

Mobile Charger Based on Radiation Recycle Technology

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Abstract— The invention comprises of conserving the energy by means of the simple yet, ingenious circuit. The power wasted in the transmission of the Electromagnetic signals is not judiciously used and is hence, wasted. And so, with the help of this circuit and the unique multiband antenna electricity can be generated from the signal radiations present in the atmosphere. In addition to that, minimizing the radiations using array of such circuits can protect the areas hit by the ill effects of the signal radiations.

Keywords— Radiation, electricity generation, multiband antenna, voltage standing wave ratio.

INTRODUCTION

With the boom in the telecom industry, the atmosphere contains more signal radiations than the oxygen! But not all the frequency modulated radiated signal is used by the operator. Much of the power remains unused and is hence, wasted. In this project using the simple yet ingenious circuit, the Fm radiated signal present in the atmosphere is converted into the direct current signal and hence, the terminal acts as a constant voltage source. With this circuit, the energy can be harvested and can be utilized for different purposes.

The circuit comprises of auto stabilizing module that makes it completely independent and hence, no external power source is required to operate the circuit.

OBJECTIVE

A.HARVESTING THE WASTED POWER

The power wasted by the cell tower in transmitting radiations can be harvested to generate descent volts of electricity by means of this circuit. There are 4.5 lac mobile towers in India and each tower transmits power of 20-Watts, continuously. But not all the power is used and hence, most of the power transmitted is wasted. This method helps us to utilize this wasted power in the form of electricity.

B.CONTROLLING THE RADIATIONS-

It's a fact that radiation norms are violated in India, as the operators don't accept the threat caused by the excess of radiations. And because of that biological disorders are found everywhere. It is noticeable that we would never spot a squirrel or a sparrow near or around the cell tower. Rather,

these two species are on the verge of extinction. Also nowadays, the cases of cancers have increased. The amount of radiations can be controlled using this method. Hence, the threat of extinction of sparrows and squirrels and cases of various cancers can be minimized.

C.GETTING A CONSTANT VOLTAGE SOURCE

The method employed here absorbs the FM radiations and as a by-product gives out some volts of electricity. Thus, this voltage source can be freely made available using the circuit. With this, many applications can be run for free. This is again an eco-friendly way to run the electronic applications.

By having array like structure of this circuit, large volts can be generated.

D. CONSERVING ENERGY

Energy conservation is the utmost call of an hour. In other words, researches are constantly done so as to have newer, greener, non-conventional sources of energy.

Conventional sources of energy are easy to use but they cause a lot of pollution. And so, they are posing a great threat to our planet by depleting the ozone layer. The above-mentioned method helps in conserving the energy by using the present radiations in the atmosphere and harvesting the same to get the electricity.

PRIOR ART

The technology available to generate wireless electricity is not in use because of the heavy losses that take place in transmission and reception. It deals with the inductive couplers and the 'TESLA' coils.

Also, the available wireless mobile chargers are not exactly wire free because of the condition, which compels the user to place his cell phone over the charging pad, which is ultimately connected to the power source. This is nothing but inductive coupling, which again incurs losses. By using this technique, we need not to transmit any power, rather, the power wasted in transmitting the mobile radiation, which is not completely utilized is harvested! Also, the areas hit by the excess of radiation and its ill effects can use it to control radiation levels and generate electricity by the same.

TECHNOLOGY USED

Basic components are being used. The list of components includes germanium diodes, electrolytic capacitors, ceramic capacitors and a multiband antenna. Germanium diodes help in forward biasing at merely low voltages; ceramic capacitors are used for radio reception and electrolytic for charge storage. Last but not least, the multiband antenna receives signals in the range of 870-960 MHz (GSM) and 1710-2480 MHz (3G and Wi-Fi).

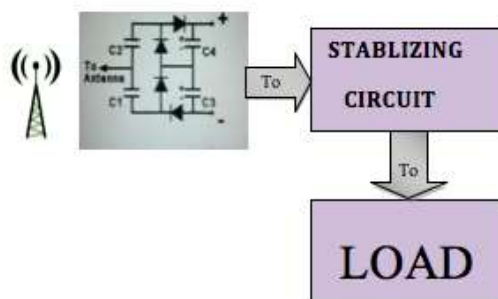


Figure 1 - System block diagram

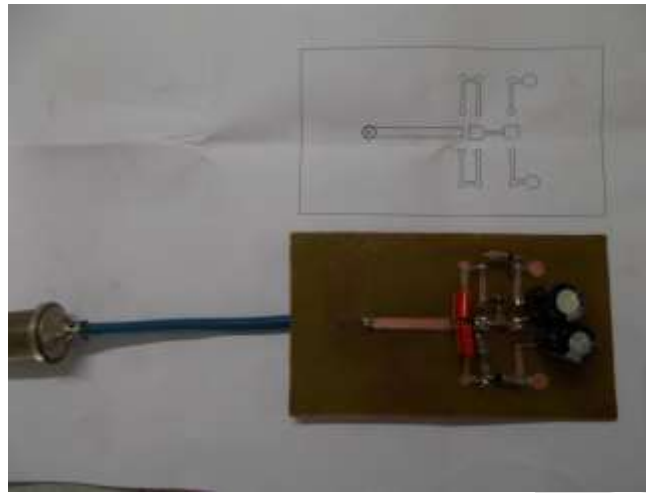


Figure 2 - Rectifier Circuit (1:1 representation)



Figure 3 – Antenna mounted circuit

WORKING

The circuit is designed so that the impedance is matched with the designed antenna. Both of their impedances are nearly equal to 1.7 and are properly matched. Broadly, two separate circuits were designed: 1. Cell phone dependent circuit, 2. Independent circuit (with antenna). Now, the working of circuit one is very simple; just have to use the cell phone as the power source and place it very close to the circuit. Now, when the call is made or is received the voltage is developed and the charge can be stored. The voltage developed totally depends upon the cell phone used as the source, since, different phones emit different amount of energies.

THEORETICAL CALCULATION

For Antenna:

At 900MHz;

Reflection coefficient (S_{11}) = $\{(VSWR-1)/(VSWR+1)\}$

$S_{11} = \{(1.6-1)/(1.6+1)\} = 0.23$

Return Loss (dB) = $-20\log(S_{11}) = 12.76\text{dB}$

Mismatch Loss (dB) = $10\log(1-S_{11}^2) = -0.0026\text{dB}$

And at 1.7GHz;

$$\text{Reflection coefficient } (S_{11}) = \{(1.7-1)/(1.7+1)\}$$

$$S_{11} = \{(1.7-1)/(1.7+1)\} = 0.26$$

$$\text{Return Loss (dB)} = -20\log(S_{11}) = 11.7\text{dB}$$

$$\text{Mismatch Loss (dB)} = 10\log(1-S_{11}^2) = -0.304\text{dB}$$

(Refer the output result for the values)

Circuit 1 calculations:

$$P_r = P_t \times G_t \times G_r \times (c/(4\pi f R))^2 \dots\dots\text{Friss' Equation.}$$

Where, P_r is the power received by the antenna, P_t is the power transmitted by the antenna, G is the gain, f is the frequency, c is the speed of light and R is the distance between two antennae.

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$$\text{So, for } P_t = 20 \text{ W; } G_t = 17\text{dB} = 50\text{W; } G_r = 2\text{dB} = 1.6\text{W}$$

$$\text{Input Power at 940 MHz} = 0.413\text{mW} = -3.8 \text{ dBm}$$

$$\text{Input Power at 1840 MHz} = 0.108\text{mW} = -9.7 \text{ dBm}$$

And output power calculated practically,
 $V = 0.7\text{V}$, $I = 0.005\text{mA}$
Therefore, output power = $VI = 3.5 \text{ uW} = -24.55 \text{ dBm}$

Circuit 2 calculations:

$$\text{Input Power} = 1.8\text{W} = 32.5 \text{ dB (Cell Phone's output)}$$

$$\text{Output Power} = 10 \text{ V} \times 0.05 \text{ mA} = 0.5\text{mW} = -3.01 \text{ dBm}$$

RESULT



Figure 4. POLAR PLOT of the Antenna



Figure 5. VSWR of the improved Generator circuit



Figure 6. VSWR of the Antenna



Figure 7. Smith CHART of the Antenna

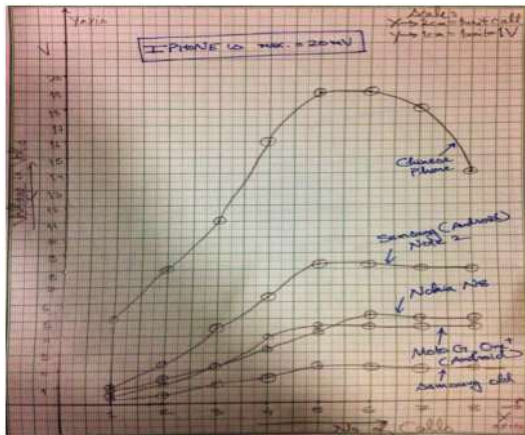


Figure 8. Final Result with the readings

CONCLUSION

Above were the results with and without having specially designed antenna. Now, there is future planning of harvesting the unused Wi-Fi signals, microwave signals, etc. On using this method broadly, the radiations can be controlled. This will help in minimizing the threats of extinction of squirrels, sparrows and human disorders like cancer. Other biological disorders like fruit bearing capacity of the trees and some human related problems can also be minimized. The power wasted by the operators can be harvested and hence, would be conserved to serve as an electricity source to run small devices and to charge mobile phones. Energy would be conserved, as people would opt for free source available to charge mobile phones or to glow couple of LEDs.

Hence, the method mentioned can be successfully used to generate electricity, detect radiation, control radiations and thus, to conserve the energy.

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