

Frequently Asked Questions

Powercast develops wireless power and RF energy harvesting solutions to provide power-over-distance for low-power applications (low microwatts and low milliwatts). Devices that typically operate on batteries for months or years can benefit from Powercast's patented, high-efficiency RF energy harvesting technology. The cost of wiring or battery replacement can be eliminated in low-power devices through wireless, remote trickle-charging, or devices can be made completely battery-free.

General Questions

Where can I buy Powercast products?

Powercast technology is designed for Original Equipment Manufacturers (OEM's) to embed directly in their products and systems. Products can be purchased through Future Electronics (www.FutureElectronics.com), Mouser Electronics (Mouser.com), and MicrochipDirect.com. If your company is an OEM and is seeking sales support, please contact us or your local representative from Future Electronics to discuss your application in more detail.

Do you offer any products for charging consumer electronics devices such as mobile phones or MP3 players?

Powercast does not have any off-the-shelf products for charging consumer electronic devices.

Does Powercast engage in custom development projects?

Yes. Powercast has completed multiple custom development projects related to RF-based wireless power and RF energy harvesting. Please contact us to provide details on your project so that we may provide a quote.

What are the intended applications for Powercast technology?

There are a number of applications that can benefit from using Powercast's technology. The amount of received power, the use case, antenna form factor, and charge rate must be considered. Devices that operate on a set of batteries for weeks, months, or years are candidates for Powercast's technology. Powercast is currently focused on low-power applications such as wireless sensors.

Power Questions

How much power can be transmitted?

Government regulations limit the amount of power that can be transmitted. In the United States and Canada the maximum is 4 Watts EIRP, and our TX91501 transmitter broadcasts a maximum of 3 Watts EIRP.

How much power is received?

The received power is determined by several factors, including distance and receiving antenna performance. Available energy after conversion in the low milliwatt and microwatt range should be expected. Please see the wireless power calculator available on our website: <http://www.powercastco.com/resources/>

What is the efficiency of the power transmission?

Powercast's technology enables unique applications for remote charging, and multiple devices can be charged simultaneously. The end-to-end efficiency of power transfer is not a relevant metric of comparison.

What is the efficiency of the RF to DC power conversion?

Please see the datasheets for performance graphs. RF-to-DC conversion efficiency is as high as 70% in some scenarios.

What is the maximum distance that your transmitter will work?

The transmitter output power is limited by government regulation, so the receiving antenna is a primary factor in operating range. Antennas with higher gain provide better range. The directional antenna provided with the evaluation boards has a gain of 6dBi and will enable a range of 40-45 feet (12-14 meters) line of sight with the P2110 component.

Radio Frequency Questions

What frequencies are supported?

The P1110 and P2110 Powerharvester receivers are designed for a center frequency of 915 MHz, but have a reasonable operating range from 850-950MHz. Please see the datasheets for performance details. The Powerharveste technology can be adapted to other frequencies and Powercast will consider custom development projects for frequency modification.

Can I use the P1110 or P2110 components for harvesting from WiFi?

These components are designed with a center frequency of 915 MHz and cannot be used to harvest energy from Wi-Fi routers.

Do you have any components for harvesting from 2.4GHz / Wi-Fi?

Standard components for 2.4GHz are not offered at this time. Typical Wi-Fi routers broadcast only about 50-100mW of energy, and the received power would be very low even in close proximity.

Antenna Questions

What type of antennas can be used?

Powerharvester receivers are designed to work with standard 50-ohm antennas. An antenna should be matched as closely as possible to the frequency being received.

Does Powercast design custom antennas?

Powercast has antenna design expertise. We will consider custom antenna development projects.

Transmitter Questions

Can I make any adjustments to your transmitter?

There are no user controls on the existing TX91501 Powercaster transmitter. Making modifications inside of the device would be a violation of FCC and Industry Canada regulations and also void the product warranty.

Is your transmitter required for this to work?

Powercast's transmitter products are not required to operate the Powerharvester receivers, but some source of RF energy must be provided. Ambient energy from sources such as mobile base stations (i.e. cell sites) are typically not strong enough to operate existing Powerharvester receivers at a useful distance.

Can I use your transmitter in any country?

Powercast's TX91501 transmitters are certified for use only in the United States and Canada, other countries have different frequency requirements and power limitations. Some countries allow for demonstration or experimental use without regulatory certification.

What modulation can be used to operate the Powerharvester receivers?

The Powerharvester receivers work independent of the type of modulation used (FHSS, DSSS, etc) from a transmitter, and can receive power from one or more transmitters using any type of modulation.

How does your transmitter send data?

The Powercast TX91501 transmitter broadcasts data as well as power. The data is currently a transmitter ID implemented using 8 bits. Future versions may include a timing broadcast for network synchronization. The data is sent using Amplitude Shift Keying (ASK) modulation and is recovered through the Powerharvester receiver in conjunction with external circuitry and a microcontroller. The data is factory-set and not user adjustable.

Will your transmitter interfere with other RF devices (Cell Phones, Wi-Fi routers, etc.)?

All devices that generate RF frequencies have the potential to interfere with other RF devices. The interference potential is dependent on numerous factors including the field strength of the unwanted signal, the frequency band of operation, and the ability of the receiver to reject the unwanted signal. The TX91501 Powercaster Transmitter is FCC approved as FCC ID: YESTX91501 and Industry Canada (IC) approved as IC: 8985A-TX91501. The 915MHz output power is approximately 0.5W (3W EIRP) and uses Direct Sequence Spread Spectrum (DSSS) to spread the power over more than 500kHz as required by the FCC and IC. The Powercast DSSS signal allows devices to more easily reject the Powercast signal. Powercast has done empirical testing with mobile phones, Wi-Fi devices, and 915MHz transceivers and found no degradation in device performance at practical separation distances.

How much power does your transmitter use?

The 3W version of the TX91501 transmitter draws about 1.5W of energy from a wall outlet, which is less energy than a typical night-light. It would take 40 transmitters to have the same total power as a single 60W light bulb.

Technology Questions

Is Powercast technology patented?

Yes. Powercast technology is covered by numerous patents.

Is Powercast technology safe?

Powercast technology is based on radio waves that are also generated by many commonly used devices, including mobile phones, cordless phones, wireless sensors, security systems, etc. Government regulations limit the amount of power that can be transmitted, and in the United States all transmitters must be approved by the FCC. RF energy declines in relation to the inverse square of the distance from the transmitter, meaning it declines rapidly. A typical mobile phone user will receive far more RF energy from their own mobile phone than they will from a properly installed Powercast transmitter.

Can Powercast technology transmit power through walls or other obstructions?

Radio waves pass through many types of materials, including walls. Walls and obstructions attenuate (or absorb) radio waves, and this will reduce the amount of energy available for reception. Radio waves reflect off of metal walls which prohibit power transfer.

How does Powercast technology compare to induction-based charging solutions?

Typical induction charging solutions like “power mats” and electric toothbrushes require that the power source and receiving device be in very close proximity to one another to transfer power efficiently, usually within millimeters, and is essentially zero distance. These types of solutions typically require special alignment and charging cradles. Powercast’s RF-based technology provides power-over-distance to one or more devices for micro-power applications and does not directly compete with induction-based charging technologies.