

## **ABSTRACT**

*The development of internet coverage and usage encourage the development of service availability with the fast data transmission and large capacity. Longhaul DWDM network as the multiplexing technology very supports the transmission process of remote optics. Channel encoding modulation which can be implemented was needed to support the media performance of Longhaul DWDM. There are some types of channel encoding modulation such as, Non-Return to Zero and Return to Zero. The selection of channel coding formats on the Longhaul DWDM network should be considered because it influences the signal quality, data transmission speed, and dispersion effect. This research conducted to observe the effect of channel coding selection in Longhaul DWDM network system by using Optisystem. The designing used power variations 0, 2, 4, 6, and 8 dBm and distance variations 200, 400, 600, 800, and 1000 kilometers. The design on the system used 16 channels with the distance of 100 Ghz channels and bitrate 40 Gbps, and also channel coding of NRZ or RZ as the result comparison to Q-factor, BER, and Eye diagram. According to the test result, the value of BER's on NRZ's design was smaller than RZ's design, and Q-factor value on NRZ's design was better than RZ's design. The Eye Diagram's result showing that the distortion value of RZ's design was better than with the distortion value 108,033  $\mu$ . However on jitter value, the NRZ channel was better than RZ with a value of jitter 0.028 ns. This research proves that channel coding of NRZ is better based on Q-Factor, BER, and Jitter.*

**Keyword :** DWDM, Non-Return to Zero, Return to Zero, Q-Factor, Optisystem.