ABSTRACT

Currently the access network is expected to provide communications services of voice, video and data. Triple Play services with a bitrate of 2.5 / 1 Gbps sometimes unable to cope with the needs of bandwidth so it needed a server migration on the access network in order to generate greater bandwidth. According to The Full Service Access Network (FSAN), Time and Wavelength Division Multiplexing (TWDM) selected in April 2012 as a solution to the migration towards Next Generation technology Passive Optical Network (NG-PON). Bindhaiq experiment with a bitrate of 80 Gbps, power launch of 40 dBm for link length of 50 km with amplifiers Semiconductor Optical Amplifier (SOA) and reach the standard of fiber optic communication networks that BER is less than 10^{-9}. Several other references discuss TWDM-PON in terms of ratios, Aggregate NGPON, link length and cost budget.

In this research, simulation and analysis TWDM-PON network architectures using software Optysytem. Before doing a simulation on software Optisystem it will do network planning through power link budget calculation. The discussion in this final project to review the feasibility of migration to TWDM-PON with a bitrate of 10 Gbps dowsntream direction by replacing the system on a device server, single OLT be stacking 4 OLT. TWDM-PON is bidirectional network with a wavelength range of 1596-1599 nm for downstream direction. Measurements on the feasibility of TWDM-PON network is done by changing the length of the link parameters are 10 and 20 km with the minimum launch power of 0 dBm and a maximum of 10 dBm. The network uses two stage passive splitter with a size of 1: 4 1: 8 to 32 users, 1: 4 1:16 to 64 users, 1: 4 1:32 to 128 users and 1: 4 1:64 for 256 users. TWDM-PON network is designed without using amplifiers. TWDM-PON network analysis approximated by SNR calculation, Q Factor and BER.

The results of simulations and calculations have been carried out showed that TWDM-PON network able to increase the bandwidth of 10 Gbps on the 32 network users, 64 users, 128 users and 256 users. 32 user network has good performance in the link length 10 and 20 km with SNR value of 26.828 dB for 10 km and 26.530 dB for 20 km. 64 network users have the good performance in the link length 10 and 20 km with SNR value of 26.814 dB for 10 km and 26.521 dB for 20 km. 128 network users have the good performance in the link length 10 and 20 km with SNR value of 26.814 dB for 10 km and 26.520 dB for 20 km. 256 network user has a good performance on the 10 km long link with a value of 26.806 dB SNR.

***Keywords** : TWDM-PON, Stacking OLT, SNR*