ABSTRACT

5G technology is developed as a continuous improvement on previous generation of wireless communication technology in response the current telecommunication demand. One of the 5G key features in improving energy efficiency is suitable for cognitive radio technology. Cognitive radio has the ability in sensing the operation situation and providing a certain response regarding the sensing result. The existence of environmental disruption in the propagation of electromagnetic waves can cause the changes in polarization (depolarization). Depolarization of the wave affects the received power of the antenna. Therefore, required an antenna with the ability to change the polarization according to the polarization of the incident waves.

The concept of polarization reconfigurable antenna can be a solution to support cognitive radio technology in 5G. This final project has designed a polarization reconfigurable antenna at 3.5 GHz frequency to support an antenna that is compatible with 5G technology. The antenna in this study is designed with a simple design. The antenna structure consists of a square patch with two slots crossing in the diagonal direction and four switch components in the slot for reconfigurable linear polarization, right-hand circular polarization (RHCP), and left-hand circular polarization (LHCP).

Based on the simulation results, the antenna design is able to reconfigure between RHCP and LHCP at 3.5 GHz frequency with axial ratio values of 1.762 dB and 1.811 dB. Whereas for linear polarization, the S_{11} of 3.5 GHz more than -10 dB and has optimum value at 3.119 GHz with an axial ratio of 40 dB. Then the results of the realization and measurement of the antenna produce S_{11} less than -10 dB at 3.5 GHz frequency in three reconfigurable polarization conditions. However, the results of polarization measurements show an axial ratio more than 3 dB for the three polarization reconfiguration.

Keyword : 5G, *5G cognitive radio, reconfigurable antenna, polarization reconfigurable* antenna*, slot antenna.*