

ABSTRACT

Energy harvesting is a process of capturing and harvesting energy from various energy sources that are nearby. This energy source can take the form of sunlight, wind, vibration, motion, heat to energy from electromagnetic signals. Electromagnetic energy is the main choice as a source of energy harvesting because of the large number of various sources, such as TV signals, radio, etc. In this study, the intended source of energy harvesting is the Radio Frequency (RF) signal. To capture and harvest RF signals in the surrounding environment, an antenna is needed. The antenna used is a dual band microstrip antenna in the form of a circular patch. By using a dual band antenna, the scope of energy harvesting becomes greater, so it can produce greater output power as well.

In the process of design and implementation in this study, an antenna simulation was performed using CST Studio Suite 2018 software, and a rectifier simulation using the Advanced Design System (ADS) software. Realization of the rectifier uses a 2 stage voltage multiplier and 4 main components of the HSMS 2820 diode.

In this study the work frequency shifted to 1,820 GHz and 2,462 GHz, getting a return loss of -10.01 dB, VSWR of 1.94, and a gain of 2.103 dB on the 1,820 GHz frequency. Whereas at 2.462 GHz frequency, the return loss result was -26.45 dB, VSWR was 1.41, and the gain was 5.212 dB, and rectenna efficiency was 65.12 %. In the measurement of rectenna with wifi router done at a distance of 15 cm produces an output voltage of 1.4 V, a distance of 10 cm at 1.6 V, and a distance of 5 cm at 1.7 V. Whereas using an mobile hotspot at a distance of 15 cm produces an output voltage of 1.6 V, a distance of 10 cm at 2.6 V, and a distance of 5 cm for 3.3 V.

Keywords: Energy Harvesting, Rectifier, Microstrip Antenna, Dual Band