ABSTRACT

Automatic Dependent Surveillance-Broadcast (ADS-B) is a modern air traffic surveillance technology that operates in real-time by utilizing signals from the Global Navigation Satellite System (GNSS) to determine the position and velocity of aircraft. In this system, the antenna plays a crucial role in receiving ADS-B signals at the 1090 MHz frequency. This study aims to design and realize a 2×4 rectangular microstrip patch array antenna using the truncated corner method, integrated into an ADS-B receiver system based on Software-Defined Radio (SDR). The antenna was designed using FR4 Epoxy substrate and coaxial probe feeding, with targeted performance including circular polarization, return loss < –10 dB, VSWR < 2, minimum bandwidth of 20 MHz, gain ≥ 3 dBi, and 50-ohm impedance. Simulation results using CST Studio Suite 2019 showed that the antenna achieved an axial ratio of 1.5107575, return loss of -12,270123, VSWR of 1.15, and a bandwidth of 30.5 MHz. After fabrication, the antenna was tested using a NanoVNA and radiation pattern measurement with a horn antenna. The measurements showed that the antenna operated at 1090 MHz, with a return loss of –13.10 dB, VSWR of 1.847, bandwidth of 30 MHz, omnidirectional radiation pattern, and circular/elliptical polarization with a gain of 6.76 dBi (co-polar) and 2.88 dBi (cross-polar). Therefore, the antenna meets the technical specifications and is suitable for use in an SDR-based ADS-B receiver system.

Keywords: *ADS-B, Microstrip Antenna, Truncated corner, SDR, 1090 Mhz*