

ABSTRACT

Bandwidth limitation is one of the problems in G-PON technology. Development of this technology continues to be done until the discovery of NG-PON2 technology. NG-PON2 is a technology that uses Time and Wavelength Division Multiplexing (TWDM) as the main solution because it can increase bandwidth up to 40 Gbps. The use of Semiconductor Optical Amplifier (SOA) is one of the development that is also done.

In this final project, design and simulation of network bidirectional using SOA. It used four stacking Optical Line Termination (OLT). The parameter of the input system is the length of link of 35 km, 45 km, and 55 km. The bitrate used is 10 Gbps for downstream and 2.5 Gbps for upstream. There are four slot outputs of cable feeder in which each feeder cable uses 2 stage passive splitter. The number of user or ONU used is 32, 64, and 128. The type of placement of the SOA booster is the booster amplifier in the downstream direction and the pre-amplifier in the upstream direction. Performance parameters are measurements of value of Power Received, OSNR, Q-Factor, and BER.

Based on the simulation results, it is found that all values of performance parameters are in their respective standards after SOA reinforcement is used at -28 dBm to -7 dBm. The effect on Power Received is to increase the value of Power Received without using the amplifier at every length of link used. While the effect on OSNR is the non-linearity of signal strength and power noise in the direction of downstream which makes the decrease of OSNR value after use of the amplifier, although it is still above the OSNR standard of at least 30 dBm. The effect on the value of Q-Factor increases Q-Factor effectively above the value 6 which makes the Q-Factor value of each channel declared ideal for link communication. While the effect on the value of BER is the same as Q-Factor, which makes the increase and raised its value to be above the standard for NG-PON2 is 10^{-9} because the value of BER follows the Q-Factor value. The farthest distance that can be used after using the SOA reinforcement is 65 km.

Keywords:*Optical Line Termination (OLT), NG-PON2, Semiconductor Optical Amplifier (SOA)*