

ABSTRACT

Gigabit Passive Optical Network (GPON) is one of the high-speed access technology has the advantage of multiple services, and the availability of large bandwidth for the application of triple play (voice, data, video). However, the transmission through optical fiber media did not cover the possibility of signal degradation that occurs so as to interfere with the transmission and the information brought into the receiver. The main factors influencing the signal degradation due to attenuation and dispersion.

Dispersion is a symptom of pulse broadening in optical fibers. Consequently, in order to cope with these symptoms, required dispersion power penalty is defined as the increase in the input power required at the receiver to eliminate the degradation of the BER (bit error rate) caused by optical fiber dispersion effects. In this final study, will see the value and influence of dispersion power penalty obtained from the low pass filter approximation method rule against multiple GPON system performance parameters include rise time budget, power link budget and power margin. The measurement results through the NMS also included as a comparison to be examined whether there is any correspondence between the field data with theoretical calculations.

After doing the analysis, it is known that in terms of design theory calculations to be more accurate with the addition of dispersion power penalty, especially power link budget and power margin. In general, the zero dispersion wavelength (λ_0) of the existing fiber optic STO Centrum Bandung area is 1312 nm and a dispersion slope parameters (S_0) for 0.093 ps/nm².km produce the greatest dispersion power penalty worth 2.7706 dB at a distance of 7.085 miles (IPTV trial Japati) with the conditions downstream operating wavelength 1550 nm, chromatic dispersion coefficient 17.537863 ps/nm.km, total chromatic dispersion 124.256 ps and line rates 2.488 Gbps. Network STO Centrum is in decent or good category because the majority have received power level in the range of -18 to -22 dBm (excellent) and the margin of power generated also be not negative ($M > 0$).

Keywords: GPON, ODN, dispersion power penalty, chromatic dispersion