141.7.9 Transmitter and dispersion penalty (TDP)

TDP measurement tests transmitter impairments, including chromatic dispersion effects, due to signal propagation in SMF used in PON. Possible causes of impairment include intersymbol interference, jitter, and RIN. Meeting the separate requirements (e.g., eye mask, spectral characteristics) does not in itself guarantee the TDP. The TDP limit shall be met. TDP is measured as defined in 88.8.5 with an optical channel that meets the requirements listed in 141.7.9.2.

141.7.9.1 Reference transmitter requirements

The reference transmitter shall meet the requirements listed in 88.8.5.1.

141.7.9.2 Channel requirements

The transmitter is tested using an optical channel that meets the requirements listed below.

A Nx25G-EPON OLT or ONU transmitter is to be compliant with a total dispersion at least as negative as the minimum dispersion given by equation 141-X and at least as positive as the maximum dispersion given by equation 141-Y for the wavelength of the device under test. This may be achieved with channels consisting of fibers with lengths chosen to meet the dispersion requirements.

$$D_{min} = MIN\left(0,\ 0.365 \cdot \lambda \cdot \left(1-(1324/\lambda)^4\right),\ 0.465 \cdot \lambda \cdot \left(1-(1324/\lambda)^4\right)\right) \quad (141\text{-}X)$$

$$D_{max} = MAX\left(0,\ 0.365 \cdot \lambda \cdot \left(1-(1300/\lambda)^4\right),\ 0.465 \cdot \lambda \cdot \left(1-(1300/\lambda)^4\right)\right) \quad (141\text{-}Y)$$

To verify that the fiber has the correct amount of dispersion, the measurement method defined in IEC 60793-1-42 may be used. The measurement is made in the linear power regime of the fiber.

The channel provides an optical return loss of 15 dB. The state of polarization of the back reflection is adjusted to create the greatest RIN.

The mean DGD of the channel is to be less than 0.8 ps.

141.7.9.3 Reference receiver requirements

The reference receiver shall meet the requirements listed in 88.8.5.3.

141.7.9.4 Test procedure

The test procedure is as defined in 88.8.5.4, with the exception that a BER of 1×10^{-2} shall be used for the lane under test.