WIRELESS POWER TRANSMISSION AND DISTRIBUTION USING E-M FIELD CONCEPT AND NICOLE TESLA PRINCIPAL

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ABSRACT:- Wireless Power Transfer is a new technology to carry electrical power without any concrete contact between the source and the load. The aim of this paper is to purpose the use of a unembellished, cheap and easy technique for mid range wireless power transfer. We cannot visualize the world without electric power. Generally the power is convey through wires.

This project describes an original idea to eradicate the hazardous utilization of electrical wires which involve lot of confusion in particularly organizing them. Visualize a future in which wireless power transfer is movable, Cell phones, Household robots, mp3 players, laptop and other portable electronics capable of changing themselves without ever being plugged in, frosty us from that final, unbiquitous power wire. Some of these devices force not even need their bulky batteries to operate.

If one ensures to operate in that regime in a specified system, the energy convey in that regime in a given system, the energy transfer can be very well organized.

Another technique includes transfer of force through microwaves using rectannas. With this we can avoid the discombobulation and danger of having long, hazardous and tangled wiring. This paper as provided gives an effective , high performance manage which can efficiently transmit the power to the oversee area varying in distances.

Index Terms:- Wireless power transfer, inductive coupling, Qi standard, A4WP, microwave power transmission.

1.INTRODUCTION

Wireless power transfer (WPT), Wireless power sending, wireless energy transmission (WET), or electromagnetic power move in the transmission of electrical energy without wires as a physical link. In a wireless power transmission system, a transmitter accessory, driven by electric power from a power source, produce a time-varying electromagnetic field.

Tesla

After 1890, inventor Nikola Tesla experimented with sending power by inductive and capacitive coupling using spark- excited radio frequency plangent transformers, now called Tesla coils, which generated glant AC voltages. Early on he endeavor to generate a wireless lighting structure based on near-field inductive and capacitive couplingand manage a series of public showing where he lit Geissler tubes and even blazing light bulbs from across a stage.

Tesla

Field region

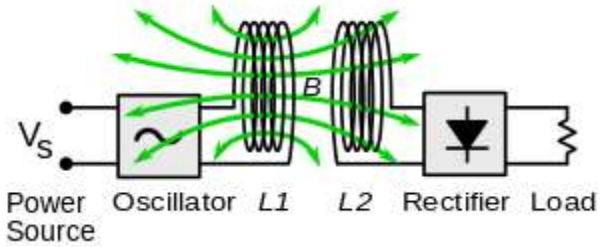
Electric and magnetic fields are created by impose particles in matter like as electrons. A stationary impose creates an electrostatic field in the space around it. A steady current of impose (direct current, DC) creates a static magnetic field around it.

2.Near-field(nonradioactive)techniques

At large relative distance, the near-field components of electric and magnetic fields are about quasi-static oscillating dipole fields.

Inductive coupling

In inductive joining (electromagnetic induction or inductive power transfer, IPT), power is sending between coils of wire by a magnetic field. The transmitter and receiver coils jointly form a transformer.



block diagram :- inductive wireless power system

Resonant inductive coupling

Resonant inductive coupling (electrodynamic coupling, strongly coupled magnetic resonance) is a type of inductive coupling in which power is sending by magnetic fields (B, green) between two resonant circuits (tuned circuits), one in the transmitter and another one in the receiver . Each resonant circuit consists of a coil of wire attached to a capacitor, or a self-resonant coil or other resonator with internal capacitance. The two are tuned to resonate at the equal level resonant frequency.

Resonant capacitive coupling

Resonance can also be used with capacitive coupling to increase the range. At the turn of the 20th century, Nikola Tesla did the first examination with both resonant inductive and capacitive coupling

3. Magnetodynamic coupling

In this method, power is sending between two rotating armatures, one in the transmitter and one in the receiver, which rotate synchronously, coupled together by a magnetic field producing by permanent magnets on the armatures. The transmitter armature is turned one of two by or as the rotor of an electric motor, and its magnetic field exerts torque on the receiver armature, turning it. The magnetic field acts such a mechanical coupling between the armatures. The receiver armature produces power to drive the load, either by turning a unconnected electric generator or by using the receiver armature itself as the rotor in a generator..

4. Far-field (radiative) techniques

Far field methods achieve longer ranges, often multiple kilometer ranges, where the distance is a great deal greater than the diameter of the device(s). High-directivity antennas or well-collimated laser light generate a beam of energy that can be made to match the shape of the receiving area. The maximum directivity for antennas is physically bounded by diffraction.

Microwaves

Power transmission via radio waves can be build more directional, allowing longer-distance power beaming, with shorter wavelengths of electromagnetic radiation, usually in the microwave range. A rectenna may be used to change the microwave energy back into electricity. Rectenna conversion efficiencies exceeding 95% have been realized. Power beaming utilize microwaves has been proposed for the sending of energy from orbiting solar power satellites to Earth and the beaming of power to spacecraft leaving orbit has been examine.

Lasers

In the case of electromagnetic radiation closer to the perceptible region of the spectrum (.2 to 2 micrometers), power can be sending by converting electricity into a laser beam that is received and concentrated onto photovoltaic cells (solar cells). This mechanism is normally known as 'power beaming' because the power is beamed at a receiver that can change it to electrical energy. At the receiver, special photovoltaic laser power converters which are optimized for monochromatic light conversion are applied.

5. Advantages compared to other wireless methods are:

- Collimated monochromatic wavefront propagation allows short beam cross-section area for transmission over large distances. As a result, there is little or no reduction in power when it's increasing the distance from the transmitter to the receiver.
- Compact size: solid state lasers fits into small products.
- No radio-frequency interference to existing radio communications like as Wi-Fi and cell phones.
- Access control: only receivers hit from the laser receive power.

Drawbacks include

- Laser radiation is dange. Without a proper safety mechanism, low might levels can blind humans and other animals. High power levels can kills through localized spot heating.
- Conversion link electricity and light is limited. Photovoltaic cells attain a maximum of 40%–50% efficiency.
- Atmospheric absorption, and absorption and scattered by clouds, fog, rain, etc., causes up to 100% losses.
- Requires a shortest line of sight with the target. (Instead of being beamed directly onto the receiver, the laser light can also be lead by an optical fiber. Then one speaks of power-over-fiber telecommunications.)

6. ADVANTAGES AND DISADVANTAGES

MERITS

- An electrical distribution system, based on this method would abolish the need for an inefficient, costly, and capital exhaustive grid of cables, towers, and substations.
- System would minimizing the cost of electrical energy used by the consumer
- It will clear the landscape of wires, cables, and transmitting towers.

DEMERITS

- Capital Cost for practical performance of Wireless Power Transmission to be very high.
- The other disadvantage of the concept is interference of microwave with today communication systems.

7. APPLICATIONS

Applications of Wireless Power Transmission

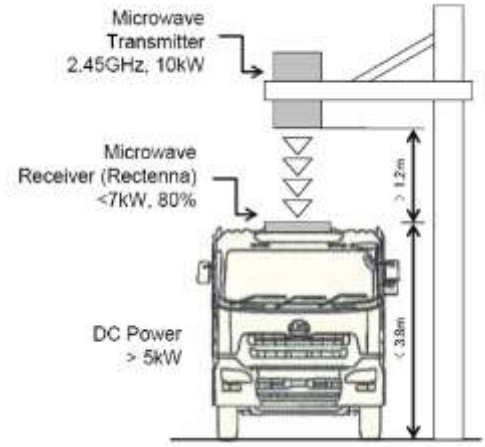
Several applications of wireless power transfer are opaque and obvious. Firstly, WPT could eliminate traditional charging systems in place presently. Instead of plugging in a mobile phone or laptop via power cord to charged the battery, wireless power can be harnesse and implemente in a home such that a laptop and phone charge continuously and wirelessly without the need for publicize anything in.

Electronic portable devices

Cell phones, laptops, tablets, even smart watches are found all around the globe and are owned and used by billions of people. What these devices all have in ordinary is the need to recharge their internal battery so that the device can be used while mobile.

Electric Vehicles

As concern over global warming and greenhouse gas release grows across the globe, the prevalence of electric vehicles has also increased rapidly. One of the drawbacks of electric vehicles in their battery. Electric vehicles currently need to be plugged it to recharge their internal batteries, and take many hours to do so. However, more envision that in the near future, one need only park her car in a pre-determined spot in her driveway and the car will charged wirelessly and automatically.



charging of electric vehicle

8. CONCLUSION

In conclusion, it is clear that deep inductive coupling power transmission would be extremely beneficial to society if it were implemented in homes and home electronics. From an environmental standpoint, this technology could replace discarding batteries and cords, reducing dangerous chemicals and potential for toxin communities. Resonant inductive coupling also has health benefits and with no need for cords life would generally become easier. Team Triple E offers a solution to the ethical dilemas uplift in this paper:

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