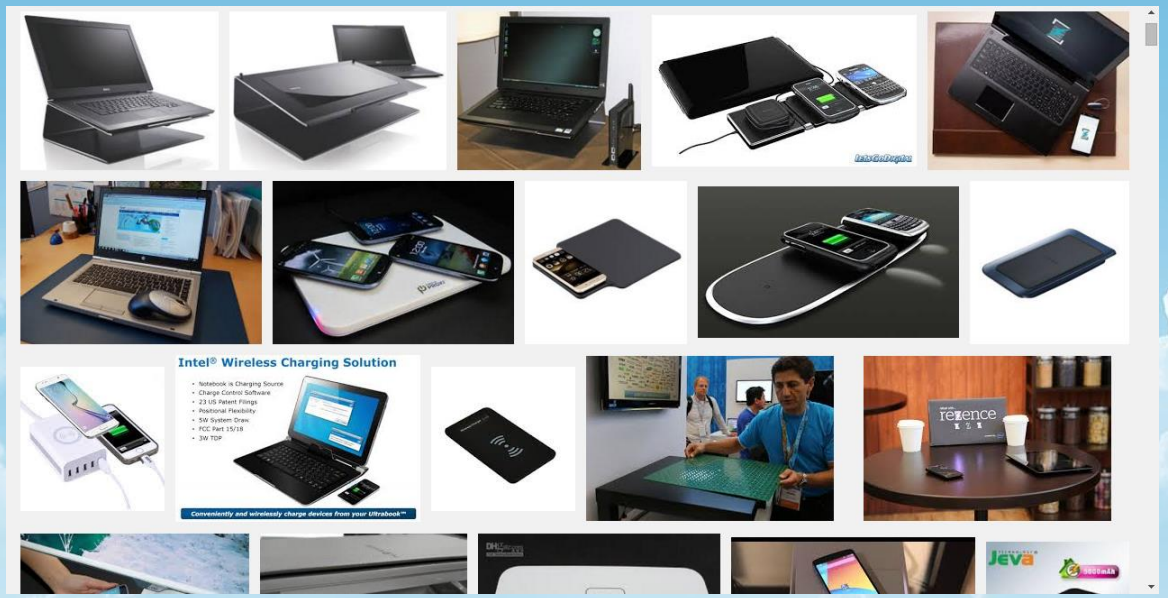
WIRELESS CHARGERS



BY

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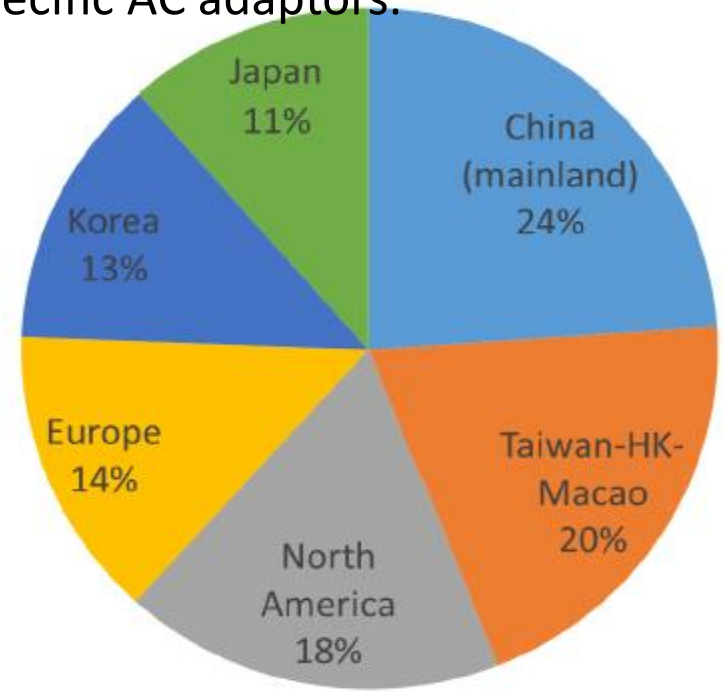
What is Wireless Charging?

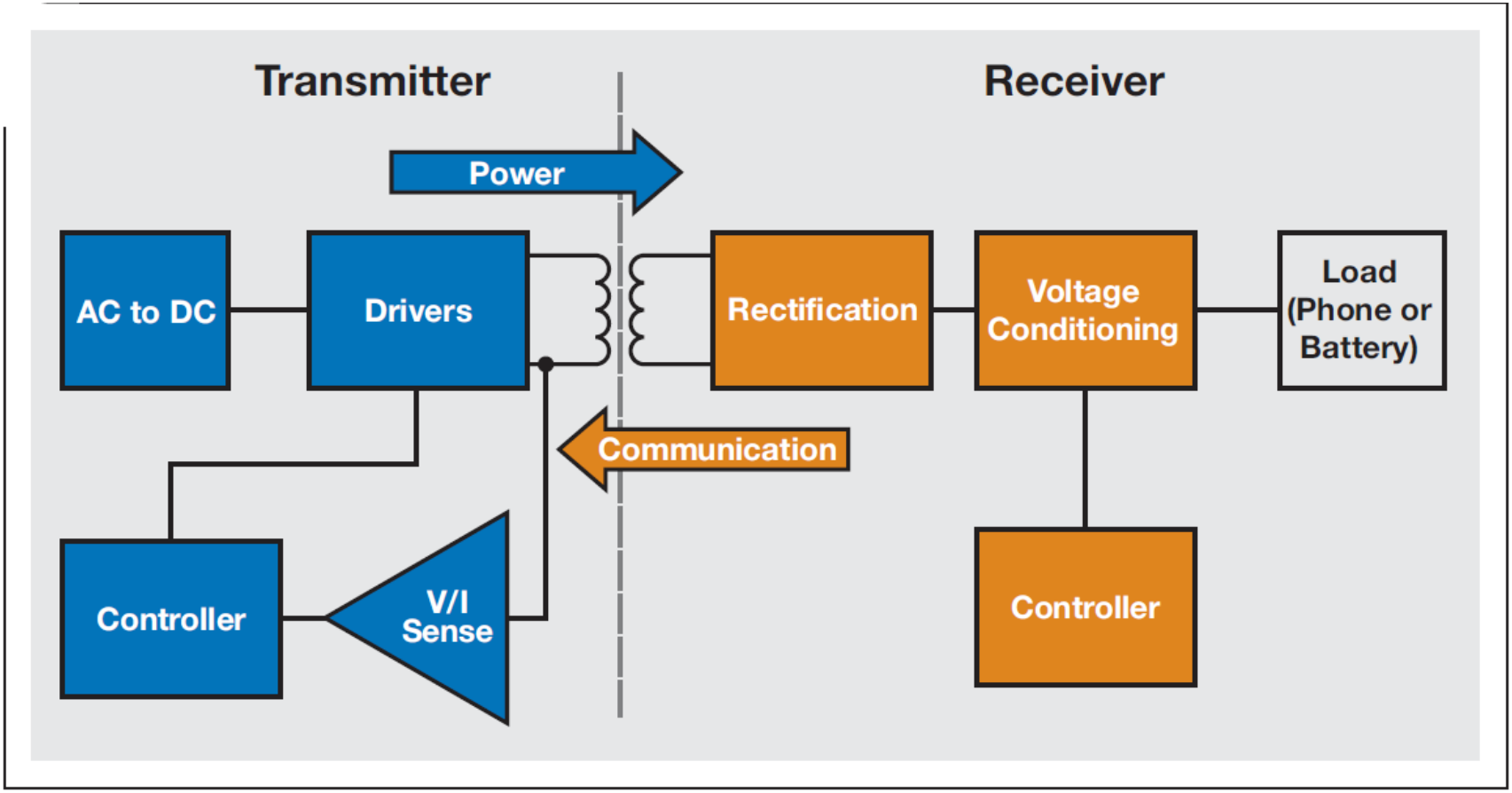
More than 200 member companies from 17 countries

- Wireless charging is one of the several methods of charging batteries without the use of cable or device specific AC adaptors.



- Wireless charging can be used for a wide variety of devices including cell phones laptop computers and MP3 players as well as larger objects such as robots and electric cars.

Typical Wireless-Power Charger Diagram?



History and WP Consortiums

- Wireless Power Consortium (Qi (Chee))

2008

- Power Matters Alliance (PMA) 2012

A global, not-for-profit, industry organization whose mission is to advance a suite of standards and protocols for wireless power transfer.

- Alliance for Wireless Power A4WP: early 2012 (>200 Members)

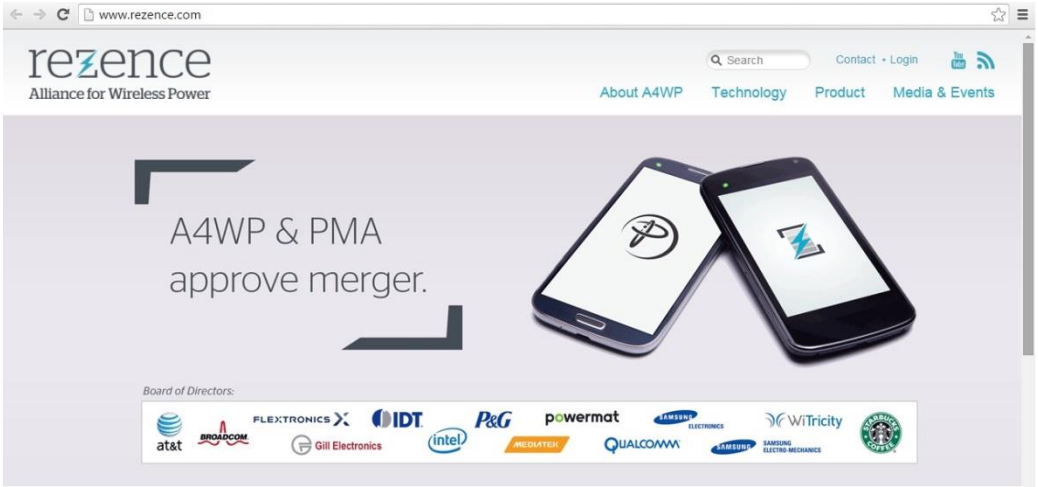
Rezence (pronounced reh-zense) is an interface standard developed by the A4WP for wireless electrical power transfer based on the principles of magnetic resonance.

- In January 2015 A4WP and the PMA announced that the two organizations intend to merge.

History and WP Consortiums

- **Rezence** : A4WP

The power transmission frequency is 6.78 MHz, and up to eight devices can be powered from a single PTU depending on transmitter and receiver geometry and power levels. A Bluetooth Smart link is defined in the A4WP system intended for control of power levels, identification of valid loads and protection of non-compliant devices



Methods of Charging

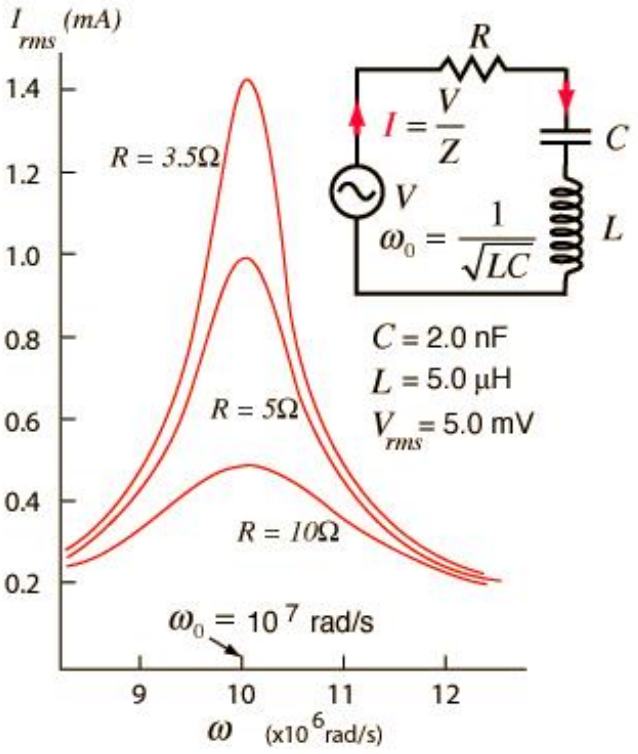
There are three types of wireless charging :-

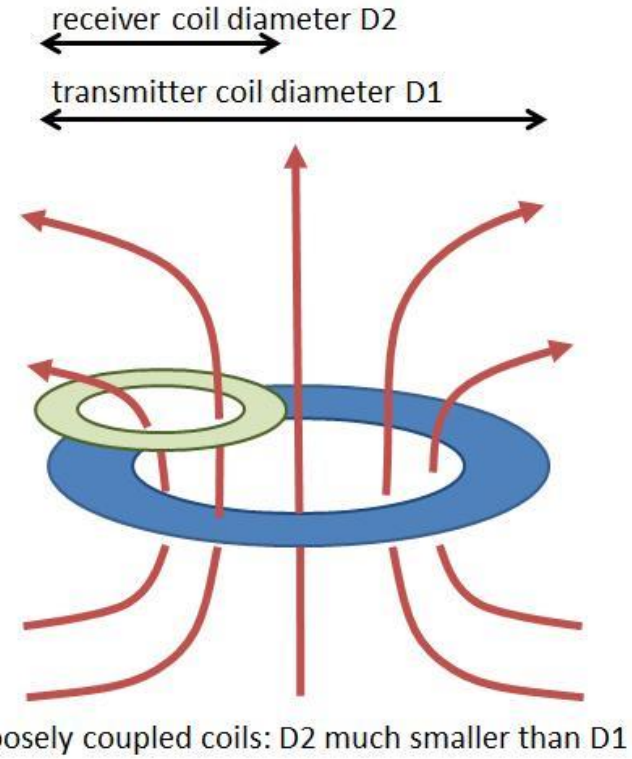
- Resonance Charging
- Inductive Charging
- Radio Charging

Resonance Charging

- It uses phenomenon of “RESONANCE”, that causes an object to vibrate when energy of certain frequency is applied.
- Two copper coils are used one attached to transmitter & another to receiver.
- Both coils are tuned to same electromagnetic frequency.
- These coils when placed close to one another power is transferred.

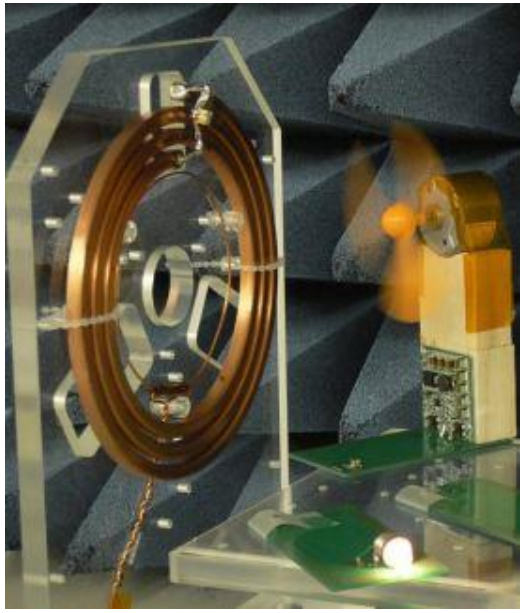
Resonance Charging

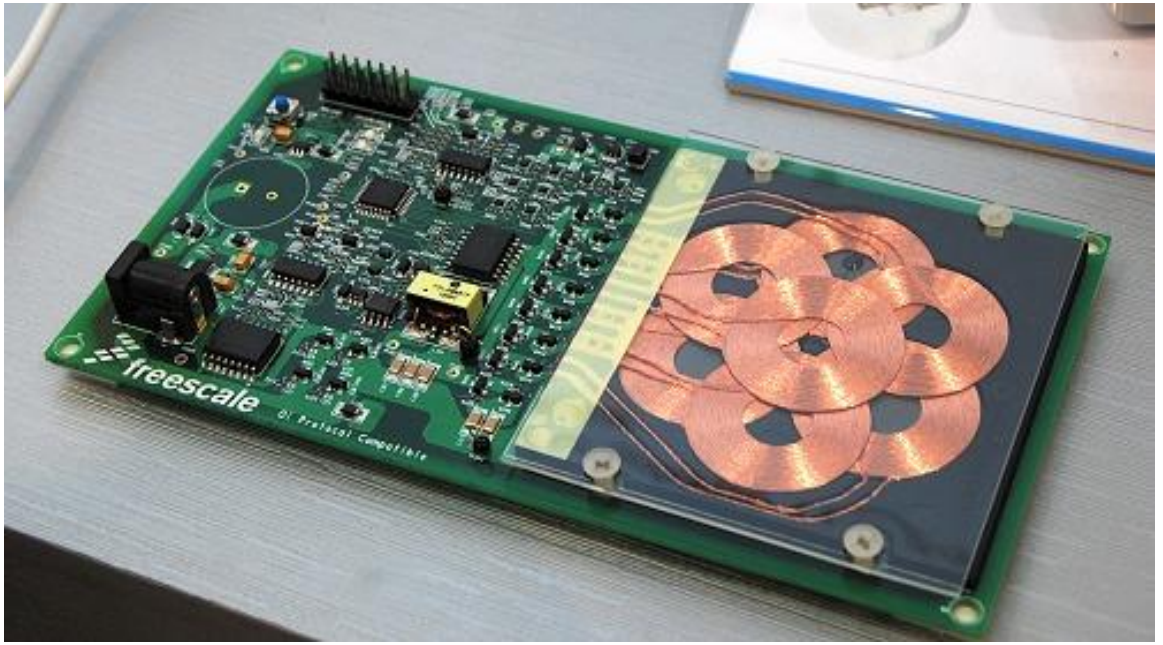




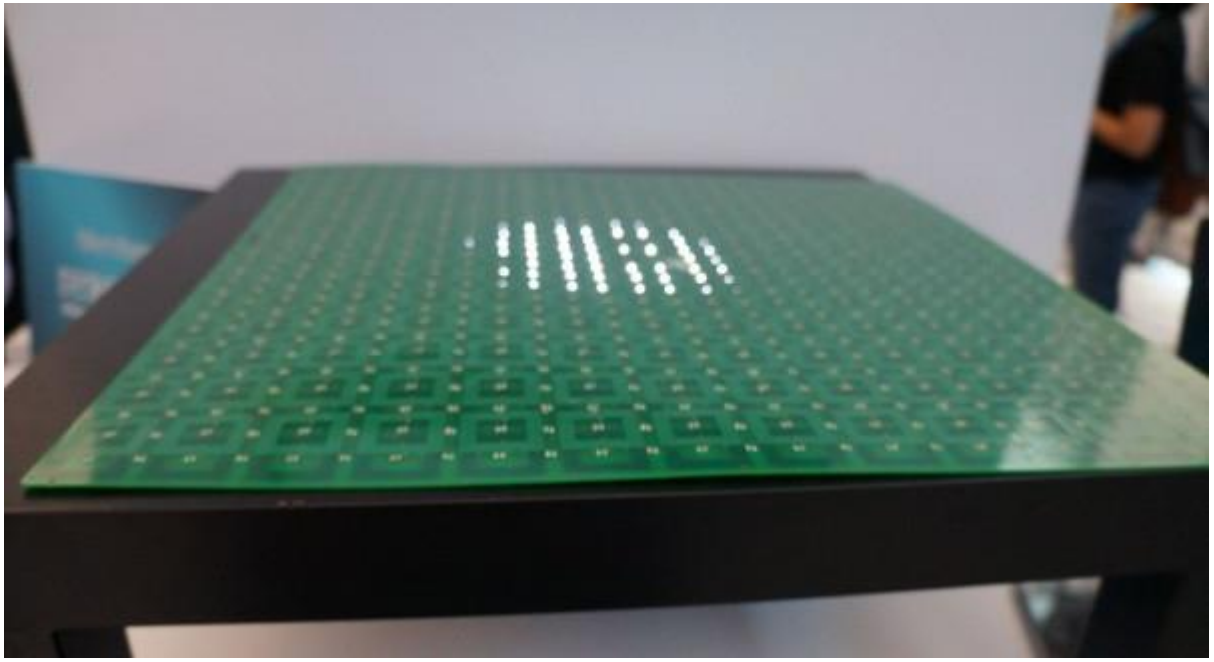
loosely coupled coils: D2 much smaller than D1

Resonance Charging





Resonance Charging



Examples:-

- Electric cars
- Robots
- Vacuum Cleaners
- Laptop computers &

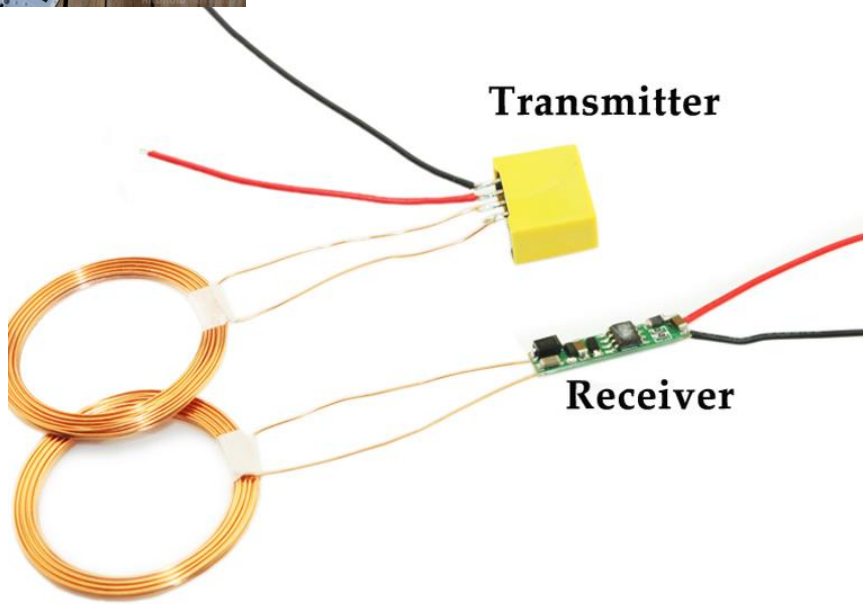
Other items that require large amounts of power.

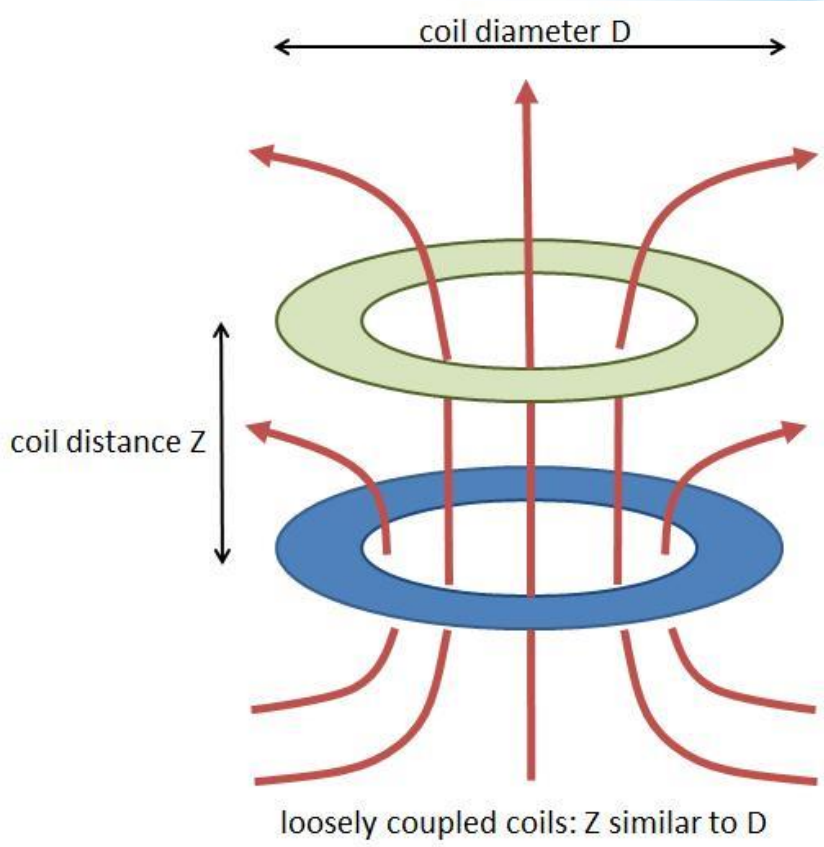
Inductive Charging

- Inductive charging is one kind of short distance wireless charging.

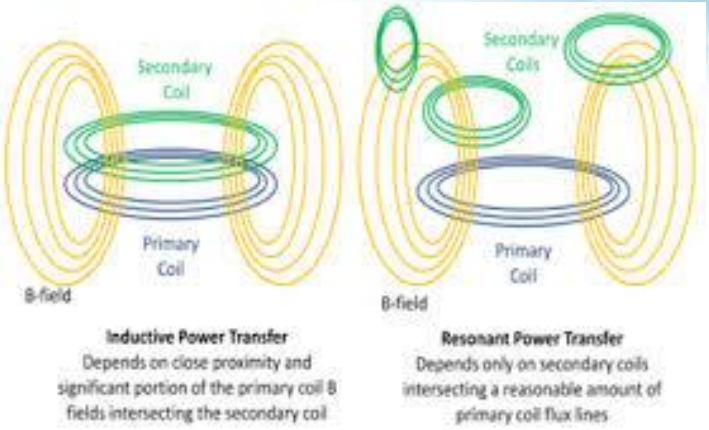
- This method works on the principle of “ELECTROMAGNETIC INDUCTION” where the charger device will create an E.M field with alternating polarity using a coil of insulated copper wire & a similar coil will be placed inside the mobile device which will convert E.M field back to electric current there by charging the battery.

Inductive Charging



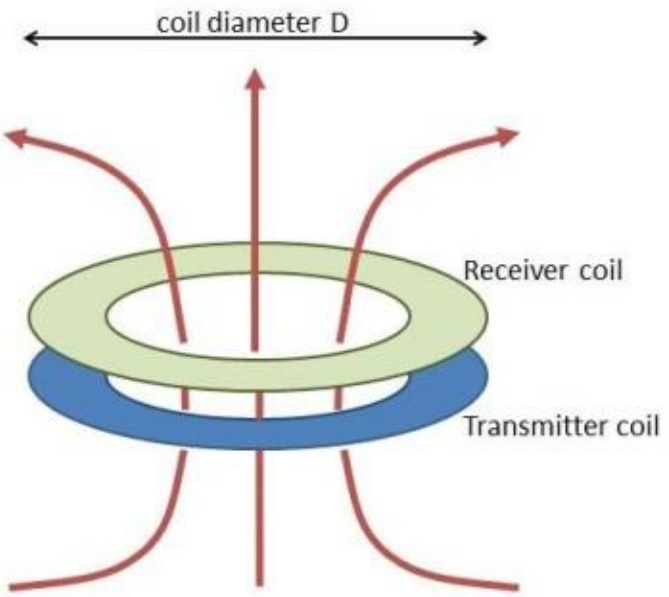


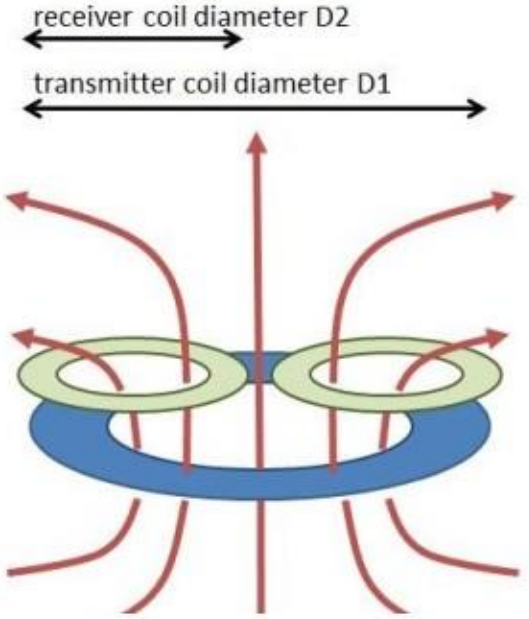
Inductive Charging



Inductive Power Transfer
Depends on close proximity and significant portion of the primary coil B fields intersecting the secondary coil

Resonant Power Transfer
Depends only on secondary coils intersecting a reasonable amount of primary coil flux lines





Examples:-

- MP3 players.
- Personal Digital Assistants (PDA's).
- Electric toothbrushes.
- Waterproof Vibrating Razors. &

Other mid-sized items

Radio Charging

- signals This method is on the basis that Radio Waves are widely in use to transmit and receive cellular telephone, television, radio and Wi-Fi.

- A Radio wave once transmitted, propagates in all directions until it reaches an antenna tuned to proper frequency to receive it.

- A transmitter plugged in to a socket, generates radio waves, when the receiver attached to the device is set to the same frequency as the transmitter, it will charge the device's battery.

Radio Charging

- The PMA with Energous, which own the unique WattUp technology.
- WattUp uses a radio frequency system to transmit power up to 15 feet from the charging station.
- Using the 900MHz for up to 12 devices can be charged at a single time.
- Energous' WattUp only delivers 1W of charging power at 15 feet, increasing to 4W nearer the charging station.
- It isn't as fast or reliable as the competition, especially when you consider that Quick Charge 2.0 mains power typically operates at around 10 watts and can reach 36 watts on supported devices

Radio Charging

Radio Charging

Examples:-

- Watches.
- Hearing aids.
- Medical implants.
- Cell phones.
- Wireless keyboards &

Other charging devices with small batteries and low power requirements.

LapTop Wireless Charging

- . Intel is developing circuitry for 20 watt to 50 watt wireless charging, which won't be enough to recharge power hungry large-screen and gaming laptops but will suffice for general-use computers.
- End of this Year or Next Year 2016!

Design Overview

The basic design mainly consists of three sole parts:

- Transmitter
- Antenna
- Receiver

Transmitter

- A power transmitter acts as a power source.
- It will transmit power to the receiver side.
- The transmission signals are mainly in between the RF/Microwave range. (Typically 900Mhz)

Antennas

- It plays an important role of mediator between transmitter & receiver.
- Important specifications:

  1.Impedance of antenna.

  2.Gain of antenna.

- Impedance of antenna should match o/p impedance of power transmitter and i/p impedance of rectifier ckt.
- Higher gain yields better result of design.

Receiver

- The receivers main purpose is to charge an AAA battery.
- For charging AC signal (microwave signal with a typical value of 900 MHz) is taken and fed to a rectifier ckt to get a D.C signal.
- A full-wave rectifier ckt is used because of its simplicity and efficiency in converting A.C signal.
- At the o/p of the rectifier, the signal is not a D.C signal yet. Thus by adding a capacitor and a resistor a smooth o/p can be achieved.

Applications

- Wireless Charging Pad for mobile devices

Other Applications:

- Inductive Coupling-RFID.
- In-Vehicle Charging.
- Radio Charging.
- Ultra Wideband.

Benefits

- Provides consumers with freedom and convenience.
- The way the technology works is simple.
- Simultaneous charging of multiple devices.
- The plastic, packaging & electronic waste associated with charges is greatly reduced.
- Since it is wireless it is economic.

Limitations

- applicable for only small distance
- For the larger devices like electric car , charging stations may be limited
- Efficiency and power loss are the major problems
-

Conclusions:

- Research in to using wireless technology to supply to terminals is finally beginning to be realized. The technology provides a wide range of other obvious benefits, including better portability, lower cost and best of all the end of having to guess which charger go what gadgets. Charging will one day become a simple matter of dropping devices into the nearest charging pad.

References

- http://www.Rezence.com
- http://www.Slide4share.com
- Wikepidia
- http://www.androidauthority.com/
- Other Internet Resources


Are you Still Wired ??

Thank You!

PH124044

SELJE nightstand with wireless charging $59.99 Includes USB port. Powder-coated steel. Requires assembly. W18⅛×D14⅛". White 690.949.54

PH124045

NORDLI nightstand with wireless charging $109.99 Includes USB port. Powder-coated steel. Requires assembly. W11¾×D19⅝H26⅛". White 090.949.52

PH124046

VARV floor lamp with wireless charging $119* Includes USB port. Powder-coated steel and ABS plastic. Nylon and polyurethane shade. Shade Ø12". H67". 202.807.02 *In compliance with California Title 20 regulations, lighting prices and features may vary in the state of California. Please see your local IKEA store for details.

PH124047

VARV table lamp with wireless charging $69.99* Includes USB port. Powder-coated steel. Nylon and polyurethane shade. Requires assembly. Shade W11". H20". 702.807.09 *In compliance with California Title 20 regulations, lighting prices and features may vary in the state of California. Please see your local IKEA store for details.

PH124048

RIGGAD work lamp with wireless charging $79.99* Includes USB port. Lacquered solid birch. Painted steel. Requires assembly. Shade Ø2". H17". 402.806.78 *In compliance with California Title 20 regulations, lighting prices and features may vary in the state of California. Please see your local IKEA store for details.

Any Questions?

PH124052

NORDMÄRKE single pad for wireless charging $27.99 You can charge two devices at the same time since this charging pad also has a USB port. Polycarbonate and ABS plastic. Designer: David Wahl. Requires assembly. Birch 802.897.90

PH124049

NORDMÄRKE single pad for wireless charging $27.99 You can charge two devices at the same time since this charging pad also has a USB port. Polycarbonate and ABS plastic. Designer: David Wahl. Requires assembly. White 803.083.07

PH124051

NORDMÄRKE triple pad for wireless charging $64.99 You can charge four devices at the same time since this charging pad also has a USB port. Polycarbonate plastic and ABS plastic. Designer: David Wahl. Requires assembly. L12×W5×H1". Birch 402.898.29

PH124053

NORDMÄRKE triple pad for wireless charging $64.99 You can charge four devices at the same time since this charging pad also has a USB port. Polycarbonate plastic and ABS plastic. Designer: David Wahl. Requires assembly. L12×W5×H1". White 103.083.15

PH124054

ROMMA cord management box with lid $9.99 May be used with NORDMÄRKE triple pad for wireless charging. ABS plastic. Designer: David Wahl. Requires assembly. W13×D6×H5½". Gray 903.083.21