ABSTRACT

The transmission system is still developing and will continue to be developed, one of them is optical fiber. One of the fiber optic network system is Next Generation Passive Optical Network Stage 2 (NG-PON 2). NG-PON2 is the latest technology to help solve the problem of bandwidth resource on Passive Optical Network (PON) today.

This research simulate and evaluation the performance of bidirectional NG-PON 2 with 40 Gbps, and 80 Gbps bit rate method changes. The system created using four and eight TWDM channels with each channel has a 10 Gbps for downstream and upstream. This system has 10, 20, 30, 40 and 50 km transmission distance with the number 64, 128 and 256 Units of Network Optics (ONU). In addition, this system also uses hybrid optical amplifier (HOA) as booster amplifier and EDFA as a pre-amplifier. The simulation is performed to find out the performance on NG-PON 2, bit rate, transmission distance and number of ONU on the influence of Bit Error Level (BER) on the user side with scenarios without amplifier and scenario using additional amplifier.

Based on the simulation results, obtained the best system is using the amplifier that is with bit rate 40 Gbps with the number of 64 ONU can reach maximum distance of 60 km, the best Q factor value is obtained with the distance 10 km that is 23.66 on the downstream side and 21.85 in upstream side, the best BER value on the downstream is 3.86×10^{-124} and on the upstream is 3.16×10^{-106}, with received power -7,05 dBm downstream and -7,10 dBm upstream, HOA gain of 16.54 dB and EDFA gain of 6.31 dB. The addition of a hybrid optical amplifier amplifier as a booster and EDFA as a preamplifier has provided better performance with more users and the longer the transmission distance so that the value of BER $\leq10^{-9}$.

Keywords: NG-PON2 , TWDM, Hybrid Optical Amplifier