

## ABSTRACT

The rapid development of communication technology has increased the demand for speedy internet access. To be able to meet the needs of users, mobile technology must be continuously updated to provide better internet speeds. A new method to provide increased data rate and channel capacity is with MIMO antennas. Multiple Input Multiple Output (MIMO) is a system that uses multiple antennas at the *transmitter* and *receiver*. In the preparation of this final project, a 2x2 MIMO antenna design will be carried out consisting of two *transmitter* antennas and two *receiver* antennas. The mutual coupling aspect is considered so that the power radiated by one antenna does not affect the other antenna. The MIMO antenna will be designed by adding an Electromagnetic Band Gap (EBG) structure and using Diversity polarization.

The mutual coupling results after the addition of the EBG structure to the sub-system 1 antenna obtained a decrease from -29.22 dB to -29.58 dB. This shows that the addition of the EBG structure reduces the mutual coupling value by 0.36 dB. While in the sub-system 2 antenna, the mutual coupling value decreased by 8.73 dB from -24.06 dB at the same union position to -32.79 dB at a different union position. This shows that the sub-system 2 antenna can reduce the mutual coupling value better than the sub-system 1 antenna. The use of 2x2 MIMO antenna using EBG with SIMO system has RSRP of -86 dBm, SNR of 25 dB, maximum *bitrate* of 4818.2 kbps, and channel capacity of 83.09 Mbps. The use of MIMO antenna using diversity polarization with SIMO system has RSRP of -85 dBm, SNR of 26 dB, maximum *bitrate* of 5223.77 kbps, and channel capacity of 86.40 Mbps. The use of MIMO antenna using diversity polarization has better performance than the use of MIMO antenna using EBG.

Keywords: MIMO, EBG, Diversity, RSRP