



Sri

**SAI RAM INSTITUTE OF TECHNOLOGY**



An ISO 9001 : 2008 Certified Institution

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**INNOVATION AND ENTREPRENEURSHIP DEVELOPMENT CENTRE ( IEDC )**

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# **EGENSOR-POWER GENERATION AND SENSING**



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DEPARTMENT OF  
SCIENCE AND TECHNOLOGY

## ***1. INTRODUCTION***

Recently, energy harvesting at radio frequency (RF) has been a fast growing topic. Since the first wireless energy transmission was proposed and demonstrated in the 1890's by Nikola Tesla using the electromagnetic wave propagation technique of Hienrich Hertz. The topic is developed and applied to many applications such as microwave-powered helicopter prototype, solar power satellite system (SPSS), microwave power transmission in space and radio-frequency identification (RFID).

The RF energy harvesting is developed by the wireless energy transmission technique for harvesting and recycling the ambient RF energy that is widely broadcasted by many wireless systems such as mobile communication systems, Wi-Fi base stations, wireless routers, wireless sensor networks and wireless portable devices. In order to extend the battery life and avoid using battery, the RF energy harvesting was applied to be a rechargeable circuit and a small power supply for portable devices and tiny devices such as mobile phones, tablet, sensor devices and biomedical implants. Although a lot of wireless systems broadcast into the environment, the power density of ambient RF energy is very small that makes it challenging to design a rectenna for harvesting the satisfying energy.

### ***1.1 SOCIAL RELEVANCE***

In this ever dynamic environment, innovation and change can never be changed. Television, Computers, Smart phones, and our daily use gadgets have become the main tools that are being used in order to carry out day to day activities for communication without which we feel helpless.

Since all smart devices or gadgets are made to operate on a certain range of frequency, they all emit radiations which are harmful to humans and this radiations can be sensed and can be reused as energy in order to compensate for energy deficiency. This helps us achieve collecting useful energy from wasted radiation.

## ***1.2 INNOVATION***

Our daily environment of is surrounded by a lot of radio frequency (RF) energy that is broadcasted by diverse wireless systems. In order to enhance the value of the energy more than the channels to communicate, the ambient RF energy harvesting system was designed to harvest and recycle the energy for many applications such as battery chargers, sensor devices and portable devices. The main element of the ambient RF energy harvesting system is a rectenna that is the combination of an antenna and a rectifying circuit.

Even though the ambient RF energy is widely broadcasted with many systems, the energy is extremely low. The high performance of the antenna and the rectifying circuit has to be designed for supporting the small incident power; also the number of frequency channels of the rectenna can enhance the performance and support different harvesting locations.

## ***1.3 MARKET SURVEY AND NEED***

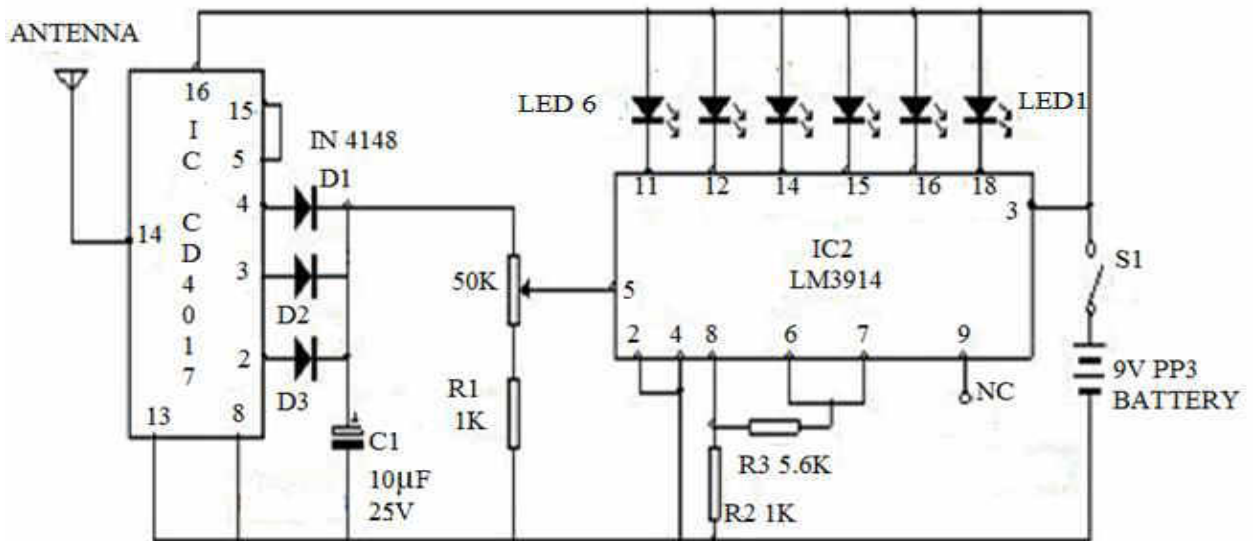
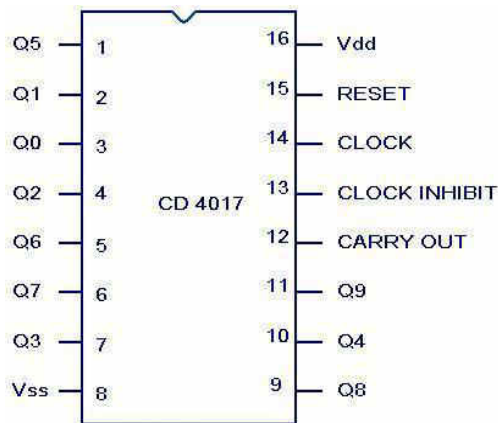
Other existing models are used for only sensing the radiation, but not to make use of it as reusable energy by converting it. Also the sense-only circuits are expensive and not easily available in our country. People are also not aware of these radiations and their effects. Hence we feel that our product could be a new and useful product for the people. This makes the product a need for the society.

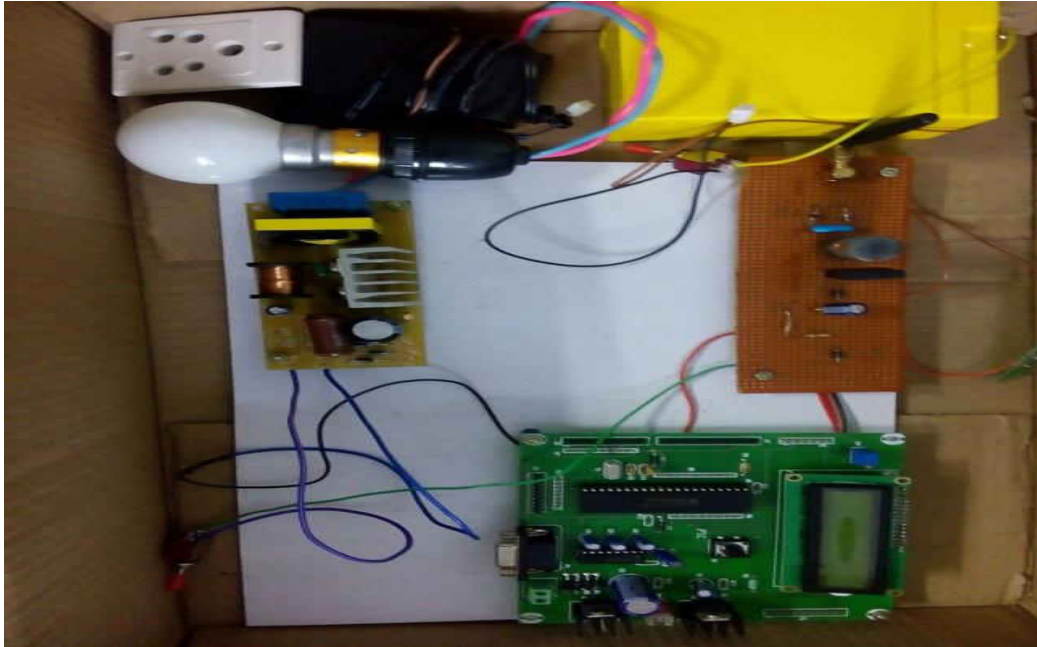
## 1.4 PRODUCT MANUFACTURING FEASIBILITY

Creating a radiation detector and generator circuit involves the knowledge about the radiations to be captured and converted thereby making it extremely feasible for manufacturing. It does not require heavy machinery or any factory to be erected for the manufacturing. In contrast, it requires a few set of tools and simulation software packages for checking the output without constructing the actual circuit and a few computers with all registered software packages in order to design this E-Gensor kit.

## 1.5 PRODUCT PHOTOGRAPHS:

### ARCHITECTURE





### **Applications:**

A metamaterial coating could be applied to the ceiling of a room to redirect and recover a Wi-Fi signal that would otherwise be lost.

Another application could be to improve the energy efficiency of appliances by wirelessly recovering power that is now lost during use.

With additional modifications, the power-harvesting metamaterial could potentially be built into a cell phone, allowing the phone to recharge wirelessly while not in use. This feature could, in principle, allow people living in locations without ready access to a conventional power outlet to harvest energy from a nearby cell phone tower instead.

A series of power-harvesting blocks could be assembled to capture the signal from a known set of satellites passing overhead. The small amount of energy generated from these signals might power a sensor network in a remote location such as a mountaintop or desert, allowing data collection for a long-term study that takes infrequent measurements.

## **CONCLUSION**

In this contemporary world, human health needs to be secured from minor yet constant threats like radiations. E-SENSOR captures all the existing invisible radiations and drawbacks and completely secures the human user and also provides reusable energy in another form.

This E-SENSOR is aimed to be effective in the near future by the application of high level of sensing elements and sensors and converts Non Ionizing radiations into electricity using the metamaterial. It is highly cost efficient, reliable and less manpower is required to handle. It can be made to go hand-in-hand with the user, and reduce the exposure of radiations in order to provide the betterment of the Electronic Community. And also in future we can develop more power for different type of radiations available in our environment.