

## **ABSTRACT**

*Telecommunications technology continues to grow very rapidly every year because the need for communication that is used by the community as a service to support life needs in terms of the use of information exchange is increasing. The process of transmitting an information through a channel will not escape the constraints of the emergence of errors. Modulation is the process of laying up information signals that have a low frequency to the carrier signal that has a high frequency, so that the information sent can reach the recipient. One parameter that determines digital modulation quality is the Bit Error Rate (BER) by looking at the effect of  $E_b / N_0$  and SNR values. The purpose of this research is to be able to become the basis of reference in the implementation of these technologies and further research, so that the benefits generated can maximize the implementation of these technologies and further research.*

*This research was conducted with simulation on matlab, so in taking this data using two scenarios. The first scenario is the 16-QAM 5G modulation simulation of the AWGN channel and the second scenario is the simulation of the rayleigh fading channel.*

*From the simulation, it is found that in the first scenario the results of the 5G 16-QAM modulation simulation and the existing theory look the same although only slightly different, so the simulation results are valid because the results of the simulation and theory are only slightly different. The second scenario is the 5G 16-QAM modulation simulation results and the theory looks the same but different, the difference is a shift of 0.5 from the simulation results with the theory.*

*Keywords; BER, transmission, modulation, 5G.*