English Abstract

Antennas are essential parts of wireless communication systems. Microstrip radiating patches are universally accepted as popular antenna structures due to their versatile feeding techniques, light weight and conformable nature. However, this class of single element antennas are inherently narrow bandwidth devices with low efficiency. The aim of this study is to design a microstrip patch antenna with dual frequency response and improved impedance bandwidth. Among many available techniques, stacked patch configuration is selected to introduce dual frequency response and the substrate parameters are mainipulated to enhance the impedance bandwidth. Coaxial probe feeding technique is selected to excite the proposed stacked circular patch antenna based on an air-dielectric composite substrate. Professional software is used to simulate and optimize the antenna response. The designed antenna exhibited dual frequency response with a wider bandwidth associated with the 2nd resonance. To achieve widening impedance bandwidth of the 1st resonance, aperture coupled feed mechanism is used with a near resonant aperture. Simulated antenna response was optimized to achieve desired results. Since aperture coupled feeding technique is more feasible to implement an array configuration, it is used to excite a two element linear array of stacked patch antennas. Computational facilities (PC RAM) limited the investigation of larger array dimensions. The fabrication of the optimized antenna structure is carried out using Protomate PCB plotter. An HP network analyser is used to measure the scattering parameters (|S11|in dB) of the designed antennas. The antenna measurement system, available in the antenna lab, is used to experimentally observe the radiation characteristics of these antennas. The measured data are used to corroborate the simulated results.