

## ABSTRACT

*Radio over Fiber is a hybrid technology that combines the technology of optical fiber with radio waves. RoF technology uses in this case that of a communication system can utilize high-capacity optical networks. The RoF technology using the technique of multiplexing that popular and reliable technology on OFDM (Orthogonal Frequency Division Multiplexing). System performance RoF depends heavily on the mechanism of up-conversion in the transmitter and down-conversion in the receiver. This research aims to analyze on transmission performance using optical quadrature modulation with coherent detection/EM-CD (external-modulated coherent detection) on a system with RoF modulation mapping 16-QAM (Quadrature Amplitude Modulation) using two external modulator on the mechanism of up-conversion, four balanced photodetector and an LO (local oscillator) as coherent detection on the mechanism of down-conversion. Simulation results indicate that the influence of the magnitude of the transmission power of a CW (continuous wave) laser, the influence of the length of the fiber, and LO affect spectrum signal, power, and signal constellation received in receivers significantly. In system analysis has been simulated results that the power variation of input Laser with CW power on between -8 dBm, -4 dBm, until the 0 dBm signal constellation results is good. However, in the power value 4 dBm and 8 dBm signal constellations results changing the rotation rotation and shape of the signal. This is because on the big power-influenced, if increasingly long distances than fiber then distance amplitude is also getting smaller and also more noise going on. Good input power is used on systems that have simulated this is on a small input power is -8 dBm.*

**Keywords:** *Radio over Fiber (RoF), OFDM, 16 QAM, Coherent Detection, Power, frequency, and Baseband over Fiber.*