ABSTRACT

The development of telecommunication needs has driven the birth of 5G technology as the latest generation of cellular communication, replacing 4G, 3G, and 2G. This technology is designed to increase data speed, network efficiency, and capacity by utilizing high frequencies, such as 3.5 GHz, and optimizing supporting devices such as microstrip antennas. To support 5G performance, the Multiple Input Multiple Output (MIMO) system is used, although it has constraints such as low port isolation. Solutions such as the Defected Ground Structure (DGS) method are applied to increase bandwidth and antenna performance. This study proposes the design of a 2x2 MIMO microstrip antenna with the DGS method and truncated corner at a frequency of 3.5 GHz to produce circular polarization, which can reduce losses due to differences in polarization between the transmitting and receiving antennas. In this study, the antenna design was carried out using the CST Microwave Studio Suite 2019 software, then continued with fabrication and measurements in the laboratory. The simulation results show that at a frequency of 3.5 GHz, the return loss parameter value of port 1 is -22.36 dB, return loss of port 2 is -21.46 dB, mutual coupling of port 1 is -23.68 dB, mutual coupling of port 2 is -23.64 dB, VSWR of port 1 is 1.16, VSWR of port 2 is 1.18, bandwidth of port 1 is 189.8 MHz, bandwidth of port 2 is 181.5 MHz, gain of port 1 is 4.14 dBi, gain of port 2 is 3.88 dBi, axial ratio is 2.7 dB which indicates circular polarization, and the results of the radiation pattern are unidirectional. Meanwhile, the measurement results obtained return loss with the lowest value on port 1 of -12 dB which is at a frequency of 3.7 GHz and port 2 of -13.57 dB which is at a frequency of 3.69 GHz, mutual coupling on port 1 of -22.58 dB and on port 2 -22.78 dB at a frequency of 3.5 GHz. While the measurement results of bandwidth on port 1 of 191 MHz there was an increase of 0.63% compared to the simulation results, on port 2 the bandwidth value of 219 MHz there was an increase of 20.6% compared to the simulation results.

Kata Kunci : MIMO, *Defected Ground Structure, Truncated Corner*