ABSTRACT

The organization in the field of telecommunications is now growing very rapidly, this is due to the needs of users who want a fast telecommunication service with wide coverage. Radio Over Fiber (RoF) is a solution offered because it provides with great bandwidth and wide coverage because it combines the cellular network with the fiber optic network. Fiber optic provides large bandwidth and a small damping and radio network provides a wide coverage so that by combining this technology can meet the needs of users.

In this study created the RoF system for 4G and 5G services to prepare for the switch on the mobile network from 4G to 5G. The RoF system for 4G Networks uses a frequency of 2.3 GHz with a bit rate of 10 Gbps, while the RoF system for the 5G network uses 3.5 GHz and 60 GHz frequencies with 10 Gbps bit rate. Modulation technique: 4-Quadrature Amplitude modulating (QAM) By using the optical modulator Lithium Nitrobate (LiNb) Mach Zehnder Modulator. The simulation uses an optical trajectory of 30 Km, 45 Km, and 60 Km.

The results of the performance of the RoF system with the farthest distance of the 60 Km have a Q-factor value of 6,017 and BER of 9.463 $X10^{-10}$ on the RoF system using a frequency of 2.3 GHz. In the RoF system using a frequency of 3.5 GHz get the Q-factor value of 6,199 and BER of 2.823 $x10^{-10}$. In the RoF system using the 60 GHz Frekeunsi gets the Q-factor value of 6,363 and BER of 9.758 X^{10-11}. The results of the three schemes still meet the standard Q-factor value of 6 and the value of BER 10^{-9}.

Keyword : RoF, QAM, Q-factor, BER.