ABSTRACT

The fifth generation wireless telecommunications network (5G) is currently being a concern of experts to the layman. Even though Indonesia has just enjoyed even the fourth generation (4G) wireless telecommunications network technology. According to the 2015 Global Mobile Suppliers Association, to meet the needs of the wireless telecommunications network will use the spectrum in the sub-6 GHz frequency band, while to meet the needs of IoT it will use millimeter wavelengths in the 30 GHz - 80 GHz frequency band According to the World Radiocommunication Conference 2015 (WRC -15) has agreed that 5G technology will use the frequency band at 3.4 GHz - 3.6 GHz. While the Indonesian Government, the Research and Development Center, is just learning this technology from various fields.

In this final project design a communication antenna for wireless communication to be applied to the base transceiver center (BTS) 5th generation technology (5G) at a frequency of 3.5 GHz (S Band) and a frequency of 6 GHz. This study uses MIMO antennas with triangular patches which are given slots. MIMO antennas will work at frequencies of 6 GHz and 3.5 GHz. The material to be used using FR-4 substrate contains a dielectric constant $\varepsilon_r = 4.3$ with a layer thickness of 1.6 mm, and a copper conductor layer with a layer thickness of 0.035mm. This research compares mutual coupling by giving the distance of each antenna element, such as closer and distance each antenna element as expected output, then compare it from the simulation process and the realization process.

The fabricated antenna has been measured at a frequency of 3.5 GHz having a return loss value of -22,383 dB, a bandwidth of 100 MHz, a mutual coupling value of -19,477 dB, the gain value increases to 14,423 dBi. As for the 6 GHz frequency has a return loss value of -28, 161 dB, bandwidth of 160 MHz, mutual coupling value of -16,403 dB, and a gain value of 6,023 dBi. The elliptical polarized antenna propagation, and the realization dimensions of 8.5 cm × 8.5 cm.

Keywords: 3.5 GHz, 5G, 6 GHz, FR-4, bandwidth, IoT, mutual coupling, MIMO, QOS, return loss, sub-6 GHz