ABSTRACT

The wireless communication systems require high data rates, increased capacity, high quality, and high reliability. Multiple Input Multiple Output (MIMO) systems provide the appropriate technology for these requirements without requiring additional bandwidth but using multiple antennas, with specific spacing and number of elements. The MIMO antenna system requires good mutual coupling and correlation values so that the elements do not affect each other..

Various methods have been studied and analyzed to reduce mutual coupling and improve isolation between antennas, including diversity techniques. This final project aims to analyze the MIMO antenna based on the technique of polarization diversity, by looking at its effect on the channel capacity. This final project is focused on analyzing the effect of mutual coupling between antenna elements to see its effect on channel capacity. Several existing antenna configurations have been simulated from previous studies on Rayleigh channel conditions, using the Matlab application.

Based on the simulation that has been done, the results show that there is an increase in the channel capacity value, the largest capacity is 116 bps/Hz for the L-R-L-R cross polarization scenario of the upper element R-L-R-L of the lower element at an SNR of 20 dB. The simulation was carried out with 6 research scenarios, namely RHCP, LHCP, R-L-R-L upper element L-R-L-R lower element, L-R-L-R upper element R-L-R-L lower element, R-L-R-L upper element R-L-R-L lower element, L-R-L-R upper element L-R-L-R lower element. Each scenario is analyzed in 2 channel conditions, namely decorelation and correlation. Channel capacity with decorrelation condition has a capacity increase value of about 2 times greater than the correlation condition at 20 dB SNR.

Keywords: *mutual coupling, MIMO antenna, channel capacity*