

ABSTRACT

Radio Over Fiber (RoF) is one of the processes in optical fiber communication where radio signal is modulated in optical fiber. With the increasing number of demands in the success of a telecommunication data processing, especially indoor, RoF could be one of the solutions to support the success of telecommunication processing with a more efficient network system in terms of its application.

In this research the radio over fiber network system design is divided into three parts or blocks which are the transmitter block, optical link block and receiver block. Differential Phase-Shift Keying (DPSK) digital modulation is used for this network system. The bit rate in this research is 1Gbps and Mach-Zehnder Modulator (MZM) as an external modulator is used to support the modulation process of radio signal in the optical fiber. CW Laser is used as the optical source and the maximum fiber length is 30 km focusing for indoor application. Avalanche Photodiode (APD) Photodetector is used in the receiver block.

Based on the results, it can be concluded that the variants of power splitter and fiber length can affect the network system performance. Where the longer fiber length and the bigger number of ports in the power splitter, the values of each performance parameter decreases. With each variants's difference at 19.5%, the simulation result shows the best parameter performance with BER value 2.34×10^{-12} is by using 1:2 power splitter and 8 km optical fiber length. Where the worst parameter performance with BER value 9.74×10^{-7} is by using 1:8 power splitter and 30 km optical fiber length.

Keywords: Radio Over Fiber, Indoor, DPSK, BER, Q-Factor