ABSTRACT

The rapid expansion of wireless communication systems, particularly in WiFi networks, underscores the need for efficient and high-performing antennas. This paper addresses this requirement by presenting the design and simulation of a dual-band rectangular microstrip antenna tailored for wireless local area network (WLAN) applications. The proposed antenna features a rectangular patch with two pairs of slots positioned on opposite edges, fed by a microstrip line. These slots are strategically designed to produce two distinct resonant frequencies at 5 GHz and 6 GHz.

The design methodology incorporates standard equations for rectangular patch and microstrip antennas to determine the optimal patch size, feedline position, and slot dimensions. Following this, a 3D modeling software is utilized for simulation. This tool enables detailed electromagnetic analysis and provides a range of parameters and plots, including return loss, voltage standing wave ratio (VSWR), input impedance, current distribution, radiation pattern, and gain, facilitating a thorough evaluation of the antenna's performance.

The anticipated results suggest that the antenna will achieve a VSWR of less than 2, with peak gains of 2 dBi at both 5 GHz and 6 GHz. The proposed antenna is expected to be well-suited for dual-band WLAN applications, offering advantages such as a compact size, simple structure, and low cost, thereby meeting the growing demands of modern wireless communication systems.

Keywords: Wi-Fi, Antenna, Dual-Band, Microstrip, Rectangular Patch.