

A Review Paper on Mobile Charging Using Microwaves

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Abstract— It is a hectic task to carry everywhere the charger of mobile phones or any electronic gadget while travelling or it is very cruel when your mobile phone getting off by the time you urgently need it. Battery life is a major problem in present electronic gadgets. The world is moving towards in the direction of developments in technology, but the technology is still incomplete just because of some limitations. Today's world requires the complete technology and for this purpose we are proposing 'Wireless Charging of Mobile Phones Using Microwaves'.

Keywords— Microwave, Slotted wave guide, Antenna, rectifier.

1. 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, For this we required shorter wavelengths Microwave technology, which 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 wave, their comparatively higher frequencies allow broad bandwidth and high data transmission

rates, smaller antenna sizes because antenna size is inversely proportional to transmitted frequency. Microwaves signals are use in spacecraft communication, and for the world wide data transmission, TV, and telephone communications are transmitted long distances by microwaves between ground stations and communications satellites. All these electronic gadgets irrespective of their manufacturer and batteries life have to be put to recharge after the battery once used. 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 idea has been made to make the recharging of the mobile phones automatically as you talk in your mobile phone. This is done by the help of microwaves. The microwave signal is transmitted from the transmitting station along with the message signal using a special kind of antennas called slotted wave guide antenna.

2.BLOCK DIAGRAM:

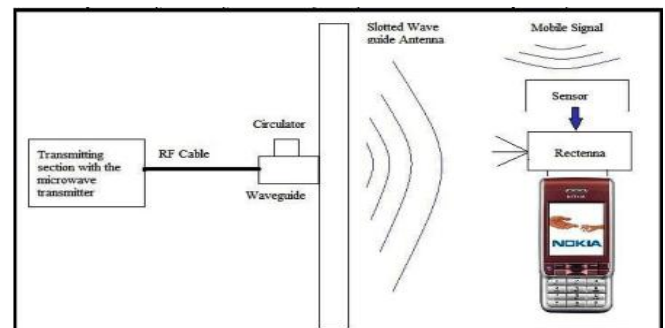


Fig 1: Functional Block Diagram of Mobile Charging using Microwave

3.FUNCTIONING:

3.1 Microwave Transmitter circuit:

Magnetron: It is a vacuum tube oscillator that generates high-power electromagnetic signals in the microwave frequency range.

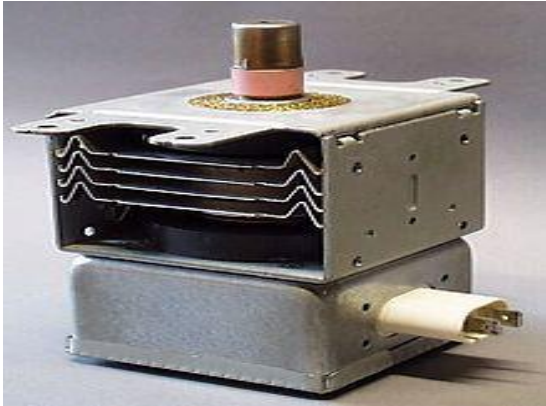


Fig 2: Magnetron

SLOTTED WAVEGUIDE ANTENNA: It is used as ideal power transmitter (because of its high aperture efficiency >95%). It has high power handling capacity, along with 64 slots of power uniformly through free space to the rectenna.

3.2 Channel (Transmission Medium):

Channel is a medium through which Microwaves radiations moves from transmitter to subscriber (mobile handset). For this application, vacuum (or Air) is required.

3.3 Receiving Medium:

Rectenna:

Rectenna = Rectifier + Antenna.

On the reception of the microwave signal, the sensor circuitry start working and send acknowledgment. Rectenna circuit converts microwave energy to dc output. Mobile phone begins to charge using the microwave power as long as the user talks over cell phone. Rectenna is a rectifying circuit that converts microwave energy into DC output. Single Rectenna is approx 23 mm², arranged to form an array suitable to the shape of mobile phone. Very thin as sheets

and can be used at the back of the Cell phones In our design it consists of a single diode power rectifier in “hybrid technology” with improved sensitivity at low power levels.

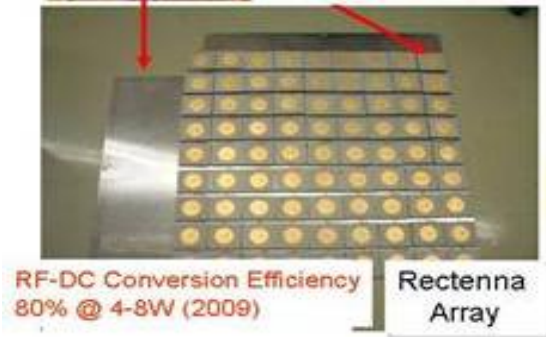


Fig 3: Rectifier

3.4 Working: The basic addition to the mobile phone is rectenna (Antenna+rectifier). A rectenna is a rectifying circuit, a special type of antenna that is used to convert microwave energy into DC current. It's elements are usually arranged in a mesh pattern, to provide a distinct appearance from most antennae. We can construct simple rectenna by using a Schottky diode placed between antenna dipoles. The diode (a uni direction device) rectifies the current induced in the antenna by the microwaves signals. Rectenna is highly efficient for converting microwave energy into electricity. In laboratory environments, efficiencies above 90% have been observed. Scientists also tried to convert electricity into microwave energy using inverse rectenna, but efficiencies are very low. only in the area of 1%. With the advent of nanotechnology and MEMS the size of rectenna elements can be brought down to molecular level. A rectenna contains a mesh of dipoles and a mesh of diodes for absorbing microwave energy from a transmitter and converting it into electric current.

4. LIMITATIONS: For charging through Microwave, Mobile Handsets required additionally a device, “Rectenna”. Rectenna would make it bulky and hence gadget size

will grow up. The main disadvantages of wireless charging is lower efficiency and high attenuation with increased resistive heating in comparison to direct contact. Implementations with the help of lower frequencies or older drive Technologies charge more slowly and generate heat within most portable electronics. Due to the lower efficiency, devices will take longer time as well as more signal to charge mobile phone.

5. IMPLEMENTATIONS:

Recently NOKIA has launched this wireless charging technology in its new recent mobile model "NOKIA LUMIA 1020".

Energy efficient chargers of all size and shape to match our phone.

They are all quiet compactable, which means we can use any chargers we like.



6. FUTURE SCOPE: In future RECTENNA is used to produce large-scale power from microwaves beam. This technology is also applicable for electronic gadgets which work on batteries and thus saves electricity. Currently researches are going on, to implement this technology for laptops.

7. CONCLUSION: At present technical era, we have a very busy schedule. So do not have enough time to be constantly at one place and recharge our electronic gadgets (like Mobile Phones, Laptops etc). We not only work at office but also work at home,

that's why our Communicating media or gadgets need sudden recharge without being interrupted. A unique blend of the Rectenna and a sensor circuit in a Mobile phone could provide a new direction in the revolution of Mobile Phone charging. Covering these aspects, this new system of wireless recharging will certainly bring drastic Change in recharging Electronic Equipment and will smooth our Lifestyle. This paper successfully displays a unique and novel method of using the microwave's signals to charge the Mobile Phones batteries.

8. References:

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