**100.3 PMD functional specifications**

The 10GBASE–XR type PMDs perform the transmit and receive functions that convey data between the PMD service interface and the MDI.

**100.3.1 PMD service interface**

The following specifies the services provided by Clause 100 PMDs. These PMD sublayer service interfaces are described in an abstract manner and do not imply any particular implementation.

The PMD service interface supports the exchange of a continuous stream of bits between the PMA and PMD entities. Bits exchanged across the PMD service interface are organized in TBD.

*Editor’s note (to be removed prior to publication): at this time, it is not clear what data format will be used between the bottom of PMA and top of PMD (across PMD service interface). Text will be expanded when more information on this interface is available.*

The PMD translates data received from the compatible PMA to and from signals suitable for the specified coaxial medium. The following primitives are defined:

— PMD\_UNITDATA.request

— PMD\_UNITDATA.indication

— PMD\_SIGNAL.request

— PMD\_SIGNAL.indication

**100.3.1.1 Delay constraints**

*Editor’s note (to be removed prior to publication): this text is taken verbatim from 75.3.1.1 and specific values (now TBD) will have to be filled in before the draft moves to WG ballot.*

The PMD shall introduce a transmit delay of not more than TBD time\_quanta with the variability of no more than TBD time\_quanta, and a receive delay of not more than TBD time\_quanta with the variability of no more than TBD time\_quanta. A description of the overall system delay constraints can be found in 101.1.2 and the definition for the time\_quantum can be found in 103.2.2.1.

**100.3.1.2 PMD\_UNITDATA.request**

This primitive defines the transfer of TBD data from the Clause 101 PMA to the Clause 100 PMD.

The semantics of the service primitive are PMD\_UNITDATA.request(tx\_unit). The data conveyed by PMD\_UNITDATA.request is a TBD. The *tx\_unit* parameter represents TBD.

*Editor’s note (to be removed prior to publication): at this time, it is not clear what data format will be used between the bottom of PMA and top of PMD (across PMD service interface). Text will be expanded when more information on this interface is available.*

The Clause 101 PMA continuously sends the appropriately formatted stream of bits to the Clause 100 PMD for transmission on the medium, at a nominal signaling speed of TBD GBd. Upon the receipt of this primitive, the PMD converts the received appropriately formatted stream of bits into the appropriate signals at the MDI, effectively sending data across the coaxial media.

*Editor’s note (to be removed prior to publication): data rate has to be somehow related to modulation depth. Right now it is marked as TBD*

**100.3.1.3 PMD\_UNITDATA.indication**

This primitive defines the transfer of TBD data from the Clause 100 PMD to the Clause 101 PMA.

The semantics of the service primitive are PMD\_UNITDATA.indication(rx\_unit). The data conveyed by PMD\_UNITDATA.indication is a TBD. The *rx\_unit* parameter represents TBD.

*Editor’s note (to be removed prior to publication): at this time, it is not clear what data format will be used between the bottom of PMA and top of PMD (across PMD service interface). Text will be expanded when more information on this interface is available.*

The Clause 100 PMD continuously sends an appropriately formatted stream of bits to the Clause 101 PMA corresponding to the signals received from the MDI, at the nominal signaling speed of TBD GBd.

*Editor’s note (to be removed prior to publication): data rate has to be somehow related to modulation depth. Right now it is marked as TBD*

**100.3.1.4 PMD\_SIGNAL.request**

In the upstream direction, this primitive is generated by the Clause 101 PCS to turn on and off the transmitter according to the granted time. A signal for transmitter control is generated as described in TBD for the Clause 101 PCS. Clause 101 transfers this signal across towards the Clause 100 without any changes.

The semantics of the service primitive are PMD\_SIGNAL.request(tx\_enable). The *tx\_enable* parameter can take on one of two values: ENABLE or DISABLE, determining whether the PMD transmitter is on (enabled) or off (disabled). The Clause 101 PCS generates this primitive to indicate a change in the value of *tx\_enable* parameter. Upon the receipt of this primitive, the Clause 101 PMD turns the transmitter on or off as appropriate.

**100.3.1.5 PMD\_SIGNAL.indication**

This primitive is generated by the Clause 100 PMD to indicate the status of the signal being received from the MDI.

The semantics of the service primitive are PMD\_SIGNAL.indication(rx\_detected). The *rx\_detected* parameter can take on one of two values: OK or FAIL, indicating whether the PMD is detecting incoming RF signal (OK) or not (FAIL). When rx\_detected = FAIL, PMD\_UNITDATA.indication(rx\_unit) is undefined. The Clause 100 PMD generates this primitive to indicate a change in the value of *rx\_detected* parameter. If the MDIO interface is implemented in the PHY, then PMD\_global\_signal\_detect shall be continuously set to the value of *rx\_detected* parameter.

NOTE—rx\_detected = OK does not guarantee that PMD\_UNITDATA.indication(rx\_unit) is known to be good or provide reliable data to the Clause 101 PMA. It is possible for a poor quality link to provide sufficient RF signl for a rx\_detected = OK indication and still not be able to properly recover individual bits and transfer them into the PMA. PMD\_SIGNAL.indication(rx\_detected) has different characteristics for upstream and downstream links, see 100.TBD for more details.

**100.3.3 PMD transmit function**

The PMD Transmit function shall convey the bits requested by the PMD service interface message PMD\_UNITDATA.request(tx\_unit) to the MDI according to the PMD to MDI RF specifications in 100.TBD.

In the upstream direction, the flow of appropriately formatted stream of bits is interrupted according to PMD\_SIGNAL.request(tx\_enable). This implies three RF signal levels: 1, 0, and none. When there is no RF signal being sent (none), the transmitter is in the OFF state.

**100.3.4 PMD receive function**

The PMD Receive function shall convey the bits received from the MDI according to the PMD to MDI RF specifications in 100.TBD to the PMD service interface using the message PMD\_UNITDATA.indication(rx\_unit), creating appropriately formatted stream of bits.

**100.3.5 PMD signal detect function**

**100.3.5.1 CNU PMD signal detect**

The PMD Signal Detect function for the continuous mode downstream signal shall report to the PMD service interface, using the message PMD\_SIGNAL.indication(rx\_detected),which is signaled continuously by the Clause 100 PMD to the Clause 101 PMA. The PMD\_SIGNAL.indication message is intended to be an indicator of the presence of the RF signal on the coaxial media.

The value of the *rx\_detected* parameter shall be generated according to the conditions defined in Table 100–1 for 10GBASE–XR type PMDs. The PMD Signal Detect function in the CNU PMD receiver is not required to verify whether a compliant 10GBASE–XR signal is being received.

**100.3.5.2 OLT PMD signal detect**

The response time for the PMD Signal Detect function for the burst mode upstream signal may be longer or shorter than a burst length; thus, it may not fulfill the traditional requirements placed on PMD Signal Detect function operating in the downstream direction.

The PMD\_SIGNAL.indication message is intended to be an indicator of the presence of the RF signal on the coaxial media. The Signal Detect function in the CLT may be realized in the PMD or the Clause 101 PMA sublayer.

The value of the *rx\_detected* parameter shall be generated according to the conditions defined in Table 100-1 for 10GBASE–XR type PMDs. The PMD Signal Detect function in the CLT PMD receiver is not required to verify whether a compliant 10GBASE–XR signal is being received.

**100.3.5.3 10GBASE–XR Signal Detect function**

The Signal Detect function for Clause 100 PMDs is defined as shown in Table 100–1.

Table 100-1—Values of rx\_detected parameter for Clause 100 PMDs

|  |  |
| --- | --- |
| Receive conditions | rx\_detected value |
| 10GBASE-XR-D1 | 10GBASE-XR-U1 |
| Average input RF power ≤ Signal Detect Threshold (min) in Table 100–TBD | Average input RF power ≤ Signal Detect Threshold (min) in Table 100–TBD | FAIL |
| Average input RF power ≥ Receive sensitivity (max) in Table 100–TBD with a compliant 10GBASE–XR signal input  | Average input RF power ≥ Receive sensitivity (max) in Table 100–TBD with a compliant 10GBASE–XR signal input | OK |
| All other conditions | All other conditions | unspecified |

*Editor’s note (to be removed prior to publication): detection conditions for RF signal need to be specified in this table, and what specific average / max / min values are considered. Current table reuses concepts defined in Clause 100-1, but this should be updated.*

**100.3.6 PMD transmit enable function for CNU**

The PMD\_SIGNAL.request(tx\_enable) message is defined for all CNU PMDs specified in Clause 100. The PMD\_SIGNAL.request(tx\_enable) message is asserted prior to data transmission by the CNU PMDs.