

ABSTRACT

Multiple Access (MA) technology is a very important component in the development of the 5G Radio Access technology system. The MA system used is now based on text Orthogonal Multiple Acces (OMA). The current challenge for OMA is the value of limited capacity or low spectral efficiency. One alternative MA technology that is able to overcome this is Domain Power Non-Orthogonal Multiple Access (PD-NOMA).

This Final Project analyzes the cooperative NOMA movement using Amplify-and-Forward (AF) and Decode-and-Forward (DF) relay in the downlink direction. This study conducted a study with several steps, namely (i) conducting a non-cooperative and cooperative NOMA system with modeling and (ii) simulation and Bit Error Rate (BER) analysis of Signal to Noise Ratio (SNR) and Channel Capacity on PD-NOMA by using relay and without relay. The value of the analysis parameters are evaluated by computer simulation.

From the test results obtained that to achieve BER under 10^{-6} with a power ratio of 0,9: 0,1 required an SNR above 28,95 dB, an AF required an SNR of 28,78 dB and a DF required an SNR of 29,02 dB. For Channel Capacity, the calculation results show that the use of PD-NOMA by using relay has different numbers to PD-NOMA without using relay. These results indicate that the performance of PD-NOMA by using DF relay is better than AF relay and without using relay.

Keyword: *Non Orthogonal Multiple Access, PD-NOMA, Amplify-and-Forward, Decode-and-Forward, BER, SNR, Channel Capacity.*