

ABSTRACT

NG-PON2 is the latest technology to help solve the problem of bandwidth resource on PON today. The time-and-wavelength division multiplexing technique with the OLT aggregation / stacking method on NG-PON2 may promises future broadband networks with enormous bandwidth. However NG-PON2 is not yet implemented within access network spreading.

In this Final Project, the performance of NG-PON2 with TWDM technique is planned and evaluated. Planning is done to know the influence of increasing ODC up to 3 TWDM channel with the NG-PON2 performance. The test scheme uses 40Gbps downstream and 10Gbps upstream. The network is bidirectional with wavelength range 1596 - 1598,4 nm for downstream and 1524 - 1526,4 for upstream. The channel space used is 0,8 nm. Measurement of feasibility of NG-PON2 network are done by changing link length parameters of 20 and 40 km with transmission power of 10 dBm. The network uses two stage passive splitter with ratio 1:4 and 1:8. The network is designed without the use of either from sender, transmission, or receiver amplifiers. In this Final Project, Q-Factor, BER, and SNR will be analyzed.

The simulation result show that the use of 3 ODC gives the lowest result for downstream transmission on both 40 km and 20 km link length based on analysis parameter of BER which keep increasing up to 6,29E-02, Q-Factor and SNR keep decrease to 1,530 for Q-Factor and 4,858 for SNR on 40 km link length. While on 20 km link length, based on analysis results shows that BER is 3,28E-04, Q-Factor is 3,407 and SNR is 8,334 dB. For the upstream transmission, the performance is good for all scheme because of signal regeneration factor received on OLT with 20 km link length, the lowest SNR is 25,625 dB and for 40 km link length, the lowest SNR is 23,147 dB. The feeder capacity used is 96 core which may accommodate all user in the research scheme. Users capacity may only accommodate up to 56 ONU for both 20 km and 40 km link length.

Key Words : NG-PON2, Time-and-Wavelength Division Multiplexing, Optics communication, Users capacity per user and per feeder.