ABSTRACT

The newest generation of Passive Optical Network (PON) is the Next Generation Passive Optical Network stage 2 (NG-PON2). Bit rate up to 10 Gbps on upstream and 40 Gbps on downstream is expected to future communication technology needs. Time Wavelength Division Multiplexing (TWDM) is the main solution on NG-PON2, using TWDM techniques and OLT stacking will provide great bandwidth.

In this research will be simulated using software with fiber optic cable G.652.C as recommended. This research will be conducted into two main scenarios, scenario I is using EDFA as booster amplifier for downstream side and scenario II is using EDFA as pre-amplifier for upstream side. After that, each scenario will be tested into 2 sub-scenarios of 64 and 128 users. Then it will be compared to some distance and power pump at the distance of 20-50 km and power pump is 50-500 mW.

Based on the simulation results, on the downstream and upstream transmission obtained the best results at a distance of 20 km. In 64 user direction downstream the results for Q Factor 35.86 with power pump 200 mW, with power pump 500 mW for received power *-11.16 dBm, SNR 41.91 dB. Meanwhile in 128 user direction downstream for Q Factor 32.30 with pump power 250 mW, with pump power 500 mW for* received power *-14.34 dBm, SNR 40.27 dB. Highest gain for downstream direction at all distance and user equal to 18.32 with power pump 500 mW. While on 64 user upstream direction the best result that is at power pump 500 mW, with result of Q Factor 27.49,* received power *equal to -10.012 dBm, SNR 30.04 dB and highest gain 51.13 with power pump 500 mW and distance 50 km. In 128 user upstream direction for best result on power pump 500 mW, with value of Q Factor 23.59 and* received power *equal to -11.054 dBm, meanwhile SNR 28.97 dB with power pump 150 mW and distance 30 km, highest gain 51.78 with power pump 500 mW and a distance of 50 km.*

Keywords*: NG-PON2, TWDM, EDFA, Booster Amplifier, Pre-Amplifier, Q Factor.*