

WIRELESS CHARGING OF MOBILE HONE USING MICROWAVE

Madhuri subhash shingare
S.E.ETC
ADCET Ashta
Email ID:shingaremadhuri@gmail.com

Nishigandha dilip pawar
S.E.ETC
ADCET Ashta
Email ID:pawarnisha4912@gmail.com

Abstract

Now a days a mobile phones becoming a basic part of our life .this is one of the most important medium for the communication, the mobile phone batteries has always been problem for recharging. Mobile have to be put to recharge after the batteries has drained out. In this paper the main purpose is shown to make the recharging of mobile phones anywhere you want without charger this is done only when there is a use of microwave, the microwave signal transmitted from transmitter using a special kind of antennas called slotted wave guide antennas at a frequency is 2.45GHZ. We have to add a sensor, rectenna circuit in our mobile phone to do this job successfully. This is one of the best technologies and for this purpose we are proposing wireless charging of mobile using microwave.

Keywords Electromagnetic Spectrum, Telecommunication, Microwave Generator, Retina, Sensor Circuitry

I. Introduction

Microwaves are radio waves (a form of electromagnetic radiation)with wavelengths ranging from as long as one meter to as short as one millimeter. The prefix "micro-" in "microwave" is not meant to suggest a wavelength in the micrometer range. It indicates that microwaves are "small" compared to waves used in typical radio broadcasting, in that they have shorter wavelengths. Microwave technology is extensively used for point-to-point telecommunications (i.e., non-broadcast uses). Microwaves are especially suitable for this use since they are more easily focused into narrow beams than radio waves, allowing frequency reuse; their comparatively higher frequencies allow broad bandwidth and high data transmission rates, and antenna sizes are smaller than at lower frequencies because antenna size is inversely proportional to transmitted frequency.



Fig. 1: A Microwave Telecommunications Tower on Wrights Hill

Microwaves are used inspacecraft communication, and much of the world's data, TV, and telephone communications are transmitted long distances by microwaves between ground stations and communications satellites. Microwaves are also employed in microwave ovens and in radar technology. With mobile phones becoming a basic part of life, the recharging of mobile phone batteries has always been a problem. The mobile phones vary in their talk time and battery standby according to their manufacturer and batteries. All these phones irrespective of their manufacturer and batteries have to be put to recharge after the battery has drained out. The main objective of this current proposal is to make the recharging of the mobile phones independent of their manufacturer and battery make. In this paper a new proposal has been made so as to make the recharging of the mobile phones is done automatically as you talk in your mobile phone! This is done by use of microwaves. The microwave signal is transmitted from the transmitter along with the message signal using special kind of antennas called slotted wave guide antenna at a frequency is 2.45 GHz.

Part A:

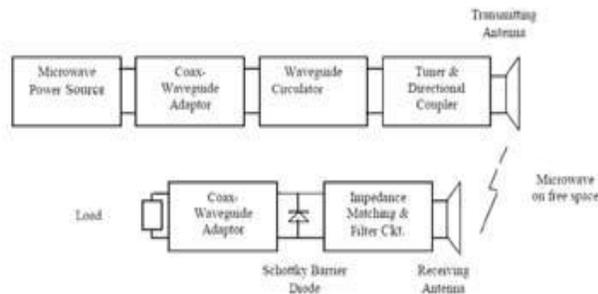
Wireless Power Transmission System:

William C. Brown gives the principle that how the power can be transfer through space using microwaves. This principle of wireless power is shown by the block diagram below: The block diagram shown in fig. 1 consist of two parts One is transmitting part and the other is the Receiving part. At the transmitting end there is one microwave power source which is actually producing microwaves.

Part B:

Components of Wireless Power Transmission System:

There are three important components of this system are Microwave generator, Transmitting an-tenna, and the receiving antenna



1. Microwave Generator

The Microwave Generator is the one which generates the microwave of preferred frequency. It generates the Microwave by the interaction of steam of elections and the magnetic field.

2. Transmitting Antenna

Transmitting antenna are use to transfer the signal from free space to the device. There are many kind of slotted wave guide antenna available. Like parabolic dish antenna, microstrip patch an-tennas are the popular type of transmitting antenna.

3. Rectenna

Its elements are usually arranged in rectenna. The current included by the microwaves in the rectenna is rectified by the diode which powers a load connected across the diode. Scotty diodes are used because they have low voltage drop and high speed so that they have low power loss. rectenna are highly efficient at converting

microwave energy above 90% have been observed with regularity. The basic addition to the mobile phone is going to be the rectenna. A rectenna is a rectifying antenna, a special type of antenna that is used to directly convert microwave energy into DC electricity. Its elements are usually arranged in a mesh pattern, giving it a

distinct appearance from most antennae. A simple rectenna can be constructed from a Schottky diode placed between antenna dipoles. The diode rectifies the current induced in the antenna by the microwaves. It has been theorized that similar devices, scaled down to the proportions used in nanotechnology, could be used to convert light into electricity at much greater efficiencies than what is currently possible with solar cells. This type of device is called an optical rectenna. Theoretically, high efficiencies can be maintained as the device shrinks, but experiments funded by the United States National Renewable energy Laboratory have so far

only obtained roughly 1% efficiency while using infrared light. Another important part of our receiver circuitry is a simple sensor

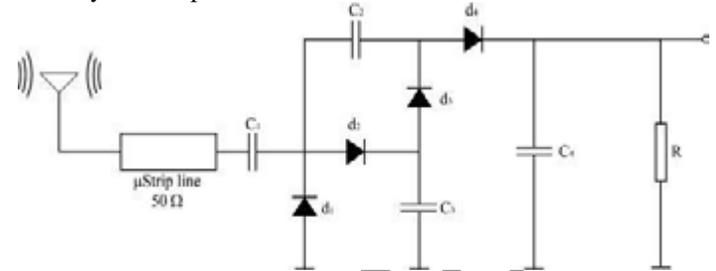


Fig. 2: Block Diagram of a Rectenna

Part C:

System Design

The system designing of wireless charging of mobile phone using microwaves mainly consist of four parts as transmitter design, receiver design, the Process of Rectification, sensor Circuitry.

1. Transmitter Design

A magnetron is a diode vacuum tube with filament in which filament act as the cathode shown in fig 3. Magnetron is actually behaved as an oscillator to produce microwaves. It can be done by putting magnet between the resonating chambers which is the center of the oscillator. These resonating chambers are named as anode in the magnetron. When electrons come out from the cathode and go direct towards the Anode, it passes through the magnetic field. It starts circulating in the resonating cavity and start producing waves according to its frequency. And the generated RF signal by this flow outside of the chamber.

2. Receiver Design

The basic addition to the mobile phone is going to be type of antenna that is used to directly convert microwave energy into DC electricity. Actually the size of rectenna can be reducing using the Nano technology. We also have to add a sensor at receiver side. As we know we are going to charge the phone while a person is talking. So here sensor is used to detect wither the phone is using microwaves or not.

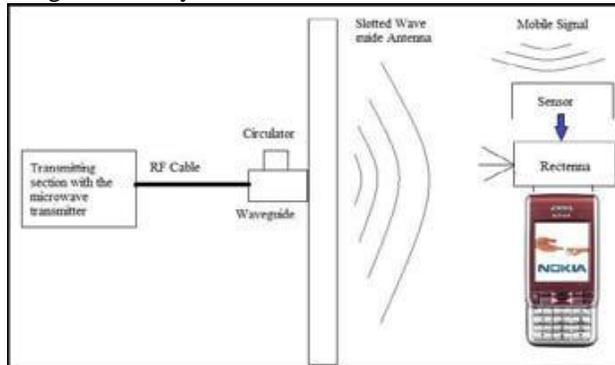
3. The Process of Rectification

Microwave can easily travel through the media but it also loses some energy. So our key objec-tive is to rectify the circuit and to rectify the waves at the low cost. And also we have to make the detection more sensitive. As we know that bridge rectification is more efficient than the single diode we use this for the better performance. We use the shottky diode to get the better impedance.

4. Sensor Circuitry

The sensor circuitry is a any message signal. This is very important as the phone has to be charged as long as the user is talking. . Thus a simple frequency to voltage converter would serve our purpose. And this

converter would act as switches to trigger the retina circuit to on. So when our phone is receiving microwave signal it make the recten circuit on and charge the battery.



Part D:.

Inductive Charging

Though some Handsets on the market currently provide wireless charging, the technology is not exactly same as mentioned here. For charging, phones are required to keep near the Charging Plate.

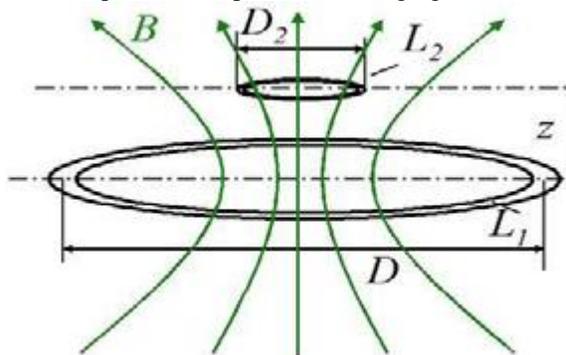
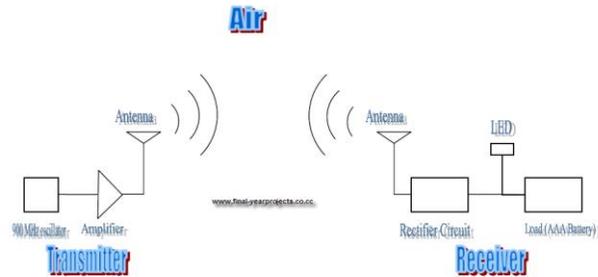


Fig. 4: Existing Power Transfer System



Nokia Lumia 920(A T&T) HTC Windows Phone AX
Nokia Lumia 822(Verizon Wireless) Mobile Phones
Using Power Transfer Charging System A transmitter coil is positioned at the bottom (L1) and the receiver coil (L2) is situated at the top and these coils are embedded into different electrical devices. L1 would be the Nokia Wireless Charging Plate and L2 would be the Nokia Lumia 920, for example.



4. ADVANTAGES

Wireless methods are always advantageous than cumbersome, untidy wiry networks.

- You can have a lot of options if the facility of wireless charging of mobile phones is somehow implemented.
- Charge the phone by Bluetooth so low risk of electrical shock or shorting.
- The need of different type of chargers by different manufacturers is totally eliminated.

5. DISADVANTAGES

- The transmitter and receiver also should be very powerful devices as the distance increases the charging is very slower.
- Wireless transmission of the energy cause some drastic effects to human body ,because of its radiation.

6. CONCLUSION Thus this paper successfully show a novel method of using the power of the microwave to charge the mobile phones without the use of wired chargers. A novel use of the rectenna and a sensor in a mobile phone could proide anew dimension in the revelation of mobile phone.

REFERENCES

[1] Theoretical and experimental. Theodore.S.Rappaport, "Wireless Communications Principles and Practice".
[2]. Wireless Power Transmission – A Next Generation Power Transmission System, International journal of engineering trends in computer science. ISSN: 2231- 2345
[3]. Hawkins, Joe, etal, "Wireless Space Power Experiment," in Proceedings of the 9th summer Conference of NASA/USRA Advanced Design Program and Advanced Space Design Program, June 14- 18, 1993