

ABSTRACT

This research aims to design a dual-band antenna with a rectangular-shaped slot obtained after optimization, enabling the antenna to be applied to WLAN with working frequencies of 2.4 GHz and 6 GHz. The substrate material used is FR-4 (lossy) with a relative permittivity value of 4.3. To obtain the basic antenna design, calculations for each antenna parameter are necessary, allowing for simulation in CST Studio 2022. Based on the conducted research, the antenna design results with the formula have ground and substrate dimensions of 92.14 mm × 79.638 mm, and the antenna patch size is 38.39 mm × 29.77 mm for 2.4 GHz and 15.35 mm × 11.46 mm for 6 GHz. The simulation results for the formula-based antenna at a frequency of 2.4 GHz show a VSWR (Voltage Standing Wave Ratio) of 2.581, and at a frequency of 6 GHz, it has a VSWR of 1.17.

After optimizing the antenna, the results differ from those of the formula-based antenna. The ground and substrate dimensions become 101.74 mm x 89.23 mm, and the patch size becomes 32.15 mm x 29.77 mm for 2.4 GHz and 34.26 mm x 11.46 mm for 6 GHz. Simulation results for the antenna at a frequency of 2.4 GHz show a VSWR of 1.54, a gain of 3.3062 dB, and a bandwidth of 67 MHz. Meanwhile, for the 6 GHz frequency, a VSWR of 1.54, a gain of 0.86 dB, and a bandwidth of 392 MHz are obtained.

In conclusion, the antenna performs in accordance with specifications as the VSWR values are 2, and the s-parameters are -10 dB.

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