

Wireless Energy Harvesting Using Rectennas

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Abstract: *Wireless communication applications such as GSM, LTE, 3G, Wi-Fi and GPS continuously transmit radio waves in order to track users and allow them to communicate. Such waves carry electromagnetic energy that floats abundantly around the end users. The harvesting of such energy constitutes the challenge that is proposed in this research effort. Such initiative constitutes a new source of renewable energy that allows the capture of floating wireless radio waves and their conversion into a direct current (DC) signal that can be used to recharge mobile devices, laptops or any other outlet that users rely on, in modern society.*

The ambient radio frequency (RF) energy can be made useful to end-users if an efficient antenna system as well as a rectifier circuit are designed and matched to each other. The combination of an antenna and a rectifier circuit is called "Rectenna". The antenna system must collect and deliver maximum power to the diode in the rectifier circuit. This is essential since the conversion efficiency of the rectifier circuit is directly proportional to the amount of input power. In this research effort, we aim at designing "Rectenna" systems to be incorporated on mobile terminals with high conversion efficiencies that will allow users to benefit from ambient electromagnetic fields as an alternative energy source.