

ABSTRACT

NG-PON2 represents the latest technology to overcome the problems of bandwidth limitations in the current PON technology. Time-and-wavelength division multiplexing mechanism using aggregation/stacking OLT method on NG-PON2 promising future broadband networks that provide huge bandwidth. But in the access network deployment NG-PON2 not been done. The final project will be design and evaluation the performance of NG-PON2 with TWDM techniques. The design is done to find out is there any effect on NG-PON2 performance if exploration bandwidth is done with the use of up to eight channels TWDM. Scenario testing using a speed of 40 Gbps to 80 Gbps downstream (WDM scheme) from the OLT using four to eight OLT aggregation of each channel OLT has a speed of 10 Gbps and 10 Gbps capacity upstream speeds of up to 40 Gbps (TDM scheme). Simulations performed using twice the divider points with a distance of 30 km and a total user 64. From the simulation results, analysis of receiver power, OSNR, Q-factor and BER is done.

Based on simulation results, obtained aggregation eight OLT provide the best performance for downstream transmission based on parameters analysis of receiver power and OSNR. However, contrary to the transmission upstream, the best performance with the use of four OLT is the value obtained -27.44175 dBm and 72.423505 dBm. While based on the link quality conditions downstream direction is represented by the value parameter Q-factor analysis, the worst performance in eight OLT who represented the small value of Q-factor is 7.683231 and the value min. BER $6,93749E 10^{-12}$. In upstream transmission, the average value of min. BER becomes unstable due to the high value of Q-factor which only occurs on one of the canals caused by PMD. The best performance for upstream based on Q-factor analysis parameters is 13.46015 with the use of four OLT.

Keywords : NG-PON2, Time-and-Wavelength Division Multiplexing, Optical Fiber Communication.