

## **ABSTRACT**

*Radio over Fibre is a technology that can meet the need for large bandwidth and high transmission speed in the long distance transmission process. Based on the concept of the RoF system, it allows the incorporation of multiple radio signals into a single optical fibre using multiplexing techniques. The focus of the research is to analyse the performance of DWDM-RoF system with optical direct detection scheme, against the use of amplifier implementation, based on Bit Error Rate (BER) and q-factor parameters. This research results in testing the use of amplifier implementations, namely in-line and pre amplifiers with parameter values when 30 km to 50 km are at a good performance standard according to ITU-T recommendations compared to boosters. The average q-factor results in the cable length range are 8.084225; 7.764113333; and 6.935514167, and the BER value is below  $10^{-10}$ . While in the booster the value of q-factor is said to be good when below 50 km, and at 50 km there are several channels with outputs that show q-factor values below the expected standard with the lowest value of 5.40325. So with the results obtained, by comparing all outputs from the use of gain has no effect on the output results of the DWDM-RoF system.*

**Keyword:** *Amplifier, BER, DWDM, Multiplexing, Q-Factor, RoF*