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"WIRELESS MOBILE PHONE CHARGING USING MICROWAVES"

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ABSTRACT

The abstract of wireless mobile phone charging using microwaves focuses on the development of a compact device driven by a single RF-amplifier to reduce costs and installation space. It proposes a broadband rectenna capable of harvesting energy from low input power levels, operating between 1.4 GHz and 2.8 GHz with a bandwidth of 1.4 GHz. The rectenna covers essential bands like GSM 1800 MHz and ISM 2450 MHz, comprising an antenna, rectifier, and a Schottky diode for rectification. A hexagonal patch antenna with a defective ground structure is designed for operation from 1.4 GHz to 2.8 GHz. The matching circuit, combining bandpass and high-pass sections, is crucial for achieving good conversion efficiency. Simulated conversion efficiencies at different power levels demonstrate the effectiveness of the proposed system, reaching up to 73.4% at specific power levels

Keywords: microwaves, rf amplifier, band pass, antenna.

1. INTRODUCTION

Microwave-based wireless phone charging is a cutting-edge technology that could completely change how people charge their phones. With this technique, mobile phones can be charged wirelessly without the use of cables or wires by using microwaves as a power transmitter. The procedure is sending microwave energy from a source to a mobile device, which transforms it into direct current power (DC power) for charging. Compared to conventional charging techniques, this technology offers a number of benefits, including cost-effectiveness, time- and convenience-saving. Numerous studies and research publications have examined the use of microwaves for wireless mobile phone charging. For example, a study on the use of microwaves for mobile phone wireless charging was published in the International Journal of Engineering Science and Innovative Technology (IJESIT). The research emphasises the ability of microwaves to transmit electricity and presents a cutting-edge technique for charging mobile phones with microwaves. Similarly, an article that was published in the International Journal of Computer Science and Mobile Computing (IJCSMC) describes a method that may permanently charge mobile phone batteries without the need for chargers and explores the use of microwaves for wireless charging of mobile phones. The technology entails using a mobile receiver to charge a mobile device's battery using microwaves from a source. A new angle on the disclosure of mobile phone technology can be offered by the combination of a sensor and a rectenna in a phone. An essential part of the apparatus that transforms microwaves into DC electricity is the rectenna, and the sensor the existence of a cell phone and controls the delivery of power.

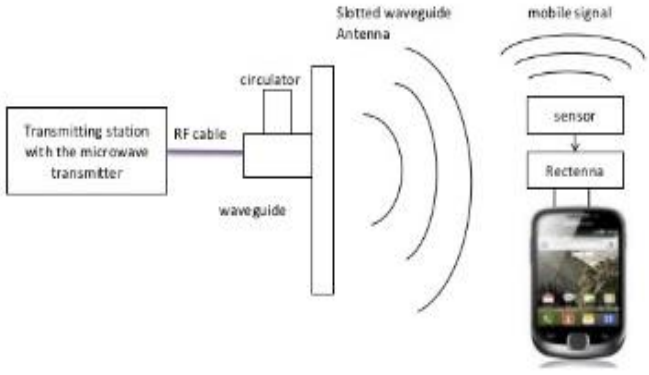

Fig1.1 : operation of charging

There are still a number of issues that need to be resolved before microwaves may be used to charge mobile phones wirelessly. For example, safety and efficiency in technology need to be maximised. To make the technology available to a larger audience, its cost must also be lowered. Nonetheless, this technology presents an intriguing field for research and development due to its prospective benefits. In conclusion, microwave-based wireless phone charging is an exciting new technology that could completely change how people charge their phones. This technology has tremendous benefits, but it also presents a number of problems that make it an attractive field for research and development. With additional investigation and advancement, Microwave-based wireless phone charging has the

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potential to become a standard feature in phones, offering consumers an easy, quick, and economical way to charge their gadgets.

The idea behind microwave-based wireless phone charging is to use microwave technology to charge phones wirelessly without the use of conventional cables or wires. This creative method provides a practical and effective solution to keep mobile phones charged by using microwaves as a power transmitter. Microwaves are usually transmitted from a source to a mobile phone, where they are transformed into direct current (DC) electricity to charge the device. Users can now charge their mobile phones by employing microwaves to integrate sensors, rectenna circuits, and filters inside the device, simplifying the charging process autonomous and unaffected by certain phone manufacturers or battery kinds.

The prevalent problem of mobile phone battery life and the hassle of always carrying chargers are the targets of this technology. Users may charge their phones while using them by employing microwaves as a power source, which improves user experience and does away with the need for separate chargers. The idea is to effectively transform microwave radiation into power that can be used by mobile devices, which presents a viable way to address the drawbacks of conventional charging techniques.

2. METHODOLOGY

In order to enable the effective and secure charging of mobile phones without the need for conventional wired chargers, the approach for wireless mobile phone charging utilising microwaves usually consists of three crucial components. The following is an outline of the methodology for this novel charging technique based on the data from the sources that have been provided:

Transmission of Microwave Signals: The first step in the process is the transmission of microwave signals, which are used as the power source for wireless mobile phone charging and are normally in the 900MHz to 2.45GHz range.

Mobile Receiver Setup: To catch and convert microwave signals into DC electricity for charging the phone's battery, a mobile receiver circuit is installed inside the device. This configuration consists of parts like a filter, a sensor, and a rectenna circuit. Operation of the Rectenna Circuit: The rectenna circuit, which consists of an antenna and a rectifier, is essential for transforming the microwave energy that is received into DC power that may be used to charge a mobile phone's battery.

3. TECHNOLOGY USED

Microwave signals are transmitted from a source to a mobile phone, where they are transformed into DC power to charge the phone's battery wirelessly.

This is the technology behind wireless mobile phone charging. This novel method effectively converts microwave radiation into useable electricity for charging mobile devices by utilising parts like filters, sensors, and rectenna circuits. Users can charge their mobile devices automatically while using them by incorporating these components into their phones, doing away with the requirement for conventional cable chargers and improving user experience all around. The various ways that microwaves can be used to charge wireless mobile phones are as follows:

Inductive Charging: This technique uses electromagnetic induction to wirelessly transfer energy to a mobile phone via an inductive charging station.

Harmonious Charging: More efficient charging over longer distances is possible using resonant charging, which uses resonant inductive coupling to transfer power wirelessly between the transmitter and receiver.

Microwave Charging: This method of wirelessly charging a mobile phone's battery entails sending microwave signals from a source to the device, where they are transformed into DC power. When it comes to efficiency, range, and safety, each of these approaches to mobile phone wireless charging with microwaves has special benefits. Microwaves are used to enable wireless mobile phone charging. A mobile phone receives microwave signals from a source and converts them into DC power to charge the battery wirelessly. Usually, the procedure includes a transmitter component that uses a magnetron to create microwaves and emits by means of a waveguide antenna with slots . the microwaves are converted into DC electricity at the receiving end by a rectenna circuit, which charges the phone's battery. Furthermore, a sensor is employed to identify when a call is placed, initiating the charging procedure. With the help of this creative technique, several providers can use a single transmitter for universal charging, doing away with the necessity for wired chargers. Convenience and cost-effectiveness are two benefits of this technology, but there are also some drawbacks, such as significant health risks and hefty implementation costs.

4. ADVANTAGES AND DISADVANTAGES ADVANTAGES

The advantages of wireless mobile phone charging using microwaves include:

- Convenience: Users can charge their phones wirelessly, eliminating the need for physical charging cables and making the charging process more convenient.

- Time-saving: Wireless charging saves time by allowing users to charge their phones automatically while talking, without the hassle of plugging in cables.
- Energy Efficiency: This method can save electricity in the long run by providing a more efficient way to charge mobile phones.
- Cost-effectiveness: Over time, wireless charging using microwaves can save money for users by reducing the need for traditional chargers and cables.
- Universal Charging: A single transmitter can wirelessly charge multiple phones, making it a versatile and universal charging solution.
- Improved User Experience: By offering a hassle-free charging experience, wireless charging using microwaves enhances the overall user experience with mobile phones.
- Elimination of Charging Adapters: Users no longer need to carry charging adapters or worry about battery standby time, as the phone charges wirelessly while in use.
- Potential for Permanent Charging: This technology has the potential to charge mobile phone batteries permanently without the need for chargers, ensuring continuous device functionality.
- Flexibility: Users can charge their phones anywhere, even in areas without access to power outlets, providing greater flexibility and convenience.
- Reduction of E-waste: Wireless charging can help reduce electronic waste by eliminating the need for disposable batteries and chargers, contributing to a more sustainable charging solution.

5. DISADVANTAGES

- Limited range: The range of wireless charging using microwaves is limited, which can restrict the mobility and convenience of users.
- Safety concerns: The use of microwaves for charging mobile phones can raise safety concerns, such as the risk of fire or damage to the device, which can impact user acceptance and adoption.

6. CONCLUSION

The conclusion about employing microwaves for wireless mobile phone charging emphasises how revolutionary this technology has the potential to be in the manner that mobile phones are charged. This approach offers a convenient and efficient way to charge mobile devices by suggesting a system that allows phones to charge automatically while in use, doing away with the need for physical charging wires. The system consists of a transmitter that broadcasts microwaves using a magnetron and slotted waveguide antenna, and receivers that are mounted on phones and have a sensor and rectenna to turn wireless energy into electricity for battery charging. Although this technology makes charging more easy everywhere, there are some drawbacks, such as increased system costs above traditional wired charging methods and possible health risks from radiation exposure. In this area, more investigation and advancement can assist in addressing these issues and open the door for the widespread use of microwaves for wireless mobile phone charging.

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