2 Normative references

The following referenced documents are indispensable for the application of this document (i.e., they must be understood and used, so each referenced document is cited in text and its relationship to this document is explained). For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.

IEEE Std 802.1Q™-2018, IEEE Standard for Information technology—Telecommunications and information systems—Local and metropolitan area networks—Bridges and Bridged Networks.

IEEE Std 802.3™-2018, IEEE Standard for Ethernet.

ITU-T Recommendation G.988, ONU management and control interface (OMCI) specification

ITU-T Recommendation G.984.3, Gigabit-capable Passive Optical Networks (G-PON): Transmission convergence layer specification

ITU-T Recommendation G.987.3, 10-Gigabit-capable passive optical networks (XG-PON): Transmission convergence (TC) layer specification

3 Definitions, acronyms, and abbreviations

4 Universal Management Tunnel (UMT) Overview and Architecture

5 Universal Management Tunnel Protocol Data Units (UMTPDU)

5.1 UMTPDU Structure

5.2 UMTPDU *Subtype* encoding

The value encoding of the *Subtype* field shall be as defined in Table 5-1.

Table 5-1—*Subtype* field encoding

Value	Designation	Description
0x0C	*OMCI_Subtype*	*OMCI_Subtype* represents the OMCI payload carried within the UMTPDU (see 5.2.2).

5.2.1 UMT configuration subtype

5.2.2 OAM subtype

5.2.3 OMCI Subtype

A UMTPDU with OMCI subtype (*Subtype* field = 0x0C) is an instantiation of a generic UMTPDU, as defined in 5.1, that carries an ONU Management and Control Interface (OMCI) payload (see ITU-T Recommendation G.988). The frame structure of UMTPDU with OMCI subtype shall be as depicted in Figure 5-1.

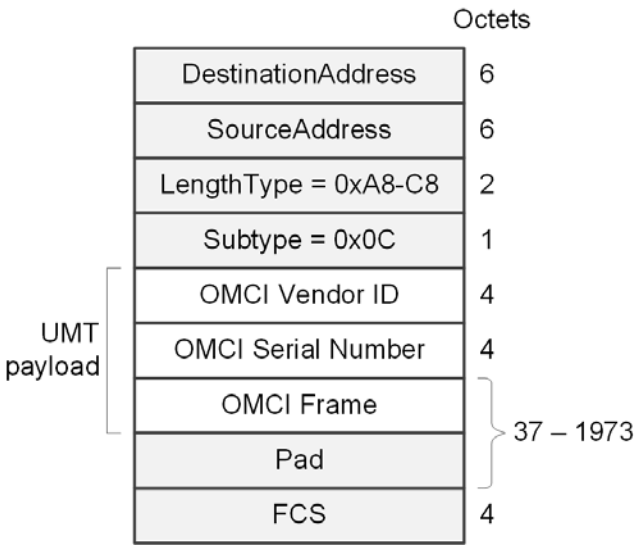

Figure 5-1—Format of UMTPDU with OMCI Subtype

The structure of the *UMT payload* in the UMTPDU with OMCI subtype is defined as follows:

—*OMCI Vendor ID*:

This field carries the vendor identifier of the ONT associated with the OMCI message. The vendor identifier is defined in ITU-T Recommendation G.988 Clause 9.1.1, ITU-T Recommendation G.984.3 Clauses 9.2.4.1, and ITU-T Recommendation G.987.3 Clause 11.3.3.2 and Clause 11.3.4.1.

—*OMCI Serial Number*:

This field carries the serial number of the ONT associated with the OMCI message. The serial number is defined in ITU-T Recommendation G.988 Clause 9.1.1, ITU-T Recommendation G.984.3 Clauses 9.2.4.1, and ITU-T Recommendation G.987.3 Clause 11.3.3.2 and Clause 11.3.4.1.

—*OMCI Message*:

This field carries one OMCI message in baseline or extended format. The OMCI baseline and extended message formats are defined in ITU-T Recommendation G.988 Clause 11.

6 UMT Sublayer

7 Per Protocol Specifications

7.1 Support for OAM

7.2 Support for L2 Subtype

7.3 Support for OMCI

7.3.1 CTE Operation

7.3.1.1 UMTSI Primitives related to OMCI

The OMCI Client communicates with the UMT CTE using the following service primitives:

- *UMTSI:OMCI.request*
- *UMTSI:OMCI.indication*

The UMTSI:OMCI interface (see Figure 4-2) is optional, but if it is implemented, the *UMTSI:OMCI.request* and *UMTSI:OMCI.indication* service primitives described in this subclause shall be supported..

7.3.1.1.1 UMTSI:OMCI.request

7.3.1.1.1.1 Function

This primitive defines the transfer of data from the OMCI Client entity to the UMT CTE. This primitive is only relevant in the egress direction.

7.3.1.1.1.2 Semantics of the service primitive

The semantics of the primitive are as follows:

UMTSI:OMCI.request (
omci_vendor_id,
omci_serial_number,
omci_frame_sdu
)

The *omci_vendor_id* parameter specifies the 4-octet Vendor ID assigned to the ONU that is the intended destination of this OMCI frame. Note that the ONU may not be the same device where the *UMTSI:OMCI.request* primitive was generated.

The *omci_serial_number* parameter specifies the 4-octet Vendor-Specific Serial Number assigned to the ONU that is the intended destination of this OMCI frame.

The *omci_frame_sdu* parameter contains the pre-formed OMCI frame (according to ITU-T Recommendation G.988) that is related to the ONU identified by the unique combination of the *omci_vendor_id* and *omci_serial_number*.

7.3.1.1.1.3 When Generated

This primitive is generated by the OMCI Client entity whenever an OMCI frame is to be transferred to a peer entity.

7.3.1.1.1.4 Effect of Receipt

The receipt of this primitive will cause the UMT CTE to apply the rules installed in the egress CTE instance to perform any required parsing and transformations of the request parameters necessary to encapsulate and transmit the OMCI frame as a UMTPDU. After performing these actions, the UMT TE entity asserts the *MACCSI:MA_DATA.request* primitive according to the procedures described in _____.

7.3.1.1.2 UMTSI:OMCI.indication

7.3.1.1.2.1 Function

This primitive defines the transfer of data from the UMT sublayer to the OMCI Client entity. This primitive is only relevant in the ingress direction.

7.3.1.1.2.2 Semantics of the service primitive

The semantics of the primitive are as follows:

UMTSI:OMCI.indication (
omci_vendor_id,
omci_serial_number,
omci_frame_sdu
)

The *omci_vendor_id, omci_serial_number, and omci_frame_sdu* parameters are as defined in 7.3.1.1.1.2.

7.3.2 Receive Path Specification

7.3.2.1 Principles of Operation

The receive path of the UMT sublayer when supporting OMCI is as defined in <TBD based on contributions for clause 6>.

In addition, the UMTPDUs with the destination address matching the local MAC address and the UMT subtype equal to OMCI_SUBTYPE (see Table 5.1) are modified to match the parameters expected by the *UMTSI:OMCI.indication()* primitive (see 7.3.1.1.2) and are passed to the UMTSI:OMCI interface.

7.3.2.2 Constants

Constants for receive path operation of the UMT sublayer when supporting OMCI are as defined in <TBD based on contributions for clause 6>.

Operation in support of OMCI adds the following:

`OMCI_SUBTYPE`

This constant represents a UMTPDU subtype as defined in Table 5.1.

7.3.2.3 Variables

Variables for receive path operation of the UMT sublayer when supporting OMCI are as defined in <TBD based on contributions for clause 6>.

7.3.2.4 Functions

Functions for receive path operation of the UMT sublayer when supporting OMCI are as defined in <TBD based on contributions for clause 6>.

7.3.2.5 Primitives

The primitives referenced in this state diagram are defined in 7.3.1.1.

7.3.2.6 State Diagram

UMT sublayer shall implement the Transmit process as defined in the state diagram in Figure ___.

<TBD - Add state diagram>

7.3.3 Transmit Path Specification

7.3.3.1 Principles of Operation

The transmit path of the UMT sublayer when supporting OMCI is as defined in <TBD based on contributions for clause 6> with the following modifications.

If an OMCI xPDU is received from the UMTSI:OMCI interface, it is converted into UMTPDU with subtype `OMCI_SUBTYPE` (see Table 5.1) by prepeding a UMTPDU header to the UMT xPDU payload. The header consists of the destination address, source address, Ethertype, and subtype fields. Note that both the destination and the source addresses are equal to the local MAC address assigned to the given port.

After the above modifications, the UMT or OMCI xPDU is formed into a complete frame, which is then processed by the Egress Classification and Translation Engine (CTE). If match is found, the frame is modified according to the matched rule action. If the frame does not match any rules, it is passed through the CTE block unmodified.

Note that to enter a tunnel, the UMT xPDU or the OMCI xPDU require a matching egress CTE rule that, as a minimum, overwrites the local MAC address value in the UMTPDU destination address field with the MAC address associated with the xPDU destination for the given tunnel.

7.3.3.2 Constants

Constants for receive path operation of the UMT sublayer when supporting OMCI are as defined in <TBD based on contributions for clause 6>.

7.3.3.3 Variables

Variables for receive path operation of the UMT sublayer when supporting OMCI are as defined in <TBD based on contributions for clause 6>.

7.3.3.4 Functions

Functions for receive path operation of the UMT sublayer when supporting OMCI are as defined in <TBD based on contributions for clause 6>.

7.3.3.5 Primitives

The primitives referenced in this state diagram are defined in 7.3.1.1.

7.3.3.6 State Diagram

UMT sublayer shall implement the Transmit process as defined in the state diagram in Figure ___.

<TBD - Add state diagram>

7.3.4 Tunnel Entrance Rules

The tunnel entrance rule for the OMCI subtype is shown in Table 6-4. This rule encapsulates a locally sourced OMCI frame into an UMTPDU at the egress of a UMT-aware device. The encapsulation involves the insertion of the source MAC address value, the destination MAC address value, the UMT Ethertype and the OMCI subtype.

Table 6-1—Egress tunnel entrance rule for OMCI subtype

Conditions	Actions
1.	1.
NOTE: <TBD Table to be updated based on contributions to clause 6>	

The ingress use case for tunnel entrance rules assumes that the ingress frame is an Ethernet frame into an L2 switch. Tunnel entrance rules for the OMCI Frame subtype cannot apply to ingress frames.

7.3.5 Tunnel Exit Rules

The tunnel exit rule for the OMCI subtype is shown in Table 6-3. This rule converts a UMTPDU into an OMCI frame. The conversion involves only removal of the destination MAC address value, the Ethertype value, the Subtype, any Pad, and the FCS.

Table 6-2—Ingress tunnel exit rule for OMCI subtype

Conditions	Actions
1.	1.
NOTE: <TBD Table to be updated based on contributions to clause 6>	

The egress use case for tunnel exit rules assumes that the egress frame is an Ethernet frame out of an L2 switch. Tunnel exit rules for the OMCI Frame subtype cannot apply to egress frames.