ABSTRACT

The widespread use of smartphones, including in places of worship, often disrupts the solemnity of the environment, creating a need for devices like jammers to limit smartphone usage in specific areas. However, the low gain of single-patch microstrip antennas (<3 dBi) presents a challenge in jammer applications. To address this issue, this study developed a microstrip antenna designed to operate at frequencies of 1.8 GHz and 2.4 GHz for jammer applications. The array method was used as the primary technique to enhance gain. This thesis involves the design and fabrication of a 2x4 MIMO microstrip array antenna operating at 1.8 GHz and 2.4 GHz. The antenna uses an epoxy FR-4 substrate with a permittivity of 4.2 and a thickness of 1.6 mm, with overall dimensions of 357.367976 x 110.159265 mm. Additionally, the antenna applies the Multiple Input Multiple Output (MIMO) concept, allowing for simultaneous transmission and reception of signals through multiple paths, thereby increasing transmission capacity and communication reliability. The designed 2x4 MIMO array antenna was analyzed based on performance parameters such as return loss (S11 and S22), isolation coefficient (S21 and S12), VSWR, gain, bandwidth, and radiation pattern. The results show that despite successful fabrication, there were performance differences between the simulation and the fabricated antenna. At 1.8 GHz and 2.4 GHz frequencies, the fabricated antenna achieved a return loss of -12.607 dB for S11 and -12.297 dB for S22. The isolation coefficient (S21 and S12) was recorded at -45.67 dB and -45.55 dB, respectively. The antenna's VSWR reached 1.6411 at 2.4 GHz and 1.5848 at 1.8 GHz, with bandwidths of 69.1 MHz and 71 MHz, respectively. The antenna gain reached 6.6 dBi at 1.8 GHz and 5.9 dBi at 2.4 GHz.

Keywords: Microstrip Antenna, 4G Network, WiFi Network, Array, Gain, MIMO, Jammer.