

141.1 Overview

This clause describes the Physical Medium dependent (PMD) sublayer for Nx25G Ethernet Passive Optical Networks (Nx25G-EPON) operating at an aggregate line rate of 25 or 50 Gb/s in the downstream direction and an aggregate line rate of 10, 25, or 50 Gb/s in the upstream direction. These PMDs are collectively referred to by the term Nx25G-EPON. All Nx25G-EPON PMDs operating in the downstream direction at 50 Gb/s are collectively referred to as 50G-EPON PMDs while those operating at a maximum rate of 25 Gb/s in the downstream direction are referred to as 25G-EPON PMDs.

141.1.1 Terminology and conventions

Nx25G-EPONs operate over a point-to-multipoint (P2MP) topology, also called a tree or trunk-and-branch topology. The device connected at the root of the tree is called an Optical Line Terminal (OLT) and the devices connected as the leaves are referred to as Optical Network Units (ONUs). The direction of transmission from the OLT to the ONU is referred to as the downstream direction, while the direction of transmission from the ONU to the OLT is referred to as the upstream direction.

141.1.2 Positioning of PMD sublayer within the IEEE 802.3 architecture

Figure 141–1 depicts the relationships of Nx25G-EPON PMD sublayers (shown hatched) with other sublayers and the ISO/IEC Open System Interconnection (OSI) reference model.

141.1.3 Power budget classes

{TBD}

141.2 PMD nomenclature

141.2.1 PMD rate classes

Nx25G-EPON PMDs defined in this clause fall into several rate classes depending on the upstream and downstream aggregate rate supported. Possible downstream rates are either 25 Gb/s or 50 Gb/s. Possible upstream rates are 10 Gb/s, 25Gb/s, or 50 Gb/s. The rate(s) at which a PMD operates is indicated in the PMD name.

141.2.2 PMD wavelengths supported

Nx25G-EPON PMDs defined in this clause fall into several wavelength classes depending on the number of wavelengths supported in the downstream and the upstream directions. Each direction may support wither one or two wavelengths. PMDs that support two upstream wavelengths always support two downstream wavelengths (i.e., asymmetric rate PMDs always have more capacity in the downstream direction than the upstream direction). The number of wavelengths support by a PMD (1 or 2) in each direction is indicated in the PMD name.

141.2.3 PMD coexistence classes

Nx25G-EPON PMDs defined in this clause support WDM coexistence with one of two previously existing PON technologies; 10G-EPON or GPON. PMDs coexisting with 10G-EPON are denoted with the letter X in the PMD name while PMDs coexisting with GPON are denoted with the letter G.

141.2.4 PMD direction classes

Nx25G-EPON PMDs defined in this clause are defined for either the OLT and face the downstream direction or for the ONU and face the upstream direction. OLT PMDs are denoted with the letter D in the PMD name while ONU PMDs are denoted with the letter U.

141.2.5 PMD power classes

Nx25G-EPON PMDs defined in this clause are defined as one of two power classes; a medium or a high power budget class. A medium PMD power class supports a P2MP media channel insertion loss of ≤ 24 dB e.g., a PON with the split ratio of at least 1:16 and the distance of at least 20 km or a PON with the split ratio of at least 1:32 and the distance of at least 10 km. A high PMD power class supports a P2MP media channel insertion loss of ≤ 29 dB e.g., a PON with the split ratio of at least 1:32 and the distance of at least 20 km. The medium power budget class is indicated in the PMD name with the numeral 2 while the high power budget class is indicated with the numeral 3.

141.2.6 PMD naming

Nx25G-EPON PMD naming conforms to the following convention:

r_1/r_2 GBASE-PQ w_1w_2 c-db

Where:

- r_1 Indicates the PMD downstream rate class (in Gb/s)
- r_2 Indicates the PMD upstream rate class (in Gb/s)
If r_1 is equal to r_2 (i.e., symmetric PMDs) r_2 is omitted
- G Indicates PMDs operating at Gigabit rates
- BASE Indicates PMDs using a baseband signal
- P Indicates PMDs using a PON P2MP protocol
- Q Indicates PMDs using the 256B/257B line code
- w_1 Indicate the number of wavelengths the PMD supports in the downstream direction
1 indicates PMDs with one wavelength in the downstream direction (i.e., 25G-EPON)
2 indicates PMDs with a two wavelengths in the downstream direction (i.e., 50G-EPON)
- w_2 Indicate the number of wavelengths the PMD supports in the upstream direction
1 indicates PMDs with one wavelength in the upstream direction either 10 Gb/s or 25 Gb/s
2 indicates PMDs with two wavelengths in the upstream direction of 25 Gb/s

- c Indicates the coexist class of the PMD
G indicates the PMD can WDM coexist with GPON
X indicates the PMD can WDM coexist with 10G-EPON
- d The direction class of the PMD
D identifies PMDs used in the OLT (downstream facing)
U identifies PMDs used in the ONU (upstream facing)
- b The optical power budget class of the PMD
2 identifies PMDs with a medium class budget
3 identifies PMDs with a high class budget

141.2.7 Mapping of PMDs to power budgets

The power budget is determined by the PMDs located at the ends of the physical media. This subclause describes how OLT (D type) and ONU (U type) PMDs may be combined to achieve the power budgets listed in Table 141–1.

141.2.7.1 Symmetric-rate power budgets

Table 141–2 illustrates recommended pairings of symmetric-rate ONU PMDs with symmetric-rate OLT PMDs to achieve the power budgets as shown in Table 141–1.

141.2.7.2 Asymmetric-rate power budgets

Table 141–3 illustrates recommended pairings of asymmetric-rate ONU PMDs with asymmetric-rate OLT PMDs to achieve the power budgets as shown in Table 141–1.