ABSTRACT

With the increasing demand of users for higher data rates in wireless communication systems, 5th or fifth generation is the term used as the next phase of 4G that exceeds the 4G standard. The 5th or 5G generation technology is planned to become the official cellular operating system standard in 2020. so that currently there is still a lot of research that studies and develops 5G. The frequency candidates to be used at 5G are in the millimeter wave spectrum.

This study designed a single feed microstrip antenna with two working frequencies of 15 GHz and 28 GHz with circular polarization. For this design, the patch used is a rectangular shape, with a rectangular and cross slot ring. The antenna patch is given a cross-shaped gap to widen the *band*width and reduce the *axial ratio* and is given a rectangular ring slot to produce a dual *band*. In addition, the antenna is designed using the technique using a microstrip line. the material used is RT Duroid 5880 which has a dielectric constant of 2.2 and 1.575 mm thick, as a substrate. The conductor material uses copper with a thickness of 0.035 mm.

The antenna produced in this study has two working frequencies namely 15 GHz and 28 GHz, at a frequency of 15 GHz the antenna has a return loss of -12.1803 dB with a bandwidth of 1.48 GHz and a gain of 7.4741 dB in the simulation, has a return loss of -4 , 6548 dB and gain 8.39 dBi on the measurement, at 28 GHz frequency the antenna has a return loss of -13.4683 dB with a bandwidth of 2.40 GHz and a gain of 7.1789 dB on the simulation, has a return loss of -14.9209 dB on the measurement dBi. At a frequency of 15 GHz the antenna has circular polarization with an axial ratio value of 2.1241 dB in the simulation, 4.15 dB at the measurement, and at the 28 GHz frequency the antenna has an elliptical polarization with an axial ratio value of 21.1628 dB.

Keywords: 5G, millimeter wave, microstrip antena, single feed, dual *band*, circular polarization, slot silang, *ring rectangular slot*.