



Designing a RF Harvesting Device with Smaller Dimensions while acquiring required power

T.N. Abeythunga^a, J.C.S.Kadupitiya^b, P.D.M.T. Ranathunga^c, D.S. De Silva^d and
S.H.K.K.Gunawickrama^e

Faculty of Engineering, University of Ruhuna

^atharinduabeythunga@gmail.com

^bjcskadupitiya@gmail.com

^cmthuzaan@gmail.com

^dsaman@eie.ruh.ac.lk

^ekeerthi@eie.ruh.ac.lk

Abstract

RF energy harvesting is a recurring theme and applicable in remote charging and wireless power transmission. This paper presents results from an analysis of patch antenna designs with minimum dimensions and acquirable permittivity which produce maximum output power of 0.1 W. The potential use of RF power was investigated experimentally. The aim of this work is to investigate the power levels that can be harvested from air and processed to achieve the energy levels that are sufficient to charge low power electronic circuits. An RF energy harvesting system has been specifically designed, constructed, and shown to collect enough energy to power circuits. If same remark is applied to a process of harvesting RF energy by using a power circuit optimized with several stage more stabilized output can be obtained. The impact of this reduced size parameters of the product is significant with combined design of patch antenna and power circuit which is mounted on either sides of the same PCB. This paper concludes that while the harvest RF was successful under certain conditions, however, supported by other energy harvesting techniques is required to replace a battery. Efficiency considerations have, therefore, since emphasis on comparing developed to combine other systems. In Particular Project tradeoffs of each circuit and materials are specially designed in order not to harmful to human body. And radio frequency bands are chosen so that no harmful impact effects on human. These characteristics are benefiting future bio medical innovations and this project's next expectation runs to a design of small power application operating reliably on direct power without charging a battery, which is believed to be a more thrilling solution. The impetus behind the development of such kind of optimum design can be ushered a new era by increasing the efficiency of the circuit almost 100%. zero bias diodes are remarkable in this regard. An RF collection system has been specifically designed, constructed, and shown to successfully collect enough energy to power circuits. For an equivalent incident signal of -40 dBm, the circuit can produce 3 mV across a 100 k Ω load. The results also show that there is a multiplication factor of 22 at 0 dBm and produces DC output voltage of 5.0 V in measurement.

Keywords: *RF Energy, Energy Harvesting, Patch Antenna, Voltage Multiplier, Pi Matching*