ABSTRACT

At this time, fiber optic technology is capable to transmit data at bit rates up to 10 Gbps. Fiber optic technology which is being developed currently is NG-PON2 technology with its bit rate capability is about more than 10 Gbps. NG-PON2 technology is designed to meet the needs of future communications technologies that require substantial bandwidth.

In NG-PON2, multiplexing techniques that have been standardized by ITU-T is Time-and-Wavelength Division Multiplexing (TWDM). NG-PON2 technology can use a variety of modulation formats. Modulation formats can affect signal quality and speed of delivery. This research analyzed the influence of type of modulation format toward the performance of TWDM based NG-PON2 network. Several simulation scenarios were performed, first by changing the modulation format used with RZ, NRZ, RZ-DPSK, and RZ-DQPSK. The second scenario was by changing the aggregation of OLT used of 4λ and 8λ. The third scenario was by changing the length system from 2 km to 10 km with a space length 2 km.

Based on the simulation result, the best modulation format is NRZ with better perfomance on each perfomance parameters compared with other modulation format. NRZ modulation format at 2, 4, 6, 8, 10 km respectively obtained LPB are -19.2853 dBm, -19.9598 dBm, -20.6990 dBm, -21.3278 dBm, and -22.0813. Value of SNR are 24.1538, 22.1149, 19.1409, 20.4323, and 15.7115 dB. Value of *Q-Factor* are 17.8154, 15.6047, 14.0567, 12.7729, and 10.8110. And value of BER are 4.22×10^{-65}, 1.51×10^{-52}, 6.08×10^{-41}, 6.98×10^{-32} and 9.74×10^{-27}. Based on those result, the NRZ modulation format produces values above the standard quality parameters and good for ise on the NG-PON2 technology.

Keywords : Format Modulation, NG-PON2, Optical Communication System, TWDM.