

ABSTRACT

Almost every single Internet of Things (IoT) device needs antennas. Antennas are used for transmitting and receiving signals in communication devices and are thus an essential part of all IoT devices. IoT antennas should be energy efficient, compact, and working in multi-antenna configuration. The antenna is a crucial part to make a communication between devices. Modern IoT devices need to transmit more data than its previous generations, this is why the newer antenna has more frequency and also has more bandwidth than its previous generation as seen in the newest Wi-Fi 6E and Wi-Fi 6, Dual-Band and high frequency design can help to solve this crucial part of the IoT communication problems as an IoT Gateway antenna.

This thesis designed a Dual-Band Rectangular Microstrip antenna using a 5 and 6 GHz, the initial design of the antenna from the calculation using standard equation of the rectangular patch and microstrip antenna, using 3D model simulation software to know what happened in the simulation and get the best results from the simulation, before creating the real antennas, the final design of the antenna will be different from the initial design, for the materials that used in this thesis is Epoxy FR4 for the substrate and copper for the patch and ground, both of these materials are common materials for making an antenna and relatively cheap.

The observation was done through the simulation step using 3D model simulation software and measurement of printed antenna. In the Simulation, the VSWR from both frequencies is reaching the target by VSWR below 2, the bandwidth for the 5 GHz is 140 MHz while it is not reaching the maximum target of 160 MHz bandwidth for the Wi-Fi 6 standard, but it reached the minimum of 80 MHz bandwidth, for the 6 GHz bandwidth is 212 MHz, it reached the target bandwidth but it lacks additional channel for other 160 MHz, the value of gain reached the target by both frequency gain is more than 1.5 dBi. The measurement results of the printed antenna were different from the simulation results due to not measuring it in chamber room and human errors during the measurement.

Keywords: IoT, Antenna, Dual-Band, Microstrip, Rectangular Patch.