.0] specification.

6.5.1.2.5 Event Priorities for DOCSIS and Vendor-Specific Events

This section of the [OSSIv3.0] specification defines the use of the Event Priorities for DOCSIS and vendor-specific events for DOCSIS devices.

The use of the Emergency Event Priority is reserved for all vendor-specific events generated by the DPoG System.

The Alert through Informational Event Priorities can be used for both DOCSIS and vendor-specific events generated by the vCM.

The Alert Event Priority is reserved for all vendor-specific events generated by the DPoG System for those events related to the operation of the DPoG System, and not for events generated by vCMs.

The Critical through Informational Event Priorities can be used for both DOCSIS and vendor-specific events generated by the DPoG System.

The use of the Debug Event Priority is reserved for all vendor-specific events generated by the DPoG System.

6.5.1.3 Throttling, Limiting, and Priority for Event, Trap, and Syslog

The DPoG System MUST support SNMP TRAP/INFORM and syslog throttling and limiting as described in DOCS-CABLE-DEVICE-MIB for event messages generated by the DPoG System.

The vCM MUST support SNMP TRAP/INFORM and syslog throttling and limiting as described in DOCS-CABLE-DEVICE-MIB for event messages generated by the vCM.

6.5.1.4 SNMPv3 Notification Receiver Configuration File TLV

This section of the [OSSIv3.0] specification details the processing requirements for the SNMPv3 Notification Receiver TLV when present in the configuration file. The SNMPv3 Notification Receiver TLV is used to configure SNMPv3 tables for notification transmission.

A vCM MUST process the SNMPv3 Notification Receiver TLV only if the vCM is in SNMP Coexistence Mode.

Based on the SNMPv3 Notification Receiver TLV, a vCM MUST create entries in the following tables in order to cause the desired trap transmission:

- snmpNotifyTable
- snmpTargetAddrTable
- snmpTargetAddrExtTable
- snmpTargetParamsTable
- snmpNotifyFilterProfileTable
- snmpNotifyFilterTable
- snmpCommunityTable
- usmUserTable
- vacmContextTable
- vacmSecurityToGroupTable
- vacmAccessTable
- vacmViewTreeFamilyTable

A vCM MUST NOT set to 'active' an entry created using the SNMPv3 Notification Receiver TLV that does not satisfy the corresponding [RFC 3413] requirements to do so. This type of misconfiguration does not stop the vCM from registering; however, the SNMP notification process may not work as expected.

6.5.1.4.1 Mapping of TLV Fields into Created SNMPv3 Table Rows

This section of the [OSSIv3.0] specification describes how the SNMPv3 Notification Receiver TLV elements are used to populate the corresponding SNMPv3 tables.

A vCM MUST implement the population of SNMPv3 tables as described in the corresponding section of the [OSSIv3.0] specification.

6.5.1.5 Non-SNMP Fault Management Protocols

The [OSSIv3.0] specification provides for the use of other tools and techniques to examine faults at the different protocol layers.

The DPoG System MUST support IP end-station generation of ICMP error messages and processing of all ICMP (ICMPv4 and ICMPv6) messages for IP addresses on any of its D interfaces.

A vCM MUST support IP end-station generation of ICMP (ICMPv4 and ICMPv6) error messages and processing of all ICMP (ICMPv4 and ICMPv6) messages.

Due to the lack of a native IP stack on the D-ONU, the D-ONU will not respond to ICMP (ICMPv4 and ICMPv6) Echo Request messages received on its CMCI interfaces targeted towards the vCM's management IP address. A vCM MUST respond to ICMP (ICMPv4 and ICMPv6) Echo Requests on behalf of the attached D-ONUs,

6.5.2 Configuration Management

The [OSSIv3.0] specification defines two categories of configuration information: non-operational and operational.

Non-operational changes occur when a management application issues a modify command to a DPoG System, and the change doesn't affect the operating environment. An example of a non-operational change is the modification of the system contact for the DPoG System. Operational changes are those that affect the behavior of the system.

The DPoG System MUST support the use of the SNMP protocol interface for the modification of operational and non-operational information. A vCM MUST support the use of the SNMP protocol interface for the modification of operational and non-operational information.

The DPoG System can support other configuration mechanisms, such as a Command Line Interface as defined in [DPoE-IPNE].

6.5.2.1 Version Control

A vCM MUST support the docsDevSwCurrentVers MIB object from the DOCS-CABLE-DEVICE-MIB to report the current firmware version of the D-ONU.

A vCM MUST report the sysDescr object value using the following fields and format:

Type	Value
HW_REV	<Hardware Version>
VENDOR	<Vendor Name>
BOOTR	<Boot ROM Version>
SW_REV	<Software Version>
MODEL	<Model Number>

A vCM MUST report each Type field and corresponding Value field separated with a colon followed by a single space and each Type-Value pair is separated by a semicolon followed by a single blank space. The format is shown below:

HW_REV: <value>; VENDOR: <value>; BOOTR: <value>; SW_REV: <value>; MODEL: <value>

A vCM MUST report a value of 'NONE' if the field is not supported on the D-ONU.

Other string data may be included in the sysDescr field, but a vCM MUST delimit the formatted string specified above by an opening "<<" and a closing ">>" to clearly identify the mandatory version fields.

The DPoG System MUST support the sysDescr field, but its content and format is vendor-specific.

6.5.2.2 System Configuration

A vCM MUST support system configuration by configuration file, configuration-file-based SNMP encoded objects, and SNMP Set operations. A vCM MUST support any valid configuration file as defined in the [DPoG-MULPI] specification.

The DPoG System MUST support system configuration via SNMP Set operations for objects under its control.

6.5.2.3 Secure Software Download

A vCM MUST use the Secure Software Download (SSD) process documented in [DPoG-SEC] to upgrade the firmware for the D-ONU.

The vCM MUST support both the SNMP-initiated and configuration-file-initiated methods to trigger the Secure Software Download. A DPoG System MAY support either one or both methods to trigger Secure Software Download.

To support an SNMP-initiated upgrade, a vCM MUST have a valid X.509 code verification certificate on behalf of the D-ONU.

If the docsDevSwAdminStatus (from the DOCS-CABLE-DEVICE-MIB) object on the vCM is set to 'ignoreProvisioningUpgrade', the vCM MUST ignore any software download configuration setting and not attempt a configuration-file-initiated upgrade. A vCM MUST preserve the value of the docsDevSwAdminStatus object across reset/reboots of the vCM and, by extension, the DPoG System.

A vCM MUST use 'allowProvisioningUpgrade' as the default value for the docsDevSwAdminStatus object until it is over-written by 'ignoreProvisioningUpgrade' after a successful SNMP-initiated software upgrade or is modified by an external manager.

A vCM MUST preserve the value of the docsDevSwOperStatus object for the vCM across reset/reboots of the vCM.

After a vCM has completed a configuration-file-initiated secure software upgrade, a vCM MUST cause the D-ONU to reboot and become operational using the correct software image as described in [DPoG-MULPI]. After the vCM has registered following a reboot after a configuration-file-initiated secure software upgrade, the vCM MUST satisfy the following requirements:

- The vCM MUST report 'allowProvisioningUpgrade' as the value for the docsDevSwAdminStatus object.
- The vCM SHOULD report the filename of the software currently operating on the D-ONU as the value for the docsDevSwFilename object.
- The vCM SHOULD report the IP address of the software download server containing the software currently running on the D-ONU as the value for the docsDevSwServerAddress.
- The vCM MUST report 'completeFromProvisioning' as the value for the docsDevSwOperStatus object.
- The vCM MUST report the current version of the software that is operating on the D-ONU as the value for the docsDevSwCurrentVers object.

After the vCM has completed an SNMP-initiated secure software upgrade, the vCM MUST cause the D-ONU to reboot and become operational using the correct software image as described in [DPoG-MULPI]. After the vCM has registered following a reboot, after an SNMP-initiated secure software upgrade, the vCM MUST satisfy the following requirements:

- The vCM MUST report 'ignoreProvisioningUpgrade' as the value for the docsDevSwAdminStatus object.
- The vCM SHOULD report the filename of the software currently operating on the D-ONU as the value for the docsDevSwFilename object.
- The vCM SHOULD report the IP address of the Software Download server containing the software currently running on the D-ONU as the value for the docsDevSwServerAddress.
- The vCM MUST report 'completeFromMgmt' as the value for the docsDevSwOperStatus object.

- The vCM MUST report the current version of the software that is operating on the D-ONU as the value for the docsDevSwCurrentVers object.

If the D-ONU suffers a loss of power or resets during an SNMP-initiated upgrade, the vCM MUST resume the upgrade without manual intervention. While the upgrade is in progress, the vCM MUST report 'inProgress' as the value for the docsDevSwOperStatus object.

In the case where the vCM reaches the maximum number of TFTP Download Retries as specified in [DPoG-MULPI], the vCM MUST behave as specified in [DPoG-MULPI]. In the case where the vCM successfully downloads an image that is not intended for the D-ONU associated with the vCM, the vCM MUST behave as specified in [DPoG-MULPI].

In the case where the vCM successfully downloads an image that is determined to be corrupted, the vCM MUST reject the corrupted image. The vCM MAY re-attempt to download if the maximum number of TFTP Download Retries has not been reached. If the vCM does not retry, the D-ONU MUST continue to run the last known working firmware image and proceed to an operational state. The vCM MUST generate two notifications: one to notify that the vCM has reached the maximum number of retries, and another to notify that the image is damaged.

For the failure scenarios listed above, the vCM MUST satisfy the following requirements:

- The vCM MUST report 'allowProvisioningUpgrade' as the value for the docsDevSwAdminStatus object.
- The vCM MUST report the filename of the software image that failed the upgrade process as the value for the docsDevSwFilename object.
- The vCM MUST report the IP address of the Software Download server containing the software image that failed the upgrade process as the value for the docsDevSwServerAddress.
- The vCM MUST report 'other' as the value for the docsDevSwOperStatus object.
- The vCM MUST report the current version of the software that is operating on the D-ONU as the value for the docsDevSwCurrentVers object.

6.5.2.4 CM Configuration Files, TLV-11 and MIB OIDs/Values

The following sections of the [OSSIv3.0] specification define the use of CM configuration file TLV-11 elements and the rules for translating TLV-11 elements into SNMP PDU varbinds (SNMP MIB OID/instance and MIB OID/instance value combinations).

A vCM is expected to satisfy all requirements related to CM configuration file processing. The existing CM configuration file TLV-11 elements are still applicable to the configuration and operation of the vCM.

6.5.2.4.1 CM Configuration File TLV-11 Element Translation (to SNMP PDU)

A vCM is required to translate CM configuration file TLV-11 elements into a single SNMP PDU containing MIB OID/instance and value components (SNMP varbinds). Once a single SNMP PDU is constructed, the vCM processes the SNMP PDU and determines if the CM configuration passes or fails, based on the rules for CM configuration file processing.

In accordance with [RFC 3416], the single, generated SNMP PDU will be treated "as if simultaneous" and the vCM MUST behave consistently, regardless of the order in which TLV-11 elements appear in the CM configuration file or in the SNMP PDU.

The CM configuration file cannot contain duplicate TLV-11 elements (SNMP MIB objects with identical OIDs). If the configuration file received by the vCM contains duplicate TLV-11 elements, the vCM MUST reject the configuration file.

A vCM MUST support the 'createAndGo' row creation method (as defined in [RFC 2579]).

A vCM MAY support the 'createAndWait' row creation method (as defined in [RFC 2579]). If 'createAndWait' is supported, the intended result is to create an SNMP table row that will remain in the 'notReady' or 'notInService' state until a non-configuration SNMP PDU is received to update the SNMP table row status.

6.5.2.4.2 CM Configuration File TLV-11 Elements Not Supported by the CM

If the CM configuration file contains SNMP OIDs that are not supported by the vCM, then the vCM MUST ignore those SNMP varbinds and treat them as if they were not present.

If the vCM does not support 'createAndWait' row states, the vCM MUST ignore those objects in the associated table row.

If any CM configuration file TLV-11 elements are ignored, the vCM MUST report them via the configured notification mechanisms after the vCM is registered.

6.5.2.4.3 CM State After CM Configuration File Processing Success

After the vCM successfully processes the CM configuration file, the vCM MUST use the appropriate OAM/PLOAM messages, as defined in [DPoG-OAM], to configure the D-ONU to transition the vCM to an operational state.

6.5.2.4.4 CM State After CM Configuration File Processing Failure

If any CM configuration file-generated SNMP varbind performs an illegal set operation, the vCM MUST reject the configuration file. The vCM MUST NOT proceed with the registration process.

6.5.2.5 IPDR Exporter Configuration

The [OSSIv3.0] specification allows for the possibility of a management interface to configure the following aspects related to IPDR Streaming:

- Authorized collectors' access list.
- Redundant collector policies for streaming sessions.
- Configuration of time intervals for exporting.
- IPDR/SP KeepAlive ackSequenceInterval and ackTimeInterval parameters.
- Configurable document boundaries using session start/stop messages (both for time interval and event sessions with topology services).
- Configuration of single service in multiple sessions that use different export methodologies (ad-hoc/event or ad-hoc/time).

6.5.3 Accounting Management

The [OSSIv3.0] specification defines an accounting management interface for subscriber usage-based applications called Subscriber Account Management Interface Specification (SAMIS). SAMIS enables vendors of cable modems and cable modem termination systems to address the operational requirements of subscriber account management in a uniform and consistent manner.

Subscriber account management described here refers to the following business processes and terms:

- Class of Service Provisioning Processes, which are involved in the automatic and dynamic provisioning and enforcement of subscribed class of policy-based Service Level Agreements (SLAs).
- Usage-Based Billing Processes, which are involved in the processing of bills based on services rendered to, and consumed by, paying subscribers. This specification focuses primarily on bandwidth-centric usage-based billing scenarios. It complements the PacketCable Event Messages Specification [PC EMv1.0].

6.5.3.1 Subscriber Usage Billing and Class of Services

This section of the [OSSIv3.0] specification defines the high-level functional requirements for support of the SAMIS interface using IPDR.

6.5.3.2 DOCSIS Subscriber Usage Billing Requirements

The DPoG System MUST support subscriber usage billing by implementing SAMIS, based on the TM Forum's BSR specification version 3.5 [IPDR/BSR], in this version of the DPoG specifications.

6.5.4 Performance Management

The [OSSIv3.0] specification provides high-level requirements on the monitoring of the MAC and PHY interfaces using the standard interface statistics (via the IF-MIB [RFC 2863]). The DPoG System will continue to support these same statistics to provide continuity from the DOCSIS systems for the corresponding GPON interfaces.

To monitor behavior at the LLC layer, the performance management focus is on bridge traffic management via the BRIDGE-MIB [RFC 4188] as supported on the modem. The vCM also will support the BRIDGE-MIB by using DPoG OAM messages to retrieve the appropriate statistics from the D-ONU.

The [OSSIv3.0] specification emphasizes the importance of supporting the CMTS diagnostic log capabilities (DOCS-DIAG-MIB) to provide early detection of modem and plant problems. The DPoG System also will support the DOCS-DIAG-MIB to provide similar functionality to existing DOCSIS systems.

The [OSSIv3.0] specification also emphasizes the importance of supporting the objects in the DOCS-IF-MIB [RFC 4546] to track DOCSIS PHY and MAC layer attributes, such as signal-to-noise ratios, micro-reflections, and ranging retry requests. Due to the differences between the DOCSIS PHY and MAC layers and the GPON PHY and MAC layers, support for these statistics will not be possible in the DPoG Network.

6.5.4.1 Treatment and Interpretation of MIB Counters

The [OSSIv3.0] specification defines the expected behavior for all counter statistics supported by DOCSIS devices. There are specific requirements for the behavior of counter attributes in the following cases:

Case 1: The state of an interface changes resulting in an "interface counter discontinuity" as defined in [RFC 2863].

When the state of an interface changes for a vCM, the ifCounterDiscontinuityTime for the affected interface MUST be set to the current value of sysUpTime and all counters on the interface set to zero. Setting the ifAdminStatus for an interface is not considered an interface reset.

When the state of an interface changes for the DPoG System, the ifCounterDiscontinuityTime for the affected interface MUST be set to the current value of sysUpTime and all counters on the interface set to zero. Setting the ifAdminStatus for an interface is not considered an interface reset.

Case 2: SNMP Agent Reset

An SNMP Agent Reset is defined as the reinitialization of the SNMP Agent when the device being managed by the SNMP Agent is rebooted or reset.

When the DPoG System is rebooted, the DPoG System MUST:

- set the value of sysUpTime to zero.
- set all interface ifCounterDiscontinuityTime values to zero.
- set all interface counters to zero.
- set all other counters maintained by the vCM SNMP Agent to zero.

When the vCM or D-ONU is rebooted, the vCM MUST:

- set the value of sysUpTime to zero.
- set all interface ifCounterDiscontinuityTime values to zero.
- set all interface counters to zero.
- set all other counters maintained by the vCM SNMP Agent to zero.

Case 3: Counter Rollover

When a counter reaches the maximum value for its precision within the DPoG System, then the counter value MUST roll over to zero when incremented.

When a counter reaches the maximum value for its precision within a vCM, then the counter value MUST roll over to zero when incremented.

6.5.5 Security Management

The DPoG System MUST provide SNMP responses in accordance with the SNMP framework defined in [RFC 3411] through [RFC 3416].

The vCM MUST provide SNMP responses in accordance with the SNMP framework defined in [RFC 3411] through [RFC 3416].

6.5.5.1 DPoG System SNMP Modes of Operation

The DPoG System SNMP Coexistence Mode is subject to the following requirements and limitations:

- The DPoG System MUST process SNMP v1/v2c Packets as described in [RFC 3411] through [RFC 3415], and [RFC 3584].
- If the DPoG System supports the SNMPv3 protocol, it MUST process SNMP v3 Packets as described in [RFC 3411] through [RFC 3415] and [RFC 3584].
- SNMP Access control is determined by the SNMP-COMMUNITY-MIB [RFC 3584] and SNMP-TARGET-MIB [RFC 3413], SNMP-VIEW-BASED-ACM-MIB [RFC 3415], and SNMP-User-Based-SM-MIB [RFC 3414].
- The DPoG System MUST support the SNMP-COMMUNITY-MIB [RFC 3584] which controls SNMPv1/v2c packet community string associations to a security name to select entries for access control in the SNMP-VIEW-BASED-ACM-MIB [RFC 3415]..
- The DPoG System SHOULD support the SNMP-USER-BASED-SM-MIB [RFC 3414] and SNMP-VIEW-BASED-ACM-MIB [RFC 3415] to control SNMPv3 packets..
- The DPoG System MUST support SNMP Notification destinations as specified in the SNMP-TARGET-MIB and SNMP-NOTIFICATION-MIB [RFC 3413].

The DPoG System MAY support SNMPv3 with AES encryption as defined in [RFC 3826].

6.5.5.2 DPoG System SNMP Access Control Configuration

If the DPoG System supports SNMPv3, the DPoG System MUST support the SNMPv3 key change mechanism defined in [RFC 3414].

6.5.5.3 vCM SNMP Modes of Operation

A vCM MUST support SNMPv1, SNMPv2c, and SNMP-Coexistence [RFC 3584].

A vCM SHOULD support SNMPv3 [RFC 3414].

A vCM access control configuration MUST support SNMPv1v2c in NmAccess mode as well as SNMP-Coexistence mode.

6.5.5.4 vCM SNMP Access Control Configuration

This section in the [OSSIv3.0] specification defines the expected behavior for SNMP access control for the modem as configured by the modem configuration file. Further, it defines the expected support for the SNMP Kickstart process used to provide a set of access controls for a modem.

A vCM SHOULD support the SNMPv3 Kickstart process.

See the [OSSIv3.0] specification for more details on the expected support for SNMPv3 agent implementations, as well as the expected behavior when running in SNMP coexistence mode.

6.5.5.5 IPDR Streaming Protocol Security Model

The [OSSIv3.0] specification includes no additional security requirements for the use of IPDR/SP beyond those which are already specified in the [IPDR/SP] specification.

6.6 OSSI for CMCI

This section of the [OSSIv3.0] specification defines the operational mechanisms needed to support the transmission of data-over-cable services between a CM and Customer Premise Equipment (CPE) as defined in CM-SP-CMCI.

These specifications do not apply to CE connected to MU or DEMARC connected to MI.

6.6.1 SNMP Access Via CMCI

[OSSIv3.0] also specifies the possibility of SNMP management prior to successful modem registration. Because the D-ONU does not have a native SNMP stack accessible via the CMCI interface, there is no requirement to support SNMP access to the ONU from the CMCI interface.

[OSSIv3.0] also contains requirements regarding the use of special IP addresses, such as 192.168.100.1, link-local methods as defined in [RFC 3927], and IPv6 link-local addresses to provide SNMP management access via the CMCI interface. As above, these requirements do not apply to the DPoG System or the D-ONU itself.

6.6.2 Console Access

[OSSIv3.0] contains requirements indicating that access to the console port on the CM is prohibited. A console port is defined as a communication path that allows the user to issue commands that affect the modem's configuration or operational status.

The D-ONU SHOULD NOT allow a communication path that permits a user to issue commands to or modify the configuration or operational status of the D-ONU from the CMCI, LCI, MU or MI interfaces. D-ONUs with eSAFEs MAY allow a communication path that permits a user or operator to issue commands to or modify the configuration or operational status of the eSAFE.

6.6.3 CM Diagnostic Capabilities

[OSSIv3.0] provides for the possibility of a diagnostic interface on the modem to be used for debugging or troubleshooting.

The D-ONU MAY have a diagnostic interface for debugging and troubleshooting purposes.

The D-ONU's diagnostic interface SHOULD be disabled by default after registration has been completed.

The D-ONU MAY provide additional controls that will enable the operator to alter or customize the diagnostic interface, such as by the configuration process, or management through the setting of a proprietary MIB.

6.6.4 Protocol Filtering

Protocol Filtering in the DPoG System MUST be implemented as described in Annex F of [OSSIv3.0], with the following exceptions:

- Legacy Filters (as specified in the DOCS-CABLE-DEVICE_MIB) are not required.
- Downstream Filtering (as specified in the DOCS-SUBMGT3-MIB) is required.
- Upstream Filtering (as specified in the DOCS-SUBMGT3-MIB) is optional.

Protocol Filtering in the D-ONU MUST be implemented as described in Annex F of [OSSIv3.0], with the following exceptions:

- Legacy IP Policy Filters are not required.

- A value of 'accept' for docsDevFilterIpDefault MUST be supported. Support for a value of 'discard' is not required. A DPoG System MUST ignore TLV 11 with the docsDevFilterIpDefault SNMP object with the value of 'discard', if this value is not supported.
- Upstream Drop Classifiers are not required to support IPv6 filtering in the current version of the specification.

Protocol Filtering in the vCM MUST be implemented as described in Annex F of [OSSIv3.0], with the following exception:

- The ability to add, delete, or modify Upstream Drop Classifiers (UDC) via SNMP is not required because docsQosPktClassTable is a read-only table. UDC changes, therefore, require a reset of the vCM (and the associated D-ONU).

6.7 OSSI for CM Device

The corresponding [OSSIv3.0] specification section contains requirements on the use of standard front-panel light-emitting diodes (LEDs) that present straightforward information about the registration state of the CM to facilitate customer support operations.

6.7.1 CM LED Requirements and Operation

The [OSSIv3.0] specification has more detailed requirements on the expectations for the behavior of the LEDs, as well as specific requirements on the minimum five LEDs that should be visible on the CM. Those LEDs are:

- Box: one LED labeled as Power for the overall CM status.
- DOCSIS: three LEDs labeled as DS, US, and Online.
- CPE: a minimum of one LED labeled as LINK for the link status for the CPE interface. If the CM has more than one CPE interface, then it should have a separate LED for each link.

Further, there are requirements on the order of the LEDs on the front of the CM so that customers (or service reps) can view the logical progression of the modem through the registration process (i.e., sync, ranging, and registration).

The following sub-sections contain specific requirements on the LED behavior for the modem, based on the modem's state.

Although it is recognized that providing a uniform and common set of diagnostic LEDs is important, the specification of the LED behavior is outside the scope of this version of the DPoG specifications.

6.7.1.1 Power On, Software Application Image Validation, and Self-Test

This section intentionally left blank.

6.7.1.2 Scan for Downstream Channel

This section intentionally left blank.

6.7.1.3 Resolve CM-SG and Range

This section intentionally left blank.

6.7.1.4 Operational

This section intentionally left blank.

6.7.1.5 Data Link and Activity

This section intentionally left blank.

6.7.2 Additional CM Operation Status Visualization Features

The [OSSIv3.0] specification allows vendors to change the LED behavior if the modem is in a proprietary mode of operation. It also requires that external indicators not be used to reveal modem provisioning information.

6.7.2.1 Secure Software Download

The [OSSIv3.0] specification has requirements on the lighting of LEDs when the modem firmware is being upgraded.

Although it is recognized that providing a uniform and common set of diagnostic LEDs is important, the specification of the LED behavior is outside the scope of this version of the DPoG specifications.

6.7.3 OSSI Annexes

The [OSSIv3.0] specification includes several Annex appendices that include requirements or further clarifications on the new objects defined in the [OSSIv3.0] specification. The following table summarizes the applicability of those Annexes to this specification:

Table 3 - OSSIv3.0 Applicability to DPoG-OSSIv1.0

Annex [OSSIv3.0]	Title	Applicability to the DPoG OSSI Specification
Annex A	IPDR for DOCSIS Cable Data Systems Subscriber Usage Billing Records	Refer to Section 10 of this document for clarifications and DPoG support requirements
Annex B	Detailed MIB Requirements (Normative)	Covered in this specification
Annex C	Auxiliary Schemas for DOCSIS IPDR Service Definitions	Refer to Section 10 of this document for clarifications to DPoG support for [OSSIv3.0] IPDR Service Definitions.
Annex D	Format and Content for Event, SYSLOG, and SNMP Notification	Covered in this specification in Section 10.
Annex E	Application of MGMD-STD-MIB to DOCSIS 3.0 MGMD Devices	Not applicable to this version of DPoG specifications.
Annex F	Protocol Filtering	Covered in this specification in Section 6.6.4.
Annex G	Diagnostic Log	No additional clarifications are needed in this specification because this section provides more clarifying text on the Diagnostic Log objects.
Annex H	Requirements for DOCS-IFEXT2-MIB	No additional clarifications are needed in this specification because this section just includes the text of the DOCS-IFEXT2-MIB.
Annex I	Load Balancing Requirements	No additional clarifications are needed in this specification because this section provides more clarifying text on the DOCSIS Load Balancing objects.
Annex J	Enhanced Signal Quality Monitoring Requirements	Not applicable to GPON because it focuses on RF network monitoring diagnostics.
Annex K	DOCSIS 3.0 Data Type Definitions	No additional clarifications are needed in this specification because this section just lists the base data types used in the DOCSIS SNMP and IPDR object definitions.
Annex L	Security Requirements	No additional clarifications are needed in this specification because this section provides more clarifying text on the DOCSIS Security objects added in the [OSSIv3.0] specification.
Annex M	Multicast Requirements	Covered in this specification.
Annex N	CM and CMTS Status Reporting Requirements	No additional clarifications are needed in this specification because this section provides more clarifying text on the DOCSIS Monitoring objects added in the [OSSIv3.0] specification.
Annex O	Media Access Control (MAC) Requirements	No additional clarifications are needed in this specification because this section provides more clarifying text on the MAC Layer objects added in the [OSSIv3.0] specification.
Annex P	Subscriber Management Requirements	No additional clarifications are needed in this specification because this section provides more clarifying text on the Subscriber Management objects added in the [OSSIv3.0] specification.

Annex [OSSIv3.0]	Title	Applicability to the DPoG OSSI Specification
Annex Q	DOCSIS 3.0 SNMP MIB Modules	No additional clarifications are needed in this specification because this section just contains the actual text of the new MIBS defined in the [OSSIv3.0] specification.
Annex R	IPDR Service Definition Schemas	Refer to Section 10 of this document for clarifications to DPoG support for [OSSIv3.0] IPDR Service Definitions.

6.8 GPON Requirements

This section captures those OSSI requirements specific to the management and control of the GPON infrastructure.

6.8.1 Provisioning

Refer to [DPoE-IPNE] for provisioning and configuration requirements of the DPoG System.

6.8.2 GPON MIBs

No GPON-specific SNMP MIBs are applicable to the DPoG System.

7 SUPPORT FOR DOCSIS 3.0 OSSI MIBS

The DPoG System MUST support the list of MIBs required of the CMTS as required by [OSSIv3.0], except where noted in the following tables. The vCM MUST support the list of MIBs required of the CM on behalf of the attached ONU device as required by [OSSIv3.0], except where noted in the following tables.

The informative Table 7 provides a high-level summary of the applicability of each DOCSIS MIB from [OSSIv3.0] to either the vCM on the DPoG System, or the DPoG System (acting as a CMTS). An X in the column indicates whether the MIB applies to the vCM or the DPoG System. The sub-sections that follow contain the detailed normative requirements for each of the MIBs listed in Table 7.

Table 6 provides the relationship between the DOCSIS 3.0 OSSI Annex A MIB requirement notation and the DPoG MIB requirement notation used throughout this section.

For more detail on how specific MIB objects are supported within a MIB module, see the corresponding section for the MIB modules themselves in [OSSIv3.0]. If this specification defines the MIB table as required and the MIB objects are not further defined (Heading level 3) in this specification, refer to the DOCSIS MIB requirements from [OSSIv3.0]. The MIB objects are to be supported as specified in the DOCSIS Annex A "Detailed MIB Requirements" [OSSIv3.0]. Table 4 provides an example of a Heading level 2 MIB requirement table. In this example, mibATable is required to be supported according to the OSSIv3.0 Annex A requirements [OSSIv3.0] for both the vCM and DPoG System. In addition, mibBTable is not applicable to the vCM and is not to be implemented in the DPoG System.

Table 4 - EXAMPLE Heading Level 2 MIB Requirements Table

Table Name	vCM	DPoG System	Comments
mibATable	MUST	MUST	
mibBTable		MUST NOT	Operator feedback is that this table is not applicable to an GPON network.

The following sections are adapted from the corresponding MIB tables included in Annex A in [OSSIv3.0]. Each MIB Module section (Heading level 2) provides a table that provides a high-level analysis at the table (or group) level of whether the table is applicable to DPoG Elements.

The vCM column indicates whether the table/group/object is to be supported for the vCM as specified in [OSSIv3.0]. The DPoG System column indicates whether the table/group/object is to be supported for the DPoG System as specified in [OSSIv3.0].

The Comments column is used to capture any special implementation comments regarding support for the object (or why the object need not be supported) by the DPoG System or vCM.

For some tables within a MIB Module, more implementation details are provided to lend guidance to how to support the table objects. When needed, sub-sections (Heading level 3) are provided for the MIB to provide these details. If this specification further defines MIB object details (Heading level 3) in the sub-sections below, these details and requirements supersede those specified in [OSSIv3.0]. Table 5 provides an example of a Heading level 3 MIB requirement table. In this example, mibATable is expanded to show the individual MIB object requirements for the objects within the table for both the vCM and DPoG System. In this case, mibAAttribute1 is required to be implemented in the DPoG System but is optional in the vCM, while mibAAttribute2 is required to be implemented in the vCM but is not to be implemented in the DPoG System. The key difference here is that the mibATable individual object requirements are not taken from DOCSIS OSSI Annex A because they are explicitly defined within a Heading level 3 section in the DPoG specification.

Table 5 - EXAMPLE Heading Level 3 MIB Requirements Table

Object	vCM	DPoG System	Comments
mibATable	MUST	MUST	
mibAEntry	MUST	MUST	

Object	vCM	DPoG System	Comments
mibAAttribute1	MAY	MUST	
mibAAttribute2	MUST	MUST NOT	

Table 6 - Relationship between OSSIv3.0 MIB Requirement Notation and DPoG Specifications

OSSIv3.0 Requirement Type	OSSIv3.0 Table Notation	DPoG MIB Requirement Mapping	Description
Deprecated	D	Not Used	This convention is not used in the DPoG Specification.
Mandatory	M	MUST	This mapping indicates the MIB Module/Table/Group/Object is required to be supported in the DPoG Specification.
Not Applicable	NA	MUST NOT	This mapping indicates the MIB Module/Table/Group/Object is not to be implemented in the DPoG Specification.
Not Supported	N-Sup	MUST NOT	This mapping indicates the MIB Module/Table/Group/Object is not to be implemented in the DPoG Specification.
-	-	SHOULD NOT	This mapping indicates the MIB Module/Table/Group/Object should not be implemented since it is not applicable to the current version of the DPoG Specification.
Optional	O	MAY/SHOULD	This mapping indicates the MIB Module/Table/Group/Object is optional to implement in the DPoG Specification. A vendor can choose to implement or not to implement the item.
Obsolete	Ob	Not Used	This convention is not used in the DPoG Specification.

Table 7 - Relationship between OSSIv3.0 MIBS and DPoG Specifications

MIB	From	vCM	DPoG System	Comment
BRIDGE-MIB	RFC 4188	X	X	
CLAB-TOPO-MIB	***Annex Q***		***X***	***Operators do not see the architectural correlation for DPoG Networks.***
DOCS-BPI-MIB	*RFC 3083*			*Not applicable to GPON.*
DOCS-DRF-MIB	*OSSI-M*			*Not applicable to GPON.*
DOCS-CABLE-DEVICE-MIB	RFC 4639	X	X	
DOCS-DIAG-MIB	Annex Q		X	
DOCS-IETF-BPI2-MIB	RFC 4131	X	X	Baseline privacy key exchange does not apply to a GPON network. AES-128-bit traffic encryption is available.
DOCS-IF-MIB	RFC 4546	X	X	
DOCS-IF3-MIB	Annex Q	X	X	
DOCS-IFEXT2-MIB	*Annex H*			*This is an optional table with little value on the DPoG System. Parameters on CM are not applicable to GPON.*
DOCS-LOADBAL3-MIB	*Annex Q*			*Load balancing doesn't apply to GPON.*
DOCS-MCAST-AUTH-MIB	Annex Q		X	
DOCS-MCAST-MIB	Annex Q		X	
DOCS-QOS3-MIB	Annex Q	X	X	
DOCS-SEC-MIB	Annex Q		X	
DOCS-SUBMGT3-MIB	Annex Q		X	
ENTITY-MIB	RFC 4133	X	X	
ENTITY-SENSOR-MIB	RFC 3433	X	X	
EtherLike-MIB	RFC 3635	X	X	

MIB	From	vCM	DPoG System	Comment
HOST-RESOURCES-MIB	RFC 2790	X	X	
IF-MIB	RFC 2863	X	X	
IGMP-STD-MIB	RFC 2933		X	The D-ONU is not required to be an active participant in the IGMP protocol and does not need to snoop IGMP packets. However, if a vendor chooses to support this functionality within the D-ONU, the MGMD-STD-MIB would be implemented in place of the IGMP-STD-MIB on the vCM.
IP-MIB	RFC 4293	X	X	
MGMD-STD-MIB	RFC 5519		X	The D-ONU is not required to be an active participant in the IGMP or MLD protocols and does not need to snoop IGMP or MLD packets. However, if a vendor chooses to support this functionality within the D-ONU, the MGMD-STD-MIB would be implemented. on the vCM.
SNMP Applications	RFC 3413	X	X	
SNMP-COMMUNITY-MIB	RFC 3584	X	X	
SNMP-FRAMEWORK-MIB	RFC 3411	X	X	
SNMP-MPD-MIB	RFC 3412	X	X	
SNMP-USER-BASED-SM-MIB	RFC 3414	X	X	
SNMP-USM-DH-OBJECTS-MIB	RFC 2786	X	X	
SNMP-VIEW-BASED-ACM-MIB	RFC 3415	X	X	
SNMPv2-MIB	RFC 3418	X	X	
TCP-MIB	RFC 4022	X	X	
UDP-MIB	RFC 4113	X	X	

7.1 BRIDGE-MIB ([RFC 4188])

Table Name	vCM	DPoG System	Comments
dot1dBase	MUST	MUST	
dot1dBasePortTable	MUST	MUST	
dot1dStp	SHOULD NOT	MUST	As support for STP is currently not required for a D-ONU, the objects within this group are not applicable for vCMs.
dot1dStpPortTable	SHOULD NOT	MUST	As support for STP is currently not required for a D-ONU, this table is not applicable for vCMs.
dot1dTp	MUST	MUST	
dot1dTpFdbTable	MUST	MUST	
dot1dTpPortTable	SHOULD NOT	MUST	
dot1dStaticTable	MUST	MUST	

7.2 CLAB-TOPO-MIB ([OSSIv3.0] Annex Q)

Table Name	vCM	DPoG System	Comments
clabTopoFiberNodeCfgTable		MUST	This table is not applicable to a GPON network.
clabTopoChFnCfgTable		MUST	This table is not applicable to a GPON network.

7.3 DOCS-CABLE-DEVICE-MIB ([RFC 4639])

Table Name	vCM	DPoG System	Comments
docsDevBase	MUST	MUST	
docsDevServer	MUST		
docsDevCpe	MUST		
docsDevCpeTable	MUST		This table could be used for pre-DOCSIS 3.0 style modem configuration files.
docsDevCpeInetTable	MUST		
docsDevNmAccessTable	MUST	MUST	These objects are used by operators to use SNMPv1/v2 to manage their networks.
docsDevSoftware	MUST	MUST	
docsDevEvent	MUST	MUST	
docsDevEvControlTable	MUST	MUST	
docsDevEventTable	MUST	MUST	
docsDevFilter	MUST	MUST NOT	
docsDevFilterLLCTable	MUST	MUST NOT	
docsDevFilterIpTable	MUST	MUST NOT	
docsDevFilterPolicyTable	MUST NOT	MUST NOT	This table is deprecated and replaced with versions that support IPv6.
docsDevFilterTosTable	MUST NOT	MUST NOT	This table is deprecated and replaced with versions that support IPv6.

7.3.1 docsDevBase

Object	vCM	DPoG System	Comments
docsDevRole	MUST	MUST	A vCM MUST return a value of 'cm' for docsDevRole. A DPoG System MUST support the values of 'cmtsActive' and 'cmtsBackup' (depending on the current role of the DPoG System).
docsDevDateTime	MUST	MUST	Set to the same value for the DPoG System and the vCMs on the DPoG System.
docsDevResetNow	MUST	MUST	When set to 'true' for the vCM, the associated D-ONU is reset and the vCM within the DPoG System is also re-initialized. When set to 'true' for the DPoG System, the DPoG System is reset.
docsDevSerialNumber	MUST	MUST	A vCM MUST set the docsDevSerialNumber object to the Serial Number of the associated D-ONU. For the DPoG System, the value is vendor-specific.
docsDevSTPControl	MUST	MAY	A vCM MUST support the values of ‘noStFilterBpdu’ and ‘noStPassBpdu’. A vCM MUST NOT support setting this value to ‘stEnabled’.
docsDevIgmpModeControl	SHOULD NOT	SHOULD NOT	Not supported in DPoG Networks.
docsDevMaxCpe	MUST	SHOULD NOT	The vCM MUST return the value specified via the modem configuration file for the docsDevMaxCpe object if the vCM is supporting IP(HSD) services. If the vCM is supporting MEF services, then the vCM MUST return a value of zero for the docsDevMaxCpe object.

7.3.2 docsDevServer

Object	vCM	DPoG System	Comments
docsDevServerBootState	MUST		See Section 7.3.2.1 for additional information.
docsDevServerDhcp	MUST		
docsDevServerTime	SHOULD NOT		A vCM SHOULD NOT support the object docsDevServerTime. Because ToD retrieval is not required in DPoG Networks, this object is not required to return a non-zero value for the vCM.
docsDevServerTftp	MUST		
docsDevServerConfigFile	MUST		
docsDevServerDhcpAddressType	MUST		
docsDevServerDhcpAddress	MUST		
docsDevServerTimeAddressType	SHOULD NOT		A vCM SHOULD NOT support the object docsDevServerTimeAddressType. Since ToD retrieval is not required in DPoG Networks, this object is not required to return a non-zero value for the vCM.
docsDevServerTimeAddress	SHOULD NOT		A vCM SHOULD NOT support the object docsDevServerTimeAddress. Since ToD retrieval is not required in DPoG Networks, this object is not required to return a non-zero value for the vCM.
docsDevServerConfigTftpAddressType	MUST		
docsDevServerConfigTftpAddress	MUST		

7.3.2.1 docsDevServerBootState Object Mappings

CM State	Original Comment (as defined in DOCS-CABLE-DEVICE-MIB)	DPoG Applicability
operational(1)	The device has completed loading and processing of configuration parameters, and the CMTS has completed the Registration exchange.	The OLT on the DPoG System and D-ONU have been properly configured to support the parameters in the modem configuration file.
disabled(2)	The device was administratively disabled, possibly by being refused network access in the configuration file.	The vCM has been denied access because the modem configuration file cannot be supported by the DPoG System (or D-ONU).
waitingForDhcpOffer(3)	A Dynamic Host Configuration Protocol (DHCP) Discover has been transmitted, and no offer has yet been received.	The DPoG System has generated a DHCP Discover on behalf of the vCM.
waitingForDhcpResponse(4)	A DHCP Request has been transmitted, and no response has yet been received.	The DPoG System has generated a DHCP Request on behalf of the vCM.
waitingForTimeServer(5)	A Time Request has been transmitted, and no response has yet been received.	Not applicable to DPoG.
waitingForTftp(6)	A request to the TFTP parameter server has been made, and no response received.	The DPoG System has sent a TFTP request to the TFTP server.
refusedByCmts(7)	The Registration Request/Response exchange with the CMTS failed.	Not applicable to DPoG.
forwardingDenied(8)	The registration process was completed, but the network access option in the received configuration file prohibits forwarding.	The OLT on the DPoG System and D-ONU have been properly configured to support the parameters in the modem configuration file, but the configuration file has blocked network access for the D-ONU.
other(9)	The registration process reached a point that does not fall into one of the above categories.	
unknown(10)	The device has not yet begun the registration process or is in some other indeterminate state.	The vCM is in the process of initialization.

7.3.3 docsDevSoftware

Object	vCM	DPoG System	Comments
docsDevSoftware			This group is only mandatory for the vCM.
docsDevSwServer	MAY	MAY	Object has been deprecated. Address of the TFTP Server.
docsDevSwFilename	MUST	MAY	
docsDevSwAdminStatus	MUST	MAY	If set to 'upgradeFromMgt', then the DPoG System initiates an upgrade for the D-ONU associated with the vCM.
docsDevSwOperStatus	MUST	MAY	
docsDevSwCurrentVers	MUST	MAY	Set to the current firmware revision running on the D-ONU associated with the vCM.
docsDevSwServerAddressType	MUST	MAY	
docsDevSwServerAddress	MUST	MAY	Address of the TFTP Server.
docsDevSwServerTransportProtocol	MUST	MAY	A vCM MUST support a value of 'tftp' for docsDevSwServerTransportProtocol. A vCM MAY support a value of 'http' for docsDevSwServerTransportProtocol.

7.3.4 docsDevFilterLLCTable

Object	vCM	DPoG System	Comments
docsDevFilterLLCUnmatchedAction	MUST	MUST NOT	
docsDevFilterLLCTable	MUST	MUST NOT	
docsDevFilterLLCEntry	MUST	MUST NOT	
docsDevFilterLLCIndex	MUST	MUST NOT	
docsDevFilterLLCStatus	MUST	MUST NOT	
docsDevFilterLLCIfIndex	MUST	MUST NOT	
docsDevFilterLLCProtocolType	MUST	MUST NOT	
docsDevFilterLLCProtocol	MUST	MUST NOT	
docsDevFilterLLCMatches	MUST	MUST NOT	

7.3.5 docsDevFilterIpTable

Object	vCM	DPoG System	Comments
docsDevFilterIpDefault	MUST	MUST NOT	A vCM MUST support a value of 'accept' for docsDevFilterIpDefault. A vCM MAY support a value of 'discard' for docsDevFilterIpDefault. A DPoG System MUST ignore TLV 11 with the docsDevFilterIpDefault SNMP object with the value of 'discard', if this value is not supported
docsDevFilterIpTable	MUST	MUST NOT	
docsDevFilterIpEntry	MUST	MUST NOT	
docsDevFilterIpIndex	MUST	MUST NOT	
docsDevFilterIpStatus	MUST	MUST NOT	
docsDevFilterIpControl	MUST	MUST NOT	A vCM MAY support the values of 'accept' and 'discard' for docsDevFilterIpControl. A vCM MAY support a value of 'policy' for docsDevFilterIpControl.

Object	vCM	DPoG System	Comments
docsDevFilterIpIfIndex	MUST!	MUST NOT	A vCM MUST apply all inbound (docsDevFilterIpDirection '1') filter entries associated with docsDevFilterIpIfIndex containing the value of '2' (CATV-MAC) or '3' (RF-Down) to the D-ONU Network (PON) Port OAM ingress rules (0xD7/0x501). A vCM MUST apply all outbound (docsDevFilterIpDirection '2') filter entries associated with docsDevFilterIpIfIndex containing the value of '2' (CATV-MAC) or '4' (RF-Up) to all D-ONU User (UNI) Port OAM ingress rules (0xD7/0x501).
docsDevFilterIpDirection	MUST	MUST NOT	
docsDevFilterIpBroadcast	MUST	MUST NOT	A vCM MUST support a value of 'false' for docsDevFilterIpBroadcast. A vCM MAY support a value of 'true' for docsDevFilterIpBroadcast.
docsDevFilterIpSaddr	MUST	MUST NOT	
docsDevFilterIpSmask	MUST	MUST NOT	
docsDevFilterIpDaddr	MUST	MUST NOT	
docsDevFilterIpDmask	MUST	MUST NOT	
docsDevFilterIpProtocol	MUST	MUST NOT	
docsDevFilterIpSourcePortLow	MUST	MUST NOT	
docsDevFilterIpSourcePortHigh	MUST	MUST NOT	
docsDevFilterIpDestPortLow	MUST	MUST NOT	
docsDevFilterIpDestPortHigh	MUST	MUST NOT	
docsDevFilterIpMatches	MUST	MUST NOT	
docsDevFilterIpTos	MUST	MUST NOT	
docsDevFilterIpTosMask	MUST	MUST NOT	
docsDevFilterIpContinue	MUST NOT	MUST NOT	
docsDevFilterIpPolicyId	MUST NOT	MUST NOT	

The appropriate mapping between docsDevFilterIP filter, docsDevFilterIpDirection, and DPoG OAM object context for OAM Port Ingress Rules (0xD7/0501) is provided in the following table:

docsDevFilterIpIfIndex	docsDevFilterIpDirection	DPoG Port Ingress Rules Mapping (0xD7/0x0501)
2 (CATV-MAC)	1 (Inbound)	Network (PON) Port
2 (CATV-MAC)	2 (Outbound)	All User (UNI) Ports
3 (RF-Down)	1 (Inbound)	Network (PON) Port
4 (RF-Up)	2 (Outbound)	All User (UNI) Ports

Applying all *docsDevFilterIp* entries associated with the CATV-MAC and RF in this manner eliminates the need to replicate filter entries for all possible User Ports and maintains the same structure of CM configuration files used in traditional DOCSIS.

7.4 DOCS-DIAG-MIB ([OSSIv3.0] ANNEX Q)

Table Name	vCM	DPoG System	Comments
docsDiagLogGlobal		MUST	
docsDiagLogTriggersCfg		MUST	
docsDiagLogTable		MUST	
docsDiagLogDetailTable		MUST	

7.4.1 docsDiagLogTriggersCfg

Object	vCM	DPoG System	Comments
docsDiagLogTriggersCfg			
docsDiagLogIncludeTriggers		MUST	Only Bit 0 (Registration trigger) applies to DPoG Networks. Bit 1 (Ranging Retry trigger) does not apply. The default value should be '80'H.
docsDiagLogEnableAgingTriggers		MUST	Only Bit 0 (Registration trigger) applies to DPoG Networks. Bit 1 (Ranging Retry trigger) does not apply.
docsDiagLogRegTimeInterval		MUST	
docsDiagLogRegDetail		MUST	Only the bits that correspond to the supported states for the CmtsCmRegState TC are supported for DPoG Networks.
docsDiagLogRangingRetryType		MUST	This object is not applicable to DPoG Networks. The DPoG System MUST return a value of '1' for docsDiagLogRangingRetryType.
docsDiagLogRangingRetryThrhld		MUST	This object is not applicable to DPoG Networks. The DPoG System MUST return a value of '6' for docsDiagLogRangingRetryThrhld .
docsDiagLogRangingRetryStationMaintNum		MUST	This object is not applicable to DPoG Networks. The DPoG System MUST return a value of '90' for docsDiagLogRangingRetryStationMaintNum.

7.4.2 docsDiagLogTable

Object	vCM	DPoG System	Comments
docsDiagLogTable		MUST	
docsDiagLogEntry		MUST	
docsDiagLogCmMacAddr		MUST	
docsDiagLogLastUpdateTime		MUST	
docsDiagLogCreateTime		MUST	
docsDiagLogLastRegTime		MUST	
docsDiagLogRegCount		MUST	
docsDiagLogRangingRetryCount		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsDiagLogRangingRetryCount.

7.4.3 docsDiagLogDetailTable

Object	vCM	DPoG System	Comments
docsDiagLogDetailTable		MUST	
docsDiagLogDetailEntry		MUST	

Object	vCM	DPoG System	Comments
docsDiagLogDetailTypeValue		MUST	For DPoG Networks, only the supported states for the CmtsCmRegState TC are supported for entries in this table.
docsDiagLogDetailCount		MUST	
docsDiagLogDetailLastUpdate		MUST	
docsDiagLogDetailLastErrorText		MUST	

7.5 DOCS-IETF-BPI2-MIB ([RFC 4131])

Table Name	vCM	DPoG System	Comments
docsBpi2CmtsBaseEntryTable		MUST	This table is used to support the configuration of the default key exchange lifetime.
docsBpi2CodeDownloadGroup	MUST		These objects need to be supported for Secure Software Download.
docsBpi2CmCryptoSuiteTable	SHOULD NOT		As currently defined, the algorithm objects do not support the algorithms supported by DPoG.
docsBpi2CmDeviceCertTable	MUST		These objects need to be supported to manage certificates.
docsBpi2CmtsProvisionedCmCertTable		MUST	These objects need to be supported to manage certificates.
docsBpi2CmtsCACertTable		MUST	These objects need to be supported to manage certificates.
docsBpi2CmBaseTable	MUST NOT		BPI will not be used for DPoG Networks, so the objects relating to BPI are not needed.
docsBpi2CmTEKTable	MUST NOT		BPI will not be used for DPoG Networks, so the objects relating to BPI are not needed.
docsBpi2CmIpMulticastMapTable	MUST NOT		BPI will not be used for DPoG Networks, so the objects relating to BPI are not needed.
docsBpi2CmtsAuthEntryTable		MUST NOT	BPI will not be used for DPoG Networks, so the objects relating to BPI are not needed.
docsBpi2CmtsTEKTable		MUST NOT	BPI will not be used for DPoG Networks, so the objects relating to BPI are not needed.
docsBpi2CmtsIpMulticastMapTable		MUST NOT	BPI will not be used for DPoG Networks, so the objects relating to BPI are not needed.
docsBpi2CmtsIpMulticastAuthTable		MUST NOT	BPI will not be used for DPoG Networks, so the objects relating to BPI are not needed.

7.5.1 docsBpi2CmtsBaseEntryTable

Object	vCM	DPoG System	Comments
docsBpi2CmtsBaseEntryTable		MUST	There is an entry in this table for each MAC Domain Interface Index associated with a GPON interface on the DPoG System.
docsBpi2CmtsBaseEntryEntry		MUST	
docsBpi2CmtsDefaultAuthLifetime		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '604800' for docsBpi2CmtsDefaultAuthLifetime .
docsBpi2CmtsDefaultTEKLifetime		MUST	Is used in DPoG Networks to configure the Encryption Key Exchange Timeout. Default is 600 seconds.
docsBpi2CmtsDefaultSelfSignedManufCertTrust		MUST	
docsBpi2CmtsCheckCertValidityPeriods		MUST	

Object	vCM	DPoG System	Comments
docsBpi2CmtsAuthentInfos		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsBpi2CmtsAuthentInfos.
docsBpi2CmtsAuthRequests		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsBpi2CmtsAuthRequests.
docsBpi2CmtsAuthReplies		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsBpi2CmtsAuthReplies.
docsBpi2CmtsAuthRejects		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsBpi2CmtsAuthRejects.
docsBpi2CmtsAuthInvalids		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsBpi2CmtsAuthInvalids.
docsBpi2CmtsSAMapRequests		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsBpi2CmtsSAMapRequests.
docsBpi2CmtsSAMapReplies		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsBpi2CmtsSAMapReplies.
docsBpi2CmtsSAMapRejects		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsBpi2CmtsSAMapRejects.

7.6 DOCS-IF-MIB ([RFC 4546])

Table Name	vCM	DPoG System	Comments
docsIfCmMacTable	MUST		Need to provide an entry for backwards compatibility; MAC address is the only useful entry, but it is an important one.
docsIfCmStatusTable	MUST		Most of these fields are not applicable. Operator feedback was that the resets object seemed like a quick way to see if there are basic issues.
docsIfCmtsCmStatusTable		MUST	It may be used by operators who haven't transitioned to DOCS-IF3-MIB yet.
docsIfCmtsServiceTable		MUST	
docsIfCmtsMacToCmTable		MUST	
docsIfCmtsChannelUtilizationTable		MUST	Operators like to know their channel utilizations for monitoring/planning purposes.
docsIfDownstreamChannelTable	SHOULD NOT	SHOULD NOT	The objects in this table (frequency, width, modulation) do not apply to GPON, but DPoG specifications may need to provide a parallel table that maps an arbitrary channel ID to a wavelength.
docsIfUpstreamChannelTable	SHOULD NOT	SHOULD NOT	Similar to the comment above for the downstream.
docsIfSignalQualityTable	SHOULD NOT	SHOULD NOT	While operator feedback is that there must be similar measures that are valuable for optical networks, those measurements would not be provided via this table.
docsIfCmtsMacTable		SHOULD NOT	
docsIfCmtsStatusTable		SHOULD NOT	

Table Name	vCM	DPoG System	Comments
docsIfCmtsDownChannelCounterTable		SHOULD NOT	This table was added so the operator could compute utilization on a system that didn't have the docsIfCmtsChannelUtilizationTable, because that table came later. Therefore, this table can be skipped if the utilization table is supported.
docsIfCmtsUpChannelCounterTable		SHOULD NOT	Many of the fields in this table don't make sense for GPON and the units are in minislots. This table is not needed if docsIfCmtsChannelUtilizationTable is supported.
docsIfQosProfileTable	MUST NOT	MUST NOT	There is no need to support 1.0 CoS in a DPoG Network.
docsIfCmServiceTable	MUST NOT		No relevance to GPON, because there is no contention region except for DISCOVERY, and there are no statistics exposed there.
docsIfCmtsModulationTable		MUST NOT	This seems like it would be completely useless/not-applicable for GPON.

7.6.1 docsIfCmMacTable

Object	vCM	DPoG System	Comments
docsIfCmMacTable	MUST		
docsIfCmMacEntry	MUST		
docsIfCmCmtsAddress	MUST		Set to the MAC Address of the GPON PON interface on the DPoG System connected to the D-ONU.
docsIfCmCapabilities	MUST		A vCM MUST return a value of '00' for docsIfCmRangingTimeout.
docsIfCmRangingRespTimeout			Obsolete object – replaced by the following object.
docsIfCmRangingTimeout	MUST		Does not apply to DPoG Networks. A vCM MUST return a value of '0' (zero) for docsIfCmRangingTimeout.

7.6.2 docsIfCmStatusTable

Object	vCM	DPoG System	Comments
docsIfCmStatusTable	MUST		
docsIfCmStatusEntry	MUST		
docsIfCmStatusValue	MUST		See following section for details on the implementation of this object for DPoG Networks.
docsIfCmStatusCode	MUST		
docsIfCmStatusTxPower	MUST		Does not apply to DPoG Networks. A vCM MUST return a value of '0' (zero) for docsIfCmStatusTxPower.
docsIfCmStatusResets	MUST		
docsIfCmStatusLostSyncs	MUST		Does not apply to DPoG Networks. A vCM MUST return a value of '0' (zero) for docsIfCmStatusLostSyncs.
docsIfCmStatusInvalidMaps	MUST		Does not apply to DPoG Networks. A vCM MUST return a value of '0' (zero) for docsIfCmStatusInvalidMaps.
docsIfCmStatusInvalidUcds	MUST		Does not apply to DPoG Networks. A vCM MUST return a value of '0' (zero) for docsIfCmStatusInvalidUcds.

Object	vCM	DPoG System	Comments
docsIfCmStatusInvalidRangingResponses	MUST		Does not apply to DPoG Networks. A vCM MUST return a value of '0' (zero) for docsIfCmStatusInvalidRangingResponses .
docsIfCmStatusInvalidRegistrationResponses	MUST		Does not apply to DPoG Networks. A vCM MUST return a value of '0' (zero) for docsIfCmStatusInvalidRegistrationResponses.
docsIfCmStatusT1Timeouts	MUST		Does not apply to DPoG Networks. A vCM MUST return a value of '0' (zero) for docsIfCmStatusT1Timeouts.
docsIfCmStatusT2Timeouts	MUST		Does not apply to DPoG Networks. A vCM MUST return a value of '0' (zero) for docsIfCmStatusT2Timeouts.
docsIfCmStatusT3Timeouts	MUST		Does not apply to DPoG Networks. A vCM MUST return a value of '0' (zero) for docsIfCmStatusT3Timeouts.
docsIfCmStatusT4Timeouts	MUST		Does not apply to DPoG Networks. A vCM MUST return a value of '0' (zero) for docsIfCmStatusT4Timeouts.
docsIfCmStatusRangingAborteds	MUST		Does not apply to DPoG Networks. A vCM MUST return a value of '0' (zero) for docsIfCmStatusRangingAborteds.
docsIfCmStatusDocsisOperMode	MUST		A vCM MUST return a value of 'docsis11' for docsIfCmStatusDocsisOperMode.
docsIfCmStatusModulationType	MUST		Does not apply to DPoG Networks. A vCM MUST return a value of 'unknown' for docsIfCmStatusModulationType.
docsIfCmStatusEqualizationData	MUST		Does not apply to DPoG Networks. A vCM MUST return a value of length zero for docsIfCmStatusEqualizationData.
docsIfCmStatusUCCs	MUST		Does not apply to DPoG Networks. A vCM MUST return a value of '0' (zero) for docsIfCmStatusUCCs.
docsIfCmStatusUCCFails	MUST		Does not apply to DPoG Networks. A vCM MUST return a value of '0' (zero) for docsIfCmStatusUCCFails.

7.6.2.1 docsIfCmStatusValue Mappings

Reported by the DPoG System on behalf of the vCM.

CM State	Original Comment (as defined in DOCSIS RFIv2)	DPoG Applicability
other(1)	Any state other than below.	
notReady(2)	CM has started up, powered-on, or modem reset is complete.	The vCM is in the process of initialization.
notSynchronized(3)	CM has completed its power-up sequence but has not synchronized.	Not applicable to DPoG Networks.
phySynchronized(4)	CM has recognized a valid DOCSIS Downstream channel.	Not applicable to DPoG Networks.
usParametersAcquired(5)	CM has collected all UCDs with different channel ID fields and has found a suitable channel to begin the ranging process.	Not applicable to DPoG Networks.

CM State	Original Comment (as defined in DOCSIS RFIv2)	DPoG Applicability
rangingComplete(6)	CM has completed initial ranging.	The DPoG System has discovered and registered the D-ONU. Simply stated, ONU Discovery & Ranging has been completed as described in the D-ONU Initialization and Configuration appendix of [DPoG-OAM].
ipComplete(7)	An IP Address has been assigned to the CM.	An IP Address has been assigned to the vCM.
todEstablished(8)	Time-of-Day has been retrieved by the CM.	Not applicable to DPoG Networks.
securityEstablished(9)	If the CM is provisioned to use Baseline Privacy, the CM has completed the BP process.	The connection to the D-ONU has been secured and the D-ONU's certificate has been authenticated by the DPoG System. Simply stated, it has passed the Channel Configuration & Encryption, OAM Discovery, OAM Channel Security Establishment phases described in in the D-ONU Initialization and Configuration appendix of [DPoG-OAM].
paramTransferComplete(10)	The CM has obtained its provisioning file from the TFTP server.	The DPoG System has retrieved the modem provisioning file for the vCM.
registrationComplete(11)	CM has completed registration with the CMTS; REG-RSP received from the CMTS (in DOCSIS 1.0), or REG-ACK sent to the CMTS (in DOCSIS 2.0+).	Not applicable to DPoG Networks.
operational(12)	CM is now operational.	The DPoG System and D-ONU have been properly configured to support the parameters in the modem configuration file.
accessDenied(13)	CMTS has rejected the CM's REG-REQ and has been denied access.	The vCM has been denied access because the modem configuration file cannot be supported by the DPoG System or D-ONU.

7.6.3 docsIfCmtsCmStatusTable

Object	vCM	DPoG System	Comments
docsIfCmtsCmStatusTable		MUST	Although deprecated by [OSSIv3.0], it is still required for DPoG Networks.
docsIfCmtsCmStatusEntry		MUST	
docsIfCmtsCmStatusIndex		MUST	Contains the registration identifier assigned by the DPoG System to the vCM.
docsIfCmtsCmStatusMacAddress		MUST	Contains the MAC address that identifies the D-ONU for the vCM.
docsIfCmtsCmStatusIpAddress		MUST	Contains the IP Address assigned to the vCM.
docsIfCmtsCmStatusDownChannelIfIndex		MUST	Contains the Interface Index value assigned to the logical Downstream Interface on the DPoG System associated with the MAC Domain containing the D-ONU.
docsIfCmtsCmStatusUpChannelIfIndex		MUST	Contains the Interface Index value assigned to the logical Upstream Interface on the DPoG System associated with the MAC Domain containing the D-ONU.
docsIfCmtsCmStatusRxPower		MUST	The object reports power in tenths of a dBmV. GPON power is typically expressed units of uWatts.
docsIfCmtsCmStatusTimingOffset		MUST	The value provided here is the round-trip time (RTT) for the D-ONU with the units converted to the DOCSIS units (6.25 microsecs/64).
docsIfCmtsCmStatusEqualizationData		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of length zero for docsIfCmtsCmStatusEqualizationData.
docsIfCmtsCmStatusValue		MUST	See following section for details on the implementation of this object for DPoG Networks.

Object	vCM	DPoG System	Comments
docsIfCmtsCmStatusUnerroreds		MUST	
docsIfCmtsCmStatusCorrecteds		MUST	
docsIfCmtsCmStatusUncorrectables		MUST	
docsIfCmtsCmStatusSignalNoise		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsIfCmtsCmStatusSignalNoise.
docsIfCmtsCmStatusMicroreflections		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsIfCmtsCmStatusMicroreflections.
docsIfCmtsCmStatusExtUnerroreds		MUST	
docsIfCmtsCmStatusExtCorrecteds		MUST	
docsIfCmtsCmStatusExtUncorrectables		MUST	
docsIfCmtsCmStatusDocsisRegMode		MUST	The DPoG System MUST return a value of 'docsis11' for docsIfCmtsCmStatusDocsisRegMode.
docsIfCmtsCmStatusModulationType		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of 'unknown' for docsIfCmtsCmStatusModulationType.
docsIfCmtsCmStatusInetAddressType		MUST	
docsIfCmtsCmStatusInetAddress		MUST	
docsIfCmtsCmStatusValueLastUpdate		MUST	Set to the value of DPoG System's sysUpTime value when the docsIfCmtsCmStatusValue for this instance changes.
docsIfCmtsCmStatusHighResolutionTimingOffset		MUST	The value provided here is the RTT for the D-ONU with the units converted to the DOCSIS units (6.25 microsecs/(64*256)).

7.6.3.1 docsIfCmtsCmStatusValue Mappings

Reported by the DPoG System for each vCM known to the DPoG System.

CMTS State for CM	Original Comment (as defined in DOCS-IF-MIB [RFC 4546])	DPoG Applicability
other(1)	Any state other than below.	
ranging(2)	The CMTS has received an Initial Ranging Request message from the CM, and the ranging process is not yet complete.	The DPoG System has discovered a GPON ONU (thus default GEM) logical link on the D-ONU.
rangingAborted(3)	The CMTS has sent a Ranging Abort message to the CM.	The DPoG System did not successfully registered the GPON ONU within the timeout specified by the DOCSIS MULPI T9 timeout value.
rangingComplete(4)	The CMTS has sent a Ranging Complete message to the CM.	The DPoG System has discovered and registered the D-ONU. Simply stated, ONU Discovery & Ranging has been completed as described in in the D-ONU Initialization and Configuration appendix of [DPoG-OAM].
ipComplete(5)	The CMTS has received a DHCP reply message and forwarded it to the CM.	An IP Address has been assigned to the vCM.
registrationComplete(6)	The CMTS has sent a Registration Response message to the CM.	Not applicable to DPoG.
accessDenied(7)	The CMTS has sent a Registration Aborted message to the CM.	The DPoG System puts the vCM in this state if the modem configuration file cannot be supported by the DPoG System (or D-ONU).

CMTS State for CM	Original Comment (as defined in DOCS-IF-MIB [RFC 4546])	DPoG Applicability
operational(8)	Value 8 is considered reserved and should not be defined in future revisions of this MIB module to avoid conflict with documented implementations that support value 8 to indicate operational state after completing the BPI initialization process.	The DPoG System puts the vCM in this state when the OLT on the DPoG System and D-ONU have been properly configured to support the parameters in the modem configuration file.
registeredBPIInitializing(9)	Baseline Privacy (BPI) is enabled and the CMTS is in the process of completing BPI initialization. This state MAY last for a significant length of time if failures occur during the initialization process. After completion of BPI initialization, the CMTS will report registrationComplete(6).	Not applicable to DPoG Networks.

7.6.4 docsIfCmtsServiceTable

Object	vCM	DPoG System	Comments
docsIfCmtsServiceTable		MUST	Although defined as a read-write table, for DPoG Networks this table need only be supported as a read-only table.
docsIfCmtsServiceEntry		MUST	
docsIfCmtsServiceId		MUST	
docsIfCmtsServiceCmStatusIndex		MUST	Object has been deprecated due to its limited range (0..65535). Contains the registration identifier assigned by the DPoG System to the vCM associated with the SID.
docsIfCmtsServiceAdminStatus		MUST	Used to disable or delete SIDs. The DPoG System SHOULD return a value of 'enabled' for docsIfCmtsServiceAdminStatus .
docsIfCmtsServiceQosProfile		MUST	Does not apply to DPoG Systems because this only applies to 1.0 CoS. The DPoG System MUST return a value of '0' (zero) for docsIfCmtsServiceQosProfile.
docsIfCmtsServiceCreateTime		MUST	Set to the value of DPoG System's sysUpTime value when the SID is created.
docsIfCmtsServiceInOctets		MUST	
docsIfCmtsServiceInPackets		MUST	
docsIfCmtsServiceNewCmStatusIndex		MUST	Contains the registration identifier assigned by the DPoG System to the vCM associated with the SID.

7.6.5 docsIfCmtsChannelUtilizationTable

Object	vCM	DPoG System	Comments
docsIfCmtsChannelUtilizationTable		MUST	This table is indexed by Interface Index, docsIfCmtsChannelUtIfType, and docsIfCmtsChannelUtId. Depending on the value of docsIfCmtsChannelUtIfType, the Interface Index value corresponds to the logical downstream or upstream interface associated with the GPON/XG-PON (PON) interface. In DPoG the channel is the GPON wavelengths. For GPON or XG-PON, there is only one channel. For NGPON2, the number of channels is equal to the number of wavelengths supported.
docsIfCmtsChannelUtilizationEntry		MUST	
docsIfCmtsChannelUtIfType		MUST	Set to docsCableDownstream for the logical downstream interface or docsCableUpstream for the logical upstream interface.

Object	vCM	DPoG System	Comments
docsIfCmtsChannelUtId		MUST	Specifies the channel identifier. This value should be set to '1' (i.e., one channel in the downstream or upstream direction).
docsIfCmtsChannelUtUtilization		MUST	For DPoG Networks, the channel utilization should be expressed as the percentage of the potential bandwidth for the interface which is being currently used.

7.7 DOCS-IF3-MIB ([OSSIv3.0] Annex Q)

Table Name	vCM	DPoG System	Comments
docsIf3CmStatusTable	MUST		Most of these objects are not applicable to DPoG Networks. Some, like resets, can be mapped to corresponding GPON values. Operator feedback was that monitoring resets would also be an important statistic.
docsIf3CmCapabilities	SHOULD NOT		Not needed for the current version of the DPoG specifications. Could be used to support more than one capability in the future.
docsIf3CmtsCmRegStatusTable		MUST	Must be implemented because some of the fields are valid for D-ONUs. The addressing objects are the more valuable objects.
docsIf3CmtsCmCtrlCmd		MUST	These commands apply to DPoG Networks with the exception of muting. Operators feel that this object is of particular use for disabling customer access.
docsIf3CmEventCtrlTable	MUST		Operators feel that this is probably used as a TLV 11 OID.
docsIf3CmtsEventCtrlTable		MUST	
docsIf3CmtsEventNotif		MUST	
docsIf3CmEventNotif	MUST		
docsIf3MdNodeStatusTable		SHOULD NOT	DPoG Networks may want to support this table in the future even though the topology is very simple (assuming the concept of a serving group is kept).
docsIf3MdDsSgStatusTable		SHOULD NOT	If the concept of a channel identifier is kept for DPoG Networks, then this table should be supported.
docsIf3MdUsSgStatusTable		SHOULD NOT	If the concept of a channel identifier is kept for DPoG Networks, then this table should be supported.
docsIf3CmStatusUsTable	SHOULD NOT		Operators feel that similar information is needed for GPON troubleshooting, but are not sure if this is the right table.
docsIf3CmtsCmUsStatusTable		SHOULD NOT	Operators feel that similar information is needed for GPON troubleshooting, but are not sure if this is the right table.
docsIf3MdCfgTable		MUST	
docsIf3DsChSetTable		SHOULD NOT	Could be provided so that DPoG Networks can have a single DS channel in a Channel set.
docsIf3UsChSetTable		SHOULD NOT	Could be provided so that DPoG Networks can have a single US channel in a Channel set.
docsIf3CmDpvStatsTable	SHOULD NOT		This version of the DPoG specifications does not support DOCSIS DPV.
docsIf3MdChCfgTable		SHOULD NOT	This table is not needed in the short-term, but may be needed in future versions.

Table Name	vCM	DPoG System	Comments
docsIf3CmMdCfgTable	SHOULD NOT		This table is used to override the CM IP provisioning.
docsIf3MdUsToDsChMappingTable		MUST NOT	Not applicable for DPoG Networks.
docsIf3BondingGrpCfgTable		MUST NOT	No bonding is supported or needed in a DPoG Network.
docsIf3DsBondingGrpStatusTable		MUST NOT	No bonding is supported or needed in a DPoG Network.
docsIf3UsBondingGrpStatusTable		MUST NOT	No bonding is supported or needed in a DPoG Network.
docsIf3RccCfgTable		MUST NOT	This appears to be completely related to the DOCSIS PHY (and support for multiple US channels).
docsIf3RxChCfgTable		MUST NOT	More configuration objects related to multiple US channel support.
docsIf3RxModuleCfgTable		MUST NOT	More configuration objects related to multiple US channel support.
docsIf3RccStatusTable		MUST NOT	No RCCs to report.
docsIf3RxChStatusTable	MUST NOT	MUST NOT	No RCCS and no Receive Channels to report status on.
docsIf3RxModuleStatusTable	MUST NOT	MUST NOT	No RCCs, and no Receive Modules.
docsIf3SignalQualityExtTable	MUST NOT	MUST NOT	Specific to DOCSIS PHY.
docsIf3CmtsSignalQualityExtTable		MUST NOT	Specific to DOCSIS PHY.
docsIf3CmtsSpectrumAnalysisMeasTable		MUST NOT	Specific to DOCSIS PHY.
docsIf3UsChExtTable	MUST NOT	MUST NOT	Specific to DOCSIS PHY.

7.7.1 docsIf3CmStatusTable

Object	vCM	DPoG System	Comments
docsIf3CmStatusTable	MUST		
docsIf3CmStatusEntry	MUST		
docsIf3CmStatusValue	MUST		See following section for details on the implementation of this object for DPoG Networks.
docsIf3CmStatusCode	MUST		
docsIf3CmStatusResets	MUST		
docsIf3CmStatusLostSyncs	MUST		Does not apply to DPoG Networks. A vCM MUST return a value of '0' (zero) for docsIf3CmStatusLostSyncs .
docsIf3CmStatusInvalidMaps	MUST		Does not apply to DPoG Networks. A vCM MUST return a value of '0' (zero) for docsIf3CmStatusInvalidMaps.
docsIf3CmStatusInvalidUcds	MUST		Does not apply to DPoG Networks. A vCM MUST return a value of '0' (zero) for docsIf3CmStatusInvalidUcds.
docsIf3CmStatusInvalidRangingRsps	MUST		Does not apply to DPoG Networks. A vCM MUST return a value of '0' (zero) for docsIf3CmStatusInvalidRangingRsps.
docsIf3CmStatusInvalidRegRsps	MUST		Does not apply to DPoG Networks. A vCM MUST return a value of '0' (zero) for docsIf3CmStatusInvalidRegRsps.
docsIf3CmStatusT1Timeouts	MUST		Does not apply to DPoG Networks. A vCM MUST return a value of '0' (zero) for docsIf3CmStatusT1Timeouts.

Object	vCM	DPoG System	Comments
docsIf3CmStatusT2Timeouts	MUST		Does not apply to DPoG Networks. A vCM MUST return a value of '0' (zero) for docsIf3CmStatusT2Timeouts.
docsIf3CmStatusUCCsSuccesses	MUST		Does not apply to DPoG Networks. A vCM MUST return a value of '0' (zero) for docsIf3CmStatusUCCsSuccesses.
docsIf3CmStatusUCCFails	MUST		Does not apply to DPoG Networks. A vCM MUST return a value of '0' (zero) for docsIf3CmStatusUCCFails.

7.7.1.1 CmRegState Textual Convention/docsIf3CmStatusValue

Reported by the DPoG System on behalf of the vCM.

CM State	Original Comment (as defined in DOCS-IF3-MIB)	Applicability to DPoG
other	Indicates any state not described below.	
notReady	Indicates that the CM has not started the registration process yet.	The vCM is in the process of initialization.
notSynchronized	Indicates that the CM has not initiated or completed the synchronization of the downstream physical layer.	Not applicable to DPoG Networks.
phySynchronized	Indicates that the CM has completed the synchronization of the downstream physical layer.	Not applicable to DPoG Networks.
dsTopologyResolutionInProgress	Indicates that the CM is attempting to determine its MD-DS-SG.	Not applicable to DPoG Networks.
usParametersAcquired	Indicates that the CM has completed the upstream parameters acquisition or have completed the downstream and upstream service groups resolution, whether the CM is registering in a pre-3.0 or a 3.0 CMTS.	Not applicable to DPoG Networks.
rangingInProgress	Indicates that the CM has initiated the ranging process.	The DPoG System has discovered an ONU at the “ONU Discovery & Ranging” stage of ONU initialization as described in in the D-ONU Initialization and Configuration appendix of [DPoG-OAM]. This state indicates the ranging process and following processes are in progress.
rangingComplete	Indicates that the CM has completed initial ranging and received a Ranging Status of success from the CMTS in the RNG-RSP message.	The DPoG System has discovered and registered the D-ONU. Simply stated, ONU Discovery & Ranging has been completed as described in in the D-ONU Initialization and Configuration appendix of [DPoG-OAM].
eaeInProgress	Indicates that the CM has sent an Auth Info message for EAE.	The D-ONU associated with the vCM is currently being authenticated by the DPoG System.
dhcpv4InProgress	Indicates that the CM has sent a DHCPv4 DISCOVER to gain IP connectivity.	The DPoG System has generated a DHCPv4 DISCOVER message to obtain an IPv4 address.
dhcpv6InProgress	Indicates that the CM has sent a DHCPv6 Solicit message.	The DPoG System has generated a DHCPv6 SOLICIT message to obtain an IPv6 address.
dhcpv4Complete	Indicates that the CM has received a DHCPv4 ACK message from the CMTS.	An IPv4 address has been assigned to the vCM.
dhcpv6Complete	Indicates that the CM has received a DHCPv6 Reply message from the CMTS.	An IPv6 address has been assigned to the vCM.

CM State	Original Comment (as defined in DOCS-IF3-MIB)	Applicability to DPoG
todEstablished	Indicates that the CM has successfully acquired time of day. If the ToD is acquired after the CM is operational, this value should not be reported.	Not applicable to DPoG Networks.
securityEstablished	Indicates that the CM has successfully completed the BPI initialization process.	The connection to the D-ONU has been secured and the D-ONU's certificate has been authenticated by the DPoG System.
configFileDownloadComplete	Indicates that the CM has completed the configuration file download process.	The DPoG System has retrieved the modem provisioning file for the vCM.
registrationInProgress	Indicates that the CM has sent a Registration Request (REG-REQ or REG-REQ-MP).	The DPoG System is in the process of sending OAM messages to the D-ONU based on the contents of the provisioning file.
registrationComplete	Indicates that the CM has successfully completed the Registration process with the CMTS.	Not applicable to DPoG Networks.
accessDenied	Indicates that the CM has received a registration aborted notification from the CMTS.	The vCM has been denied access because the modem configuration file cannot be supported by the DPoG System (or D-ONU).
operational	Indicates that the CM has completed all necessary initialization steps and is operational.	The OLT on the DPoG System and D-ONU have been properly configured to support the parameters in the modem configuration file.
bpiInit	Indicates that the CM has started the BPI initialization process as indicated in the CM configuration file. If the CM already performed EAE, this state is skipped by the CM.	Not applicable to DPoG Networks.
forwardingDisabled	Indicates that the registration process was completed, but the network access option in the received configuration file prohibits forwarding.	The OLT on the DPoG System and D-ONU have been properly configured to support the parameters in the modem configuration file, but the configuration file has blocked network access for the D-ONU.
rfMuteAll	Indicates that the CM is instructed to mute all channels in the CM-CTRL-REQ message from CMTS.	Not applicable to DPoG Networks, however, It could be used to note when an upstream laser has been administratively disabled.

7.7.2 docsIf3CmtsCmRegStatusTable

Object	vCM	DPoG System	Comments
docsIf3CmtsCmRegStatusTable		MUST	
docsIf3CmtsCmRegStatusEntry		MUST	
docsIf3CmtsCmRegStatusId		MUST	Contains the registration identifier assigned by the DPoG System to the vCM.
docsIf3CmtsCmRegStatusMacAddr		MUST	Contains the MAC Address that identifies the D-ONU for the vCM.
docsIf3CmtsCmRegStatusIPv6Addr		MUST	Contains the IPv6 address assigned to the vCM.
docsIf3CmtsCmRegStatusIPv6LinkLocal		MUST	
docsIf3CmtsCmRegStatusIPv4Addr		MUST	Contains the IPv4 address assigned to the vCM.
docsIf3CmtsCmRegStatusValue		MUST	See following section for details on the implementation of this object for DPoG Networks.
docsIf3CmtsCmRegStatusMdIfIndex		MUST	Contains the Interface Index value assigned to the logical MAC Domain on the DPoG System for the GPON (PON) interface connected to the D-ONU.

Object	vCM	DPoG System	Comments
docsIf3CmtsCmRegStatusMdCmSgId		MUST	Not applicable to this version of DPoG specifications. The DPoG System MUST return a value of '0' (zero) for docsIf3CmtsCmRegStatusMdCmSgId.
docsIf3CmtsCmRegStatusRcpId		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsIf3CmtsCmRegStatusRcpId.
docsIf3CmtsCmRegStatusRccStatusId		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsIf3CmtsCmRegStatusRccStatusId.
docsIf3CmtsCmRegStatusRcsId		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsIf3CmtsCmRegStatusRcsId.
docsIf3CmtsCmRegStatusTcsId		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsIf3CmtsCmRegStatusTcsId.
docsIf3CmtsCmRegStatusQosVersion		MUST	The DPoG System MUST return a value of 'docsis11' for docsIf3CmtsCmRegStatusQosVersion.
docsIf3CmtsCmRegStatusLastRegTime		MUST	
docsIf3CmtsCmRegStatusAddrResolutionReqs		MUST	

7.7.2.1 CmtsCmRegState Textual Convention/ docsIf3CmtsCmRegStatusValue

Reported by the DPoG System for each vCM known to the DPoG System.

CMTS State for CM	Original Comment (as defined in DOCS-IF3-MIB)	Applicability to DPoG
Other	Indicates any state not described below.	
initialRanging	Indicates that the CMTS has received an Initial Ranging Request message from the CM, and the ranging process is not yet complete.	The DPoG System has received a registration message from the D-ONU.
rangingAutoAdjComplete	Indicates that the CM has completed initial ranging and the CMTS sends a Ranging Status of success in the RNG-RSP.	The DPoG System has discovered and registered the D-ONU. Simply stated, ONU Discovery & Ranging has been completed as described in in the D-ONU Initialization and Configuration appendix of [DPoG-OAM].
startEae	Indicates that the CMTS has received an Auth Info message for EAE from the CM.	The D-ONU associated with the vCM is in the process of being authenticated by the DPoG System.
startDhcpv4	Indicates that the CMTS has received a DHCPv4 DISCOVER message from the CM.	The DPoG System has generated a DHCPv4 DISCOVER message to obtain an IPv4 address for the vCM.
startDhcpv6	Indicates that the CMTS has received a DHCPv6 Solicit message from the CM.	The DPoG System has generated a DHCPv6 SOLICIT message to obtain an IPv6 address for the vCM.
dhcpv4Complete	Indicates that the CMTS has sent a DHCPv4 ACK message to the CM.	An IPv4 address has been assigned to the vCM.
dhcpv6Complete	Indicates that the CMTS has sent a DHCPv6 Reply message to the CM.	An IPv6 address has been assigned to the vCM.
startConfigFileDownload	Indicates that the CM has started the configuration file download. If the TFTP Proxy feature is not enabled, the CMTS may not report this state.	The DPoG System has sent a TFTP request for the configuration file for the vCM.

CMTS State for CM	Original Comment (as defined in DOCS-IF3-MIB)	Applicability to DPoG
configFileDownloadComplete	Indicates that the CM has completed the configuration file download process. If the TFTP Proxy feature is not enabled, the CMTS is not required to report this state.	The DPoG System has retrieved the modem configuration file for the vCM.
startRegistration	Indicates that the CMTS has received a Registration Request (REG-REQ or REG-REQ-MP) from the CM.	The DPoG System is in the process of sending OAM messages to the D-ONU based on the contents of the modem configuration file.
registrationComplete	Indicates that the CMTS has received a Registration Acknowledge (REG-ACK) with a confirmation code of okay/success.	Not applicable to DPoG Networks.
operational	Indicates that the CM has completed all necessary initialization steps and is operational.	The OLT on the DPoG System and D-ONU have been properly configured to support the parameters in the modem configuration file.
bpiInit	Indicates that the CMTS has received an Auth Info or Auth Request message as part of BPI Initialization.	Not applicable to DPoG Networks.
forwardingDisabled	Indicates that the registration process was completed, but the network access option in the received configuration file prohibits forwarding.	The OLT on the DPoG System and D-ONU have been properly configured to support the parameters in the modem configuration file, but the configuration file has blocked network access for the ONU.
rfMuteAll	Indicates that the CM is instructed to mute all channels in the CM-CTRL-REQ message from CMTS.	Not applicable to this version of DPoG specifications; however, It could be used to note when an upstream laser has been administratively disabled.

7.7.3 docsIf3CmtsCmCtrlCmd

Object	vCM	DPoG System	Comments
docsIf3CmtsCmCtrlCmd			
docsIf3CmtsCmCtrlCmdMacAddr		MUST	MAC Address of D-ONU to which the request is addressed.
docsIf3CmtsCmCtrlCmdMuteUsChId		MUST	Not applicable to DPoG Networks; applies to use of RF Mute command. The DPoG System MUST return a value of '0' (zero) for docsIf3CmtsCmCtrlCmdMuteUsChId.
docsIf3CmtsCmCtrlCmdMuteInterval		MUST	Not applicable to this version of DPoG specifications; applies to use of RF Mute command. The DPoG System MUST return a value of '1' for docsIf3CmtsCmCtrlCmdMuteInterval.
docsIf3CmtsCmCtrlCmdDisableForwarding		MUST	
docsIf3CmtsCmCtrlCmdCommit		MUST	The 'mute' option is not supported by DPoG Networks. 'cmReinit' causes the vCM and D-ONU to be reset. 'disableForwarding' causes traffic to stop (or start) being forwarded by the D-ONU, depending on the value of docsIf3CmtsCmCtrlCmdDisableForwarding.

7.7.4 docsIf3MdCfgTable

Object	vCM	DPoG System	Comments
docsIf3MdCfgTable		MUST	
docsIf3MdCfgEntry		MUST	

Object	vCM	DPoG System	Comments
docsIf3MdCfgMddInterval		MUST	Not applicable to DPoG Networks, as this relates to the transmission of DOCSIS MDD messages. The DPoG System MUST return the default value '2000' for docsIf3MdCfgMddInterval.
docsIf3MdCfgIpProvMode		MUST	Required to provision IpProvMode of vCMs on a particular Mac Domain. The default value of this attribute MUST be determined by the system level default value defined in [DPoE-IPNE]. The "alternate" and "dual-stack" value for this attribute is not supported by DPoG Networks. If an attempt is made to set docsIf3MdCfgIpProvMode to "alternate" or "dual-stack", the DPoG System MUST reject the set.
docsIf3MdCfgCmStatusEvCtlEnabled		MUST	Not applicable to DPoG Networks. The DPoG System MUST return the value 'false' for docsIf3MdCfgCmStatusEvCtlEnabled.
docsIf3MdCfgUsFreqRange		MUST	Not applicable to DPoG Networks. This relates to advertising the supported DOCSIS upstream frequency range on a particular Mac Domain. The DPoG System MUST return the default value standard for docsIf3MdCfgUsFreqRange.
docsIf3MdCfgMcastDsidFwdEnabled		MUST	Not applicable to DPoG Networks. The DPoG System MUST return the value 'false' for docsIf3MdCfgMcastDsidFwdEnabled.
docsIf3MdCfgMultRxChModeEnabled		MUST	Not applicable to DPoG Networks. The DPoG System MUST return the value false for docsIf3MdCfgMultRxChModeEnabled.
docsIf3MdCfgMultTxChModeEnabled		MUST	Not applicable to DPoG Networks. The DPoG System MUST return the value 'false' for docsIf3MdCfgMultTxChModeEnabled.
docsIf3MdCfgEarlyAuthEncrCtrl		MUST	The DPoG System MUST implement docsIf3MdCfgEarlyAuthEncrCtrl as defined by [DPoG-SEC].
docsIf3MdCfgTftpProxyEnabled		MUST	Not applicable to DPoG Networks. TFTP Proxy is not required on a DPoG System. Unlike DOCSIS where the CM requests and parses the CM configuration file, a vCM instance on the DPoG System parses CM configuration files. The DPoG System MUST return the value 'false' for docsIf3MdCfgTftpProxyEnabled.
docsIf3MdCfgSrcAddrVerifEnabled		MUST	
docsIf3MdCfgDownChannelAnnex		MUST	Not applicable to DPoG Networks. The DPoG System MUST return the default value 'unknown' for docsIf3MdCfgDownChannelAnnex.
docsIf3MdCfgCmUdcEnabled		MUST	
docsIf3MdCfgSendUdcRulesEnabled		MUST	
docsIf3MdCfgServiceTypeIdList		MUST	Not applicable to DPoG Networks. The DPoG System MUST return the default value " " for docsIf3MdCfgServiceTypeIdList.
docsIf3MdCfgBpi2EnforceCtr		MUST	Not applicable to DPoG Networks. The DPoG System MUST return the value 'disable' for docsIf3MdCfgBpi2EnforceCtr.

7.8 DOCS-IFEXT2-MIB ([OSSIv3.0] Annex H)

The majority of the objects in this MIB are related to SCDMA support, specifically the Maximum Scheduled Codes (MSC) feature.

Table Name	vCM	DPoG System	Comments
docsIfExt2CmtsUpChannelTable		MUST NOT	SCDMA is not supported for GPON.
docsIfExt2CmMscStatusTable	MUST NOT		SCDMA is not supported for GPON.
docsIfExt2CmtsMscGlobalEnable		MUST NOT	SCDMA is not supported for GPON.
docsIfExt2CmtsCmMscStatusTable		MUST NOT	SCDMA is not supported for GPON.
docsIfExt2CmtsUpChannelMscTable		MUST NOT	SCDMA is not supported for GPON.

7.9 DOCS-MCAST-AUTH-MIB ([OSSIv3.0] Annex Q)

Table Name	vCM	DPoG System	Comments
docsMcastAuthCtrl		MUST	
docsMCastAuthCmtsCmStatusTable		MUST	
docsMcastAuthProfileSessRuleTable		MUST	
docsMcastAuthStaticSessRuleTable		MAY	
docsMcastAuthProfilesTable		MUST	

7.9.1 docsMcastAuthCmtsCmStatusTable

Object	vCM	DPoG System	Comments
docsMcastAuthCmtsCmStatusTable		MUST	
docsMcastAuthCmtsCmStatusEntry		MUST	
docsMcastAuthCmtsCmStatusCfgProfileNameList		MUST	
docsMcastAuthCmtsCmStatusCfgListId		MUST	
docsMcastAuthCmtsCmStatusMaxNumSess		MUST	For DPoG Networks, this attribute is redefined as the default maximum number of multicast sessions authorized to be dynamically joined by clients reached through each CMIM interface. The definition differs from DOCSIS in two ways. First, the attribute is a per-interface value for DPoG versus a per-CM value. Second, the attribute is a default that can be overridden for a particular interface by the value of dpogMcastAuthCmtsCmStatusIfaceMaxNumSess.
docsMcastAuthCmtsCmStatusCfgParamFlag		MUST	

7.10 DOCS-MCAST-MIB ([OSSIv3.0] Annex Q)

Table Name	vCM	DPoG System	Comments
docsMcastCmtsGrpCfgTable		MUST	
docsMcastCmtsGrpEncryptCfgTable		MAY	If the feature is implemented, then docsMcastCmtsGrpEncryptCfgTable applies.
docsMcastCmtsGrpPhsCfgTable		MUST NOT	PHS is not applicable to DPoG Networks.
docsMcastCmtsGrpQosCfgTable		MUST	
docsMcastCmtsReplSessTable		MUST	
docsMcastDefGrpSvcClass		MUST	
docsMcastDsidPhsTable		MUST NOT	PHS is not applicable to DPoG Networks.

7.10.1 docsMcastCmtsGrpCfgTable

Object	vCM	DPoG System	Comments
docsMcastCmtsGrpCfgTable		MUST	
docsMcastCmtsGrpCfgEntry		MUST	
docsMcastCmtsGrpCfgId		MUST	
docsMcastCmtsGrpCfgRulePriority		MUST	
docsMcastCmtsGrpCfgPrefixAddrType		MUST	
docsMcastCmtsGrpCfgSrcPrefixAddr		MUST	
docsMcastCmtsGrpCfgSrcPrefixLen		MUST	
docsMcastCmtsGrpCfgGrpPrefixAddr		MUST	
docsMcastCmtsGrpCfgGrpPrefixLen		MUST	
docsMcastCmtsGrpCfgTosLow		MUST	
docsMcastCmtsGrpCfgTosHigh		MUST	
docsMcastCmtsGrpCfgTosMask		MUST	
docsMcastCmtsGrpCfgQosConfigId		MUST	
docsMcastCmtsGrpCfgEncryptConfigId		MUST	
docsMcastCmtsGrpCfgPhsConfigId		MUST	Not Applicable to DPoG Networks. The DPoG System MUST return the value '0' (zero) for docsMcastCmtsGrpCfgPhsConfigId.
docsMcastCmtsGrpCfgRowStatus		MUST	

7.10.2 docsMcastCmtsGrpEncryptCfgTable

The DPoG Network only supports AES-128 encryption. The DPoG System contains one entry within this table that can be associated with docsMcastCmtsGrpCfgTable entries specifying that resulting multicast sessions will be encrypted with AES-128.

Object	vCM	DPoG System	Comments
docsMcastCmtsGrpEncryptCfgTable		MUST	
docsMcastCmtsGrpEncryptCfgEntry		MUST	
docsMcastCmtsGrpEncryptCfgId		MUST	
docsMcastCmtsGrpEncryptCfgCtrl		MUST	The DPoG System MUST return the value “cmts(1)” for docsMcastCmtsGrpEncryptCfgCtrl.
docsMcastCmtsGrpEncryptCfgAlg		MUST	The DPoG System MUST return the value ‘aes128CbcMode’ for docsMcastCmtsGrpEncryptCfgAlg.
docsMcastCmtsGrpEncryptCfgRowStatus		MUST	

7.10.3 docsMcastCmtsGrpQosCfgTable

Object	vCM	DPoG System	Comments
docsMcastCmtsGrpQosCfgTable		MUST	
docsMcastCmtsGrpQosCfgEntry		MUST	
docsMcastCmtsGrpQosCfgId		MUST	
docsMcastCmtsGrpQosCfgServiceClassName		MUST	
docsMcastCmtsGrpQosCfgQosCtrl		MUST	
docsMcastCmtsGrpQosCfgAggSessLimit		MUST	
docsMcastCmtsGrpQosCfgAppId		MUST	
docsMcastCmtsGrpQosCfgRowStatus		MUST	

7.10.4 docsMcastCmtsReplSessTable

Object	vCM	DPoG System	Comments
docsMcastCmtsReplSessTable		MUST	
docsMcastCmtsReplSessEntry		MUST	
docsMcastCmtsReplSessPrefixAddrType		MUST	
docsMcastCmtsReplSessGrpPrefix		MUST	
docsMcastCmtsReplSessSrcPrefix		MUST	
docsMcastCmtsReplSessMdlfIndex		MUST	
docsMcastCmtsReplSessDcsId		MUST	The DPoG System MUST return the DCID associated with the multicast service flow docsMcastCmtsReplSessDcsId.
docsMcastCmtsReplSessServiceFlowId		MUST	
docsMcastCmtsReplSessDsid		MUST	The DPoG System MUST return the mGEMID of the multicast service flow docsMcastCmtsReplSessDsid.
docsMcastCmtsReplSessSaid		MUST	Not Applicable to DPoG Networks. The DPoG System MUST return the value '0' (zero) for docsMcastCmtsReplSessSaid.

7.10.5 docsMcastDefGrpSvcClass

Object	vCM	DPoG System	Comments
docsMcastDefGrpSvcClass		MUST	
docsMcastDefGrpSvcClassDef		MUST	

7.11 DOCS-QOS3-MIB ([OSSIv3.0] Annex Q)

Table Name	vCM	DPoG System	Comments
docsQosPktClassTable	MUST	MUST	
docsQosParamSetTable	MUST	MUST	Not all parameters apply to GPON. See the comments for docsQosServiceFlowTable table.
docsQosServiceFlowTable	MUST	MUST	This table is supported, but not all objects apply. For instance, there is no DSID or Channel Set ID.
docsQosServiceFlowStatsTable	MUST	MUST	
docsQosServiceFlowLogTable		SHOULD NOT	This table does not seem to be valuable in the presence of the Subscriber Usage records provided by IPDR. Operators do not need this table in the current version of the specification.
docsQosServiceClassTable		MUST	
docsQosCmtsMacToSrvFlowTable		MUST	
docsQosGrpServiceFlowTable		MUST	
docsQosGrpPktClassTable		MUST	
docsQosDynamicServiceStatsTable	SHOULD NOT	SHOULD NOT	Currently not applicable to GPON. There is no dynamic service messaging defined between the DPoG System and D-ONUs in the current version of the specification.
docsQosUpstreamStatsTable		MUST NOT	This is not applicable to GPON.

Table Name	vCM	DPoG System	Comments
docsQosPhsTable	MUST NOT	MUST NOT	PHS is not applicable to GPON.
docsQosServiceFlowSidClusterTable	MUST NOT	MUST NOT	No upstream channel bonding in GPON, so this is not needed.
docsQosUpChCounterExtTable		MUST NOT	This is not applicable to GPON.
docsQosServiceFlowCcfStatsTable		MUST NOT	This is not applicable to GPON.
docsQosCmServiceUsStatsTable	MUST NOT		This is not applicable to GPON.
docsQosCmtsDsidTable		MUST NOT	No downstream bonding in GPON, so this is not needed.
docsQosCmtsDebugDsidTable		MUST NOT	No downstream bonding in GPON, so this is not needed.
docsQosCmtsDebugDsidStatsTable		MUST NOT	No downstream bonding in GPON, so this is not needed.
docsQosCmDsidTable	MUST NOT		No downstream bonding in GPON, so this is not needed.

7.11.1 docsQosPktClassTable

The docsQosPktClassTable is augmented by new management objects as defined in the dpogPktClassTable and MUST be supported by the DPoG System. The dpogPktClassTable provides new management objects that are applicable only to the DPoG System in addition to the following docsQosPktClassTable objects as described in [OSSIv3.0].

The docsQos3PktClassMibBitMap object MUST be supported by the DPoG System for backwards-compatibility when DOCSIS-style classifiers are used in the modem configuration file. The DPoG System MUST implement the dpogPktClassBitMap object when new DPoG Classifiers are used.

The docsQos3PktClassUserPriLow and docsQos3PktClassUserPriHigh objects MUST be supported by the DPoG System for backwards-compatibility when DOCSIS-style classifiers are used in the modem configuration file. The DPoG System MUST implement the dpogPktClassCVlanPCP object to identify a single priority when new DPoG Classifiers are used.

Object	vCM	DPoG System	Comments
docsQosPktClassTable	MUST	MUST	
docsQosPktClassEntry	MUST	MUST	
docsQosPktClassId	MUST	MUST	
docsQosPktClassDirection	MUST	MUST	
docsQosPktClassPriority	MUST	MUST	
docsQosPktClassIpTosLow	MUST	MUST	
docsQosPktClassIpTosHigh	MUST	MUST	
docsQosPktClassIpTosMask	MUST	MUST	
docsQosPktClassIpProtocol	MUST	MUST	
docsQosPktClassIpSourceAddr	MUST	MUST	
docsQosPktClassIpSourceMask	MUST	MUST	
docsQosPktClassIpDestAddr	MUST	MUST	
docsQosPktClassIpDestMask	MUST	MUST	
docsQosPktClassSourcePortStart	MUST	MUST	

Object	vCM	DPoG System	Comments
docsQosPktClassSourcePortEnd	MUST	MUST	
docsQosPktClassDestPortStart	MUST	MUST	
docsQosPktClassDestPortEnd	MUST	MUST	
docsQosPktClassDestMacAddr	MUST	MUST	
docsQosPktClassDestMacMask	MUST	MUST	
docsQosPktClassSourceMacAddr	MUST	MUST	
docsQosPktClassEnetProtocolType	MUST	MUST	This MIB object will always be interpreted as the value contained "after" the 802.1 header, independent of what tagging convention is used. A vCM MUST support a value of 'ethertype(1)' for docsQosPktClassEnetProtocolType. The DPoG System MUST support a value of 'ethertype(1)' for docsQosPktClassEnetProtocolType. A vCM MUST NOT support a value of 'mac(3)' for docsQosPktClassEnetProtocolType. The DPoG System MUST NOT support a value of 'mac(3)' for docsQosPktClassEnetProtocolType. The value 'mac(3)' does not apply to DPoG Networks. A vCM MAY support other values for docsQosPktClassEnetProtocolType. The DPoG System MAY support other values for docsQosPktClassEnetProtocolType.
docsQosPktClassEnetProtocol	MUST	MUST	
docsQosPktClassUserPriLow	MUST	MUST	
docsQosPktClassUserPriHigh	MUST	MUST	
docsQosPktClassVlanId	MUST	MUST	
docsQosPktClassState	MUST	MUST	Only 'active' is currently supported for DPoG Networks. The DPoG System MUST return a value of 'active' for docsQosPktClassState. A vCM MUST return a value of 'active' for docsQosPktClassState.
docsQosPktClassPkts	MUST	MUST	
docsQosPktClassBitMap	MUST	MUST	
docsQosPktClassIpAddrType	MUST	MUST	
docsQosPktClassFlowLabel	MUST	MUST	
docsQosPktClassCmInterfaceMask	MUST	MUST	

7.11.2 docsQosParamSetTable

Object	vCM	DPoG System	Comments
docsQosParamSetTable	MUST	MUST	This table has separate entries (Active, Admitted, Provisioned) for each service flow. For this version of DPoG specifications, all of the entries will be present in the table, but they all will have the 'provisioned' values.
docsQosParamSetEntry	MUST	MUST	
docsQosParamSetServiceClassName	MUST	MUST	
docsQosParamSetPriority	MUST	MUST	

Object	vCM	DPoG System	Comments
docsQosParamSetMaxTrafficRate	MUST	MUST	.
docsQosParamSetMaxTrafficBurst	MUST	MUST	
docsQosParamSetMinReservedRate	MUST	MUST	
docsQosParamSetMinReservedPkt	MUST	MUST	Not applicable to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsQosParamSetMinReservedPkt. A vCM MUST return a value of '0' (zero) for docsQosParamSetMinReservedPkt.
docsQosParamSetActiveTimeout	MUST	MUST	Not applicable to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsQosParamSetActiveTimeout. A vCM MUST return a value of '0' (zero) for docsQosParamSetActiveTimeout.
docsQosParamSetAdmittedTimeout	MUST	MUST	Not applicable to DPoG Networks. The DPoG System MUST return a value of '200' for docsQosParamSetAdmittedTimeout. A vCM MUST return a value of '200' for docsQosParamSetAdmittedTimeout.
docsQosParamSetMaxConcatBurst	MUST	MUST	.
docsQosParamSetSchedulingType	MUST	MUST	The DPoG System MUST return a value of 'undefined' for the docsQosParamSetSchedulingType object. A vCM MUST return a value of 'undefined' for the docsQosParamSetSchedulingType object.
docsQosParamSetNomPollInterval	MUST	MUST	
docsQosParamSetTolPollJitter	MUST	MUST	
docsQosParamSetUnsolicitGrantSize	MUST	MUST	
docsQosParamSetNomGrantInterval	MUST	MUST	
docsQosParamSetTolGrantJitter	MUST	MUST	
docsQosParamSetGrantsPerInterval	MUST	MUST	
docsQosParamSetTosAndMask	MUST	MUST	A vCM MUST support a value of '0x00' for docsQosParamSetTosAndMask. A vCM MAY support values other than '0x00' for docsQosParamSetTosAndMask. The DPoG System MUST support a value of '0x00' for docsQosParamSetTosAndMask. The DPoG System MAY support values other than '0x00' for docsQosParamSetTosAndMask.
docsQosParamSetTosOrMask	MUST	MUST	
docsQosParamSetMaxLatency	MUST	MUST	Not applicable to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsQosParamSetMaxLatency. A vCM MUST return a value of '0' (zero) for docsQosParamSetMaxLatency.
docsQosParamSetType	MUST	MUST	
docsQosParamSetRequestPolicyOct	MUST	MUST	The only bit field that is supported by DPoG specifications is 'piggybackReqWithData'.

Object	vCM	DPoG System	Comments
docsQosParamSetBitMap	MUST	MUST	Only those TLVs in the bitfield which are supported by DPoG specifications should be set.
docsQosParamSetServiceFlowId	MUST	MUST	
docsQosParamSetRequiredAttrMask	MUST	MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsQosParamSetRequiredAttrMask. A vCM MUST return a value of '0' (zero) for docsQosParamSetRequiredAttrMask.
docsQosParamSetForbiddenAttrMask	MUST	MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsQosParamSetForbiddenAttrMask. A vCM MUST return a value of '0' (zero) for docsQosParamSetForbiddenAttrMask.
docsQosParamSetAttrAggrRuleMask	MUST	MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsQosParamSetAttrAggrRuleMask. A vCM MUST return a value of '0' (zero) for docsQosParamSetAttrAggrRuleMask.
docsQosParamSetAppId	MUST	MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsQosParamSetAppId. A vCM MUST return a value of '0' (zero) for docsQosParamSetAppId.
docsQosParamSetMultiplierContentionReqWindow	MUST	MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '8' for docsQosParamSetMultiplierContentionReqWindow. A vCM MUST return a value of '8' for docsQosParamSetMultiplierContentionReqWindow.
docsQosParamSetMultiplierBytesReq	MUST	MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '4' for docsQosParamSetMultiplierBytesReq. A vCM MUST return a value of '4' for docsQosParamSetMultiplierBytesReq.
docsQosParamSetMaxReqPerSidCluster	MUST	MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsQosParamSetMaxReqPerSidCluster. A vCM MUST return a value of '0' (zero) for docsQosParamSetMaxReqPerSidCluster.
docsQosParamSetMaxOutstandingBytesPerSidCluster	MUST	MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsQosParamSetMaxOutstandingBytesPerSidCluster. A vCM MUST return a value of '0' (zero) for docsQosParamSetMaxOutstandingBytesPerSidCluster.

Object	vCM	DPoG System	Comments
docsQosParamSetMaxTotBytesReqPerSidCluster	MUST	MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsQosParamSetMaxTotBytesReqPerSidCluster. A vCM MUST return a value of '0' (zero) for docsQosParamSetMaxTotBytesReqPerSidCluster.
docsQosParamSetMaxTimeInSidCluster	MUST	MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsQosParamSetMaxTimeInSidCluster. A vCM MUST return a value of '0' (zero) for docsQosParamSetMaxTimeInSidCluster.
docsQosParamSetPeakTrafficRate	MUST	MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsQosParamSetPeakTrafficRate. A vCM MUST return a value of '0' (zero) for docsQosParamSetPeakTrafficRate.
docsQosParamSetDsResequencing	MUST	MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsQosParamSetDsResequencing. A vCM MUST return a value of '0' (zero) for docsQosParamSetDsResequencing.

7.11.3 docsQosServiceFlowTable

In the DPoGv1.0 specifications, the service flow is mapped to a GEMID. It is important to note that in GPON a GEMID is bi-directional, while a service flow is uni-directional. With the exception of Multicast traffic, all traffic classes have two service flows (up and down), and thus can be mapped to the same GEMID (for example, HSD Silver Down can have the same GEMID as its corollary HSD Silver Up).

The upstream traffic Alloc-ID (TCONT) in this specific case is also mapped to the GEMID in a one-to-one manner. Therefore, each TCONT contains only one GEM.

Object	vCM	DPoG System	Comments
docsQosServiceFlowTable	MUST	MUST	
docsQosServiceFlowEntry	MUST	MUST	
docsQosServiceFlowId	MUST	MUST	
docsQosServiceFlowSID	MUST	MUST	
docsQosServiceFlowDirection	MUST	MUST	
docsQosServiceFlowPrimary	MUST	MUST	
docsQosServiceFlowParamSetTypeStatus	MUST	MUST	For DPoG Networks, all three bits (active, admitted, provisioned) of the docsQosServiceFlowParamSetTypeStatus object MUST be set for entries in the docsQosServiceFlowTable.
docsQosServiceFlowChSetId	MUST	MUST	The DPoG System MUST return '1', as only a single channel exists for GPON & XG-PON. A vCM MUST return '1', as only a single channel exists for GPON & XG-PON.
docsQosServiceFlowAttrAssignSuccess	MUST	MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of 'false' for docsQosServiceFlowAttrAssignSuccess. A vCM MUST return a value of 'false' for docsQosServiceFlowAttrAssignSuccess.

Object	vCM	DPoG System	Comments
docsQosServiceFlowDsid	MUST	MUST	For multicast Group Service Flows, the DPoG System MUST return the value of the mGEMID associated with the GSF for docsQosServiceFlowDsid. For all remaining cases, the DPoG System MUST return a value of '0' (zero) for docsQosServiceFlowDsid. For multicast Group Service Flows, a vCM MUST return the value of the mGEMID associated with the GSF for docsQosServiceFlowDsid. For all remaining cases, a vCM MUST return a value of '0' (zero) for docsQosServiceFlowDsid.
docsQosServiceFlowMaxReqPerSidCluster	MUST	MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsQosServiceFlowMaxReqPerSidCluster. A vCM MUST return a value of '0' (zero) for docsQosServiceFlowMaxReqPerSidCluster.
docsQosServiceFlowMaxOutstandingBytesPerSidCluster	MUST	MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsQosServiceFlowMaxOutstandingBytesPerSidCluster. A vCM MUST return a value of '0' (zero) for docsQosServiceFlowMaxOutstandingBytesPerSidCluster.
docsQosServiceFlowMaxTotBytesReqPerSidCluster	MUST	MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsQosServiceFlowMaxTotBytesReqPerSidCluster. A vCM MUST return a value of '0' (zero) for docsQosServiceFlowMaxTotBytesReqPerSidCluster.
docsQosServiceFlowMaxTimeInSidCluster	MUST	MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsQosServiceFlowMaxTimeInSidCluster. A vCM MUST return a value of '0' (zero) for docsQosServiceFlowMaxTimeInSidCluster.

7.11.4 docsQosServiceFlowStatsTable

Object	vCM	DPoG System	Comments
docsQosServiceFlowStatsTable	MUST	MUST	
docsQosServiceFlowStatsEntry	MUST	MUST	
docsQosServiceFlowPkts	MUST	MUST	
docsQosServiceFlowOctets	MUST	MUST	
docsQosServiceFlowTimeCreated	MUST	MUST	
docsQosServiceFlowTimeActive	MUST	MUST	
docsQosServiceFlowPHSUnknowns	MUST	MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsQosServiceFlowPHSUnknowns. A vCM MUST return a value of '0' (zero) for docsQosServiceFlowPHSUnknowns.
docsQosServiceFlowPolicedDropPkts	MUST	MUST	
docsQosServiceFlowPolicedDelayPkts	MUST	MUST	Not supported in DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsQosServiceFlowPolicedDelayPkts. A vCM MUST return a value of '0' (zero) for docsQosServiceFlowPolicedDelayPkts.

7.11.5 docsQosServiceClassTable

Object	vCM	DPoG System	Comments
docsQosServiceClassTable		MUST	
docsQosServiceClassEntry		MUST	
docsQosServiceClassName		MUST	
docsQosServiceClassStatus		MUST	
docsQosServiceClassPriority		MUST	
docsQosServiceClassMaxTrafficRate		MUST	
docsQosServiceClassMaxTrafficBurst		MUST	
docsQosServiceClassMinReservedRate		MUST	
docsQosServiceClassMinReservedPkt		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsQosServiceClassMinReservedPkt.
docsQosServiceClassMaxConcatBurst		MUST	
docsQosServiceClassNomPollInterval		MUST	
docsQosServiceClassTolPollJitter		MUST	
docsQosServiceClassUnsolicitGrantSize		MUST	
docsQosServiceClassNomGrantInterval		MUST	
docsQosServiceClassTolGrantJitter		MUST	
docsQosServiceClassGrantsPerInterval		MUST	
docsQosServiceClassMaxLatency		MUST	
docsQosServiceClassActiveTimeout		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsQosServiceClassActiveTimeout.
docsQosServiceClassAdmittedTimeout		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsQosServiceClassAdmittedTimeout.
docsQosServiceClassSchedulingType		MUST	
docsQosServiceClassRequestPolicy		MUST	The only bit field that is supported by DPoG specifications is 'piggybackReqWithData'.
docsQosServiceClassTosAndMask		MUST	DPoG System MUST support a value of 0x00 for docsQosServiceClassTosAndMask. The DPoG System MAY support other values for docsQosServiceClassTosAndMask.
docsQosServiceClassTosOrMask		MUST	
docsQosServiceClassDirection		MUST	
docsQosServiceClassStorageType		MUST	
docsQosServiceClassDSCPOverwrite		MUST	
docsQosServiceClassRequiredAttrMask		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsQosServiceClassRequiredAttrMask .
docsQosServiceClassForbiddenAttrMask		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsQosServiceClassForbiddenAttrMask.
docsQosServiceClassAttrAggrRuleMask		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsQosServiceClassAttrAggrRuleMask.
docsQosServiceClassAppId		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsQosServiceClassAppId.

Object	vCM	DPoG System	Comments
docsQosServiceClassMultiplierContentionReqWindow		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '8' for docsQosServiceClassMultiplierContentionReqWindow.
docsQosServiceClassMultiplierBytesReq		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '4' for docsQosServiceClassMultiplierBytesReq.
docsQosServiceClassMaxReqPerSidCluster		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsQosServiceClassMaxReqPerSidCluster .
docsQosServiceClassMaxOutstandingBytesPerSidCluster		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsQosServiceClassMaxOutstandingBytesPerSidCluster.
docsQosServiceClassMaxTotBytesReqPerSidCluster		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsQosServiceClassMaxTotBytesReqPerSidCluster.
docsQosServiceClassMaxTimeInSidCluster		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsQosServiceClassMaxTimeInSidCluster.
docsQosServiceClassPeakTrafficRate		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsQosServiceClassPeakTrafficRate.
docsQosServiceClassDsResequencing		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsQosServiceClassDsResequencing.

7.11.6 docsQosCmtsMacToSrvFlowTable

Object	vCM	DPoG System	Comments
docsQosCmtsMacToSrvFlowTable		MUST	
docsQosCmtsMacToSrvFlowEntry		MUST	
docsQosCmtsCmMac		MUST	Contains the MAC address assigned to the D-ONU corresponding to the vCM.
docsQosCmtsServiceFlowId		MUST	Contains the Service Flow Identifier associated with the vCM.
docsQosCmtsIfIndex		MUST	Contains the Interface Index value assigned to the logical MAC Domain on the DPoG System for the GPON (PON) interface connected to the D-ONU.

7.11.7 docsQosGrpServiceFlowTable

Object	vCM	DPoG System	Comments
docsQosGrpServiceFlowTable		MUST	
docsQosGrpServiceFlowEntry		MUST	
docsQosGrpServiceFlowIsDef		MUST	
docsQosGrpServiceFlowQosConfigId		MUST	
docsQosGrpServiceFlowNumSess		MUST	

7.11.8 docsQosGrpPktClassTable

Object	vCM	DPoG System	Comments
docsQosGrpPktClassTable		MUST	
docsQosGrpPktClassEntry		MUST	
docsQosGrpPktClassGrpConfigId		MUST	

7.12 DOCS-SEC-MIB ([OSSIv3.0] Annex Q)

Table Name	vCM	DPoG System	Comments
docsSecCmtsServerCfgTftpOptions		MUST	Not applicable to DPoG Networks. Only supports an SNMP Access Type of RO. The DPoG System MUST return a value of ''H for docsSecCmtsServerCfgTftpOptions.
docsSecCmtsServerCfgConfigFileLearningEnable		MUST	Not applicable to DPoG Networks because there can be no mismatch between the contents of the modem configuration file and a REG-REQ. Only supports an SNMP Access Type of RO The DPoG System MUST return a value of 'false' for docsSecCmtsServerCfgConfigFileLearningEnable.
docsSecCmtsEncryptAlgPriority		MUST	In the current implementation, DPoG Networks are limited in which encryption algorithms can be supported. In the future, there may be support for this object, depending on which encryption algorithms are supported in GPON. Only supports an SNMP Access Type of RO. The DPoG System MUST return an empty list for docsSecCmtsEncryptAlgPriority.
docsSecCmtsSavControlCmAuthEnable		MUST	
docsSecSavCmAuthTable		MUST	
docsSecSavCfgListTable		MUST	
docsSevSavStaticListTable		MUST	
docsSecCmtsCmSavStatsTable		MUST	
docsSecCmtsCertificateCertRevocationMethod		MUST	This is needed in support of CM certificate authentication.
docsSecCmtsCertRevocationList		MUST	This is needed in support of CM certificate authentication.
docsSecCmtsOnlineCertStatusProtocol		MUST	This is needed in support of CM certificate authentication.
docsSecCmtsCmEaeExclusionTable		MUST NOT	EAE is not supported for DPoG Networks.
docsSecCmtsCmBpi2EnforceExclusionTable		MUST NOT	BPI+ is not applicable to DPoG Networks.

7.13 DOCS-SUBMGT3-MIB ([OSSIv3.0] Annex Q)

Table Name	vCM	DPoG System	Comments
docsSubMgt3Base		MUST	
docsSubMgt3CpeCtrlTable		MUST	
docsSubMgt3CpeIpTable		MUST	
docsSubMgt3GrpTable		MUST	

Table Name	vCM	DPoG System	Comments
docsSubMgt3FilterGrpTable		MUST	The DPoG System MUST support downstream filtering. The DPoG System MAY support upstream filtering.

7.13.1 docsSubMgt3Base

Object	vCM	DPoG System	Comments
docsSubmgt3Base			
docsSubmgt3BaseCpeMaxIpv4Def		MUST	
docsSubmgt3BaseCpeMaxIpv6PrefixDef		MUST	
docsSubmgt3BaseCpeActiveDef		MUST	
docsSubmgt3BaseCpeLearnableDef		MUST	
docsSubmgt3BaseSubFilterDownDef		MUST	
docsSubmgt3BaseSubFilterUpDef		MUST	
docsSubmgt3BaseCmFilterDownDef		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsSubmgt3BaseCmFilterDownDef .
docsSubmgt3BaseCmFilterUpDef		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsSubmgt3BaseCmFilterUpDef.
docsSubmgt3BasePsFilterDownDef		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsSubmgt3BasePsFilterDownDef.
docsSubmgt3BasePsFilterUpDef		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsSubmgt3BasePsFilterUpDef.
docsSubmgt3BaseMtaFilterDownDef		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsSubmgt3BaseMtaFilterDownDef.
docsSubmgt3BaseMtaFilterUpDef		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsSubmgt3BaseMtaFilterUpDef.
docsSubmgt3BaseStbFilterDownDef		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsSubmgt3BaseStbFilterDownDef.
docsSubmgt3BaseStbFilterUpDef		MUST	Does not apply to DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsSubmgt3BaseStbFilterUpDef.

7.14 ENTITY-MIB ([RFC 4133])

Table Name	vCM	DPoG System	Comments
entPhysicalTable	MUST	MUST	
entAliasMappingTable	MUST	MUST	
entPhysicalContainsTable	MUST	MUST	
entLastChangeTime	MUST	MUST	

7.15 ENTITY-SENSOR-MIB ([RFC 3433])

Table Name	vCM	DPoG System	Comments
entPhysSensorTable	MUST	MUST	

7.16 EtherLike-MIB ([RFC 3635])

Table Name	vCM	DPoG System	Comments
dot3StatsTable	MUST	MUST	
dot3CollTable	MUST	MUST	
dot3ControlTable	MUST	MUST	Only needed for interfaces that support PAUSE.
dot3PauseTable	MUST	MUST	Only needed for interfaces that support PAUSE.

7.16.1 dot3StatsTable

Object	vCM	DPoG System	Comments
dot3StatsTable	MUST	MUST	
dot3StatsEntry	MUST	MUST	
dot3StatsIndex	MUST	MUST	
dot3StatsAlignmentErrors	MAY	MUST	
dot3StatsFCSErrors	MAY	MUST	
dot3StatsInternalMacTransmitErrors	MAY	MUST	
dot3StatsFrameTooLongs	MAY	MUST	
dot3StatsInternalMacReceiveErrors	MAY	MUST	
dot3StatsSymbolErrors	MAY	MUST	
dot3StatsSingleCollisionFrames	MAY	MAY	
dot3StatsMultipleCollisionFrames	MAY	MAY	
dot3StatsDeferredTransmissions	MAY	MAY	
dot3StatsLateCollisions	MAY	MAY	
dot3StatsExcessiveCollisions	MAY	MAY	
dot3StatsCarrierSenseErrors	MAY	MAY	
dot3StatsDuplexStatus	MUST	MAY	
dot3StatsSQETestErrors	MAY		

7.17 HOST-RESOURCES-MIB ([RFC 2790])

Table Name	vCM	DPoG System	Comments
hrDeviceTable	MUST	MUST	
hrMemorySize	MUST	MUST	
hrStorageTable	MUST	MUST	
hrSWRunTable	MUST	MUST	
hrSWRunPerfTable	MUST	MUST	
hrProcessorTable	MUST	MUST	

7.18 IF-MIB ([RFC 2863])

Table Name	vCM	DPoG System	Comments
ifNumber	MUST	MUST	
ifTableLastChange	MUST	MUST	
ifTable	MUST	MUST	
ifXTable	MUST	MUST	A vCM MUST support configuration of the ifAlias object on the vCM associated with a D-ONU to allow the object to be used to hold the UNI Identifier.
ifStackTable	MUST	MUST	
ifStackLastChange	MUST	MUST	
ifRcvAddressTable	MAY	SHOULD NOT	
ifTestTable	MUST NOT	MUST NOT	

7.18.1 DPoG Interface Table Implementation Considerations

In Annex A.2 of the [OSSIv3.0] specification, there are specific requirements regarding the population of the ifTable, ifXTable, and the ifStackTable for DOCSIS interfaces. This section describes the expectations for the creation of these DOCSIS interfaces for the DPoG System, as well as differences between DPoG specifications and DOCSIS specifications.

A MAC Domain is the representation of a TUL Interface to the DOCSIS OSS. A single GPON (PON) interface may support multiple MAC Domains (TULs). A single MAC Domain may support multiple downstream interfaces and multiple upstream interfaces. The DPoG System MUST create entries in its ifTable for MAC Domain interfaces (ifType=docsCableMacLayer) associated with each GPON (PON) interface on the DPoG System. The DPoG System MUST create entries in its ifTable for Downstream interfaces (ifType=docsCableDownstream), and Upstream interfaces (ifType=docsCableUpstream) associated with each MAC Domain interface on the DPoG System. This is needed to provide parity with the existing DOCSIS implementations where DOCSIS MIBs refer to MAC Domain, Downstream, and Upstream interfaces.

The following table describes any special processing for the DPoG System logical interfaces for the ifTable/ifXTable:

MIB Objects	DPoG MAC Domain	DPoG-Downstream	DPoG-Upstream
IfTable			
ifIndex	Vendor-specific	Vendor-specific	Vendor-specific
ifDescr	Vendor-specific	Vendor-specific	Vendor-specific
ifType	127	128	129

MIB Objects	DPoG MAC Domain	DPoG-Downstream	DPoG-Upstream
ifMtu	2000 (1G) 9000 (10G)	2000 (2.5G) 9000 (10G)	2000 (1.25G) 9000 (2.5G)
ifSpeed	0	For GPON (2.5G): 2,488,320,000 For XG-PON (10G): 4,294,967,295 (highest)	For GPON (1.25G): 1,244,160,000 For XG-PON (2.5G): 2,488,320,000
ifPhysAddress:	MAC Address of the GPON interface	Empty-String	Empty-String
ifAdminStatus: [For DPoG System: When a managed system initializes, all interfaces start with ifAdminStatus in the up(1) state. As a result of either explicit management or configuration information saved via other non-SNMP methods (i.e., CLI commands) retained by the managed system, ifAdminStatus is then changed to either the down(2) or testing(3) states (or remains in the up(1) state).]	up(1), down(2), testing(3)	Follows from MAC Domain	Follows from MAC Domain
ifOperStatus:	up(1), down(2), testing(3), dormant(5), notPresent(6)	Follows from MAC Domain	Follows from MAC Domain
ifXTable			
ifHighSpeed	0	For GPON (2.5G): 2,488 For XG-PON (10G): 9,953	For GPON (1.25G): 1,244 For XG-PON (2.5G): 2,488
ifPromiscuousMode	true,false	False	true,false

The DPoG System MAC Domain ifMtu attribute MUST report the smallest ifMtu value of any Downstream or Upstream interface associated with the MAC Domain.

The DPoG System MUST support ifInDiscards that includes frames dropped due to any of the reasons described in section 5 of [DPoE-MEF].

The DPoG System MUST create entries in its ifStackTable that map the Downstream and Upstream interfaces to their associated MAC Domain interface on the GPON (PON) interface.

A vCM MUST create entries in its ifTable for a MAC Domain interface (ifType=docsCableMacLayer), a Downstream interface (ifType=docsCableDownstream), and an Upstream interface (ifType=docsCableUpStream) for the GPON interface on the D-ONU.

The following table describes any special processing for the vCM logical interfaces for the ifTable/ifXTable:

MIB Objects	vCM MAC Domain	vCM-Downstream	vCM-Upstream
IfTable			
ifIndex	2	3	4
ifDescr			
ifType	127	128	129
ifMtu	2000 (1G) 9000 (10G)	2000 (2.5G) 9000 (10G)	2000 (1.25G) 9000 (2.5G)
ifSpeed	0	For GPON (2.5G): 2,488,320,000 For XG-PON (10G): 4,294,967,295 (highest)	For GPON (1.25G): 1,244,160,000 For XG-PON (2.5G): 2,488,320,000
ifPhysAddress:	MAC Address of the GPON interface	Empty-String	Empty-String

MIB Objects	vCM MAC Domain	vCM-Downstream	vCM-Upstream
ifAdminStatus: [For DPoG System: When a managed system initializes, all interfaces start with ifAdminStatus in the up(1) state. As a result of either explicit management or configuration information saved via other non-SNMP methods (i.e., CLI commands) retained by the managed system, ifAdminStatus is then changed to either the down(2) or testing(3) states (or remains in the up(1) state).]	up(1), down(2), testing(3)	Follows from MAC Domain	Follows from MAC Domain
ifOperStatus:	up(1), down(2), testing(3), dormant(5), notPresent(6)	Follows from MAC Domain	Follows from MAC Domain
ifXTable			
ifHighSpeed	0	For GPON (2.5G): 2,488 For XG-PON (10G): 9,953	For GPON (1.25G): 1,244 For XG-PON (2.5G): 2,488
ifPromiscuousMode	true	true	false

The vCM MAC Domain ifMtu attribute MUST report the smallest ifMtu value of any Downstream or Upstream interface associated with the MAC Domain.

A vCM MUST create entries in its ifStackTable that map the Downstream and Upstream interfaces to their associated MAC Domain interface on the GPON interface.

The vCM MUST support the following MIB objects in the ifTable of the IF-MIB for each D-ONU S1 interface (per CMCI):

- ifAlias. This writeable object is used to provision the MU Identifier or MI Identifier. As an example, the Service Provider might use "SC-DPoG-System-DPoG-ONU1-Port1" as a UNI Identifier to signify Port 1 on 'D-ONU1' on the 'Santa Clara DPoG System'. TLV-11 should be used to set ifAlias.
- ifType. This read-only object stores the S1 Interface Physical Medium and Mac Layer.
- ifSpeed. This read-only object stores the Speed of the S1 Interface .
- ifMtu. This read-only object stores the Maximum Transmission Unit (MTU) size of S1 Interface, as specified in [DPoG-MULPI].

The vCM MUST support the dot3StatsDuplexStatus MIB object in the dot3StatsTable of the EtherLike-MIB. This object stores the Mode of the S1 Interface.

7.19 IGMP-STD-MIB ([RFC 2933])

The D-ONU is not required to be an active participant in the IGMP protocol and does not need to snoop IGMP packets. However, if a vendor chooses to support this functionality within the D-ONU, the vCM MAY implement the MGMD-STD-MIB in place of the IGMP-STD-MIB.

7.20 IP-MIB ([RFC 4293])

Table Name	vCM	DPoG System	Comments
ipv4GeneralGroup	MUST	MUST	These groups/tables are not as important for the remote device, especially given that IP connectivity to the D-ONU is being spoofed by the DPoG System.
ipv6GeneralGroup2	MUST	MUST	
ipv4InterfaceTable	SHOULD NOT	MUST	
ipv6InterfaceTable	MUST	MUST	

Table Name	vCM	DPoG System	Comments
ipSystemStatsTable	MUST	MUST	
ipIfStatsTable	MUST	MUST	
ipAddressPrefixTable	MUST	MUST	
ipAddressTable	MUST	MUST	
ipNetToPhysicalTable	MUST	MUST	
ipDefaultRouterTable	MUST	MUST	
icmpStatsTable	SHOULD NOT	MUST	
icmpMsgStatsTable	SHOULD NOT	MUST	
ipv6RouterAdvertTable	MUST	MUST	

7.21 MGMD-STD-MIB ([RFC 5519])

The DPoG System MUST support the MGMD-STD-MIB. The D-ONU is not required to be an active participant in the IGMP or MLD protocols and does not need to snoop IGMP or MLD packets. However, if a vendor chooses to support this functionality within the D-ONU, the MGMD-STD-MIB can be implemented. on the vCM.

Table Name	vCM	DPoG System	Comments
mgmdRouterInterfaceTable	MAY	MUST	
mgmdRouterCacheTable	MAY	MUST	
mgmdInverseRouterCacheTable	MAY	MUST	
mgmdRouterSrcListTable	MAY	MUST	

7.22 SNMPv2-MIB ([RFC 3418])

Table Name	vCM	DPoG System	Comments
SystemGroup	MUST	MUST	
sysORTable	MUST	MUST	
SNMPGroup	MUST	MUST	
snmpSetGroup	MUST	MUST	

7.23 TCP-MIB ([RFC 4022])

Table Name	vCM	DPoG System	Comments
tcpBaseGroup	MUST	MUST	These groups/tables are not as important for the remote device given that IP connectivity to the D-ONU is being spoofed by the DPoG System.
tcpHCGroup	MUST	MUST	
tcpConnectionTable	MUST	MUST	
tcpListenerTable	MUST	MUST	

7.24 UDP-MIB ([RFC 4113])

Table Name	vCM	DPoG System	Comments
UDPGroup	MUST	MUST	These groups/tables are not as important for the remote device given that IP connectivity to the D-ONU is being spoofed by the DPoG System.
udpEndpointTable	MUST	MUST	

7.25 DOCS-L2VPN-MIB ([L2VPN])

There are dependencies from this MIB on the Q-BRIDGE-MIB, which is currently not listed on the set of MIBs to be supported by the DPoG System.

Table Name	vCM	DPoG System	Comments
docsL2vpnIdToIndexTable		MUST	
docsL2vpnIndexToIdTable		MUST	
docsL2vpnCmTable		MUST	
docsL2vpnVpnCmTable		MUST	
docsL2vpnVpnCmStatsTable		MUST	
docsL2vpnPortStatusTable		SHOULD NOT	The only object reported in this table is the Group SAID for the VPN on a particular CMTS MAC Domain. As the use of Security Association Identifiers is currently not specified for DPoG Networks, this table need not be supported.
docsL2vpnSfStatusTable		MUST	
docsL2vpnPktClassTable		MUST	
docsL2vpnCmNsiTable		MUST	
docsL2vpnCmVpnCpeTable		SHOULD NOT	This table is required only when implementing multipoint forwarding. Multipoint forwarding is not supported in DPoG Networks.
docsL2vpnVpnCmCpeTable		SHOULD NOT	This table is required only when implementing multipoint forwarding. Multipoint forwarding is not supported in DPoG Networks.
docsL2vpnDot1qTpFdbExtTable		SHOULD NOT	This table is required only when implementing multipoint forwarding. Multipoint forwarding is not supported in DPoG Networks.
docsL2vpnDot1qTpGroupExtTable		SHOULD NOT	This table is required only when implementing multipoint forwarding. Multipoint forwarding is not supported in DPoG Networks.

7.25.1 docsL2vpnCmTable

Object	vCM	DPoG System	Comments
docsL2vpnCmCompliantCapability		MUST	
docsL2vpnCmDutFilteringCapability		MUST	Per [DPoG-MULPI], Downstream Unencrypted Traffic (DUT) Filtering (TLV 45) is not supported in DPoG Networks. The DPoG System MUST return a value of 'false' for the docsL2vpnCmDutFilteringCapability object.

Object	vCM	DPoG System	Comments
docsL2vpnCmDutCMIM		MUST	Per [DPoG-MULPI], Downstream Unencrypted Traffic (DUT) Filtering (TLV 45) is not supported in DPoG Networks. The DPoG System MUST return a value of '1' for docsL2vpnCmDutCMIM in bit position 0.
docsL2vpnCmDhcpSnooping		MUST	

7.25.2 docsL2vpnVpnCmTable

Object	vCM	DPoG System	Comments
docsL2vpnVpnCmCMIM		MUST	
docsL2vpnVpnCmIndividualSAId		MUST	The concept of a Security Association is not supported in DPoG Networks. The DPoG System MUST return a value of '0' (zero) for docsL2vpnVpnCmIndividualSAId.
docsL2vpnVpnCmVendorSpecific		MUST	The L2VPN vendor-specific TLV (43.5.43) is not supported in DPoG Networks. The DPoG System MUST return a zero-length octetstring for the docsL2vpnVpnCmVendorSpecific object.

7.25.3 docsL2vpnVpnCmStatsTable

Object	vCM	DPoG System	Comments
docsL2vpnVpnCmStatsUpstreamPkts		MUST	
docsL2vpnVpnCmStatsUpstreamBytes		MUST	
docsL2vpnVpnCmStatsUpstreamDiscards		MUST	
docsL2vpnVpnCmStatsDownstreamPkts		MUST	
docsL2vpnVpnCmStatsDownstreamBytes		MUST	
docsL2vpnVpnCmStatsDownstreamDiscards		MUST	

8 SUPPORT FOR MEF PERFORMANCE MANAGEMENT REQUIREMENTS

In DPoG v1.0, the MEF services are not covered however this section is reserved as a place holder for future when the MEF implementation is covered.

9 SUPPORT FOR DPOG MIBS

This section describes MIB objects specific to DPoG implementations. The formal MIB module definition is provided in Annex B of this document.

The DPoG MIB is organized into the following tables:

- dpogPktClassTable – augments the existing dosQosPktClassTable to add the classifier objects supported by the DPoG system.
- dpogServiceFlowTable – augments the existing docsQos3ServiceFlowTable to provide references for an ASF. In current version, service flows are represented by GEMIDs that are mapped to TCONTs in a one-to-one relationship. ASFs are not yet supported by the DPoG specifications; however, the table is provided for future compatibility when ASFs are supported.
- dpogAsfServiceFlowTable– this table provides a way to identify the list of service flows associated with a specific ASF. ASFs are not yet supported by the DPoG specifications; however, this table is provided for future compatibility. The values in this table will be defaults and changing or querying them will have no effect on DPoG System operation.
- dpogMcastAuthCmtsCmStatusProfileTable – this table extends the docsMcastAuthCmtsCmStatusTable to allow the filtering of multicast join requests based on the D-ONU interface (CMIM) of origin. CMIMs can be specified per profile in the CM configuration file.
- docsMcastAuthStaticSessRuleTable – this table extends the docsMcastAuthStaticSessRuleTable to allow the filtering of multicast join requests based on the D-ONU interface (CMIM) of origin. CMIMs can be specified per static session rule in the CM configuration file.
- dpogMcastAuthCmtsCmStatusIfaceTable – this read-only table is implemented by the DPoG System. It is an extension of the docsMcastAuthCmtsCmStatusTable, providing additional matching criteria per D-ONU interface. Table entries are created in response to TLVs present in a CM configuration file.
- dpogMcastCmSessTable – this table is implemented within the vCM. It provides information on the multicast configuration of the associated D-ONU.

The table in Section 9.1 identifies MIB support requirements for both the DPoG System and the vCM. The values for the ASF and MESP indexes are the values from the DOCSIS configuration file for both the vCM and the DPoG System.

9.1 DPoG-MIB

Table Name	vCM	DPoG System	Comments
dpogPktClassTable	MUST	MUST	
dpogServiceFlowTable	MUST	MUST	
dpogAsfServiceFlowTable	MUST	MUST	
dpogMcastAuthCmtsCmStatusProfileTable		MUST	
dpogMcastAuthStaticSessRuleTable		SHOULD	
dpogMcastAuthCmtsCmStatusIfaceTable		MUST	
dpogMcastCmSessTable	MUST		

9.1.1 dpogPktClassTable

Object	vCM	DPoG System	Comments
dpogPktClassTable	MUST	MUST	
dpogPktClassBitMap	MUST	MUST	
dpogPktClassCTagTPID	MUST	MUST	
dpogPktClassCTagPCP	MUST	MUST	
dpogPktClassCTagCFI	MUST	MUST	
dpogPktClassCTagVID	MUST	MUST	
dpogPktClassCTagTCI	MUST	MUST	
dpogPktClassSTagTPID	MUST	MUST	
dpogPktClassSTagPCP	MUST	MUST	
dpogPktClassSTagDEI	MUST	MUST	
dpogPktClassSTagVID	MUST	MUST	
dpogPktClassSTagTCI	MUST	MUST	
dpogPktClassITagTPID	MUST	MUST	
dpogPktClassITagPCP	MUST	MUST	
dpogPktClassITagUCA	MUST	MUST	
dpogPktClassITagDEI	MUST	MUST	
dpogPktClassITagSID	MUST	MUST	
dpogPktClassITagTCI	MUST	MUST	
dpogPktClassBTagTPID	MUST	MUST	
dpogPktClassBTagPCP	MUST	MUST	
dpogPktClassBTagDEI	MUST	MUST	
dpogPktClassBTagVID	MUST	MUST	
dpogPktClassBTagTCI	MUST	MUST	
dpogPktClassBTagBDA	MUST	MUST	
dpogPktClassBTagBSA	MUST	MUST	

9.1.2 dpogServiceFlowTable

Object	vCM	DPoG System	Comments
dpogServiceFlowTable	MUST	MUST	
dpogServiceFlowEntry	MUST	MUST	
dpogServiceFlowAsfId	MUST	MUST	
dpogServiceFlowUpTPIDTrans	MUST	MUST	
dpogServiceFlowDnTPIDTrans	MUST	MUST	
dpogServiceFlowUpSTPIDTrans	MUST	MUST	
dpogServiceFlowDnSTPIDTrans	MUST	MUST	
dpogServiceFlowUpBTPIDTrans	MUST	MUST	
dpogServiceFlowDnBTPIDTrans	MUST	MUST	
dpogServiceFlowUpITPIDTrans	MUST	MUST	
dpogServiceFlowDnITPIDTrans	MUST	MUST	

9.1.3 dpogAsfServiceFlowTable

Object	vCM	DPoG System	Comments
dpogAsfServiceFlowTable	MUST	MUST	
dpogAsfServiceFlowEntry	MUST	MUST	
dpogAsfServiceFlowAsfId	MUST	MUST	
dpogAsfServiceFlowId	MUST	MUST	

9.1.4 dpogMcastAuthCmtsCmStatusProfileTable

Object	vCM	DPoG System	Comments
dpog**McastAuthCmtsCmStatusProfileTable**		MUST	
dpog**McastAuthCmtsCmStatusProfileEntry**		MUST	
dpogMcastAuthCmtsCmStatusProfileCmInterfaceMask		MUST	

9.1.5 dpogMcastAuthCmtsCmStatusIfaceTable

Object	vCM	DPoG System	Comments
dpog**McastAuthCmtsCmStatusIfaceTable**		MUST	
dpog**McastAuthCmtsCmStatusIfaceEntry**		MUST	
dpogMcastAuthCmtsCmStatusIfaceCmInterfaceBitPos		MUST	
dpogMcastAuthCmtsCmStatusIfaceMaxNumSess		MUST	

9.1.6 dpogMcastAuthStaticSessRuleTable

Object	vCM	DPoG System	Comments
dpog**McastAuthStaticSessRuleTable**		SHOULD	
dpog**McastAuthStaticSessRuleEntry**		SHOULD	
dpogMcastAuthStaticSessRuleCmInterfaceMask		SHOULD	

9.1.7 dpogMcastCmSessTable

Object	vCM	DPoG System	Comments
dpogMcastCmSessTable	MUST		
dpogMcastCmSessEntry	MUST		
dpogMcastCmSessPrefixAddrType	MUST		
dpogMcastCmSessGrpPrefix	MUST		
dpogMcastCmSessSrcPrefix	MUST		
dpogMcastCmSessCmInterfaceMask	MUST		
dpogMcastCmSessMllid	MUST		
dpogMcastCmSessEncrypted	MUST		

9.1.8 Virtual Cable Modem specific MIB objects

Object	vCM	DPoG System	Comments
dpogVcmDynCfgState	MUST		
dpogVcmDynCfgNow	MUST		Read-write attribute.

10 SUPPORTED DPOG EVENTS

The tables in this section summarize the format and content for event, syslog, and SNMP notifications required by features specific to DPoG. Each row specifies a possible event that may be generated by a vCM, DPoG System or both. These events are to be reported through local event logging, and may be accompanied by syslog or SNMP notification.

The "Process" and "Sub-Process" columns indicate at which stage the event occurs.

The "vCM Priority" and "DPoG System Priority" columns indicate the priority the event is assigned in the vCM or DPoG System. These priorities are the same as is reported in the docsDevEvLevel object in the cable device MIB [RFC 4639] and in the LEVEL field of the syslog. The DPoG System MUST NOT generate an event for which no priority is specified in the "DPoG System Priority" column. The vCM MUST NOT generate an event for which no priority is specified in the "vCM Priority" column.

The "Event Message" column specifies the event text, which is reported in the docsDevEvText object of the cable device MIB and the text field of the syslog. The format of some event messages include the "<TAGS>" keyword, as described in Annex D of [OSSIv3.0].

The "Event ID" column indicates a unique identification number for the event, which is assigned to the docsDevEvId object in the cable device MIB and the <eventId> field of the syslog.

The "Notification Name" column specifies the SNMP notification, which notifies this event to an SNMP notification receiver.

The syslog format is described in Section 6.5.1.2.1.3 of this specification.

10.1 Interface Status

These events are defined in the [DPoE-MEF] specification.

Table 8 - DPoG Events Extensions

Process	Sub-Process	vCM Priority	DPoG System Priority	Event Message	Message Notes and Detail	Error Code Set	Event ID	Notification Name
Interface Status	Ethernet Interface	Critical	Critical	Ethernet Interface link down	For Local Log & Syslog, append: ifIndex: <P1>; ifAdminStatus: <P2>; ifAlias: <P3> P1 = ifIndex from ifTable for Ethernet Interface P2 = ifAdminStatus from ifTable for Ethernet Interface P3 =ifAlias from ifTable for Ethernet Interface	P001.1	80000101	linkDown [RFC 2863]

Process	Sub-Process	vCM Priority	DPoG System Priority	Event Message	Message Notes and Detail	Error Code Set	Event ID	Notification Name
Interface Status	Ethernet Interface	Notice	Notice	Ethernet Interface link up	For Local Log & Syslog, append: ifIndex: <P1>; ifAdminStatus: <P2>; ifAlias: <P3> P1 = ifIndex from ifTable for Ethernet Interface P2 = ifAdminStatus from ifTable for Ethernet Interface P3 =ifAlias from ifTable for Ethernet Interface	P001.2	80000102	linkUp [RFC 2863]

10.2 Dynamic D-ONU Configuration Update

The Dynamic D-ONU Configuration Update process is described in [DPoG-MULPI]. The table below defines the events associated with each of the five stages of the update process. The stage associated with a particular event is identified in the "Sub-Process" column.

Process	Sub-Process	vCM Priority	DPoG System Priority	Event Message	Event ID	Notification Name
Dynamic Configuration Update						
Dynamic Config	Download In Progress	Warning		Dyn Config Failed – Download<TAGS>	95000100	CM: docsIf3CmEventNotif
Dynamic Config	Validation In Progress	Warning		Dyn Config Failed – Validation<TAGS>	95000101	CM: docsIf3CmEventNotif
Dynamic Config	Resource Validation	Warning		Dyn Config Failed – Resource Validation<TAGS>	95000102	CM: docsIf3CmEventNotif
Dynamic Config	Update (Apply changes)	Error		Dyn Config Failed – Update<TAGS>	95000103	CM: docsIf3CmEventNotif
Dynamic Config	Update	Informational		Dyn Config Complete<TAGS>	95000104	CM: docsIf3CmEventNotif

11 SUPPORT FOR DOCSIS EVENTS

This section defines those DOCSIS events (as defined in Annex D of [OSSIv3.0]) that will need to be supported by the DPoG System.

The following tables are adapted from the corresponding table of events defined in Annex D in [OSSIv3.0] and enumerate whether support is required for a particular event by the DPoG System in this version of the specification. Note that not all columns from Annex D are found in the following table; only those columns that help provide context for the event's definition are provided.

Entries in bold italics indicate that the event is not applicable to the current version of the specification. Entries in italics indicate that the event is not supported by the DPoG specifications.

The table columns are:

- **Process** – Process name as defined in Annex D.
- **Sub-Process** – Sub-Process name as defined in Annex D.
- **vCM** – Indicates whether the event should be generated by the DPoG System on behalf of the vCM representing the D-ONU.
- **DPoG System** – Indicates whether the event should be generated by the DPoG System.
- **Event Message** – Event Message text as defined in Annex D.
- **Event ID** – Event ID for the event as defined in Annex D.
- **Comments** – Used to capture any special implementation comments regarding support for the event within DPoG Networks or why the event need not be supported for DPoG Networks.

11.1 Authentication and Encryption

Process	Sub-Process	vCM	DPoG System	Event Message	Event ID	Comments
BPKM	AUTH-FSM	MUST	MUST	Auth Reject – No Information<TAGS>	66030102	This event can be used by the DPoG System for modem authentication errors not covered by other Auth Reject event messages.
BPKM	AUTH-FSM	MUST	MUST	Auth Reject – Unauthorized CM<TAGS>	66030103	This event can be generated by the DPoG System if the DPoG System implements a local "black list" which excludes specific D-ONU MAC Addresses.
BPKM	***AUTH-FSM***	***SHOULD NOT***	***SHOULD NOT***	***Auth Reject – Unauthorized SAID<TAGS>***	***66030104***	***SAIDs are not applicable to DPoG Networks.***
BPKM	AUTH-FSM	MUST	MUST	Auth Reject – Permanent Authorization Failure<TAGS>	66030108	Permanent Authorization is used for a number of different error conditions including errors related to the use of the certificates, such as unknown manufacturers, invalid signatures, ASN.1 parsing failures, and certificate revocation.
BPKM	*AUTH-FSM*	*MUST NOT*	*MUST NOT*	*Auth Reject – Time of Day not acquired<TAGS>*	*66030109*	*TOD is not needed in a DPoG System.*
BPKM	*AUTH-FSM*	*MUST NOT*	*MUST NOT*	*Auth Reject – EAE disabled<TAGS>*	*66030110*	*EAE cannot be disabled in DPoG Networks.*

Process	Sub-Process	vCM	DPoG System	Event Message	Event ID	Comments
BPKM	AUTH-FSM	MUST	MUST	CM Certificate Error<TAGS>	66030111	
BPKM	*AUTH-FSM*	*MUST NOT*	*MUST NOT*	*Auth Invalid – No Information<TAGS>*	*66030202*	*This is not applicable to DPoG Networks.*
BPKM	*AUTH-FSM*	*MUST NOT*	*MUST NOT*	*Auth Invalid – Unauthorized CM<TAGS>*	*66030203*	*This is not applicable to DPoG Networks.*
BPKM	*AUTH-FSM*	*MUST NOT*	*MUST NOT*	*Auth Invalid – Unsolicited<TAGS>*	*66030205*	*This is not applicable to DPoG Networks.*
BPKM	*AUTH-FSM*	*MUST NOT*	*MUST NOT*	*Auth Invalid – Invalid Key Sequence Number<TAGS>*	*66030206*	*No BPI key exchange in DPoG Networks.*
BPKM	*AUTH-FSM*	*MUST NOT*	*MUST NOT*	*Auth Invalid – Message (Key Request) Authentication Failure<TAGS>*	*66030207*	*No BPI key exchange in DPoG Networks.*
BPKM	*AUTH-FSM*	*MUST NOT*	*MUST NOT*	*Unsupported Crypto Suite<TAGS>*	*66030300*	*There is no way for the OLT to determine if an ONU cannot support the intended crypto suite.*
BPKM	AUTH-FSM	MUST		Authorized<TAGS>	66040100	This event can be generated by the DPoG System for the vCM when the D-ONU successfully authorizes with the DPoG System.
BPKM	*AUTH-FSM*	*MUST NOT*		*Auth Pend<TAGS>*	*66040200*	*This is not applicable to DPoG Networks.*
BPKM	*AUTH-FSM*	*MUST NOT*		*Auth Comp<TAGS>*	*66040300*	*This is not applicable to DPoG Networks.*
BPKM	*AUTH-FSM*	*MUST NOT*		*Stop<TAGS>*	*66040400*	*This is not applicable to DPoG Networks.*
BPKM	CERTIFICATE REVOCATION		MUST	Failed to retrieve CRL from <P1>	66030400	
BPKM	CERTIFICATE REVOCATION		MUST	Failed to retrieve OCSP status	66030401	
BPKM	CERTIFICATE REVOCATION		MUST	CRL data not available when validating CM certificate chain<TAGS>	66030402	
BPKM	*TEK-FSM*	*MUST NOT*	*MUST NOT*	*Key Reject – No Information<TAGS>*	*66050102*	*No Traffic Key exchange in DPoG Networks.*
BPKM	***TEK-FSM***	***SHOULD NOT***	***SHOULD NOT***	***Key Reject – Unauthorized SAID<TAGS>***	***66050103***	***SAIDs are not applicable to DPoG Networks.***
BPKM	*TEK-FSM*	*MUST NOT*	*MUST NOT*	*TEK Invalid – No Information<TAGS>*	*66050203*	*No Traffic Key exchange in DPoG Networks.*
BPKM	*TEK-FSM*	*MUST NOT*	*MUST NOT*	*TEK Invalid – Invalid Key Sequence Number<TAGS>*	*66050206*	*No Traffic Key exchange in DPoG Networks.*
Dynamic SA	***SA MAP-FSM***	***SHOULD NOT***		***SA Map State Machine Started<TAGS>***	***66060100***	***SAIDs are not applicable to DPoG Networks.***
Dynamic SA	***SA MAP-FSM***	***SHOULD NOT***	***SHOULD NOT***	***Unsupported Crypto Suite<TAGS>***	***66060200***	***SAIDs are not applicable to DPoG Networks.***

Process	Sub-Process	vCM	DPoG System	Event Message	Event ID	Comments
Dynamic SA	***SA MAP-FSM***	***SHOULD NOT***		***Map Request Retry Timeout<TAGS>***	***66060300***	***SAIDs are not applicable to DPoG Networks.***
Dynamic SA	***SA MAP-FSM***	***SHOULD NOT***		***Unmap<TAGS>***	***66060400***	***SAIDs are not applicable to DPoG Networks.***
Dynamic SA	***SA MAP-FSM***	***SHOULD NOT***	***SHOULD NOT***	***Map Reject – Downstream Traffic Flow Not Mapped to BPI+ SAID (EC=8)<TAGS>***	***66060510***	***SAIDs are not applicable to DPoG Networks.***
Dynamic SA	***SA MAP-FSM***	***SHOULD NOT***	***SHOULD NOT***	***Map Reject – Not Authorized for Requested Downstream Traffic Flow (EC=7)<TAGS>***	***66060509***	***SAIDs are not applicable to DPoG Networks.***
Dynamic SA	***SA MAP-FSM***	***SHOULD NOT***	***SHOULD NOT***	***Mapped to Existing SAID<TAGS>***	***66060600***	***SAIDs are not applicable to DPoG Networks.***
Dynamic SA	***SA MAP-FSM***	***SHOULD NOT***	***SHOULD NOT***	***Mapped to New SAID<TAGS>***	***66060700***	***SAIDs are not applicable to DPoG Networks.***
Init (BPI+)	*DOCSIS 1.0 CONFIG FILE*	*MUST NOT*	*MUST NOT*	*Missing BP Configuration Setting TLV Type: <P1><TAGS>*	*66010100*	*Baseline Privacy TLV 17s are not supported by DPoG Networks.*
Init (BPI+)	*DOCSIS 1.0 CONFIG FILE*	*MUST NOT*	*MUST NOT*	*Invalid BP Configuration Setting Value: <P1> for Type: <P2><TAGS>*	*66010200*	*Baseline Privacy TLV 17s are not supported by DPoG Networks.*

11.2 DBC, DCC and UCC

Because Dynamic Bonding Changes (DBC), Dynamic Channel Changes (DCC), and Upstream Channel Changes (UCC) are not applicable to DPoG Networks, these events are not supported. The DPoG System MUST NOT support any of the DBC, DCC, and UCC events defined in Annex D of [OSSIv3.0] since these are not applicable to DPoG Networks. The vCM MUST NOT support any of the DBC, DCC, and UCC events defined in Annex D of [OSSIv3.0] since these are not applicable to DPoG Networks.

11.3 DHCP, TOD and TFTP

Process	Sub-Process	vCM	DPoG System	Event Message	Event ID	Comments
DHCP		MUST		DHCP RENEW sent – No response for <P1><TAGS>	68010100	
DHCP		MUST		DHCP REBIND sent – No response for <P1><TAGS>	68010200	
DHCP		MUST		DHCP RENEW WARNING – Field invalid in response <P1> option<TAGS>	68010300	
DHCP		MUST		DHCP RENEW FAILED - Critical field invalid in response	68010301	
DHCP		MUST		DHCP REBIND WARNING – Field invalid in response <TAGS>	68010400	

Process	Sub-Process	vCM	DPoG System	Event Message	Event ID	Comments
DHCP		MUST		DHCP REBIND FAILED - Critical field invalid in response	68010401	
DHCP		MUST		DHCP Reconfigure received<TAGS>	68010500	
DHCP		MUST		DHCP Renew - lease parameters <P1> modified<TAGS>	68010600	
DHCP		MUST		Primary lease failed, IPv4 fallback initiated<TAGS>	68010700	
Init	DHCP	MUST		DHCP FAILED – Discover sent, no offer received<TAGS>	68000100	
Init	DHCP	MUST		DHCP FAILED – Request sent, No response<TAGS>	68000200	
Init	DHCP	MUST		DHCP WARNING - Non-critical field invalid in response <TAGS>	68000300	
Init	DHCP	MUST		DHCP FAILED – Critical field invalid in response <TAGS>	68000301	
Init	DHCP	MUST		DHCP failed – RS sent, no RA received<TAGS>	68001200	
Init	DHCP	MUST		DHCP Failed – Invalid RA<TAGS>	68001201	
Init	DHCP	MUST		DHCP failed – DHCP Solicit sent, No DHCP Advertise received<TAGS>	68001202	
Init	DHCP	MUST		DHCP failed – DHCP Request sent, No DHCP REPLY received<TAGS>	68001203	
Init	DHCP	MUST		Primary address acquired, secondary failed<TAGS>	68001204	
Init	DHCP	MUST		Primary address failed, secondary active<TAGS>	68001205	
Init	IPv6 Address Acquisition	MUST		Link-Local address failed DAD<TAGS>	68001301	
Init	IPv6 Address Acquisition	MUST		DHCP lease address failed DAD<TAGS>	68001302	
Init	*TOD*	*MUST NOT*		*ToD request sent – No Response received<TAGS>*	*68000401*	*TOD is not applicable to DPoG Networks.*
Init	*TOD*	*MUST NOT*		*ToD Response received – Invalid data format<TAGS>*	*68000402*	*TOD is not applicable to DPoG Networks.*
Init	TFTP	MUST		TFTP failed – Request sent – No Response<TAGS>	68000500	
Init	TFTP	MUST		TFTP failed – configuration file NOT FOUND<TAGS>	68000600	
Init	TFTP	MUST		TFTP Failed – OUT OF ORDER packets<TAGS>	68000700	
Init	TFTP	MUST		TFTP file complete – but failed Message Integrity check MIC<TAGS>	68000800	

Process	Sub-Process	vCM	DPoG System	Event Message	Event ID	Comments
Init	TFTP	MUST		TFTP file complete – but missing mandatory TLV<TAGS>	68000900	
Init	TFTP	MUST		TFTP Failed – file too big<TAGS>	68001000	
Init	*TFTP*	*MUST NOT*		*TFTP file complete- but doesn't enable 2.0 Mode – conflicts with current US channel type<TAGS>*	*68001100*	
Init	TFTP	MUST		TFTP Request Retries exceeded, CM unable to register	68001101	
TOD		*MUST NOT*		*ToD request sent- No Response received<TAGS>*	*68000403*	*TOD is not applicable to DPoG Networks.*
TOD		*MUST NOT*		*ToD Response received – Invalid data format<TAGS>*	*68000404*	*TOD is not applicable to DPoG Networks.*

11.4 Secure Software Download

Process	Sub-Process	vCM	DPoG System	Event Message	Event ID	Comments
SW Upgrade	SW UPGRADE INIT	MUST		SW Download INIT – Via NMS	69010100	
SW Upgrade	SW UPGRADE INIT	MUST		SW Download INIT – Via Config file <P1>	69010200	
SW Upgrade	SW UPGRADE GENERAL FAILURE	MUST		SW Upgrade Failed during download – Max retry exceed (3)	69010300	
SW Upgrade	SW UPGRADE GENERAL FAILURE	MUST		SW Upgrade Failed Before Download – Server not Present	69010400	
SW Upgrade	SW UPGRADE GENERAL FAILURE	MUST		SW upgrade Failed before download – File not Present	69010500	
SW Upgrade	SW UPGRADE GENERAL FAILURE	MUST		SW upgrade Failed before download –TFTP Max Retry Exceeded	69010600	
SW Upgrade	SW UPGRADE GENERAL FAILURE	MUST		SW upgrade Failed after download –Incompatible SW file	69010700	
SW Upgrade	SW UPGRADE GENERAL FAILURE	MUST		SW upgrade Failed after download – SW File corruption	69010800	
SW Upgrade	SW UPGRADE GENERAL FAILURE	MUST		Disruption during SW download – Power Failure	69010900	
SW Upgrade	SW UPGRADE GENERAL FAILURE	MUST		Disruption during SW download – RF removed	69011000	Although no RF interfaces exist in DPoG Networks, this event could be used for GPON network issues.

Process	Sub-Process	vCM	DPoG System	Event Message	Event ID	Comments
SW Upgrade	SW UPGRADE SUCCESS	MUST		SW download Successful – Via NMS	69011100	
SW Upgrade	SW UPGRADE SUCCESS	MUST		SW download Successful – Via Config file	69011200	
SW Upgrade	SW UPGRADE GENERAL FAILURE	MUST		Improper Code File Controls	69020100	
SW Upgrade	SW UPGRADE GENERAL FAILURE	MUST		Code File Manufacturer CVC Validation Failure	69020200	
SW Upgrade	SW UPGRADE GENERAL FAILURE	MUST		Code File Manufacturer CVS Validation Failure	69020300	
SW Upgrade	SW UPGRADE GENERAL FAILURE	MUST		Code File Co-Signer CVC Validation Failure	69020400	
SW Upgrade	SW UPGRADE GENERAL FAILURE	MUST		Code File Co-Signer CVS Validation Failure	69020500	
SW Upgrade	VERIFICATION OF CVC	MUST		Improper Configuration File CVC Format	69020600	
SW Upgrade	VERIFICATION OF CVC	MUST		Configuration File CVC Validation Failure	69020700	
SW Upgrade	VERIFICATION OF CVC	MUST		Improper SNMP CVC Format	69020800	
SW Upgrade	VERIFICATION OF CVC	MUST		SNMP CVC Validation Failure	69020900	

11.5 Registration and TLV-11

Process	Sub-Process	vCM	DPoG System	Event Message	Event ID	Comments
Init	REGISTRATION RESPONSE	MAY		REG-RSP – invalid format or not recognized;<TAGS>	73000100	Depending on the implementation of the vCM registration within the DPoG System, this event may not be generated.
Init	REGISTRATION RESPONSE	MAY		REG RSP not received<TAGS>	73000200	Depending on the implementation of the vCM registration within the DPoG System, this event may not be generated.
Init	REGISTRATION RESPONSE	MAY		REG RSP bad SID <P1><TAGS>	73000300	Depending on the implementation of the vCM registration within the DPoG System, this event may not be generated.
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Service unavailable – Other<TAGS>*	*73000400*	*This is generated for 1.0-style modem registration, which is not supported for DPoG Networks.*

Process	Sub-Process	vCM	DPoG System	Event Message	Event ID	Comments
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Service unavailable – Unrecognized configuration setting<TAGS>*	*73000401*	*This is generated for 1.0-style modem registration, which is not supported for DPoG Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Service unavailable – Temporarily unavailable<TAGS>*	*73000402*	*This is generated for 1.0-style modem registration, which is not supported for DPoG Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Service unavailable – Permanent<TAGS>*	*73000403*	*This is generated for 1.0-style modem registration, which is not supported for DPoG Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Registration rejected authentication failure: CMTS MIC invalid<TAGS>*	*73000500*	*CMTS MIC verification is not needed on the DPoG System.*
Init	*3.0 SPECIFIC REGISTRATION REQUEST*		*MUST NOT*	*Registration authentication failure: REG REQ rejected –TLV parameters do not match learned config file TLV parameters<TAGS>*	*73000501*	*There is no way for this to happen in DPoG Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*REG REQ has Invalid MAC header<TAGS>*	*73010100*	*This is generated for 1.0-style modem registration, which is not supported for DPoG Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*REG REQ has Invalid SID or not in use<TAGS>*	*73010200*	*This is generated for 1.0-style modem registration, which is not supported for DPoG Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*REG REQ missed Required TLVs<TAGS>*	*73010400*	*This is generated for 1.0-style modem registration, which is not supported for DPoG Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad DS FREQ – Format Invalid<TAGS>*	*73010500*	*There is no DS frequency in DPoG Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad DS FREQ – Not in use<TAGS>*	*73010501*	*There is no DS frequency in DPoG Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad DS FREQ – Not Multiple of 62500 Hz<TAGS>*	*73010502*	*There is no DS frequency in DPoG Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad US CH – Invalid or Unassigned<TAGS>*	*73010600*	*There are no US settings in DPoG Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad US CH – Change followed with (RE-) Registration REQ<TAGS>*	*73010601*	*There are no US settings in DPoG Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad US CH – Overload<TAGS>*	*73010700*	*There are no US settings in DPoG Networks.*
Init	REGISTRATION REQUEST		MUST	Network Access has Invalid Parameter<TAGS>	73010800	
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad Class of Service – Invalid Configuration<TAGS>*	*73010900*	*CoS TLVs are not supported in DPoG Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad Class of Service – Unsupported class<TAGS>*	*73011000*	*CoS TLVs are not supported in DPoG Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad Class of Service – Invalid class ID or out of range<TAGS>*	*73011100*	*CoS TLVs are not supported in DPoG Networks.*

Process	Sub-Process	vCM	DPoG System	Event Message	Event ID	Comments
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad Max DS Bit Rate – Invalid Format<TAGS>*	*73011200*	*This event is generated for 1.0-style CoS TLVs, which are not supported in DPoG Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad Max DS Bit Rate Unsupported Setting<TAGS>*	*73011201*	*This event is generated for 1.0-style CoS TLVs, which are not supported in DPoG Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad Max US Bit – Invalid Format<TAGS>*	*73011300*	*This event is generated for 1.0-style CoS TLVs, which are not supported in DPoG Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad Max US Bit Rate – Unsupported Setting<TAGS>*	*73011301*	*This event is generated for 1.0-style CoS TLVs, which are not supported in DPoG Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad US Priority Configuration – Invalid Format<TAGS>*	*73011400*	*This event is generated for 1.0-style CoS TLVs, which are not supported in DPoG Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad US Priority Configuration – Setting out of Range<TAGS>*	*73011401*	*This event is generated for 1.0-style CoS TLVs, which are not supported in DPoG Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad Guaranteed Min US CH Bit rate Configuration setting – Invalid Format<TAGS>*	*73011500*	*This event is generated for 1.0-style CoS TLVs, which are not supported in DPoG Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad Guaranteed Min US CH Bit rate Configuration setting – Exceed Max US Bit Rate<TAGS>*	*73011501*	*This event is generated for 1.0-style CoS TLVs, which are not supported in DPoG Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad Guaranteed Min US CH Bit rate Configuration setting – Out of Range<TAGS>*	*73011502*	*This event is generated for 1.0-style CoS TLVs, which are not supported in DPoG Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad Max US CH Transmit Burst configuration setting – Invalid Format<TAGS>*	*73011600*	*This event is generated for 1.0-style CoS TLVs, which are not supported in DPoG Networks.*
Init	*REGISTRATION REQUEST*		*MUST NOT*	*Bad Max US CH Transmit Burst configuration setting – Out of Range<TAGS>*	*73011601*	*This event is generated for 1.0-style CoS TLVs, which are not supported in DPoG Networks.*
Init	***REGISTRATION REQUEST***		***SHOULD NOT***	***Invalid Modem Capabilities configuration setting<TAGS>***	***73011700***	***Modem Capabilities is not currently supported in DPoG Networks, but could be supported in future revisions.***
Init	REGISTRATION REQUEST		MUST	Configuration file contains parameter with the value outside of the range<TAGS>	73011800	
Init	1.1 and 2.0 SPECIFIC REGISTRATION REQUEST		MUST	REG REQ rejected – Unspecified reason<TAGS>	73020100	This event would be generated by the DPoG System if a vCM registration is rejected for some reason not covered by one of the following event messages.

Process	Sub-Process	vCM	DPoG System	Event Message	Event ID	Comments
Init	1.1 and 2.0 SPECIFIC REGISTRATION REQUEST		MUST	REG REQ rejected – Unrecognized configuration setting<TAGS>	73020101	In the DPoG System, this event would be generated if the configuration file contains settings that are unknown.
Init	1.1 and 2.0 SPECIFIC REGISTRATION REQUEST		MUST	REG REQ rejected – Major service flow error<TAGS>	73020110	
Init	1.1 and 2.0 SPECIFIC REGISTRATION REQUEST		MUST	REG REQ rejected – Major classifier error<TAGS>	73020111	
Init	*1.1 and 2.0 SPECIFIC REGISTRATION REQUEST*		*MUST NOT*	*REG REQ rejected – Major PHS rule error<TAGS>*	*73020112*	*PHS is not supported for DPoG Networks.*
Init	1.1 and 2.0 SPECIFIC REGISTRATION REQUEST		MUST	REG REQ rejected – Multiple major errors<TAGS>	73020113	This event is generated by the DPoG System if the modem configuration file contains major service flow and classifier errors.
Init	1.1 and 2.0 SPECIFIC REGISTRATION REQUEST		MUST	REG REQ rejected – Message syntax error <P1><TAGS>	73020114	Depending on the implementation of the vCM registration within the DPoG System, this event may not be generated.
Init	1.1 and 2.0 SPECIFIC REGISTRATION REQUEST		MUST	REG REQ rejected – Primary service flow error <P1><TAGS>	73020115	Generated if a service flow ID is not specified or made active.
Init	1.1 and 2.0 SPECIFIC REGISTRATION REQUEST		MUST	REG REQ rejected – temporary no resource<TAGS>	73020102	This event would be generated if there are not enough resources on the DPoG System to support the modem configuration file.
Init	1.1 and 2.0 SPECIFIC REGISTRATION REQUEST		MUST	REG REQ rejected – Permanent administrative<TAGS>	73020103	Generated by the DPoG System to indicate that the modem configuration will not be supported unless a change is made to the DPoG System configuration.
Init	1.1 and 2.0 SPECIFIC REGISTRATION REQUEST		MUST	REG REQ rejected – Required parameter not present <P1><TAGS>	73020104	Depending on the implementation of the vCM registration within the DPoG System, this event may not be generated.
Init	*1.1 and 2.0 SPECIFIC REGISTRATION REQUEST*		*MUST NOT*	*REG REQ rejected – Header suppression setting not supported<TAGS>*	*73020105*	*Header suppression is not supported in DPoG Networks.*
Init	1.1 and 2.0 SPECIFIC REGISTRATION REQUEST		MUST	REG REQ rejected – Multiple errors<TAGS>	73020106	Depending on the implementation of the vCM registration within the DPoG System, this event may not be generated.
Init	1.1 and 2.0 SPECIFIC REGISTRATION REQUEST		MUST	REG REQ rejected – duplicate reference-ID or index in message<TAGS>	73020107	Depending on the implementation of the vCM registration within the DPoG System, this event may not be generated.

Process	Sub-Process	vCM	DPoG System	Event Message	Event ID	Comments
Init	1.1 and 2.0 SPECIFIC REGISTRATION REQUEST		MUST	REG REQ rejected – parameter invalid for context <P1><TAGS>	73020108	Depending on the implementation of the vCM registration within the DPoG System, this event may not be generated.
Init	*1.1 and 2.0 SPECIFIC REGISTRATION REQUEST*		*MUST NOT*	*REG REQ rejected – Authorization failure<TAGS>*	*73020109*	
Init	1.1 and 2.0 SPECIFIC REGISTRATION RESPONSE	MUST		REG RSP contains service flow parameters that CM cannot support <P1><TAGS>	73025100	
Init	1.1 and 2.0 SPECIFIC REGISTRATION RESPONSE	MUST		REG RSP contains classifier parameters that CM cannot support <P1><TAGS>	73025101	
Init	*1.1 and 2.0 SPECIFIC REGISTRATION RESPONSE*	*MUST NOT*		*REG RSP contains PHS parameters that CM cannot support <P1><TAGS>*	*73025102*	*PHS is not supported in DPoG Networks.*
Init	1.1 and 2.0 SPECIFIC REGISTRATION RESPONSE	MAY		Registration RSP rejected unspecified reason<TAGS>	73025103	Depending on the implementation of the vCM registration within the DPoG System, this event may not be generated.
Init	1.1 and 2.0 SPECIFIC REGISTRATION RESPONSE	MAY		Registration RSP rejected message syntax error <P1><TAGS>	73025104	Depending on the implementation of the vCM registration within the DPoG System, this event may not be generated.
Init	1.1 and 2.0 SPECIFIC REGISTRATION RESPONSE	MAY		Registration RSP rejected message too big <P1><TAGS>	73025105	Depending on the implementation of the vCM registration within the DPoG System, this event may not be generated.
Init	2.0 SPECIFIC REGISTRATION RESPONSE	MAY		REG-RSP received after REG-ACK. Returning to 1.x transmit mode<TAGS>	73026100	Depending on the implementation of the vCM registration within the DPoG System, this event may not be generated.
Init	REGISTRATION ACKNOWLEDGEMENT		MUST	REG aborted no REG-ACK<TAGS>	73030100	Depending on the implementation of the vCM registration within the DPoG System, this event may not be generated.
Init	REGISTRATION Acknowledgement		MUST	REG ACK rejected unspecified reason<TAGS>	73030200	Depending on the implementation of the vCM registration within the DPoG System, this event may not be generated.
Init	REGISTRATION ACKNOWLEDGEMENT		MUST	REG ACK rejected message syntax error<TAGS>	73030300	Depending on the implementation of the vCM registration within the DPoG System, this event may not be generated.
Init	TLV-11 PARSING	MUST		TLV-11 – unrecognized OID<TAGS>	73040100	
Init	TLV-11 PARSING	MUST		TLV-11 – Illegal Set operation failed<TAGS>	73040200	
Init	TLV-11 PARSING	MUST		TLV-11 – Failed to set duplicate elements<TAGS>	73040300	

Process	Sub-Process	vCM	DPoG System	Event Message	Event ID	Comments
Init	1.1 and 2.0 SPECIFIC REGISTRATION REQUEST		MAY	REG REQ rejected – Message too big <P1><TAGS>	73020116	Depending on the implementation of the vCM registration within the DPoG System, this event may not be generated.
Init	Waiting for REG-RSP or REG-RSP-MP	MAY		T6 Timeout and retries exceeded<TAGS>	73027100	Depending on the implementation of the vCM registration within the DPoG System, this event may not be generated.
Init	CM Complete Registration	MUST		Cannot create US Primary Service Flow<TAGS>	73050100	
Init	*CM Complete Registration*	*MUST NOT*		*Received REG-RSP while in REG-HOLD1 state<TAGS>*	*73050200*	
Init	*CM Complete Registration*	*MUST NOT*		*Received REG-RSP while in REG-HOLD2 state<TAGS>*	*73050300*	
Init	Waiting for REG-REQ or REG-REQ-MP		MAY	T9 Timeout – Never received REG-REQ or all REG-REQ-MP fragments<TAGS>	73021100	Depending on the implementation of the vCM registration within the DPoG System, this event may not be generated.
Init	*CMTS Registration*		*MUST NOT*	*Missing RCP in REG-REQ or REG-REQ-MP<TAGS>*	*73055100*	*Channel bonding is not supported in DPoG Networks.*
Init	*CMTS Registration*		*MUST NOT*	*Received Non-Queue-Depth Based Bandwidth Request and Multiple Transmit Channel mode is enabled<TAGS>*	*73055200*	*Channel bonding is not supported in DPoG Networks.*
Init	*CMTS Registration*		*MUST NOT*	*Received Queue-Depth Based Bandwidth Request when Multiple Transmit Channel mode is not enabled<TAGS>*	*73055300*	*Channel bonding is not supported in DPoG Networks.*
Init	*CMTS Registration*		*MUST NOT*	*Received REG-ACK with TCS - Partial Service<TAGS>*	*73055400*	*Channel bonding is not supported in DPoG Networks.*
Init	*CMTS Registration*		*MUST NOT*	*Received REG-ACK with RCS - Partial Service<TAGS>*	*73055500*	*Channel bonding is not supported in DPoG Networks.*
Init	CMTS Registration		MAY	T6 Timer expires and Retries Exceeded<TAGS>	73055600	Depending on the implementation of the vCM registration within the DPoG System, this event may not be generated.
Init	*CMTS Registration*		*MUST NOT*	*Initializing Channel Timeout<TAGS>*	*73055700*	*Channel bonding is not supported in DPoG Networks.*
Init	*CMTS Registration*		*MUST NOT*	*REG-REQ-MP received when no MDD present<TAGS>*	*73055800*	*DOCSIS-specific message is not applicable to DPoG Networks.*

11.6 QoS

Process	Sub-Process	vCM Supports	System Supports	Event Message	Event ID	Comments
Service Flow	*Service Flow Assignment*		*MUST NOT*	*Attribute Masks for SF (SFID <P1>) do not satisfy those in the SCN <P2>.*	*75010100*	

11.7 General

Process	Sub-Process	vCM Supports	System Supports	Event Message	Event ID	Comments
		MUST NOT		*A transmit opportunity was missed because the MAP arrived too late.*	*78000100*	*There are no MAP messages in DPoG Networks.*

11.8 Ranging

Most of the following events do not apply to DPoG Networks as they are specific to the DOCSIS ranging process. However, a few of these events can be provided by the DPoG System to emulate ranging issues when links are lost on the GPON network.

Process	Sub-Process	vCM Supports	System Supports	Event Message	Event ID	Comments
Init	*RANGING*	*MUST NOT*		*No Maintenance Broadcasts for Ranging opportunities received – T2 time-out<TAGS>*	*82000100*	
Init	*RANGING*	*MUST NOT*		*No Ranging Response received – T3 time-out<TAGS>*	*82000200*	
Init	*RANGING*	*MUST NOT*		*Ranging Request Retries exhausted<TAGS>*	*82000300*	
Init	*RANGING*	*MUST NOT*		*Received Response to Broadcast Maintenance Request, But no Unicast Maintenance opportunities received – T4 time out<TAGS>*	*82000400*	
Init	*RANGING*	*MUST NOT*		*Started Unicast Maintenance Ranging – No Response received – T3 time-out<TAGS>*	*82000500*	
Init	*RANGING*	*MUST NOT*		*Unicast Maintenance Ranging attempted – No response – Retries exhausted<TAGS>*	*82000600*	
Init	RANGING	MUST		Unicast Ranging Received Abort Response – Re-initializing MAC<TAGS>	82000700	Used to report an interruption in the ranging process as commanded by the DPoG System
Init	*RANGING*	*MUST NOT*		*16 consecutive T3 timeouts while trying to range on upstream channel <P1><TAGS>*	*82000800*	
Init	*RANGING*	*MUST NOT*		*B-INIT-RNG Failure – Retries exceeded<TAGS>*	*82000900*	
Init	*RANGING*		*MUST NOT*	*No Ranging Requests received from POLLED CM (CMTS generated polls);<CM-MAC>;*	*82010100*	
Init	*RANGING*		*MUST NOT*	*Retries exhausted for polled CM (report MAC address). After 16 R101.0 errors<CM-MAC>;*	*82010200*	

Process	Sub-Process	vCM Supports	System Supports	Event Message	Event ID	Comments
Init	*RANGING*		*MUST NOT*	*Unable to Successfully Range CM (report MAC address) Retries Exhausted;<CM-MAC>;*	*82010300*	
Init	RANGING		MUST	Failed to receive Periodic RNG-REQ from modem (SID X), timing-out SID;<CM-MAC>	82010400	Used to report a Link Loss from the connected ONU.
Init	*RANGING*		*MUST NOT*	*CM transmitted B-INIT-RNG-REQ with MD-DS-SG ID of zero;<CM-MAC>*	*82010500*	

11.9 Dynamic Services

Dynamic Services are not supported in this version of the DPoG specifications.

11.10 Downstream Acquisition

The Downstream Acquisition section of the events includes events related to DOCSIS SYNC Timing issues, Receive Channel Configuration (RCC), Receive Channel Profiles (RCP), and Upstream Channel Descriptors (UCD). The vCM MUST NOT support any of the Downstream Acquisition events defined in Annex D of [OSSIv3.0] since these are not applicable to DPoG Networks.

11.11 Diagnostic Log

Process	Sub-Process	vCM Supports	System Supports	Event Message	Event ID	Comments
Diag	LogSize		MUST	Diagnostic log size reached high threshold. Enabled detectors: <P1>;Log maximum size: <P2>.	86000100	
Diag	LogSize		MUST	Diagnostic log size dropped to low threshold. Enabled detectors: <P1>;Log maximum size: <P2>.	86000200	
Diag	LogSize		MUST	Diagnostic log size reached full threshold. Enabled detectors: <P1>;Log maximum size: <P2>.	86000300	

11.12 IPDR

The DPoG System MUST support events described in the IPDR section of [OSSIv3.0], Annex D.

11.13 Multicast

Multicast is supported in this version of the DPoG specifications. The DPoG System MUST support events described in the Multicast section of [OSSIv3.0], Annex D.

11.14 CM-Status

The CM-Status section of Annex D describes events related to the receipt of CM-STATUS messages from the CM at unexpected times in the DOCSIS ranging and registration process. This message is not supported in this version of the DPoG specifications.

11.15 CM-CTRL

Process	Sub-Process	vCM Supports	System Supports	Event Message	Event ID	Comments
CM-CTRL	***CM-CTRL***	***SHOULD NOT***	***SHOULD NOT***	***CM-CTRL – Command: <P1> (if P1= mute Add Interval: <P2> ChannelID: <P3>) (If P1 = forwarding Add Action: <P4>) <TAGS>***	***76000100***	
CM-CTRL	*CM-CTRL*	*MUST NOT*	*MUST NOT*	*CM-CTRL- Invalid message format<TAGS>*	*76000200*	

12 SUPPORT FOR MEF IPDR SERVICE DEFINITIONS

In DPoG v1.0, MEF services are not supported; however, this section is reserved as a place holder for when the MEF implementation is supported.

13 SUPPORT FOR DOCSIS 3.0 OSSI IPDR SERVICE DEFINITIONS

Table 9 provides a high-level summary of the applicability of each of the DOCSIS 3.0 IPDR service definitions to the DPoG System. Acting as a DOCSIS 3.0 CMTS, the DPoG System MUST produce IPDR records consistent with requirements described in the corresponding sections of [OSSIv3.0].

The following table provides a high-level summary of the applicability of each DOCSIS service definitions taken from [OSSIv3.0] and applied to the DPoG System. Consistent with the conventions established in [OSSIv3.0], the value in the "DPoG System" column indicates whether or not the service definition is applicable to DPoG.

Table 9 - Relationship between OSSI 3.0 and DPoG 1.0 IPDR Service Definitions

Service Definition	From	DPoG System	Comment
DOCSIS-SAMIS-TYPE-1	[OSSIv3.0]	MUST	
DOCSIS-SAMIS-TYPE-2	[OSSIv3.0]	MUST	
DOCSIS-CMTS-TOPO-TYPE	[OSSIv3.0]		*Not applicable to GPON.*
DOCSIS-CPE-TYPE	[OSSIv3.0]	MUST	Only applies to the HSD interface on the CMCI Interface.
DOCSIS-CMTS-CM-REG-STATUS-TYPE	[OSSIv3.0]	MUST	
DOCSIS-CMTS-CM-US-STATS-TYPE	[OSSIv3.0]		*Not applicable to GPON*
DOCSIS-CMTS-CM-US-UTIL-STATS-TYPE	[OSSIv3.0]		*Not applicable to GPON*
DOCSIS-CMTS-CM-DS-UTIL-STATS-TYPE	[OSSIv3.0]	MUST	
DOCSIS-DIAG-LOG-TYPE	[OSSIv3.0]	MUST	
DOCSIS-DIAG-LOG-DETAILTYPE	[OSSIv3.0]	MUST	
DOCSIS-DIAG-LOG-EVENT-TYPE	[OSSIv3.0]	MUST	
DOCSIS-SPECTRUM-MEASUREMENT-TYPE	[OSSIv3.0]		*Not applicable to GPON.*
DOCSIS-CMTS-CM-SERVICE-FLOW	[OSSIv3.0]	MUST	

The following sections examine the applicable IPDR service definitions from Table 9. Each section describes one [OSSIv3.0] service definition and evaluates the applicability of each record attribute within it.

The DPoG System's IPDR Exporter is the source of IPDR records (acting as a CMTS). It is assumed that all necessary data for the DPoG System to complete the required IPDR record attributes described in this specification is made available by either the OLT or D-ONU(s). The details of where or how this supporting data is gathered and presented to the DPoG System in order to populate the required IPDR record attributes is beyond the scope of this specification.

The data provided in these attributes will be sourced from the DPoG System. There are some cases where some further explanation is required for specific attributes, and this is provided in the "Comment" field of the table.

The following sections are adapted from the corresponding sections included in Annex B and Annex C of [OSSIv3.0]. For each service definition, this section includes a table providing an evaluation of whether the record attributes apply to the DPoG System.

The value in the "DPoG System" column indicates whether or not the record attribute is applicable to a DPoG System. An "X" in the column field indicates that the service definition record attribute applies to the DPoG System and MUST be implemented. An empty field indicates that the record attribute does not apply to the DPoG System and SHOULD NOT be supported.

In all IPDR records the DPoG System MUST provide an entry for every record attribute, whether it is required or not. In the cases where the attribute is not required, a default value MUST be provided. This default value is indicated in the following tables.

13.1 Requirements for DOCSIS SAMIS Service Definitions

The generation of the Subscriber Usage Billing records is the top priority when generating IPDR records.

The DPoG System MUST support the generation of Subscriber Usage Billing Service records as defined by the [OSSIv2.0] specification.

The DPoG System MUST support the generation of Type 1 Subscriber Usage Billing records as defined by the [OSSIv3.0] specification.

The DPoG System MUST support the generation of Type 2 (Optimized Format) Subscriber Usage Billing records as defined by the [OSSIv3.0] specification.

13.1.1 DOCSIS-SAMIS-TYPE-1

Attribute Name	DPoG System	Comments
DOCSIS-CMTS:CmtsHostName	MUST	
DOCSIS-CMTS:CmtsSysUpTime	MUST	
DOCSIS-CMTS:CmtsIpv4Addr	MUST	
DOCSIS-CMTS:CmtsIpv6Addr	MUST	
DOCSIS-CMTS:CmtsMdIfName	MUST	
DOCSIS-CMTS:CmtsMdIfIndex	MUST	
DOCSIS-CM:CmMacAddr	MUST	
DOCSIS-CM:CmIpv4Addr	MUST	
DOCSIS-CM:CmIpv6Addr	MUST	
DOCSIS-CM:CmIpv6LinkLocalAddr	MUST	
DOCSIS-CM:CmQosVersion	MUST	
DOCSIS-CM:CmRegStatusValue	MUST	
DOCSIS-CM:CmLastRegTime	MUST	
DOCSIS-REC:RecType	MUST	
DOCSIS-REC:RecCreationTime	MUST	
DOCSIS-QOS:ServiceFlowChSet		The DPoG System MUST set to 0.
DOCSIS-QOS:ServiceAppId		The DPoG System MUST set to 0.
DOCSIS-QOS:ServiceDsMulticast	MUST	
DOCSIS-QOS:ServiceIdentifier	MUST	
DOCSIS-QOS:ServiceGateId		The DPoG System MUST set to 0.
DOCSIS-QOS:ServiceClassName	MUST	
DOCSIS-QOS:ServiceDirection	MUST	
DOCSIS-QOS:ServiceOctetsPassed	MUST	This object represents the MEF Service Flow.
DOCSIS-QOS:ServicePktsPassed	MUST	Monitored at DPoG System
DOCSIS-QOS:ServiceSlaDropPkts	MUST	Monitored at DPoG System
DOCSIS-QOS:ServiceSlaDelayPkts	MUST	Monitored at DPoG System
DOCSIS-QOS:ServiceTimeCreated	MUST	
DOCSIS-QOS:ServiceTimeActive	MUST	

13.1.2 DOCSIS-SAMIS-TYPE-2

Attribute Name	DPoG System	Comments
DOCSIS-CMTS:CmtsHostName	MUST	
DOCSIS-CMTS:CmtsSysUpTime	MUST	
DOCSIS-CMTS:CmtsMdIfName	MUST	
DOCSIS-CMTS:CmtsMdIfIndex	MUST	
DOCSIS-CM:CmMacAddr	MUST	
DOCSIS-REC:RecType	MUST	
DOCSIS-REC:RecCreationTime	MUST	
DOCSIS-QOS:ServiceFlowChSet		The DPoG system MUST set to 0.
DOCSIS-QOS:ServiceAppId		The DPoG system MUST set to 0.
DOCSIS-QOS:ServiceDsMulticast	MUST	
DOCSIS-QOS:ServiceIdentifier	MUST	
DOCSIS-QOS:ServiceGateId		The DPoG system MUST set to 0.
DOCSIS-QOS:ServiceClassName	MUST	
DOCSIS-QOS:ServiceDirection	MUST	
DOCSIS-QOS:ServiceOctetsPassed	MUST	Monitored at DPoG System
DOCSIS-QOS:ServicePktsPassed	MUST	Monitored at DPoG System
DOCSIS-QOS:ServiceSlaDropPkts	MUST	Monitored at DPoG System (Need to clarify meaning of this attribute)
DOCSIS-QOS:ServiceSlaDelayPkts	MUST	Monitored at DPoG System (Need to clarify meaning of this attribute)
DOCSIS-QOS:ServiceTimeCreated	MUST	
DOCSIS-QOS:ServiceTimeActive	MUST	

13.2 Requirements for DOCSIS Spectrum Measurement Service Definition

The DPoG System MUST NOT support generation of the Upstream Spectrum Measurement records.

13.3 Requirements for DOCSIS Diagnostic Log Service Definitions

The DPoG System MUST support the generation of Diagnostic Log records.

The supported Diagnostic Log triggers will be limited to those CM registration states which are supported by the DPoG System.

13.3.1 DOCSIS-DIAG-LOG-TYPE

Attribute Name	DPoG System	Comments
DOCSIS-CM:CmMacAddr	MUST	
DOCSIS-DIAG-LOG:LastUpdateTime	MUST	
DOCSIS-DIAG-LOG:CreateTime	MUST	
DOCSIS-DIAG-LOG:LastRegTime	MUST	
DOCSIS-DIAG-LOG:RegCount	MUST	
DOCSIS-DIAG-LOG:RangingRetryCount	MUST	The DPoG System MUST set to 0.
DOCSIS-REC:RecType	MUST	

13.3.2 DOCSIS-DIAG-LOG-DETAILTYPE

Attribute Name	DPoG System	Comments
DOCSIS-CM:CmMacAddr	MUST	
DOCSIS-DIAG-LOG-DETAIL:TypeValue	MUST	
DOCSIS-DIAG-LOG-DETAIL:Count	MUST	
DOCSIS-DIAG-LOG-DETAIL:LastUpdate	MUST	
DOCSIS-DIAG-LOG-DETAIL:LastErrorText	MUST	
DOCSIS-REC:RecType	MUST	

13.3.3 DOCSIS-DIAG-LOG-EVENT-TYPE

Attribute Name	DPoG System	Comments
DOCSIS-CM:CmMacAddr	MUST	
DOCSIS-CMTS:CmtsSysUpTime	MUST	
DOCSIS-DIAG-LOG:TriggerFlagValue	MUST	
DOCSIS-DIAG-LOG-DETAIL:TypeValue	MUST	
DOCSIS-DIAG-LOG-DETAIL:LastErrorText	MUST	
DOCSIS-REC:RecType	MUST	

13.4 Requirements for CMTS CM Registration Status Service Definition

The DPoG System MUST support the generation of CMTS CM Registration Status Information records.

13.4.1 DOCSIS-CMTS-CM-REG-STATUS-TYPE

Attribute Name	DPoG System	Comments
DOCSIS-CMTS:CmtsHostName	MUST	
DOCSIS-CMTS:CmtsSysUpTime	MUST	
DOCSIS-CMTS:CmtsMdIfName	MUST	
DOCSIS-CMTS:CmtsMdIfIndex	MUST	
DOCSIS-CMTS-CM-NODE-CH:CmtsMdCmSgId		The DPoG system MUST set to 0.
DOCSIS-CMTS-CM-NODE-CH:CmtsRcpId		The DPoG system MUST set to 0.
DOCSIS-CMTS-CM-NODE-CH:CmtsRccStatusId		The DPoG system MUST set to 0.
DOCSIS-CMTS-CM-NODE-CH:CmtsRcsId		The DPoG system MUST set to 0.
DOCSIS-CMTS-CM-NODE-CH:CmtsTcsId		The DPoG system MUST set to 0.
DOCSIS-CM:CmMacAddr	MUST	
DOCSIS-CM:CmIpv4Addr	MUST	
DOCSIS-CM:CmIpv6Addr	MUST	
DOCSIS-CM:CmIpv6LinkLocalAddr	MUST	
DOCSIS-CM:CmQosVersion	MUST	The DPoG system MUST set to ‘1.1 QoS Mode’
DOCSIS-CM:CmRegStatusValue	MUST	
DOCSIS-CM:CmLastRegTime	MUST	
DOCSIS-REC:RecType	MUST	
DOCSIS-REC:RecCreationTime	MUST	

13.5 Requirements for CMTS CM Upstream Status Service Definitions

The DPoG System SHOULD NOT support the generation of CMTS CM Upstream Status records.

13.6 Requirements for CMTS Topology Service Definition

The DPoG System SHOULD NOT support the generation of CMTS Topology records.

The only reason to provide support for these records would be to provide compatibility with applications that are building topology diagrams for operator use.

13.7 Requirements for CPE Service Definition

The DPoG System MUST support the generation of CPE Service Definition records.

13.7.1 DOCSIS-CPE-TYPE

Attribute Name	DPoG System	Comments
DOCSIS-CMTS:CmtsHostName	MUST	
DOCSIS-CMTS:CmtsSysUpTime	MUST	
DOCSIS-CMTS:CmtsMdIfName	MUST	
DOCSIS-CMTS:CmtsMdIfIndex	MUST	
DOCSIS-CM:CmMacAddr	MUST	
DOCSIS-REC:RecType	MUST	
DOCSIS-CPE:CpeMacAddr	MUST	
DOCSIS-CPE:CpeIpv4AddrList	MUST	Gleaned from DHCP requests on DPoG system.
DOCSIS-CPE:CpeIpv6AddrList	MUST	Gleaned from DHCP requests on DPoG system.
DOCSIS-CPE:CpeFqdn	MUST	DPoG System resolves name by using DNS lookup.

13.8 Requirements for CMTS Upstream Utilization Statistics Service Definition

The DPoG System SHOULD NOT support the generation of CMTS Upstream Utilization Statistics records.

13.9 Requirements for CMTS Downstream Utilization Statistics Service Definition

The DPoG System MUST support the generation of CMTS Downstream Utilization Statistics records.

13.9.1 DOCSIS-CMTS-CM-DS-UTIL-STATS-TYPE

Attribute Name	DPoG System	Comments
DOCSIS-CMTS:CmtsHostName	MUST	
DOCSIS-CMTS:CmtsSysUpTime	MUST	
DOCSIS-CMTS:CmtsMdIfIndex	MUST	
DOCSIS-CMTS-DS-UTIL:DsChId	MUST	
DOCSIS-CMTS-DS-UTIL: DsUtilInterval	MUST	The time interval, in seconds, over which the channel utilization is calculated.
DOCSIS-CMTS-DS-UTIL: DsUtilIndexPercentage	MUST	The calculated and truncated utilization index percentage for the downstream interface.
DOCSIS-CMTS-DS-UTIL: DsUtilTotalBytes	MUST	The total number of bytes transported by the downstream interface.

Attribute Name	DPoG System	Comments
DOCSIS-CMTS-DS-UTIL: DsUtilUsedBytes	MUST	The total number of DOCSIS data bytes transported by the downstream interface. The number of data bytes is defined as the total number of bytes transported in DOCSIS payloads minus the number of stuff bytes transported in DOCSIS payloads.
DOCSIS-REC:RecType	MUST	

13.10 Requirements for CMTS CM Service Flow Service Definition

The DPoG System MUST support the generation of CMTS CM Service Flow records.

13.10.1 DOCSIS-CMTS-CM-SERVICE-FLOW

Attribute Name	DPoG System	Comments
DOCSIS-CMTS:CmtsHostName	MUST	
DOCSIS-CMTS:CmtsSysUpTime	MUST	
DOCSIS-CMTS:CmtsMdIfName	MUST	
DOCSIS-CMTS:CmtsMdIfIndex	MUST	
DOCSIS-REC:RecType	MUST	
DOCSIS-REC:RecCreationTime	MUST	
DOCSIS-QOS:ServiceFlowChSet	MUST	The DPoG system MUST set to 0.
DOCSIS-QOS:ServiceAppId	MUST	The DPoG system MUST set to 0.
DOCSIS-QOS:ServiceDsMulticast	MUST	
DOCSIS-QOS:ServiceIdentifier	MUST	
DOCSIS-QOS:ServiceGateId	MUST	The DPoG system MUST set to 0.
DOCSIS-QOS:ServiceClassName	MUST	
DOCSIS-QOS:ServiceDirection	MUST	
DOCSIS-SERVICE-FLOW:ServiceTrafficPriority	MUST	
DOCSIS-SERVICE-FLOW:ServiceMaxSustained	MUST	
DOCSIS-SERVICE-FLOW:ServiceMaxBurst	MUST	
DOCSIS-SERVICE-FLOW:ServiceMinReservedRate	MUST	
DOCSIS-SERVICE-FLOW:ServiceMinReservedPktSize	MUST	The DPoG system MUST set to 0.
DOCSIS-SERVICE-FLOW:ServiceIpTos	MUST	
DOCSIS-SERVICE-FLOW:ServicePeakRate	MUST	The DPoG system MUST set to 0.
DOCSIS-SERVICE-FLOW:ServiceSchedule	MUST	
DOCSIS-SERVICE-FLOW:ServiceNomPollInterval	MUST	
DOCSIS-SERVICE-FLOW:ServiceTolPollJitter	MUST	The DPoG system MUST set to 0.
DOCSIS-SERVICE-FLOW:ServiceUGSize	MUST	The DPoG system MUST set to 0.
DOCSIS-SERVICE-FLOW:ServiceNomGrantInterval	MUST	The DPoG system MUST set to 0.
DOCSIS-SERVICE-FLOW:ServiceTolGrantJitter	MUST	The DPoG system MUST set to 0.
DOCSIS-SERVICE-FLOW:ServiceGrantsPerInterval	MUST	The DPoG system MUST set to 0.
DOCSIS-SERVICE-FLOW:ServicePacketClassifiers	MUST	
DOCSIS-QOS:ServiceTimeCreated	MUST	

Annex A IPDR Service Definition Schemas (Normative)

In DPoG v1.0 specifications, MEF services are not covered; however, this section is reserved as a place holder for future when the MEF implementation is covered.

Annex B DPoG MIB Requirements (Normative)

This Annex defines the DPoG MIB module and MIB variables required for DPoGv1.0 System and vCM devices.

In this Annex, "GRAY SHADED" sections and values are NOT required to be supported in DPoG v1.0. However, they are provided in the document for future compatibility. Therefore, in DPoGv1.0 such MIB entities shall be populated by default values but changing or reading their values shall not impact the operation and shall not be expected to return operational data.

B.1 MIB-Object Details

B.1.1 DOCS-DPoG-MIB

```
DOCS-DPoG-MIB DEFINITIONS ::= BEGIN

IMPORTS
    MODULE-IDENTITY,
    OBJECT-TYPE,
    Unsigned32,
    Integer32,
    Counter64               FROM SNMPv2-SMI

    TEXTUAL-CONVENTION,
    TruthValue,
    MacAddress              FROM SNMPv2-TC

    MODULE-COMPLIANCE,
    OBJECT-GROUP            FROM SNMPv2-CONF

    SnmpAdminString         FROM SNMP-FRAMEWORK-MIB -- RFC 2580

    ifIndex                 FROM IF-MIB

    InetAddressType,
    InetAddress             FROM INET-ADDRESS-MIB    -- RFC 4001

    docsQosServiceFlowId,
    docsQosServiceFlowEntry,
    docsQos3PktClassEntry
                            FROM DOCS-QOS3-MIB

    docsSubmgt3FilterGrpEntry
                            FROM DOCS-SUBMGT3-MIB

    docsIf3CmtsCmRegStatusId
                            FROM DOCS-IF3-MIB



    docsMcastAuthProfilesName,
    docsMcastAuthProfileSessRuleId,
    docsMcastAuthStaticSessRuleCfgListId,
    docsMcastAuthStaticSessRuleId
                            FROM DOCS-MCAST-AUTH-MIB

    clabProjDocsis,
    DocsL2vpnIfList         FROM CLAB-DEF-MIB;
```

```
dpogMIB MODULE-IDENTITY
    LAST-UPDATED  "201111040000Z"  -- November 4th, 2011
    ORGANIZATION  "CableLabs"
    CONTACT-INFO
        "Postal: Cable Television Laboratories, Inc.
        858 Coal Creek Circle
        Louisville, Colorado 80027-9750
        U.S.A.
        Phone:  +1 303-661-9100
        Fax:   +1 303-661-9199
        E-mail: mibs@cablelabs.com"
    DESCRIPTION
        "This is the management MIB for devices complying with the DOCSIS
DPoG Feature."
    REVISION "201111040000Z"
    DESCRIPTION
        "Initial version."
    ::= { clabProjDocsis 25}
```

```
-------------------------------------------------------------
--
-- Textual Conventions
--
DpogMESPDisableEnable ::= TEXTUAL-CONVENTION

    STATUS      current
    DESCRIPTION
            "Disable and Enable options for binary capabilities in the
             MESP table."

    SYNTAX      INTEGER {
                        disabled (0),
                        enabled (1)
                        }

DpogMESPFieldId ::= TEXTUAL-CONVENTION

    STATUS      current
    DESCRIPTION
            "Identifies a specific field in the frame being classified."

    SYNTAX      INTEGER {
                        ipV4Tos(0),
                        ipV6Dscp(1),
                        spcp(2),
                        cpcp(3),
                        ipcp(4),
                        bpcp(5),
                        sdei(6),
                        cdei(7),
                        idei(8),
                        bdei(9),
                        mplsexp(10)
                        }

-------------------------------------------------------------
```

```
-- MIB Organization
--
dpogMIBNotifications OBJECT IDENTIFIER ::= { dpogMIB 0 }  -- Placeholder for
notifications
dpogMIBObjects OBJECT IDENTIFIER ::= { dpogMIB 1 }
dpogMEFConfig OBJECT IDENTIFIER ::= { dpogMIBObjects 1 }
dpogMEFStats OBJECT IDENTIFIER ::= { dpogMIBObjects 2 }
dpogMultiCast OBJECT IDENTIFIER ::= { dpogMIBObjects 3 }
dpogVcm OBJECT IDENTIFIER ::= { dpogMIBObjects 4 }
dpogMIBConformance  OBJECT IDENTIFIER ::= { dpogMIB 2 }

--
-- DPoG MIB Objects
--

-----------------------------------------------------------------------
--
-- The following set of tables define the MEF configuration data that
-- is supported by the DPoG system.
--
-----------------------------------------------------------------------

-----------------------------------------------------------------------
--
-- Metro Ethernet Service Profile Table
--
-- This table contains one row for each service flow that is using an MESP.
-- The ifIndex of the MAC Domain is provided as an additional index for
convenience.
--
-----------------------------------------------------------------------


dpogMESPTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF DpogMESPEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "Table contains the attributes for each Metro Ethernet Service
Profile in
            use by a service flow or ASF."
    ::= {  dpogMEFConfig 1 }

dpogMESPEntry OBJECT-TYPE
    SYNTAX      DpogMESPEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "The table is indexed by the ifIndex of the associated MAC Domain
and the
            service flow ID"
    INDEX { ifIndex, docsQosServiceFlowId  }
    ::= { dpogMESPTable 1 }

DpogMESPEntry ::= SEQUENCE
    {
```

```
      dpogMESPBpCir           INTEGER,
      dpogMESPBpCbs           INTEGER,
      dpogMESPBpEir           INTEGER,
      dpogMESPBpEbs           INTEGER,
      dpogMESPBpCf            DpogMESPDisableEnable,
      dpogMESPBpCm            DpogMESPDisableEnable,
      dpogMESPBpCif           DpogMESPFieldId,
      dpogMESPBpGreen         INTEGER,
      dpogMESPBpYellow        INTEGER,
      dpogMESPBpRed           INTEGER,
      dpogMESPBpCpCrStatus    DpogMESPDisableEnable,
      dpogMESPBpCpCrField     DpogMESPFieldId,
      dpogMESPBpCrGreen       INTEGER,
      dpogMESPBpCrYellow      INTEGER,
      dpogMESPBpCrRed         INTEGER
    }

dpogMESPBpCir OBJECT-TYPE
    SYNTAX      INTEGER
    UNITS       "kbit/s"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The field is used to carry the value of the Committed
Information Rate
             (CIR) associated with the given MESP.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpogMESPEntry 1 }

dpogMESPBpCbs  OBJECT-TYPE
    SYNTAX      INTEGER
    UNITS       "kbytes"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The field is used to carry the value of the Committed Burst Size
(CBS)
             associated with the given MESP.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpogMESPEntry 2 }

dpogMESPBpEir  OBJECT-TYPE
    SYNTAX      INTEGER
    UNITS       "kbit/s"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The field is used to carry the value of the Excess Information
Rate
             (EIR) associated with the given MESP.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpogMESPEntry 3 }

dpogMESPBpEbs  OBJECT-TYPE
```

```
    SYNTAX      INTEGER
    UNITS       "kbytes"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The field is used to carry the value of the Excess Burst Size
(EBS)
             associated with the given MESP.

             The  value of this attribute is derived from TLV TBD."

    ::= { dpogMESPEntry 4 }

dpogMESPBpCf  OBJECT-TYPE
    SYNTAX      DpogMESPDisableEnable
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The field is used to carry the value of the Coupling Flag (CF)
associated
             with the given MESP. Two values are supported i.e., 0 when the
coupling flag
             is disabled and 1 when the coupling flag is enabled.

             The  value of this attribute is derived from TLV TBD."
    DEFVAL { disabled }
    ::= { dpogMESPEntry 5 }

dpogMESPBpCm  OBJECT-TYPE
    SYNTAX      DpogMESPDisableEnable
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The field is used to indicate the Color Mode (CM) for processing
incoming
             frames associated with the given MESP.

             The  value of this attribute is derived from TLV TBD."
    DEFVAL { disabled }
    ::= { dpogMESPEntry 6 }

dpogMESPBpCif  OBJECT-TYPE
    SYNTAX      DpogMESPFieldId
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "This field is used to indicate which field within the incoming
frames
             is used to retrieve color information.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpogMESPEntry 7 }

dpogMESPBpGreen  OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
```

```
    DESCRIPTION
            "This attribute provides the value of the field identified
dpogMESPBpCif which
             is used to represent green frame color.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpogMESPEntry 8 }

dpogMESPBpYellow  OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "This attribute provides the value of the field identified
dpogMESPBpCif which
             is used to represent yellow frame color.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpogMESPEntry 9 }

dpogMESPBpRed  OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "This attribute provides the value of the field identified
dpogMESPBpCif which
             is used to represent red frame color.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpogMESPEntry 10 }

dpogMESPBpCpCrStatus  OBJECT-TYPE
    SYNTAX      DpogMESPDisableEnable
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "This attribute is used to indicate the Color Marking (CR)
operation associated
             with the given MESP.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpogMESPEntry 11 }

dpogMESPBpCpCrField  OBJECT-TYPE
    SYNTAX      DpogMESPFieldId
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "This attribute indicates which of the fields within the incoming
frames is used
             to save color information to.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpogMESPEntry 12 }

dpogMESPBpCrGreen  OBJECT-TYPE
```

```
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "This attribute provides the specific value assigned to the field
specified in
             dpogMESPBpCpCrField to represent green frame color.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpogMESPEntry 13 }

dpogMESPBpCrYellow  OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "This attribute provides the specific value assigned to the field
specified in
             dpogMESPBpCpCrField to represent yellow frame color.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpogMESPEntry 14 }

dpogMESPBpCrRed  OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "This attribute provides the specific value assigned to the field
specified in
             dpogMESPBpCpCrField to represent red frame color.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpogMESPEntry 15 }


-------------------------------------------------------------------
--
-- DPoG Packet Classifier Table
--
-- This table augments the table docsQos3PktClassTable from the DOCSIS-QOS3-
MIB.
-- The attributes for this table are the set of new classifier properties
that
-- are defined in the DPoG 1.0 Specifications.
--
-------------------------------------------------------------------


dpogPktClassTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF DpogPktClassEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "Table to provide the additional classifier parameters defined in
DPoG v1.0."
    ::= { dpogMEFConfig 2 }
```

```
dpogPktClassEntry OBJECT-TYPE
    SYNTAX      DpogPktClassEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "Additional classifier attributes from DPoG v1.0"
    AUGMENTS {docsQos3PktClassEntry}
    ::= { dpogPktClassTable 1 }

DpogPktClassEntry  ::= SEQUENCE
    {
      dpogPktClassBitMap      BITS,
      dpogPktClassCTagTPID    INTEGER,
      dpogPktClassCTagPCP     INTEGER,
      dpogPktClassCTagCFI     INTEGER,
      dpogPktClassCTagVID     INTEGER,
      dpogPktClassCTagTCI     INTEGER,
      dpogPktClassSTagTPID    INTEGER,
      dpogPktClassSTagPCP     INTEGER,
      dpogPktClassSTagDEI     INTEGER,
      dpogPktClassSTagVID     INTEGER,
      dpogPktClassSTagTCI     INTEGER,
      dpogPktClassITagTPID    INTEGER,
      dpogPktClassITagPCP     INTEGER,
      dpogPktClassITagUCA     INTEGER,
      dpogPktClassITagDEI     INTEGER,
      dpogPktClassITagSID     INTEGER,
      dpogPktClassITagTCI     INTEGER,
      dpogPktClassBTagTPID    INTEGER,
      dpogPktClassBTagPCP     INTEGER,
      dpogPktClassBTagDEI     INTEGER,
      dpogPktClassBTagVID     INTEGER,
      dpogPktClassBTagTCI     INTEGER,
      dpogPktClassBTagBDA     INTEGER,
      dpogPktClassBTagBSA     INTEGER

    }

dpogPktClassBitMap OBJECT-TYPE
     SYNTAX      BITS {
                       ctagTPID(0),
                       ctagPCP(1),
                       ctagCFI(2),
                       ctagVID(3),
                       ctagTCI(4),
                       stagTPID(5),
                       stagPCP(6),
                       stagDEI(7),
                       stagVID(8),
                       stagTCI(9),
                       itagTPID(10),
                       itagPCP(11),
                       itagUCA(12),
                       itagDEI(13),
                       itagSID(14),
                       itagTCI(15),
```

```
                        btagTPID(16),
                        btagPCP(17),
                        btagDEI(18),
                        btagVID(19),
                        btagTCI(20),
                        btagBDA(21),
                        btagBSA(22)
                       }
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "This attribute indicates which parameter encodings
              from this specific table that were actually present in the
              packet classifier encoding signaled in the DOCSIS message that
created
              or modified the classifier.
              A bit of this attribute is set to 1 if the parameter indicated
              by the comment was present in the classifier encoding,
              and to 0 otherwise.
              Note that BITS are encoded most significant bit first,
            so that if, for example, bits 6 and 7 are set, this attribute
              is encoded as the octet string '030000'H."

    ::= { dpogPktClassEntry 1 }

dpogPktClassCTagTPID OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ad] C-TPID field.

             If this parameter is not specified for an entry, then the DPoG
System MUST use a default
             value of 0x8100 for the [802.1ad] C-TPID field. Other values of
[802.1ad] C-TPID may be
             provisioned, as required.

             The DPoG System MUST NOT match Ethernet frames without the
[802.1ad] C-TPID to this entry.
             The D-ONU MUST NOT match Ethernet frames without the [802.1ad]
C-TPID to this entry.

             The  value of this attribute is derived from TLV TBD."
    DEFVAL { '8100'H }
    ::= { dpogPktClassEntry 2 }

dpogPktClassCTagPCP OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ad] C-PCP field.
```

```
            If this parameter is specified for an entry, the DPoG System
MUST NOT match Ethernet
            frames without [802.1ad] C-Tag to this entry. If this parameter
is specified for an
            entry, the D-ONU MUST NOT match Ethernet frames without the
[802.1ad] C-Tag to
            this entry.

            The  value of this attribute is derived from TLV TBD."
    ::= { dpogPktClassEntry 3 }

dpogPktClassCTagCFI OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ad] C-CFI field.

            If this parameter is specified for an entry, the DPoG System
MUST NOT match Ethernet
            frames without [802.1ad] C-Tag to this entry. If this parameter
is specified for an
            entry, the D-ONU MUST NOT match Ethernet frames without the
[802.1ad] C-Tag to
            this entry.

            The  value of this attribute is derived from TLV TBD."
    ::= { dpogPktClassEntry 4 }

dpogPktClassCTagVID OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ad] C-VID field.

            If this parameter is specified for an entry, the DPoG System
MUST NOT match Ethernet
            frames without [802.1ad] C-Tag to this entry. If this parameter
is specified for an
            entry, the D-ONU MUST NOT match Ethernet frames without the
[802.1ad] C-Tag to
            this entry.

            The  value of this attribute is derived from TLV TBD."
    ::= { dpogPktClassEntry 5 }

dpogPktClassCTagTCI OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ad] C-TCI field.
```

```
            If this parameter is specified for an entry, the DPoG System
MUST NOT match Ethernet
            frames without [802.1ad] C-Tag to this entry. If this parameter
is specified for an
            entry, the D-ONU MUST NOT match Ethernet frames without the
[802.1ad] C-Tag to
            this entry.

            The DPoG System MUST reject any CM config file with C-TCI TLV
present when C-PCP TLV,
            C-CFI TLV or C-VID TLV is present.

            The  value of this attribute is derived from TLV TBD."
    ::= { dpogPktClassEntry 6 }

dpogPktClassSTagTPID OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ad] S-TPID field.

            If this parameter is not specified for an entry, then the DPoG
System MUST use a default
            value of 0x88a8 for the [802.1ad] S-TPID field. Other values of
[802.1ad] S-TPID may be
            provisioned, as required.

            The DPoG System MUST NOT match Ethernet frames without the
[802.1ad] S-Tag to this entry.
            The D-ONU MUST NOT match Ethernet frames without the [802.1ad]
S-Tag to this entry.

            The  value of this attribute is derived from TLV TBD."
    DEFVAL { '88a8'H }
    ::= { dpogPktClassEntry 7 }

dpogPktClassSTagPCP OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ad] S-PCP field.

            If this parameter is specified for an entry, the DPoG System
MUST NOT match Ethernet
            frames without [802.1ad] S-Tag to this entry. If this parameter
is specified for an
            entry, the D-ONU MUST NOT match Ethernet frames without the
[802.1ad] S-Tag to
            this entry.

            The  value of this attribute is derived from TLV TBD."
    ::= { dpogPktClassEntry 8 }
```

```
dpogPktClassSTagDEI OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ad] S-DEI field.

             If this parameter is specified for an entry, the DPoG System
MUST NOT match Ethernet
             frames without [802.1ad] S-Tag to this entry. If this parameter
is specified for an
             entry, the D-ONU MUST NOT match Ethernet frames without the
[802.1ad] S-Tag to
             this entry.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpogPktClassEntry 9 }

dpogPktClassSTagVID OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
           "The values of the field specify the matching parameters for the
[802.1ad] S-SID field.

             If this parameter is specified for an entry, the DPoG System
MUST NOT match Ethernet
             frames without [802.1ad] S-Tag to this entry. If this parameter
is specified for an
             entry, the D-ONU MUST NOT match Ethernet frames without the
[802.1ad] S-Tag to
             this entry.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpogPktClassEntry 10 }

dpogPktClassSTagTCI OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
           "The values of the field specify the matching parameters for the
[802.1ad] S-TCI field.

             If this parameter is specified for an entry, the DPoG System
MUST NOT match Ethernet
             frames without [802.1ad] S-Tag to this entry. If this parameter
is specified for an entry,
             the D-ONU MUST NOT match Ethernet frames without the [802.1ad]
S-Tag to this entry.

             The DPoG System MUST reject any CM config file with S-TCI TLV
present when S-PCP TLV,
             S-DEI TLV or S-VID TLV is present.
```

```
            The  value of this attribute is derived from TLV TBD."
    ::= { dpogPktClassEntry 11 }

dpogPktClassITagTPID OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ah] I-TPID field.

            If this parameter is not specified for an entry, then the DPoG
System MUST use a default
            value of 0x88e7 for the [802.1ah] I-TPID field. Other values of
[802.1ah] I-TPID may be
            provisioned, as required.

            The DPoG System MUST NOT match Ethernet frames without the
[802.1ah] I-TAG tag to this
            entry. The D-ONU MUST NOT match Ethernet frames without the
[802.1ah] I-TAG tag to
            this entry.

            The  value of this attribute is derived from TLV TBD."
    DEFVAL { '88e7'H }
    ::= { dpogPktClassEntry 12 }

dpogPktClassITagPCP OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ah] I-PCP field.

            If this parameter is specified for an entry, the DPoG System
MUST NOT match Ethernet
            packets without the [802.1ah] I-Tag to this entry. If this
parameter is specified for
            an entry, the D-ONU MUST NOT match Ethernet packets without the
[802.1ah] I-Tag
            to this entry.

            The  value of this attribute is derived from TLV TBD."
    ::= { dpogPktClassEntry 13 }

dpogPktClassITagUCA OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ah] I-UCA field.

            If this parameter is specified for an entry, the DPoG System
MUST NOT match Ethernet
```

```
            packets without the [802.1ah] I-Tag to this entry. If this
parameter is specified for
            an entry, the D-ONU MUST NOT match Ethernet packets without the
[802.1ah] I-Tag to
            this entry.

            The  value of this attribute is derived from TLV TBD."
    ::= { dpogPktClassEntry 14 }

dpogPktClassITagDEI OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ah] I-DEI field.

            If this parameter is specified for an entry, the DPoG System
MUST NOT match Ethernet
            packets without the [802.1ah] I-Tag to this entry. If this
parameter is specified for
            an entry, the D-ONU MUST NOT match Ethernet packets without the
[802.1ah] I-Tag to
            this entry.

            The  value of this attribute is derived from TLV TBD."
    ::= { dpogPktClassEntry 15 }

dpogPktClassITagSID OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ah] I-SID field.

            If this parameter is specified for an entry, the DPoG System
MUST NOT match Ethernet
            packets without the [802.1ah] I-Tag tag to this entry. If this
parameter is specified
            for an entry, the D-ONU MUST NOT match Ethernet packets without
the [802.1ah]
            I-Tag tag to this entry.

            The  value of this attribute is derived from TLV TBD."
    ::= { dpogPktClassEntry 16 }

dpogPktClassITagTCI OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ah] I-TCI field.

            If this parameter is specified for an entry, the DPoG System
MUST NOT match Ethernet
```

```
            packets without the [802.1ah] I-Tag to this entry. If this
parameter is specified for
            an entry, the D-ONU MUST NOT match Ethernet packets without the
[802.1ah] I-Tag to
            this entry.

            The DPoG System MUST reject any CM config file with I-TCI TLV
present when I-SID TLV,
            or I-PCP TLV or I-DEI TLV or I-UCA TLV is present.

            The  value of this attribute is derived from TLV TBD."
    ::= { dpogPktClassEntry 17 }

dpogPktClassBTagTPID OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ah] B-TPID field.

            If this parameter is not specified for an entry, then the DPoG
System MUST use a
            default value of 0x88a8 for the [802.1ah] B-TPID field. Other
values of [802.1ah]
            B-TPID may be provisioned, as required.

            The DPoG System MUST NOT match Ethernet frames without the
[802.1ah] B-Tag to this
            entry. The D-ONU MUST NOT match Ethernet frames without the
[802.1ah] B-Tag to
            this entry.

            The  value of this attribute is derived from TLV TBD."
    DEFVAL { '88a8'H }
    ::= { dpogPktClassEntry 18 }

dpogPktClassBTagPCP OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ah] B-PCP field.

            If this parameter is specified for an entry, the DPoG System
MUST NOT match Ethernet
            frames without [802.1ah] B-Tag to this entry. If this parameter
is specified for an
            entry, the D-ONU MUST NOT match Ethernet frames without the
[802.1ah] B-Tag to
            this entry.

            The  value of this attribute is derived from TLV TBD."
    ::= { dpogPktClassEntry 19 }

dpogPktClassBTagDEI OBJECT-TYPE
```

```
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ah] B-DEI field.

             If this parameter is specified for an entry, the DPoG System
MUST NOT match Ethernet
             frames without [802.1ah] B-Tag to this entry. If this parameter
is specified for an
             entry, the D-ONU MUST NOT match Ethernet frames without the
[802.1ah] B-Tag to
             this entry.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpogPktClassEntry 20 }

dpogPktClassBTagVID OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ah] B-VID field.

             If this parameter is specified for an entry, the DPoG System
MUST NOT match Ethernet
             frames without [802.1ah] B-Tag to this entry. If this parameter
is specified for an
             entry, the D-ONU MUST NOT match Ethernet frames without the
[802.1ah] B-Tag to
             this entry.

             The  value of this attribute is derived from TLV TBD."
    ::= { dpogPktClassEntry 21 }

dpogPktClassBTagTCI OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The values of the field specify the matching parameters for the
[802.1ah] B-TCI field.

             If this parameter is specified for an entry, the DPoG System
MUST NOT match Ethernet
             packets without the [802.1ah] B-Tag to this entry. If this
parameter is specified for
             an entry, the D-ONU MUST NOT match Ethernet packets without the
[802.1ah] B-Tag to
             this entry.

             The DPoG System MUST reject any CM config file with B-TCI TLV
present when B-PCP TLV,
             B-DEI TLV or B-VID TLV is present.
```

```
            The  value of this attribute is derived from TLV TBD."
    ::= { dpogPktClassEntry 22 }

dpogPktClassBTagBDA OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The value of the field specifies the matching value for the
backbone MAC destination
            address. If this parameter is omitted, then comparison of the
backbone MAC
            destination address for this entry is irrelevant.

            The  value of this attribute is derived from TLV TBD."
    ::= { dpogPktClassEntry 23 }

dpogPktClassBTagBSA OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The value of the field specifies the matching value for the
backbone MAC
            source address. If this parameter is omitted, then comparison of
the backbone
            MAC source address for this entry is irrelevant.

            The  value of this attribute is derived from TLV TBD."
    ::= { dpogPktClassEntry 24 }


-------------------------------------------------------------------------
--
-- DPoG Service Flow Tables
--
-- The first table augments the table docsQosServiceFlowTable from the
DOCSIS-QOS-MIB.
-- This table provides a mapping from service flow to associated ASF where
appropriate.
-- It also shows the TPID translation values configured for the service flow.
--
-- The second table provides a mechanism for the user to efficiently find the
set of
-- service flows that are assoicated with a specific ASF.
--
-------------------------------------------------------------------


dpogServiceFlowTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF DpogServiceFlowEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "Table to provide the additional service flow data specified in
DPoG v1.0."
    ::= { dpogMEFConfig 3 }
```

```
dpogServiceFlowEntry OBJECT-TYPE
    SYNTAX      DpogServiceFlowEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "Additional service flow attributes from DPoG v1.0"
    AUGMENTS {docsQosServiceFlowEntry}
    ::= { dpogServiceFlowTable 1 }

DpogServiceFlowEntry ::= SEQUENCE
    {
      dpogServiceFlowAsfId          Unsigned32,
      dpogServiceFlowUpTPIDTrans    INTEGER,
      dpogServiceFlowDnTPIDTrans    INTEGER,
      dpogServiceFlowUpSTPIDTrans   INTEGER,
      dpogServiceFlowDnSTPIDTrans   INTEGER,
      dpogServiceFlowUpBTPIDTrans   INTEGER,
      dpogServiceFlowDnBTPIDTrans   INTEGER,
      dpogServiceFlowUpITPIDTrans   INTEGER,
      dpogServiceFlowDnITPIDTrans   INTEGER
    }

dpogServiceFlowAsfId OBJECT-TYPE
    SYNTAX      Unsigned32 (0..65535)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The identifier for the Aggregated Service Flow as defined in the
CM config file.
             The value 0 means that no ASF is defined."
    ::= { dpogServiceFlowEntry 1 }

dpogServiceFlowUpTPIDTrans    OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The new TPID value for the outermost tag as defined in TLV
43.5.14.1"
    ::= { dpogServiceFlowEntry 2 }

dpogServiceFlowDnTPIDTrans    OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The new TPID value for the outermost tag as defined in TLV
43.5.14.2"
    ::= { dpogServiceFlowEntry 3 }


dpogServiceFlowUpSTPIDTrans    OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
```

```
            "The new TPID value for the S-TPID as defined in TLV 43.5.14.3"
    ::= { dpogServiceFlowEntry 4 }

dpogServiceFlowDnSTPIDTrans    OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The new TPID value for the S-TPID as defined in TLV 43.5.14.4"
    ::= { dpogServiceFlowEntry 5 }

dpogServiceFlowUpBTPIDTrans    OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The new TPID value for the B-TPID as defined in TLV 43.5.14.5"
    ::= { dpogServiceFlowEntry 6 }

dpogServiceFlowDnBTPIDTrans    OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The new TPID value for the B-TPID as defined in TLV 43.5.14.6"
    ::= { dpogServiceFlowEntry 7 }

dpogServiceFlowUpITPIDTrans    OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The new TPID value for the I-TPID as defined in TLV 43.5.14.7"
    ::= { dpogServiceFlowEntry 8 }

dpogServiceFlowDnITPIDTrans    OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The new TPID value for the I-TPID as defined in TLV 43.5.14.8"
    ::= { dpogServiceFlowEntry 9 }

dpogAsfServiceFlowTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF DpogAsfServiceFlowEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "This table provides a way to map from an ASF Id to the
associated set of service
             flows"
    ::= { dpogMEFConfig 4 }

dpogAsfServiceFlowEntry OBJECT-TYPE
    SYNTAX      DpogAsfServiceFlowEntry
    MAX-ACCESS  not-accessible
    STATUS      current
```

```
    DESCRIPTION
            "This table is indexed by the ifIndex of the MAC domain, the ASF
Id and Service flow id."
    INDEX { ifIndex, dpogAsfServiceFlowAsfId, dpogAsfServiceFlowId }
    ::= { dpogAsfServiceFlowTable 1 }

DpogAsfServiceFlowEntry ::= SEQUENCE
    {
      dpogAsfServiceFlowAsfId       Unsigned32,
      dpogAsfServiceFlowId          Unsigned32
    }

dpogAsfServiceFlowAsfId OBJECT-TYPE
    SYNTAX      Unsigned32 (0..65535)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The identifier for the Aggregated Service Flow as defined in the
CM config file."
    ::= { dpogAsfServiceFlowEntry 1 }

dpogAsfServiceFlowId OBJECT-TYPE
    SYNTAX      Unsigned32 (0..65535)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The identifier for service flow associated with this ASF."
    ::= { dpogAsfServiceFlowEntry 2 }

-----------------------------------------------------------------------
--
-- DPoG Filter Group Table
--
-- This table augments the table docsSubmgt3FilterGrpTable from the DOCS-
SUBMGT3-MIB.
-- The attributes for this table are the set of new classifier properites
that
-- are defined in the DPoG 1.0 Specifications.
--
-----------------------------------------------------------------


dpogSubmgt3FilterGrpTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF DpogSubmgt3FilterGrpEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This object is applicable to the DPoG System.
         It describes a set of filter or classifier
         criteria. Classifiers are assigned by group to the
         individual vCMs. That assignment is made via the
         Frame Classification TLV encodings sent to a vCM instance
         within the DPoG System during registration or in their
         absence, default values configured in the DPoG System.
         A Filter Group ID (GrpId) is a set of rules that correspond
         to the expansion of a UDC Group ID into individual drop
         classification rules."
```

```
    ::= { dpogMEFConfig 5 }

dpogSubmgt3FilterGrpEntry OBJECT-TYPE
    SYNTAX      DpogSubmgt3FilterGrpEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The conceptual row of dpogSubmgt3FilterGrpTable, augmenting
         a row of docsSubmgt3FilterGrpTable.
         The DPoG System persists all instances of the FilterGrp object
         across reinitializations."
    AUGMENTS {docsSubmgt3FilterGrpEntry}
    ::= { dpogSubmgt3FilterGrpTable 1 }

DpogSubmgt3FilterGrpEntry ::= SEQUENCE
    {
    dpogSubmgt3FilterGrpCTagMatch       BITS,
      dpogSubmgt3FilterGrpCTagTPID        Unsigned32,
      dpogSubmgt3FilterGrpCTagPCP         Unsigned32,
      dpogSubmgt3FilterGrpCTagCFI         Unsigned32,
      dpogSubmgt3FilterGrpCTagVID         Unsigned32,
      dpogSubmgt3FilterGrpCTagTCI         Unsigned32,
    dpogSubmgt3FilterGrpSTagMatch       BITS,
      dpogSubmgt3FilterGrpSTagTPID        Unsigned32,
      dpogSubmgt3FilterGrpSTagPCP         Unsigned32,
      dpogSubmgt3FilterGrpSTagDEI         Unsigned32,
      dpogSubmgt3FilterGrpSTagVID         Unsigned32,
      dpogSubmgt3FilterGrpSTagTCI         Unsigned32,
    dpogSubmgt3FilterGrpITagMatch       BITS,
      dpogSubmgt3FilterGrpITagTPID        Unsigned32,
      dpogSubmgt3FilterGrpITagPCP         Unsigned32,
      dpogSubmgt3FilterGrpITagUCA         Unsigned32,
      dpogSubmgt3FilterGrpITagDEI         Unsigned32,
      dpogSubmgt3FilterGrpITagSID         Unsigned32,
      dpogSubmgt3FilterGrpITagTCI         Unsigned32,
    dpogSubmgt3FilterGrpBTagMatch       BITS,
      dpogSubmgt3FilterGrpBTagTPID        Unsigned32,
      dpogSubmgt3FilterGrpBTagPCP         Unsigned32,
      dpogSubmgt3FilterGrpBTagDEI         Unsigned32,
      dpogSubmgt3FilterGrpBTagVID         Unsigned32,
      dpogSubmgt3FilterGrpBTagTCI         Unsigned32,
      dpogSubmgt3FilterGrpBTagBDA         MacAddress,
      dpogSubmgt3FilterGrpBTagBSA         MacAddress,
    dpogSubmgt3FilterGrpMplsMatch       BITS,
    dpogSubmgt3FilterGrpMplsLabel       Unsigned32,
    dpogSubmgt3FilterGrpMplsTc          Unsigned32
    }

dpogSubmgt3FilterGrpCTagMatch OBJECT-TYPE
    SYNTAX      BITS {
                        matchTPID(0),
                        matchVID(1),
                        matchCFI(2),
                        matchPCP(3),
                        matchTCI(4)
                      }
    MAX-ACCESS  read-create
```

```
    STATUS      current
    DESCRIPTION
        "When matchTPID is set to 1, the [802.1ad] C-Tag will be included in
         the match criteria for this classifier.  The C-Tag will be
identified
         via the C-TPID value specified in dpogSubmgt3FilterGrpCTagTPID.

         By default, the contents of the C-TCI portion of the C-Tag are not
         part of the match criteria.  C-TCI fields can be included in the
         match criteria for this classifier by setting the associated
         bits to 1.

         The entire C-TCI field is identified by matchTCI.  Setting
         this bit will include the contents of dpogSubmgt3FilterGrpCTagTCI
         in the match criteria of this classifer.

         The C-TCI sub-fields are identified by matchVID, matchCFI and
         matchPCP.  Setting these bits will include the contents of
         dpogSubmgt3FilterGrpCTagVID, dpogSubmgt3FilterGrpCTagCFI,
         or dpogSubmgt3FilterGrpCTagPCP in the match criteria of this
         classifer.

         The matchTCI bit and the bits for the sub-fields of the
         C-TCI are mutually exclusive.  If the matchTCI bit is set, the
         bits for the sub-fields (matchVID, matchCFI, matchPCP) must be
         cleared.  If one or more of the sub-field bits are set, the matchTCI
         bit must be cleared."
    DEFVAL { {} }
    ::= { dpogSubmgt3FilterGrpEntry 1 }

dpogSubmgt3FilterGrpCTagTPID OBJECT-TYPE
    SYNTAX      Unsigned32 (0..65535)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the
         [802.1ad] C-TPID field.
         The default value of this field is 0x8100."
    REFERENCE
        "DPoG 1.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.14.5"
    DEFVAL { 33024 }   -- 0x8100
    ::= { dpogSubmgt3FilterGrpEntry 2 }

dpogSubmgt3FilterGrpCTagPCP OBJECT-TYPE
    SYNTAX      Unsigned32 (0..7)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the [802.1ad]
         C-PCP field, a sub-field of the C-TCI field."
    REFERENCE
        "DPoG 1.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.14.7"
    ::= { dpogSubmgt3FilterGrpEntry 3 }

dpogSubmgt3FilterGrpCTagCFI OBJECT-TYPE
```

```
    SYNTAX      Unsigned32 (0..1)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the [802.1ad]
         C-CFI field, a sub-field of the C-TCI field."
    REFERENCE
        "DPoG 1.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.14.8"
    ::= { dpogSubmgt3FilterGrpEntry 4 }

dpogSubmgt3FilterGrpCTagVID OBJECT-TYPE
    SYNTAX      Unsigned32 (0..4095)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the [802.1ad]
         C-VID field, a sub-field of the C-TCI field."
    REFERENCE
        "DPoG 1.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.14.6"
    ::= { dpogSubmgt3FilterGrpEntry 5 }

dpogSubmgt3FilterGrpCTagTCI OBJECT-TYPE
    SYNTAX      Unsigned32 (0..65535)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute represents the classifier value for the [802.1ad]
         C-TCI field."
    REFERENCE
        "DPoG 1.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.14.10"
    ::= { dpogSubmgt3FilterGrpEntry 6 }

dpogSubmgt3FilterGrpSTagMatch OBJECT-TYPE
    SYNTAX      BITS {
                        matchTPID(0),
                        matchVID(1),
                        matchDEI(2),
                        matchPCP(3),
                        matchTCI(4)
                    }
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "When matchTPID is set to 1, the [802.1ad] S-Tag will be included in
         the match criteria for this classifier.  The S-Tag will be
identified
         via the S-TPID value specified in dpogSubmgt3FilterGrpSTagTPID.

         By default, the contents of the S-TCI portion of the S-Tag are not
         part of the match criteria.  S-TCI fields can be included in the
         match criteria for this classifier by setting the associated
         bits to 1.

         The entire S-TCI field is identified by matchTCI.  Setting
```

```
        this bit will include the contents of dpogSubmgt3FilterGrpSTagTCI
        in the match criteria of this classifer.

        The S-TCI sub-fields are identified by matchVID, matchDEI and
        matchPCP.  Setting these bits will include the contents of
        dpogSubmgt3FilterGrpSTagVID, dpogSubmgt3FilterGrpSTagDEI,
        or dpogSubmgt3FilterGrpSTagPCP in the match criteria of this
        classifer.

        The matchTCI bit and the bits for the sub-fields of the
        S-TCI are mutually exclusive.  If the matchTCI bit is set, the
        bits for the sub-fields (matchVID, matchDEI, matchPCP) must be
        cleared.  If one or more of the sub-field bits are set, the matchTCI
        bit must be cleared."
    DEFVAL { {} }
    ::= { dpogSubmgt3FilterGrpEntry 7 }

dpogSubmgt3FilterGrpSTagTPID OBJECT-TYPE
    SYNTAX      Unsigned32 (0..65535)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the
         [802.1ad] S-TPID field.
         The default value of this field is 0x88a8."
    REFERENCE
        "DPoG 1.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.14.1"
    DEFVAL { 34984 }   -- 0x88a8
    ::= { dpogSubmgt3FilterGrpEntry 8 }

dpogSubmgt3FilterGrpSTagPCP OBJECT-TYPE
    SYNTAX      Unsigned32 (0..7)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the [802.1ad]
         S-PCP field, a sub-field of the S-TCI field."
    REFERENCE
        "DPoG 1.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.14.3"
    ::= { dpogSubmgt3FilterGrpEntry 9 }

dpogSubmgt3FilterGrpSTagDEI OBJECT-TYPE
    SYNTAX      Unsigned32 (0..1)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the [802.1ad]
         S-DEI field, a sub-field of the S-TCI field."
    REFERENCE
        "DPoG 1.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.14.4"
    ::= { dpogSubmgt3FilterGrpEntry 10 }

dpogSubmgt3FilterGrpSTagVID OBJECT-TYPE
    SYNTAX      Unsigned32 (0..4095)
```

```
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the [802.1ad]
         S-VID field, a sub-field of the S-TCI field."
    REFERENCE
        "DPoG 1.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.14.2"
    ::= { dpogSubmgt3FilterGrpEntry 11 }

dpogSubmgt3FilterGrpSTagTCI OBJECT-TYPE
    SYNTAX      Unsigned32 (0..65535)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute represents the classifier value for the [802.1ad]
         S-TCI field."
    REFERENCE
        "DPoG 1.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.14.9"
    ::= { dpogSubmgt3FilterGrpEntry 12 }

dpogSubmgt3FilterGrpITagMatch OBJECT-TYPE
    SYNTAX      BITS {
                        matchTPID(0),
                        matchSID(1),
                        matchUCA(2),
                        matchDEI(3),
                        matchPCP(4),
                        matchTCI(5)
                    }
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "When matchTPID is set to 1, the [802.1ah] I-Tag will be included in
         the match criteria for this classifier.  The I-Tag will be
identified
         via the I-TPID value specified in dpogSubmgt3FilterGrpITagTPID.

         By default, the contents of the I-TCI portion of the I-Tag are not
         part of the match criteria.  I-TCI fields can be included in the
         match criteria for this classifier by setting the associated
         bits to 1.

         The entire I-TCI field is identified by matchTCI.  Setting
         this bit will include the contents of dpogSubmgt3FilterGrpITagTCI
         in the match criteria of this classifer.

         The I-TCI sub-fields are identified by matchSID, matchUCU, matchDEI,
         and matchPCP.  Setting these bits will include the contents of
         dpogSubmgt3FilterGrpITagSID, dpogSubmgt3FilterGrpITagUCA,
         dpogSubmgt3FilterGrpITagDEI or dpogSubmgt3FilterGrpITagPCP in the
         match criteria of this classifer.

         The matchTCI bit and the bits for the sub-fields of the
         I-TCI are mutually exclusive.  If the matchTCI bit is set, the
```

```
         bits for the sub-fields (matchSID, matchUCA, matchDEI, matchPCP)
must
         be cleared.  If one or more of the sub-field bits are set, the
         matchTCI bit must be cleared."
    DEFVAL { {} }
    ::= { dpogSubmgt3FilterGrpEntry 13 }

dpogSubmgt3FilterGrpITagTPID OBJECT-TYPE
    SYNTAX      Unsigned32 (0..65535)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the
         [802.1ah] I-TPID field.
         The default value of this field is 0x88e7."
    REFERENCE
        "DPoG 1.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.15.1"
    DEFVAL { 35047 }           -- 0x88e7
    ::= { dpogSubmgt3FilterGrpEntry 14 }

dpogSubmgt3FilterGrpITagPCP OBJECT-TYPE
    SYNTAX      Unsigned32 (0..7)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the [802.1ah]
         I-PCP field, a sub-field of the I-TCI field."
    REFERENCE
        "DPoG 1.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.15.4"
    ::= { dpogSubmgt3FilterGrpEntry 15 }

dpogSubmgt3FilterGrpITagUCA OBJECT-TYPE
    SYNTAX      Unsigned32 (0..1)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the [802.1ah]
         I-UCA field, a sub-field of the I-TCI field."
    REFERENCE
        "DPoG 1.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.15.6"
    ::= { dpogSubmgt3FilterGrpEntry 16 }

dpogSubmgt3FilterGrpITagDEI OBJECT-TYPE
    SYNTAX      Unsigned32 (0..1)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the [802.1ah]
         I-DEI field, a sub-field of the I-TCI field."
    REFERENCE
        "DPoG 1.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.15.5"
    ::= { dpogSubmgt3FilterGrpEntry 17 }
```

```
dpogSubmgt3FilterGrpITagSID OBJECT-TYPE
    SYNTAX      Unsigned32 (0..16777215)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the [802.1ah]
         I-SID field, a sub-field of the I-TCI field."
    REFERENCE
        "DPoG 1.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.15.2"
    ::= { dpogSubmgt3FilterGrpEntry 18 }

dpogSubmgt3FilterGrpITagTCI OBJECT-TYPE
    SYNTAX      Unsigned32 (0..4294967295)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the [802.1ah]
         I-TCI field."
    REFERENCE
        "DPoG 1.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.15.3"
    ::= { dpogSubmgt3FilterGrpEntry 19 }

dpogSubmgt3FilterGrpBTagMatch OBJECT-TYPE
    SYNTAX      BITS {
                        matchTPID(0),
                        matchVID(1),
                        matchDEI(2),
                        matchPCP(3),
                        matchTCI(4),
                        matchDA(5),
                        matchSA(6)
                    }
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "When matchTPID is set to 1, the [802.1ah] B-Tag will be included in
         the match criteria for this classifier.  The B-Tag will be
identified
         via the B-TPID value specified in dpogSubmgt3FilterGrpBTagTPID.

         By default, the contents of the B-TCI portion of the B-Tag are not
         part of the match criteria.  B-TCI fields can be included in the
         match criteria for this classifier by setting the associated
         bits to 1.

         The entire B-TCI field is identified by matchTCI.  Setting
         this bit will include the contents of dpogSubmgt3FilterGrpBTagTCI
         in the match criteria of this classifer.

         The B-TCI sub-fields are identified by matchVID, matchDEI and
         matchPCP.  Setting these bits will include the contents of
         dpogSubmgt3FilterGrpBTagVID, dpogSubmgt3FilterGrpBTagDEI,
         or dpogSubmgt3FilterGrpBTagPCP in the match criteria of this
         classifer.
```

```
        The matchTCI bit and the bits for the sub-fields of the
        B-TCI are mutually exclusive.  If the matchTCI bit is set, the
        bits for the sub-fields (matchVID, matchDEI, matchPCP) must be
        cleared.  If one or more of the sub-field bits are set, the matchTCI
        bit must be cleared.

        By default, the B-DA and B-SA portions of the B-Tag are not part of
        the match criteria.  These fields can be included in the match
        match criteria for this classifier by setting the associated
        bits to 1.
        Setting the matchDA bit will include the contents of
        dpogSubmgt3FilterGrpBTagBDA in the match criteria of this classifer.
        Setting the matchSA bit will include the contents of
        dpogSubmgt3FilterGrpBTagBSA in the match criteria of this
classifer."
    DEFVAL { {} }
    ::= { dpogSubmgt3FilterGrpEntry 20 }


dpogSubmgt3FilterGrpBTagTPID OBJECT-TYPE
    SYNTAX      Unsigned32 (0..65535)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the
         [802.1ah] B-TPID field.
         The default value of this field is 0x88a8."
    REFERENCE
        "DPoG 1.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.15.7"
    DEFVAL { 34984 }   -- 0x88a8
    ::= { dpogSubmgt3FilterGrpEntry 21 }

dpogSubmgt3FilterGrpBTagPCP OBJECT-TYPE
    SYNTAX      Unsigned32 (0..7)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the [802.1ah]
         B-PCP field, a sub-field of the B-TCI field."
    REFERENCE
        "DPoG 1.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.15.9"
    ::= { dpogSubmgt3FilterGrpEntry 22 }

dpogSubmgt3FilterGrpBTagDEI OBJECT-TYPE
    SYNTAX      Unsigned32 (0..1)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the [802.1ah]
         B-DEI field, a sub-field of the B-TCI field."
    REFERENCE
        "DPoG 1.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.15.10"
    ::= { dpogSubmgt3FilterGrpEntry 23 }
```

```
dpogSubmgt3FilterGrpBTagVID OBJECT-TYPE
    SYNTAX      Unsigned32 (0..4095)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the [802.1ah]
         B-VID field, a sub-field of the B-TCI field."
    REFERENCE
        "DPoG 1.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.15.11"
    ::= { dpogSubmgt3FilterGrpEntry 24 }

dpogSubmgt3FilterGrpBTagTCI OBJECT-TYPE
    SYNTAX      Unsigned32 (0..65535)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This attribute contains the classifier value for the [802.1ah]
         B-TCI field."
    REFERENCE
        "DPoG 1.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.15.8"
    ::= { dpogSubmgt3FilterGrpEntry 25 }

dpogSubmgt3FilterGrpBTagBDA OBJECT-TYPE
    SYNTAX      MacAddress
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The value of the field specifies the classifier value for the
         backbone MAC destination address."
    REFERENCE
        "DPoG 1.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.15.12"
    ::= { dpogSubmgt3FilterGrpEntry 26 }

dpogSubmgt3FilterGrpBTagBSA OBJECT-TYPE
    SYNTAX      MacAddress
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The value of the field specifies the classifier value for the
         backbone MAC source address."
    REFERENCE
        "DPoG 1.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.15.13"
    ::= { dpogSubmgt3FilterGrpEntry 27 }

dpogSubmgt3FilterGrpMplsMatch OBJECT-TYPE
    SYNTAX      BITS {
                        matchLabel(0),
                        matchTc(1)
                    }
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "By default, the top MPLS Label Stack Entry is not included
```

```
         in the match criteria of this classifier.
         Setting the matchLabel bit will include the contents of
         dpogSubmgt3FilterGrpMplsLabel in the match criteria of this
classifer.
         Setting the matchTc bit will include the contents of
         dpogSubmgt3FilterGrpMplsTc in the match criteria of this classifer."
    DEFVAL { {} }
    ::= { dpogSubmgt3FilterGrpEntry 28 }

dpogSubmgt3FilterGrpMplsLabel OBJECT-TYPE
    SYNTAX      Unsigned32 (0..1048575)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The value of this field specifies the classifier value to compare
         with the 20-bit Label portion of the top MPLS Label Stack Entry."
    REFERENCE
        "DPoG 1.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.17.2"
    ::= { dpogSubmgt3FilterGrpEntry 29 }

dpogSubmgt3FilterGrpMplsTc OBJECT-TYPE
    SYNTAX      Unsigned32 (0..7)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The value of this field specifies the classifier value to compare
         with the 3-bit Traffic Class field of the top MPLS Label Stack
Entry."
    REFERENCE
        "DPoG 1.0 MAC and Upper Layer Protocols Interface
         Specification, Common TLV Encodings section, TLV 60.17.1"

    ::= { dpogSubmgt3FilterGrpEntry 30 }
```

```
-------------------------------------------------------------------
--
-- Metro Ethernet Service Profile Service Class Table
--
-- This table contains one row for each MESP configured on the DPoGsystem.
-- These rows are created on the DPoG System, and then referenced by name
-- from the config file.
--
-------------------------------------------------------------------

dpogMESPServiceClassTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF DpogMESPServiceClassEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "Table contains the attributes for each Metro Ethernet Service
Profile defined as
             a service class on the DPoG System."
    ::= {  dpogMEFConfig 6 }
```

```
dpogMESPServiceClassEntry OBJECT-TYPE
    SYNTAX      DpogMESPServiceClassEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "The table is indexed by the name given to the MESP Service
Class"
    INDEX { dpogMESPServiceClassName  }
    ::= { dpogMESPServiceClassTable 1 }

DpogMESPServiceClassEntry ::= SEQUENCE
    {
      dpogMESPServiceClassName           SnmpAdminString,
      dpogMESPServiceClassBpCir          INTEGER,
      dpogMESPServiceClassBpCbs          INTEGER,
      dpogMESPServiceClassBpEir          INTEGER,
      dpogMESPServiceClassBpEbs          INTEGER,
      dpogMESPServiceClassBpCf           DpogMESPDisableEnable,
      dpogMESPServiceClassBpCm           DpogMESPDisableEnable,
      dpogMESPServiceClassBpCif          DpogMESPFieldId,
      dpogMESPServiceClassBpGreen        INTEGER,
      dpogMESPServiceClassBpYellow       INTEGER,
      dpogMESPServiceClassBpRed          INTEGER,
      dpogMESPServiceClassBpCpCrStatus   DpogMESPDisableEnable,
      dpogMESPServiceClassBpCpCrField    DpogMESPFieldId,
      dpogMESPServiceClassBpCrGreen      INTEGER,
      dpogMESPServiceClassBpCrYellow     INTEGER,
      dpogMESPServiceClassBpCrRed        INTEGER
    }

dpogMESPServiceClassName OBJECT-TYPE
    SYNTAX      SnmpAdminString (SIZE(1..15))
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "This key indicates the Service Class Name for the Metro Ethernet
Service Profile. This
            name is used as a reference in the config file. "
    ::= { dpogMESPServiceClassEntry 1 }

dpogMESPServiceClassBpCir OBJECT-TYPE
    SYNTAX      INTEGER
    UNITS       "kbit/s"
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "The field is used to carry the value of the Committed
Information Rate
             (CIR) associated with the given MESP.

             The  value of this attribute is derived from TLV TBD."
    DEFVAL { 0 }
    ::= { dpogMESPServiceClassEntry 2 }

dpogMESPServiceClassBpCbs  OBJECT-TYPE
    SYNTAX      INTEGER
    UNITS       "kbytes"
```

```
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "The field is used to carry the value of the Committed Burst Size
(CBS)
             associated with the given MESP.

             The  value of this attribute is derived from TLV TBD."
    DEFVAL { 0 }
    ::= { dpogMESPServiceClassEntry 3 }

dpogMESPServiceClassBpEir  OBJECT-TYPE
    SYNTAX      INTEGER
    UNITS       "kbit/s"
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "The field is used to carry the value of the Excess Information
Rate
             (EIR) associated with the given MESP.

             The  value of this attribute is derived from TLV TBD."
    DEFVAL { 0 }
    ::= { dpogMESPServiceClassEntry 4 }

dpogMESPServiceClassBpEbs  OBJECT-TYPE
    SYNTAX      INTEGER
    UNITS       "kbytes"
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "The field is used to carry the value of the Excess Burst Size
(EBS)
             associated with the given MESP.

             The  value of this attribute is derived from TLV TBD."
    DEFVAL { 0 }
    ::= { dpogMESPServiceClassEntry 5 }

dpogMESPServiceClassBpCf  OBJECT-TYPE
    SYNTAX      DpogMESPDisableEnable
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "The field is used to carry the value of the Coupling Flag (CF)
associated
             with the given MESP. Two values are supported i.e., 0 when the
coupling flag
             is disabled and 1 when the coupling flag is enabled.

             The  value of this attribute is derived from TLV TBD."
    DEFVAL { disabled }
    ::= { dpogMESPServiceClassEntry 6 }

dpogMESPServiceClassBpCm  OBJECT-TYPE
    SYNTAX      DpogMESPDisableEnable
    MAX-ACCESS  read-create
```

```
    STATUS      current
    DESCRIPTION
            "The field is used to indicate the Color Mode (CM) for processing
incoming
             frames associated with the given MESP.

             The  value of this attribute is derived from TLV TBD."
    DEFVAL { disabled }
    ::= { dpogMESPServiceClassEntry 7 }

dpogMESPServiceClassBpCif  OBJECT-TYPE
    SYNTAX      DpogMESPFieldId
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "This field is used to indicate which field within the incoming
frames
             is used to retrieve color information.

             The  value of this attribute is derived from TLV TBD."
    DEFVAL { 0 }
    ::= { dpogMESPServiceClassEntry 8 }

dpogMESPServiceClassBpGreen  OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "This attribute provides the value of the field identified
dpogMESPBpCif which
             is used to represent green frame color.

             The  value of this attribute is derived from TLV TBD."
    DEFVAL { 0 }
    ::= { dpogMESPServiceClassEntry 9 }

dpogMESPServiceClassBpYellow  OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "This attribute provides the value of the field identified
dpogMESPBpCif which
             is used to represent yellow frame color.

             The  value of this attribute is derived from TLV TBD."
    DEFVAL { 0 }
    ::= { dpogMESPServiceClassEntry 10 }

dpogMESPServiceClassBpRed  OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "This attribute provides the value of the field identified
dpogMESPBpCif which
             is used to represent red frame color.
```

```
            The  value of this attribute is derived from TLV TBD."
    DEFVAL { 0 }
    ::= { dpogMESPServiceClassEntry 11 }

dpogMESPServiceClassBpCpCrStatus  OBJECT-TYPE
    SYNTAX      DpogMESPDisableEnable
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "This attribute is used to indicate the Color Marking (CR)
operation associated
            with the given MESP.

            The  value of this attribute is derived from TLV TBD."
    DEFVAL { 0 }
    ::= { dpogMESPServiceClassEntry 12 }

dpogMESPServiceClassBpCpCrField  OBJECT-TYPE
    SYNTAX      DpogMESPFieldId
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "This attribute indicates which of the fields within the incoming
frames is used
            to save color information to.

            The  value of this attribute is derived from TLV TBD."
    DEFVAL { 0 }
    ::= { dpogMESPServiceClassEntry 13 }

dpogMESPServiceClassBpCrGreen  OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "This attribute provides the specific value assigned to the field
specified in
            dpogMESPBpCpCrField to represent green frame color.

            The  value of this attribute is derived from TLV TBD."
    DEFVAL { 0 }
    ::= { dpogMESPServiceClassEntry 14 }

dpogMESPServiceClassBpCrYellow  OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "This attribute provides the specific value assigned to the field
specified in
            dpogMESPBpCpCrField to represent yellow frame color.

            The  value of this attribute is derived from TLV TBD."
    DEFVAL { 0 }
    ::= { dpogMESPServiceClassEntry 15 }
```

```
dpogMESPServiceClassBpCrRed  OBJECT-TYPE
    SYNTAX      INTEGER
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
            "This attribute provides the specific value assigned to the field
specified in
             dpogMESPBpCpCrField to represent red frame color.

             The  value of this attribute is derived from TLV TBD."
    DEFVAL { 0 }
    ::= { dpogMESPServiceClassEntry 16 }

--------------------------------------------------------------------------
--
-- DPoG MEF Performance Management Statistics
--
-- The following tables provide access to the additional statistics required
to support
-- the performance management requirements defined in the DPoG MEF
specification.
--
--------------------------------------------------------------------------



--------------------------------------------------------------------------
--
-- This table provides the additional statistics required on the MI and MU
-- interfaces.
--
--------------------------------------------------------------------------

dpogMEFIfStatsTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF DpogMEFIfStatsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "Table to provide the MEF statistics for the MI and MU
            interfaces on the D-ONU"
    ::= { dpogMEFStats 1 }

dpogMEFIfStatsEntry OBJECT-TYPE
    SYNTAX      DpogMEFIfStatsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "Statistics for the MI and MU interfaces"
    INDEX {ifIndex}
    ::= { dpogMEFIfStatsTable 1 }

DpogMEFIfStatsEntry ::= SEQUENCE
    {
      dpogMEFIfIngressL2CPFrameCount      Counter64,
      dpogMEFIfIngressL2CPOctetCount      Counter64,
      dpogMEFIfEgressL2CPFrameCount       Counter64,
      dpogMEFIfEgressL2CPOctetCount       Counter64,
      dpogMEFIfIngressL2CPDiscardedFrames Counter64,
```

```
      dpogMEFIfIngressL2CPDiscardedOctets Counter64
    }

dpogMEFIfIngressL2CPFrameCount  OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of upstream L2CP frames received on this
interface."
    ::= { dpogMEFIfStatsEntry 1 }

dpogMEFIfIngressL2CPOctetCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of octets from upstream L2CP frames received on
this interface."
    ::= { dpogMEFIfStatsEntry 2 }

dpogMEFIfEgressL2CPFrameCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of downstream L2CP frames sent on this
interface."
    ::= { dpogMEFIfStatsEntry 3 }

dpogMEFIfEgressL2CPOctetCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of octets from downstream L2CP frames sent on
this interface."
    ::= { dpogMEFIfStatsEntry 4 }

dpogMEFIfIngressL2CPDiscardedFrames OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of L2CP frames discarded on this interface."
    ::= { dpogMEFIfStatsEntry 5 }

dpogMEFIfIngressL2CPDiscardedOctets OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of octets from L2CP frames discarded on this
interface."
    ::= { dpogMEFIfStatsEntry 6 }
```

```
-------------------------------------------------------------------
--
-- The following 2 tables provide access to the MEF usage data defined in
-- in the DPoG MEF specification. This is a subset of the data defined in
-- MEF Technical Specification 7.1.
--
-- This data is provided for each service flow defined on a D-ONU, and for
-- each COS value within each service flow. As a result 2 tables are defined
-- to provide the appropriate indexes for accessing the data.
--
-- The 2 tables are:
--
--    dpogMEFSvcFlowUsageTable
--    dpogMEFSvcFlowCosUsageTable
--
-------------------------------------------------------------------

dpogMEFSvcFlowUsageTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF DpogMEFSvcFlowUsageEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "Table to provide the MEF usage statistics for each service
            flow on the D-ONU."
    ::= { dpogMEFStats 2 }

dpogMEFSvcFlowUsageEntry OBJECT-TYPE
    SYNTAX      DpogMEFSvcFlowUsageEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "Statistics for the MEF Usage usage data on a service flow."
    INDEX {docsQosServiceFlowId }
    ::= { dpogMEFSvcFlowUsageTable 1 }

DpogMEFSvcFlowUsageEntry ::= SEQUENCE
    {
      dpogMEFSvcFlowUsageGreenFrameCount        Counter64,
      dpogMEFSvcFlowUsageYellowFrameCount       Counter64,
      dpogMEFSvcFlowUsageRedFrameCount          Counter64,
      dpogMEFSvcFlowUsageGreenOctetCount        Counter64,
      dpogMEFSvcFlowUsageYellowOctetCount       Counter64,
      dpogMEFSvcFlowUsageRedOctetCount          Counter64,
      dpogMEFSvcFlowUsageL2CPFrameCount         Counter64,
      dpogMEFSvcFlowUsageL2CPOctetCount         Counter64,
      dpogMEFSvcFlowUsageL2CPDiscardedFrames    Counter64,
      dpogMEFSvcFlowUsageL2CPDiscardedOctets    Counter64
    }

dpogMEFSvcFlowUsageGreenFrameCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of frames that are marked with color green."
    ::= { dpogMEFSvcFlowUsageEntry 1 }
```

```
dpogMEFSvcFlowUsageYellowFrameCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of frames that are marked with color yellow."
    ::= { dpogMEFSvcFlowUsageEntry 2 }


dpogMEFSvcFlowUsageRedFrameCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of frames that are marked with color red.
             For the downstream service flows this will always be 0"
    ::= { dpogMEFSvcFlowUsageEntry 3 }


dpogMEFSvcFlowUsageGreenOctetCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of octets from frames that are marked with
color green."
    ::= { dpogMEFSvcFlowUsageEntry 4 }


dpogMEFSvcFlowUsageYellowOctetCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of octets from frames that are marked with
yellow."
    ::= { dpogMEFSvcFlowUsageEntry 5 }


dpogMEFSvcFlowUsageRedOctetCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of octets from frames that are marked with
color red.
            For the downstream service flows this will always be 0"
    ::= { dpogMEFSvcFlowUsageEntry 6 }

dpogMEFSvcFlowUsageL2CPFrameCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of  L2CP frames sent on this service flow."
    ::= { dpogMEFSvcFlowUsageEntry 7 }
```

```
dpogMEFSvcFlowUsageL2CPOctetCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of octets from  L2CP frames sent on this
service flow."
    ::= { dpogMEFSvcFlowUsageEntry 8 }

dpogMEFSvcFlowUsageL2CPDiscardedFrames OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of L2CP frames discarded on this service flow."
    ::= { dpogMEFSvcFlowUsageEntry 9 }

dpogMEFSvcFlowUsageL2CPDiscardedOctets OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of L2CP octets discarded  on this service
flow."
    ::= { dpogMEFSvcFlowUsageEntry 10 }



dpogMEFSvcFlowCosUsageTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF DpogMEFSvcFlowCosUsageEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "Table to provide the MEF usage statistics for each service
            flow on the D-ONU."
    ::= { dpogMEFStats 3 }

dpogMEFSvcFlowCosUsageEntry OBJECT-TYPE
    SYNTAX      DpogMEFSvcFlowCosUsageEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "Statistics for the MEF Usage usage data on a service flow."
    INDEX {docsQosServiceFlowId, dpogMEFSvcFlowCosValue }
    ::= { dpogMEFSvcFlowCosUsageTable 1 }

DpogMEFSvcFlowCosUsageEntry ::= SEQUENCE
    {
      dpogMEFSvcFlowCosValue                        INTEGER,
      dpogMEFSvcFlowCosUsageGreenFrameCount         Counter64,
      dpogMEFSvcFlowCosUsageYellowFrameCount        Counter64,
      dpogMEFSvcFlowCosUsageRedFrameCount           Counter64,
      dpogMEFSvcFlowCosUsageGreenOctetCount         Counter64,
      dpogMEFSvcFlowCosUsageYellowOctetCount        Counter64,
      dpogMEFSvcFlowCosUsageRedOctetCount           Counter64
    }
```

```
dpogMEFSvcFlowCosValue OBJECT-TYPE
    SYNTAX      INTEGER (0..7)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The Class of service value for this entry. The value is the
COS+1. The value
            will be in the range 1 to 8"
    ::= { dpogMEFSvcFlowCosUsageEntry 1 }

dpogMEFSvcFlowCosUsageGreenFrameCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of frames that are marked with color green."
    ::= { dpogMEFSvcFlowCosUsageEntry 2 }


dpogMEFSvcFlowCosUsageYellowFrameCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of frames that are marked with color yellow."
    ::= { dpogMEFSvcFlowCosUsageEntry 3 }


dpogMEFSvcFlowCosUsageRedFrameCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of frames that are marked with color red.
            For downstream service flows this value will always be 0."
    ::= { dpogMEFSvcFlowCosUsageEntry 4 }


dpogMEFSvcFlowCosUsageGreenOctetCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of octets from frames that are marked with
color green."
    ::= { dpogMEFSvcFlowCosUsageEntry 5 }


dpogMEFSvcFlowCosUsageYellowOctetCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of octets from frames that are marked with
color yellow."
```

```
    ::= { dpogMEFSvcFlowCosUsageEntry 6 }


dpogMEFSvcFlowCosUsageRedOctetCount OBJECT-TYPE
    SYNTAX      Counter64
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "The total number of octets from frames that are marked with
color red.
            For downstream service flows this value will always be 0."
    ::= { dpogMEFSvcFlowCosUsageEntry 7 }


--------------------------------------------------------------------
--
-- This section of the MIB provides the extensions to DOCSIS required
-- for multi-cast support in the DPoG system
--
--------------------------------------------------------------------

--------------------------------------------------------------------
--
-- DPoG extension of docsMcastAuthCmtsCmStatusTable.
--
-- Table that extends the docsMcastAuthCmtsCmStatusTable with
-- additional authorization criteria per profile.
--
--------------------------------------------------------------------


dpogMcastAuthCmtsCmStatusProfileTable OBJECT-TYPE
     SYNTAX      SEQUENCE OF DpogMcastAuthCmtsCmStatusProfileEntry
     MAX-ACCESS  not-accessible
     STATUS      current
     DESCRIPTION
        "This table is applicable to the DPoG System. It's an
         extension of the docsMcastAuthCmtsCmStatusCfgProfileNameList within
the
         docsMcastAuthCmtsCmStatusTable, providing additional matching
         criteria per profile as specified in the CM configuration file."
     ::= { dpogMultiCast 1}

dpogMcastAuthCmtsCmStatusProfileEntry OBJECT-TYPE
     SYNTAX      DpogMcastAuthCmtsCmStatusProfileEntry
     MAX-ACCESS  not-accessible
     STATUS      current
     DESCRIPTION
         "The conceptual row of dpogMcastAuthCmtsCmStatusProfileTable."
     INDEX {
             docsIf3CmtsCmRegStatusId,
             docsMcastAuthProfilesName
           }
     ::= { dpogMcastAuthCmtsCmStatusProfileTable 1 }

DpogMcastAuthCmtsCmStatusProfileEntry ::= SEQUENCE {
     dpogMcastAuthCmtsCmStatusProfileCmInterfaceMask
```

```
                DocsL2vpnIfList
     }

dpogMcastAuthCmtsCmStatusProfileCmInterfaceMask OBJECT-TYPE
     SYNTAX      DocsL2vpnIfList
     MAX-ACCESS  read-only
     STATUS      current
     DESCRIPTION
        "This attribute identifies the D-ONU interfaces associated with this
         Multicast Authorization Profile.
         The D-ONU interfaces are identified via the CMIM, where a bit set to
1 specifies
         that join requests from the interface are allowed to be compared
with
         this set of profile rules.
         The CMIM value is received via the CM configuration file within TLV
43.10.
         If a CMIM is not specified, all interfaces are valid and the default
value
         will be reported."
     ::= { dpogMcastAuthCmtsCmStatusProfileEntry 1 }


--------------------------------------------------------------------
--
-- DPoG extension of docsMcastAuthStaticSessRuleTable.
--
-- Table that extends the docsMcastAuthStaticSessRuleTable with
-- additional authorization criteria.
--
--------------------------------------------------------------------


dpogMcastAuthStaticSessRuleTable OBJECT-TYPE
     SYNTAX      SEQUENCE OF DpogMcastAuthStaticSessRuleEntry
     MAX-ACCESS  not-accessible
     STATUS      current
     DESCRIPTION
        "This table is applicable to the DPoG System.  It's an
         extension of the docsMcastAuthStaticSessRuleTable, providing
         additional matching criteria to be applied during the authorization
         process.  When an entry is created in the
docsMcastAuthStaticSessRuleTable,
         the DPoG System will create a matching entry in this table.
Attributes
         should reflect the values received in the vCM config file.  If a
         value wasn't specified in the vCM config file, the default value
must
         be applied."
     ::= { dpogMultiCast 2}

dpogMcastAuthStaticSessRuleEntry OBJECT-TYPE
     SYNTAX      DpogMcastAuthStaticSessRuleEntry
     MAX-ACCESS  not-accessible
     STATUS      current
     DESCRIPTION
         "The conceptual row of dpogMcastAuthStaticSessRuleTable."
```

```
     INDEX {
             docsMcastAuthStaticSessRuleCfgListId,
             docsMcastAuthStaticSessRuleId
           }
     ::= { dpogMcastAuthStaticSessRuleTable 1 }

DpogMcastAuthStaticSessRuleEntry ::= SEQUENCE {
     dpogMcastAuthStaticSessRuleCmInterfaceMask
                  DocsL2vpnIfList
     }

dpogMcastAuthStaticSessRuleCmInterfaceMask OBJECT-TYPE
     SYNTAX      DocsL2vpnIfList
     MAX-ACCESS  read-only
     STATUS      current
     DESCRIPTION
        "This attribute specifies the D-ONU interfaces on which join requests
         are authorized for this static session rule.
         The D-ONU interfaces are identified via the CMIM, where a bit set to
1 specifies
         that join requests from the interface are allowed to be compared
with
         this static session rule.
         The CMIM value is received via the CM configuration file within TLV
43.10.
         If a CMIM is not specified, all interfaces are valid and the default
value
         will be reported."
     ::= { dpogMcastAuthStaticSessRuleEntry 1 }


--------------------------------------------------------------------
--
-- DPoG extension of docsMcastAuthCmtsCmStatusTable.
--
-- Table that extends the docsMcastAuthCmtsCmStatusTable with
-- additional authorization criteria per D-ONU interface.
--
--------------------------------------------------------------------

dpogMcastAuthCmtsCmStatusIfaceTable OBJECT-TYPE
     SYNTAX      SEQUENCE OF DpogMcastAuthCmtsCmStatusIfaceEntry
     MAX-ACCESS  not-accessible
     STATUS      current
     DESCRIPTION
        "This table is applicable to the DPoG System.  It's an
         extension of the docsMcastAuthCmtsCmStatusTable, providing
additional
         matching criteria per D-ONU interface as specified in the CM
configuration file."
     ::= { dpogMultiCast 3}

dpogMcastAuthCmtsCmStatusIfaceEntry OBJECT-TYPE
     SYNTAX      DpogMcastAuthCmtsCmStatusIfaceEntry
     MAX-ACCESS  not-accessible
     STATUS      current
     DESCRIPTION
```

```
          "The conceptual row of dpogMcastAuthCmtsCmStatusIfaceTable."
     INDEX {
             docsIf3CmtsCmRegStatusId,
             dpogMcastAuthCmtsCmStatusIfaceCmInterfaceBitPos
           }
     ::= { dpogMcastAuthCmtsCmStatusIfaceTable 1 }

DpogMcastAuthCmtsCmStatusIfaceEntry ::= SEQUENCE {
     dpogMcastAuthCmtsCmStatusIfaceCmInterfaceBitPos   Unsigned32,
     dpogMcastAuthCmtsCmStatusIfaceMaxNumSess          Unsigned32
     }


dpogMcastAuthCmtsCmStatusIfaceCmInterfaceBitPos OBJECT-TYPE
     SYNTAX      Unsigned32
     MAX-ACCESS  read-only
     STATUS      current
     DESCRIPTION
        "This attribute specifies a bit position within the CMIM, used as an
index
         to this table to identify a particular D-ONU interface.
         will be reported."
     ::= { dpogMcastAuthCmtsCmStatusIfaceEntry 1 }

dpogMcastAuthCmtsCmStatusIfaceMaxNumSess OBJECT-TYPE
     SYNTAX      Unsigned32
     MAX-ACCESS  read-only
     STATUS      current
     DESCRIPTION
        "This attribute indicates the maximum number of multicast sessions
         to be authorized for the associated D-ONU interface.
         This value is provided via the CM configuration file as part
         of TLV 43.10.  If this value is missing, the
         docsMcastAuthCmtsCmStatusMaxNumSess attribute of the associated
         docsMcastAuthCmtsCmStatusEntry is used to determine
         the maximum number of multicast sessions that may be authorized for
         the entire D-ONU."
     ::= { dpogMcastAuthCmtsCmStatusIfaceEntry 2 }



--------------------------------------------------------------------
--
-- DPoG vCM Multicast Session Table
--
-- This table applies to the vCM instances.  Each row represents a
-- multicast session the D-ONU has been configured to forward.  Each
-- entry includes the CMIM and LLID associated with the session as well
-- as a packet count.
--
--------------------------------------------------------------------

dpogMcastCmSessTable OBJECT-TYPE
     SYNTAX      SEQUENCE OF DpogMcastCmSessEntry
     MAX-ACCESS  not-accessible
     STATUS      current
     DESCRIPTION
```

```
        "This table is applicable to the vCM representing the D-ONU.
         It contains an entry for each multicast session the D-ONU is
configured
         to forward."
     ::= { dpogMultiCast 4}

dpogMcastCmSessEntry OBJECT-TYPE
     SYNTAX      DpogMcastCmSessEntry
     MAX-ACCESS  not-accessible
     STATUS      current
     DESCRIPTION
        "The conceptual row of dpogMcastCmSessTable.
         The entry is indexed by the (S,G) pair."
     INDEX { dpogMcastCmSessPrefixAddrType,
             dpogMcastCmSessGrpPrefix,
             dpogMcastCmSessSrcPrefix
           }
     ::= { dpogMcastCmSessTable 1 }

DpogMcastCmSessEntry ::= SEQUENCE {
     dpogMcastCmSessPrefixAddrType     InetAddressType,
     dpogMcastCmSessGrpPrefix          InetAddress,
     dpogMcastCmSessSrcPrefix          InetAddress,
     dpogMcastCmSessCmInterfaceMask    DocsL2vpnIfList,
     dpogMcastCmSessMllid              Unsigned32,
     dpogMcastCmSessEncrypted          TruthValue
     }

dpogMcastCmSessPrefixAddrType OBJECT-TYPE
     SYNTAX      InetAddressType
     MAX-ACCESS  not-accessible
     STATUS      current
     DESCRIPTION
        "This attribute defines the address type for the GrpPrefix
        and SrcPrefix addresses."
     ::= { dpogMcastCmSessEntry 1 }

dpogMcastCmSessGrpPrefix OBJECT-TYPE
     SYNTAX      InetAddress
     MAX-ACCESS  not-accessible
     STATUS      current
     DESCRIPTION
        "This attribute defines the group G of a particular
         (S,G) IP multicast session."
     ::= { dpogMcastCmSessEntry 2 }

dpogMcastCmSessSrcPrefix OBJECT-TYPE
     SYNTAX      InetAddress
     MAX-ACCESS  not-accessible
     STATUS      current
     DESCRIPTION
        "This attribute identifies a specific Multicast Source
         Address.  A Source Address that is all zeros is defined
         as 'all source addresses  (*, G)'."
     REFERENCE
        "RFC 3569.
         RFC 3306."
```

```
     ::= { dpogMcastCmSessEntry 3 }

dpogMcastCmSessCmInterfaceMask OBJECT-TYPE
     SYNTAX      DocsL2vpnIfList
     MAX-ACCESS  read-only
     STATUS      current
     DESCRIPTION
        "This attribute represents the bitmap of the interfaces
        communicated to the D-ONU."
     ::= { dpogMcastCmSessEntry 4 }

dpogMcastCmSessMllid OBJECT-TYPE
     SYNTAX  Unsigned32
     MAX-ACCESS  read-only
     STATUS  current
     DESCRIPTION
        "An object that identifies the Logical Link
         Identifier (LLID) associated with the Group Service Flow (GSF)
         containing this multicast session.  Note that a GSF
         may contain multiple multicast sessions.  As such, multiple
         entries in this table may report the same value, identifying
         the entries as belonging to the same GSF. "
     REFERENCE   "[802.3ah], 30.3.5.1.4."
     ::= { dpogMcastCmSessEntry 5 }

dpogMcastCmSessEncrypted OBJECT-TYPE
     SYNTAX      TruthValue
     MAX-ACCESS  read-only
     STATUS      current
     DESCRIPTION
        "Set to 'true' if multicast session is encrypted."
     ::= { dpogMcastCmSessEntry 6 }


-------------------------------------------------------------------------
--
-- This section of the MIB provides the definition of objects to be
-- supported by the SNMP agent in the virtual cable modem in the
-- DPoG system. The objects in this section will not be supported by
-- the SNMP agent for the DPoG system itself.
--
-------------------------------------------------------------------------

dpogVcmDynCfgState OBJECT-TYPE
     SYNTAX INTEGER {
           notStarted(1),
           downloadInProgress(2),
           downloadFailed(3),
           validationInProgress(4),
           validationFailed(5),
           resourceValidationInProgress(6),
           resourceValidationFailed(7),
           updateInProgress(8),
           updateFailed(9),
           updateComplete(10)
           }
     MAX-ACCESS  read-only
```

```
     STATUS      current
     DESCRIPTION
        "This attribute provides the current state of the
         vCM / D-ONU Dynamic Config Update process"
     REFERENCE
        "DPoG 1.0 MAC and Upper Layer Protocols Interface
         Specification, Dynamic D-ONU Configuration Update Mechanism
         section."
     ::= { dpogVcm 1 }

dpogVcmDynCfgNow OBJECT-TYPE
      SYNTAX TruthValue
      MAX-ACCESS read-write
      STATUS current
      DESCRIPTION
            "Setting this object to true(1) will cause the vCM/D-ONU to
            initiate the dynamic D-ONU Configuration update process
            as described in section 9.5 of DPoG-SP-MULPI.

            Reading this object always returns false(2)."
      ::= { dpogVcm 2 }

-------------------------------------------------------------------------
--
-- Conformance definitions
--

dpogCompliances  OBJECT IDENTIFIER ::= { dpogMIBConformance 1 }
dpogGroups       OBJECT IDENTIFIER ::= { dpogMIBConformance 2 }

dpogBaseCompliance MODULE-COMPLIANCE
    STATUS      current
    DESCRIPTION
            "Mandatory in all DPoG Systems and vCMs implementing DPoG V1.0."
    MODULE
    MANDATORY-GROUPS {dpogBaseGroup}
    GROUP dpogMefStatsGroup
    DESCRIPTION
            "The dpogMefStatsGroup is required for DPoG Systems and VcMs that
support MEF statistics"
            ::= {dpogCompliances 1}

dpogSystemCompliance MODULE-COMPLIANCE
    STATUS      current
    DESCRIPTION
            "Mandatory in all DPoG Systems implementing DPoG V1.0."
    MODULE
    MANDATORY-GROUPS{dpogSystemsGroup}
    GROUP dpogSystemsOptionalGroup
    DESCRIPTION
            "This group contains the optional attributes for DPoG Systems"
            ::= {dpogCompliances 2}

dpogVcmCompliance MODULE-COMPLIANCE
    STATUS      current
    DESCRIPTION
            "Mandatory in all virtual cable modems implemented in the DPoG
```

```
            system."
    MODULE
    MANDATORY-GROUPS {dpogVcmOnlyGroup}
                ::= {dpogCompliances 3}

dpogBaseGroup OBJECT-GROUP
    OBJECTS {
      dpogMESPBpCir,
      dpogMESPBpCbs,
      dpogMESPBpEir,
      dpogMESPBpEbs,
      dpogMESPBpCf,
      dpogMESPBpCm,
      dpogMESPBpCif,
      dpogMESPBpGreen,
      dpogMESPBpYellow,
      dpogMESPBpRed,
      dpogMESPBpCpCrStatus,
      dpogMESPBpCpCrField,
      dpogMESPBpCrGreen,
      dpogMESPBpCrYellow,
      dpogMESPBpCrRed,
      dpogPktClassBitMap,
      dpogPktClassCTagTPID,
      dpogPktClassCTagPCP,
      dpogPktClassCTagCFI,
      dpogPktClassCTagVID,
      dpogPktClassCTagTCI,
      dpogPktClassSTagTPID,
      dpogPktClassSTagPCP,
      dpogPktClassSTagDEI,
      dpogPktClassSTagVID,
      dpogPktClassSTagTCI,
      dpogPktClassITagTPID,
      dpogPktClassITagPCP,
      dpogPktClassITagUCA,
      dpogPktClassITagDEI,
      dpogPktClassITagSID,
      dpogPktClassITagTCI,
      dpogPktClassBTagTPID,
      dpogPktClassBTagPCP,
      dpogPktClassBTagDEI,
      dpogPktClassBTagVID,
      dpogPktClassBTagTCI,
      dpogPktClassBTagBDA,
      dpogPktClassBTagBSA,
      dpogServiceFlowAsfId,
      dpogServiceFlowUpTPIDTrans,
      dpogServiceFlowDnTPIDTrans,
      dpogServiceFlowUpSTPIDTrans,
      dpogServiceFlowDnSTPIDTrans,
      dpogServiceFlowUpBTPIDTrans,
      dpogServiceFlowDnBTPIDTrans,
      dpogServiceFlowUpITPIDTrans,
      dpogServiceFlowDnITPIDTrans,
      dpogAsfServiceFlowAsfId,
      dpogAsfServiceFlowId
```

```
    }
    STATUS current
    DESCRIPTION
            "A collection of objects required for DPoG 1.0 classification."
    ::= { dpogGroups 1 }

dpogSystemsGroup OBJECT-GROUP
    OBJECTS {
      dpogSubmgt3FilterGrpCTagMatch,
          dpogSubmgt3FilterGrpCTagTPID,
          dpogSubmgt3FilterGrpCTagPCP,
          dpogSubmgt3FilterGrpCTagCFI,
          dpogSubmgt3FilterGrpCTagVID,
          dpogSubmgt3FilterGrpCTagTCI,
      dpogSubmgt3FilterGrpSTagMatch,
          dpogSubmgt3FilterGrpSTagTPID,
          dpogSubmgt3FilterGrpSTagPCP,
          dpogSubmgt3FilterGrpSTagDEI,
          dpogSubmgt3FilterGrpSTagVID,
          dpogSubmgt3FilterGrpSTagTCI,
      dpogSubmgt3FilterGrpITagMatch,
          dpogSubmgt3FilterGrpITagTPID,
          dpogSubmgt3FilterGrpITagPCP,
          dpogSubmgt3FilterGrpITagUCA,
          dpogSubmgt3FilterGrpITagDEI,
          dpogSubmgt3FilterGrpITagSID,
          dpogSubmgt3FilterGrpITagTCI,
      dpogSubmgt3FilterGrpBTagMatch,
          dpogSubmgt3FilterGrpBTagTPID,
          dpogSubmgt3FilterGrpBTagPCP,
          dpogSubmgt3FilterGrpBTagDEI,
          dpogSubmgt3FilterGrpBTagVID,
          dpogSubmgt3FilterGrpBTagTCI,
          dpogSubmgt3FilterGrpBTagBDA,
          dpogSubmgt3FilterGrpBTagBSA,
      dpogSubmgt3FilterGrpMplsMatch,
      dpogSubmgt3FilterGrpMplsLabel,
      dpogSubmgt3FilterGrpMplsTc,
      dpogMEFSvcFlowUsageGreenFrameCount,
      dpogMEFSvcFlowUsageYellowFrameCount,
      dpogMEFSvcFlowUsageRedFrameCount,
      dpogMEFSvcFlowUsageGreenOctetCount,
      dpogMEFSvcFlowUsageYellowOctetCount,
      dpogMEFSvcFlowUsageRedOctetCount,
      dpogMEFSvcFlowUsageL2CPFrameCount,
      dpogMEFSvcFlowUsageL2CPOctetCount,
      dpogMEFSvcFlowUsageL2CPDiscardedFrames,
      dpogMEFSvcFlowUsageL2CPDiscardedOctets,
      dpogMEFSvcFlowCosValue,
      dpogMEFSvcFlowCosUsageGreenFrameCount,
      dpogMEFSvcFlowCosUsageYellowFrameCount,
      dpogMEFSvcFlowCosUsageRedFrameCount,
      dpogMEFSvcFlowCosUsageGreenOctetCount,
      dpogMEFSvcFlowCosUsageYellowOctetCount,
      dpogMEFSvcFlowCosUsageRedOctetCount,
      dpogMcastAuthCmtsCmStatusProfileCmInterfaceMask,
      dpogMcastAuthCmtsCmStatusIfaceCmInterfaceBitPos,
```

```
      dpogMcastAuthCmtsCmStatusIfaceMaxNumSess,
      dpogMESPServiceClassBpCir,
      dpogMESPServiceClassBpCbs,
      dpogMESPServiceClassBpEir,
      dpogMESPServiceClassBpEbs,
      dpogMESPServiceClassBpCf,
      dpogMESPServiceClassBpCm,
      dpogMESPServiceClassBpCif,
      dpogMESPServiceClassBpGreen,
      dpogMESPServiceClassBpYellow,
      dpogMESPServiceClassBpRed,
      dpogMESPServiceClassBpCpCrStatus,
      dpogMESPServiceClassBpCpCrField,
      dpogMESPServiceClassBpCrGreen,
      dpogMESPServiceClassBpCrYellow,
      dpogMESPServiceClassBpCrRed
    }
    STATUS current
    DESCRIPTION
            "A collection of objects only supported on the DPoG System."
    ::= { dpogGroups 2 }

dpogVcmOnlyGroup OBJECT-GROUP
    OBJECTS {
        dpogMcastCmSessCmInterfaceMask,
        dpogMcastCmSessMllid,
        dpogMcastCmSessEncrypted,
        dpogVcmDynCfgState,
        dpogVcmDynCfgNow
    }
    STATUS current
    DESCRIPTION
            "A collection of objects only supported on the virtual cable
modem"
    ::= { dpogGroups 3 }

dpogMefStatsGroup OBJECT-GROUP
    OBJECTS {
            dpogMEFIfIngressL2CPFrameCount,
            dpogMEFIfIngressL2CPOctetCount,
            dpogMEFIfEgressL2CPFrameCount,
            dpogMEFIfEgressL2CPOctetCount,
            dpogMEFIfIngressL2CPDiscardedFrames,
            dpogMEFIfIngressL2CPDiscardedOctets
    }
    STATUS current
    DESCRIPTION
            "A collection of objects required on DPoG system and Vcm when MEF
stats are being supported"
    ::= { dpogGroups 4 }

dpogSystemsOptionalGroup OBJECT-GROUP
    OBJECTS {
            dpogMcastAuthStaticSessRuleCmInterfaceMask
    }
    STATUS current
    DESCRIPTION
```

```
            "A collection of optional objects on DPoG systems"
    ::= { dpogGroups 5 }
END
```

Appendix I Acknowledgments

On behalf of our industry, we would like to thank the following individuals for their contributions to the development of this specification, listed in alphabetical order of company affiliation.

Contributor	Company Affiliation
Richard Goodson	Adtran
Arkin Aydin, Rex Coldren, Michael Shaffer	Alcatel-Lucent
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