

Wireless Mobile Charging

Poonam Juneja¹, Rajat Kumar Chaudhary²

Department of Electrical and Electronics Engineering, Maharaja Agrasen Institute of Technology, New Delhi, India¹

UG Student, B.Tech 3rd year, Maharaja Agrasen Institute of Technology, New Delhi, India²

Abstract: Wireless Power Transfer technology is a recent development in today's times. It removes the disadvantage of using the wired technology that is prevalent today. In this experiment, wireless power transfer would be used to charge the mobile handsets of people using public transportation system like buses. Certain drawbacks of wired power transfer technology being used currently call for the adopting of wireless power transfer technology. It is not feasible to obtain a charging point /plug point at all times or even keep the charger with oneself at all times. Electromagnetic induction is the underlying principle of wireless power transmission. The use of wireless transmission would eliminate the need of wires which pertaining to the situation may be complex or hazardous.

Keywords: WPT (Wireless Power Transfer (or) Transmission), Electromagnetic induction, charging mobile phones.

1. INTRODUCTION

An energizing source is required along with two antennas, one for transmission of the signal and one for receiving it. The receiving antenna would then energize the load. The energizing source sends a high power time varying signal to the transmission antenna.[3] The resulting electrostatic field produced around the transmitting antenna would also be time varying in accordance with the high power signal. The time varying power signal produces electromagnetic waves. These electromagnetic waves then move through air and the receiving antenna positioned at the appropriate location. Once the receiving antenna receives these electromagnetic waves, another signal would be induced in the receiving antenna based on its strength. This gives rise to current that feeds the load.

A. ELECTROMAGNETIC INDUCTION

An electric current flowing through a conductor, such as a wire, carries electrical energy. When an electric current passes through a circuit there is an electric field in the dielectric surrounding the conductor; magnetic field lines around the conductor and lines of electric force radially about the conductor.

B. PRINCIPLE OF ELCTROMAGNETIC INDUCTION:

A conductor placed in the vicinity of a changing electric field experiences flow of electric current through it.

2. PROPOSED SYSTEM MODEL

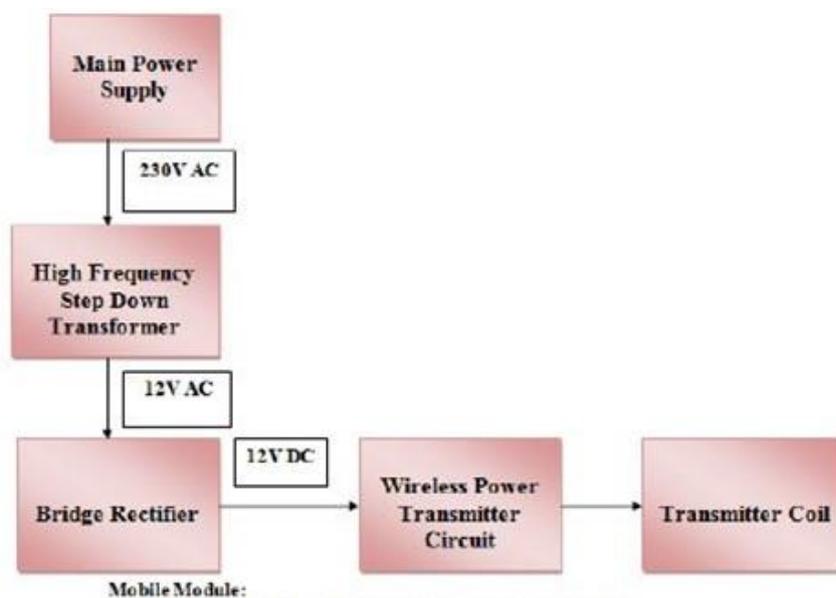


Figure 1 : Transmitter module block diagram

In this project we aim to charge mobile phones of users using public transportation system. Coil is required at both the power point and load point to act as transmitter and receiver coil respectively [3]. A power chord will be used to connect the receiving coil to the power point. The AC power received by the coil needs to be stepped down and converted to DC. This is done using step down transformer and rectifier circuit respectively. The transformer steps the signal down to 12V AC and the rectifier converts it to 12V DC. The transmitter coil transmits the signal to receiver coil. We store the received power in a rechargeable battery which further operates the wheel chair. The 12V signal is further reduced to 5V DC signal which would act as the input signal to the mobile phone and controller board. This would charge the battery of the load. We will use the switches in the vehicle for controlling the movements which may be in any direction.

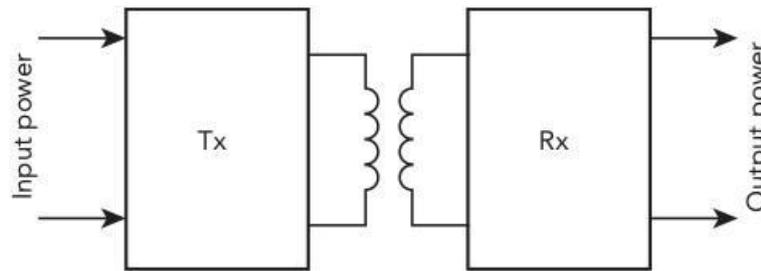


Figure 2 : Power Transfer Circuit

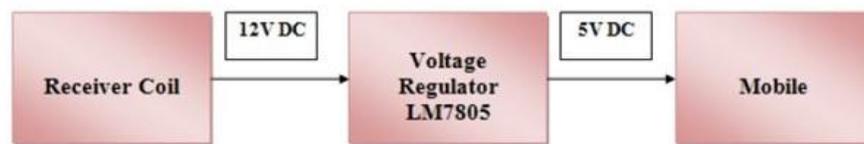


Figure 3 : Mobile module block diagram

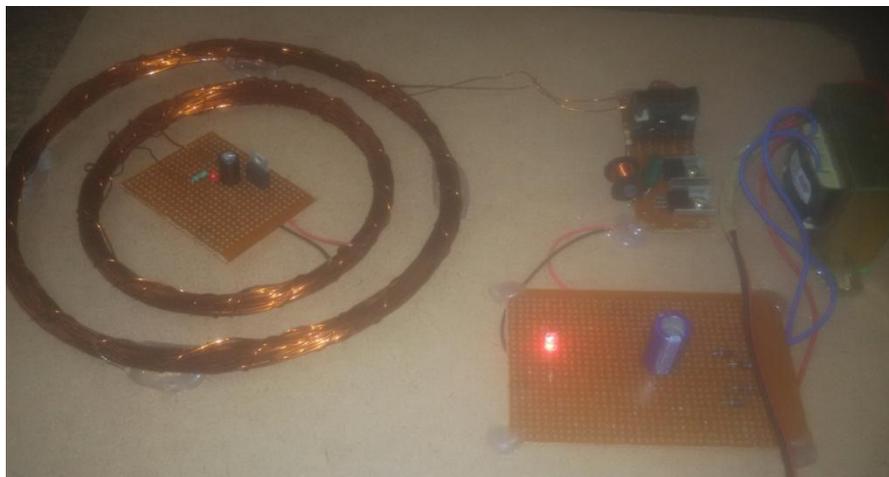


Figure 4: Working Model

3. NEEDS OF WIRELESS POWER TRANSFER

The main objective of Wireless Power Transmission is that it allows charging eliminating the use of power chord. The power is transferred without the use of interconnecting wires .[2] The technology involving charging without the use of wires has been around for some time now and is used in electric toothbrushes and some surgical instruments such as artificial hearts . It is also referred to as inductive charging which has basic requirements of a transmitter coil and a receiver coil. The magnetic field generated in the transmitter coil due to AC passed through it is responsible for inducing a voltage in the receiver coil which powers the load, which is the mobile phone in this case.

4. APPLICATIONS OF WIRELESS POWER TRANSFER

The initial applications would involve creating a charging station that would have a range of one to five metres. This would enable charging of any compatible electronics that fall within the range of this station. The efficiencies of such systems are almost as much as of conventional chargers. Once effective methods to increase the range of such wireless

power transfer stations are increased they can be developed to power homes which would need placing a transmitter close to home [5]. Once the range is expanded entire streets can be powered using a transmitter.

5. MERITS OF WIRELESS POWER TRANSFER

- a) Wireless Power Transmission system has the potential to eliminate the existing transmission network; this would reduce a lot of transmission losses and also eliminate the use of certain equipment thus saving cost [4].
- b) It would enable transmission of power to places where the current transmission system fails to supply power. The system would also have higher efficiency than wired transmission system. [5]
- c) Most of the faults would be eliminated due to absence of cable transmission wires.

6. CONCLUSION

This paper analyzed the transmission of wireless power to a load device which may be vehicle battery or a mobile phone and explains the basic principle of Wireless Power Transmission and how it may change the scenario of charging electronics devices.

REFERENCES

- [1] Aakib J Sayyad, N. P. Sarvade "Wireless Power Transmission for Charging Mobiles" IJETT, Volume 12, Number 7, June 2014
- [2] Xiao Lu, Ping Wang, "Wireless Charging Technologies: Fundamentals, Standards, and Network Applications" 14 Nov 2015 IEEE COMMUNICATIONS SURVEYS AND TUTORIALS, TO APPEAR
- [3] Apurva Gupta, "Wireless Charging of Mobile phone using Microwaves" International Journal of Scientific & Engineering Research Volume 4, Issue 3, March-2013 ISSN 2229-5518 IJSER © 2013
- [4] S. Sheik Mohammed, K. Ramasamy, T. Shanmuganantham "Wireless Power Transmission – A Next Generation Power Transmission System" International Journal of Computer Applications (0975 – 8887) Volume 1 – No. 13
- [5] Vikash Mishra, Lavya Nigam, Anand Mohan "Wireless Power Transmission" International Journal of Emerging Technology and Advanced Engineering Website: www.ijetae.com (ISSN 2250-2459, ISO 9001:2008 Certified Journal, Volume 4, Issue 2, February 2014)