

ABSTRACT

Energy harvesting has contributed in energy crisis problems about limited resources. This technique takes an external source of energy from a system with abundant availability such as sunlight, wind and radio waves. In addition to sunlight, today radio waves are an almost unlimited source of energy due to the availability of many transmit sources such as BTS, WLAN access points, and television stations. One application of energy harvesting that utilizes radio waves as a source is rectifying antenna (rectenna). Radio waves in the free air are received by the antenna and then converted to dc voltage.

This final project research designs a simple rectenna system consisting of antennas and rectifiers. The designed antenna is a tapered slot vivaldi microstrip antenna and can operate on 470 - 806 MHz UHF TV signals. The rectifier circuit is designed to be a *voltage multiplier* by using a combination of diodes and capacitors as their constituents. The diode used is the BAT 17 type Schottky diode. The diode is capable of operating in the UHF frequency range (300 – 3000 MHz).

Realization of Vivaldi antenna consists of FR-4 epoxy as a substrate with dimension 200 mm x 250 mm. The results of Vivaldi antenna realization have the highest gain in the 470 - 806 MHz frequency range of 2.4 dB. VSWR of this antenna has the highest value of 1.86 and bandwidth over 400 MHz. The rectenna system successfully converts radio waves into dc voltages worth 20.2 mV with 19 dBm of radiated power from transmit antennas with a distance of 60 cm at 806 MHz frequency. The lowest dc voltage is generated at 470 MHz frequency of 0.4 mV with 19 dBm of radiated power from the transmit antenna 60 cm apart.

Keywords : Energy Harvesting, Rectenna, Rectifier, Vivaldi Antenna, Voltage Multiplier