ABSTRACT

Technology in this day and age is already using 5G technology which has a very much faster speed, capacity and latency in accessing data compared to 4G technology. There are several types of antennas that can support the implementation of 5G technology, one of which is discussed in this Final Project is microstrip antennas, microstrip antennas have several advantages, one of which has a size that is easy to carry and the cost of fabrication is quite cheap. Therefore, this Final Project is to design and realize a microstrip antenna using a circular patch and a microstrip antenna that will be added to the ground plane using a metamaterial structure, namely Complementary Split-Ring Resonator (CSRR).

The addition of the CSRR metamaterial structure aims to increase the antenna bandwidth and reduce the dimensions of the antenna. For the type used in the substrate, FR-4 has a relative permittivity specification (εr) of 4.4, the thickness of the substrate (h) is 1.6 mm and the ground plane and patch have copper material which has a thickness (t) of 0.035 mm. The design and simulation of the antenna then this Final Project using 3D software.

For the results of this Final Project is to design and simulate the antenna. The results of the simulation show an increase in bandwidth and a significant miniaturization of the antenna dimensions. For the bandwidth value, the increase is 260.5% and the miniaturization of the antenna dimensions on the ground plane is 18.18%. The bandwidth of the circular patch microstrip antenna is 114 MHz while the metamaterial antenna with CSRR is 411 MHz. The return loss value is -19.504 dB, VSWR 1.237, with an omnidirectional radiation pattern and has a gain value of 1.454 dBi. Therefore, it can be concluded that the design of the metamaterial antenna with CSRR in this Final Project has met the specifications and can work at a frequency of 3.5 GHz in 5G technology.

Keywords: *5G Technology, Complementary Split-Ring Resonator (CSRR), Circular Patch Microstrip Antenna, Metamaterial.*