

Design and Analysis of Multilayer Patch Antenna for R.F. Energy Harvesting from GSM 900 Cell Tower

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Abstract

This paper describes the design of a coaxially probe fed stacked circular microstrip antenna (CMSA) used for RF energy harvesting systems. The main objective of this paper is to design a cost-effective patch antenna suitable for RF energy harvesting (RF-EH) applications. Here, reduction in the cost is possible as PCB technology is not used. A Stacked CMSA is designed with a resonant frequency of 942MHz (GSM-900). In this design for better optimization and BW, a simple coaxial feeding mechanism is used. Return Loss BW of 6.051% is achieved. The simulated impedance BW (VSWR_{s2}) of 57 MHz (918 MHz-975 MHz) has been noticed. The gain achieved for the proposed antenna is 4.4dB which is sufficient enough for harvesting. Also, the simulated results of voltage multiplier and rectifier circuit along with the matching circuit are described in detail in this paper. Simulated and theoretical results show good similarities. The presented result shows that the proposed antenna system is practically applicable for RF-EH and hence, prototype development is in process.

Keywords: Microstrip Antenna, Radio frequency, Energy harvesting, Impedance Matching, Cockcroft Walton Multipliers, Stacked CMSA,
