**International Journal of Research Publication and Reviews**

Journal homepage: www.ijrpr.com ISSN 2582-7421

# NON-CONTACT POWER TRANSMISSION FOR SMART PHONE CHARGING SYSTEM

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**ABSTRACT**

The main goal of our project is the design and development of efficient wireless (non-contact) transmission of electrical energy to the charger using resonant inductive coupling. In the research and implementation of wireless power transfer systems, near-field wireless power is transmitted with the aim of not maximizing the power transfer distance to power multiple indoor devices. Our goal is to allow the introduction of multiple resonant pickup coils so that a single resonant transmitter on the surface can power multiple devices at the same time. This project will showcase adaptive technologies to improve the efficiency of magnetic resonance-based wireless power transfer systems for future wearable devices. Implementation of this project will enable the industry to adopt a highly efficient non-contact method. H. Practical use of wireless charging system for future mobile home appliances. Magnetic resonance coupling has been proposed for wireless power transfer (WPT) of multiple devices. In this system, the primary coil is embedded in the surface of the table to efficiently power the portable device on the table. Only the primary and secondary coils cancel the function of the power transformer. We have confirmed that high-efficiency power transfer is possible anywhere on the desktop. Here, we introduce a new energy beam forming technology of magnetic resonance coupling WPT, which can supply transmission energy in any direction by controlling the phase difference of the transmitting antenna, minimizing unnecessary magnetic flux loss. increase. We also showed that the cross-loop antenna is the best structure for energy beam forming because the coupling between the two transmitting antennas is minimal.

***Keywords:*** *Non-contact power transfer, beam forming, Inductive coupling etc.,*

## 1. INTRODUCTION

Today, most electronic systems, such as smart phones and laptop music players, are costly and heavy because they require short distances, lengthy charging times, or the want to update a used battery with a charged battery. Therefore, it's miles battery-powered. get annoyed. Wireless inductive electricity switch gives the thrilling capability of for powering digital systems. Recently, a wireless power supply device that wirelessly (wirelessly) supplies electric power to a device that does not have a power cord or the like has been put into practical use. Non-contact electromagnetic induction power transmission utilizes the phenomenon that when a current is passed through one in all adjoining coils, an electromotive pressure is generated within side the different coil the use of magnetic flux as a medium. Wireless Power Transfer (WPT) is a leap forward generation that powers communiqué gadgets without the want for an AC adapter. Due to latest exquisite advances, this generation has acquired a fantastic deal of interest from scientists and R & D groups across the world. Recently, using cell gadgets which includes cell phones, PDAs, laptops, tablets, and different transportable gadgets with rechargeable batteries has turn out to be widespread. Our system focuses on smart phone charging system with wireless energy transmission.

### A. Existing Method:

OP4T has been specified for this system and an open source implementation of this architecture has been proposed for the NetFPGA SUME prototyping board. Experimentally demonstrated that this open source implementation, leveraging the P4 programming language and partial reconstruction, enables accurate in-band packet time stamping without sacrificing achievable throughput. It has been. As an example, OP4T has been shown to be able to measure the fine-grained characteristics of software packet forwarding

**Problem Statement**

- This system is designed for electric vehicles and can use high frequency structures.
- High frequency structure improves inductive coupling ratio. Therefore, the cost function is high and the weight and size of the system is complex.

### B. Proposed Method:

A WPT device for transferring smart phones with a linear array of number one strength transmit coils that strength the secondary strength obtain coils within side the device. The device is designed to limit the lack of strength stored within side the number one coils and compensating capacitors with the aid of using detecting the position and presence of the vehicle and transferring energy to the coils and capacitors downstream of the linear array.

## 2. LITERATURE REVIEW

NelofarAslam, Kewen Xia [1] Next-generation sensor nodes are smarter, more energy efficient and more durable in building wireless sensor networks (WSNs). These sensor nodes face the overwhelming challenge of power consumption, which gradually shortens the life of the entire network. Wireless Power Transfer (WPT) is one of the latest energy harvesting technologies introduced at the heart of sensor nodes for efficient lifetime solutions. The Wireless Portable Charger (WPCD) drifts through the WSN and charges all nodes in search of the 's eternal life. This paper jointly seeks to optimize a multipurpose function for WPCD billing routes and a self-learning algorithm for data routing. The objective function was designed to optimize fair power consumption and maximize the routing efficiency of WPCD.

Bo Luo, Tao Long, LimouGuo, Ruikun Mai [2] IPT systems require capacitors to balance the system, while CPT systems require inductors to tune the system. Therefore, the hybrid system is one of the possible solutions for compensating IPT couplers with CPT couplers and vice versa. This document proposes an inductive and capacitive hybrid wireless power transfer (HWPT) system to improve the misalignment prevention function of the system coupler. IPT couplers and CPT couplers are used together to compensate for each other and transfer power together. The theory of superposition is used to analyze the working principle of the system in detail. A scaled down system is built using the results of the analysis to validate the performance of the proposed approach. Experimental results show that the proposed HWPT system can do an output power of 655W with an efficiency of 85.82 DC with proper alignment, with a maximum output power deviation of only 10% with a 0270mm coupler misalignment.

ChihCheng Huang, ChunLiang Lin, Senior Member [3] The main drawback of battery charging in traditional electric vehicles is the use of plug in chargers. The purpose of this article is to propose a wireless battery charging method that can simultaneously send data about battery status, vehicle ID code, or emergency message between the network and the vehicle, in addition to sending energy. In this task, you will apply inductive power transfer (IPT) to complete the charging system. The proposed control system can monitor the operating status of the secondary (vehicle) side in real time and adjust the charging current according to the status of the battery. In addition, the proposed mechanism can be stopped immediately in an emergency such as overcharging of voltage or current. This improves efficiency during charging and safety of the during the charging process.

### A. SYSTEM FUNCTION

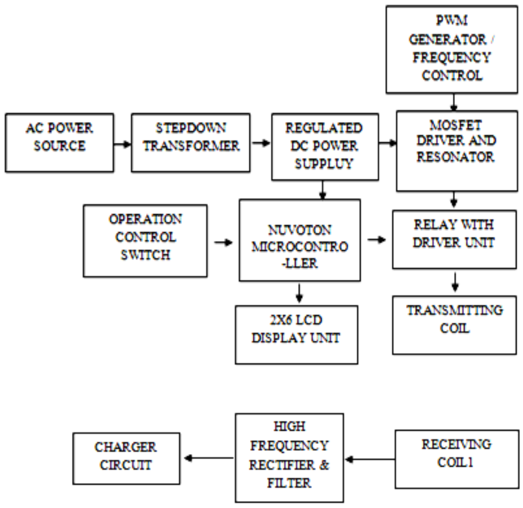



**Fig.1 block diagram of the system**

**Fig.3 circuit diagram of the receiver unit**

The relay unit is used to switching the power which transmits through wireless medium based on controller output logic state. The relay switch is close when it receives the logic `1` state from controller. The relay switch is open when it receives the logic `0` state from controller. The power is transmitting from relay unit when the switch is closed condition. This unit is used to displays the information about wireless power transmission. Totally 2X16 = 32 characters can display at a time.

Fig.3 shows the receiver units. The receiving coil is acquired the resonance frequency from the transmitting coil and the coil produce the electrical AC voltage according to their frequency input. These voltages can be rectified by using rectifier IC and it applied to the input of 7805 regulator. The regulator produces the constant +5V output. This output is used to charging the mobile phone through charger pin.

## 3. CONCEPT OF RESONANT WIRELESS POWER TRANSFER

Resonance is a phenomenon that takes place in diverse approaches in nature. Resonance commonly includes the power that oscillates among the 2 modes. A famous instance is a mechanical pendulum wherein power oscillates among capability and kinetic forms. The operation of an remoted resonator may be defined with the aid of using primary parameter.

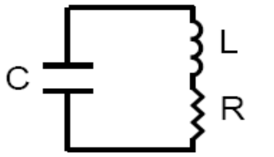



**Fig.4 Circuit diagram of the Resonator**

**Example of a Resonator**

In this circuit, the energy of the resonant frequency oscillates between the inductor (energy stored in the magnetic field) and the capacitor (energy stored in the electric field) and is dissipated by the resistor. The resonant frequency and quality factor of this resonator are:

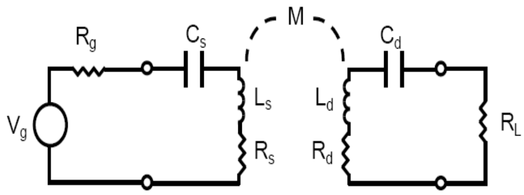
$$\omega_0 = \frac{1}{\sqrt{LC}}$$

$$Q = \frac{\omega_0}{2\Gamma} = \sqrt{\frac{L}{C}}\frac{1}{R} = \frac{\omega_0 L}{R}$$

The equation shows that the loss of the circuit is reduced. H. Decreasing it will increase the quality score of the system. In a high resonance wireless power transfer system, the system resonator must have a high Q in order to transmit power efficiently. High Q electromagnetic resonators are usually manufactured from conductors and components with low absorption loss (sometimes referred to as ohms, resistors, series resistance, etc.), low radiation loss, and a tremendously slim resonant frequency range. In addition, resonators may be designed to lessen interplay with overseas m atter.

**Coupled Resonators**

If resonators are positioned in proximity to atleast each other detailed there is coupling among them, it will become feasible for the resonators to change electricity. The performance of the electricity change relies upon at the feature parameters for each resonator and additionally the electricity coupling rate, κ, among them. The dynamics of the two resonator gadget can be defined the use of coupled mode theory, or from an evaluation of a circuit equal of the coupled gadget of resonators.




Here, the generator is a sinusoidal voltage supply with amplitude at a frequency with generator resistance. The supply and tool resonator coils are represented through inductance and are coupled through mutual inductance M.

$$M = k\sqrt{L_s L_d}$$

Each coil has a sequence capacitor to shape a resonator. The resistance is the parasitic resistance (consisting of resistance loss and radiation loss) of every resonator coil and every resonator capacitor. Where

$$U = \frac{\omega M}{\sqrt{R_s R_d}} = \frac{\kappa}{\sqrt{\Gamma_s \Gamma_d}} = k\sqrt{Q_s Q_d}$$

You can choose the generator and load resistance that provides the best system performance (or use an impedance conversion network to match the other resistance values of the

$$\frac{R_g}{R_s} = \frac{R_L}{R_d} = \sqrt{1+U^2}$$

$$\eta_{opt} = \frac{U^2}{\left(1+\sqrt{1+U^2}\right)^2}$$

Here we can see that a system with a large value allows for very efficient energy transfer. Note that the impedance matching above is equal to Coupled Mode Theory. Coupled mode theory indicates that the paintings extracted from the tool may be modeled as circuit resistance. This has the impact of giving a further time period w to the strength lack of the unloaded tool object. The price d such that the full strength loss price is given by,

$$\Gamma_d' = \Gamma_d + \Gamma_W$$

And that the performance of the energy transmission is maximized when

$$\frac{\Gamma_W}{\Gamma_d} = \sqrt{\left[1+\left(\kappa^2 / \Gamma_s \Gamma_d\right)\right]} = \sqrt{1+k^2 Q_s Q_d} = \sqrt{1+U^2}$$

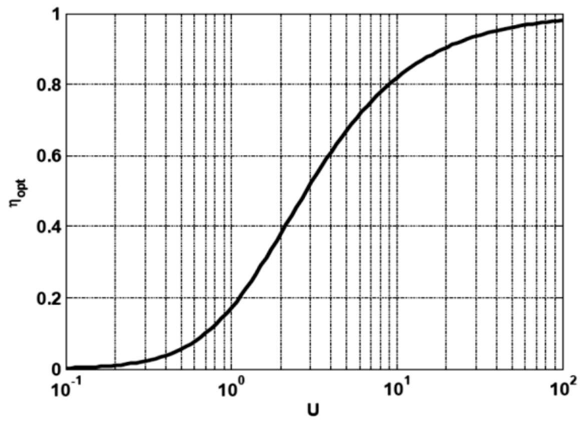



**Fig.6 Optimum efficiency of energy transfer**

Keep in thoughts that the best feasible performance of a Wi-Fi electricity switch device relies upon only at the determine of advantage of the device. This is the magnetic coupling coefficient among the resonators, and the determine of advantage of the unloaded resonator, and

$$U = \frac{\omega M}{\sqrt{R_s R_d}} = k\sqrt{Q_s Q_d}$$

Knowing the resonator fine coefficients for a specific software and the variety of magnetic coupling among them, equations may be used to decide the best feasible performance of the system.

## 4. EXPERIMENTAL RESULT

### A. COIL PARAMETERS

Diameter : 4.5 inches

Number of turns : 30

### B. RATINGS

Input power : 24Watts

Transmitting Coil voltage: 24V

Transmitting Coil Current: 1Amp

Frequency : 60 KHZ

### C. MEASUREMENTS

Table-I reading of the wireless power transmission

| Distance in mm | Voltage in AC |
|---|---|
| 0 | 12.5 |
| 35 | 7.5 |
| 60 | 3.4 |
| 100 | 1.4 |
| 170 | 0.4 |
| 200 | 0.2 |
| 23 | 0.1 |

**Graphical analysis:**

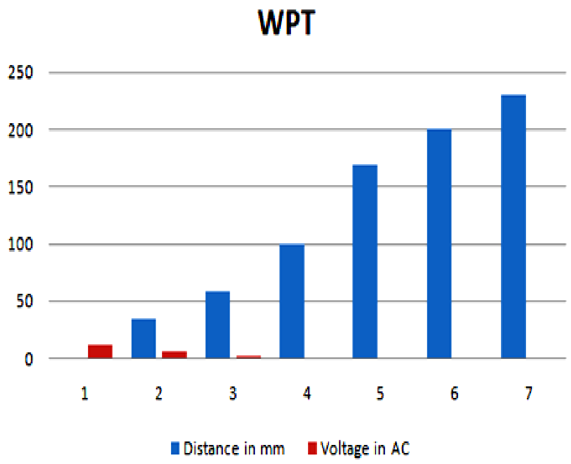



**Fig.7 Graphical analysis of distance vs AC voltage**

## 5. CONCLUSION

Therefore, the wireless power switch enables convenient and smooth charging of the battery and operation of various electric or digital devices. There is no problem with the cable or plug. Just place the tool on the base and you're done. Such devices could even be the preferred charging solution. The easiest way to adjust the coupling coefficient between the transmitter coils is to improve the performance of your device. This will allow the company to launch near-green ultra-green wireless chargers for mobile customer electronics in the future.

From a performance standpoint, WiFi resonant switches are ideal for shared energy packets when the transmit and receive coils are in close proximity. Resonant induced energy pads combined with the power supply of some digital devices are offered at the price of battery-powered devices, allowing for any positioning and close range detection.

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