

In a medical environment it is vital to ensure a clean and sterile working environment. To achieve this goal products have to be designed with great care, so the medical personnel can clean them easily. Electrical contacts are a major concern in this case, because of the aggressive nature of medical grade detergent. A degradation of these contacts cannot be prevented and they will have to be renewed eventually. This results in a downtime of the device in question. Also when transporting a patient with the attached peripherals plugs and cables have to be pulled and plugged back in every time. This will wear down contacts as well. For example if you don't hit the connector in the right angle, it might result in damaged contacts.

With the help of wireless power you can eliminate all these inconveniences and protection relevant issues. Creating products that are completely sealed is becoming easier when you don't have to worry about contacts. This is especially beneficial in the medical area where a completely sealed device offers many advantages.

The device is easily sanitized with strong medical grade detergents or even in the autoclave. Because there are no electrical contacts on the outside you don't have to worry about wearing them down, which in turn reduces the down-time for maintenance or repair. Wireless power also adds a layer of convenience and ease of use for the medical personnel as you no longer have to plug in a device. You just put in on the charger with no strings attached. It is as simple as "drop it and forget it".

If you want to integrate wireless power in an application you have to decide which wireless power you want to use. There are three mayor players in the consumer market. The Power Matters Alliance (PMA) and the Alliance for Wireless Power (A4WP) which have combined their efforts to publish a common standard. These two have about 140 members combined. But there are no products in the market yet. The other mayor player is the WPC with its qi-standard. They have a total of about 210 members and products are in the market.

However these consumer oriented standards might not be the right choice for a medical application. The big focus of these consumer standards is on interoperability, so you can charge any device on any charger. In the highly sensitive medical area you don't want this. You only want to charge or power certified products which fulfill a medical grade quality standard. Therefore wireless power in medical applications will use a proprietary concept.

RRC has developed its own proprietary modulation scheme with a separate data and power transmission coil. This scheme uses an oscillator to generate an on-off-pattern with the communication coil which is variable in length and contains data to control the energy transfer. This control information is continuous and can be transmitted 800 times faster than the qi-standard does.

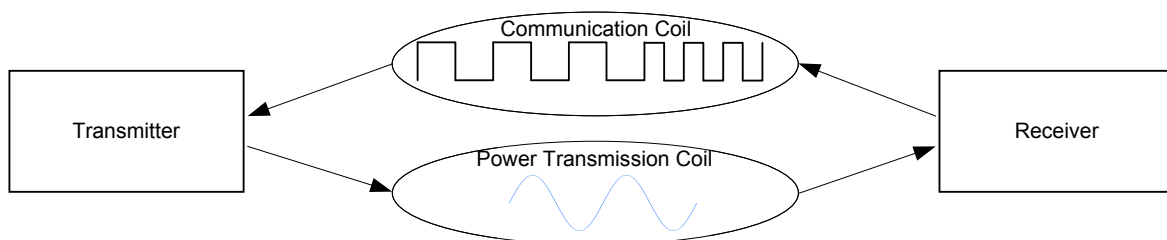


Figure 1: A figure of the energy and data transmission in the proprietary RRC modulation scheme.

The power is transmitted independent from the data, as opposed to the qi-standard where the communication is interfering with the power transfer. In this scheme a Signal-to-Noise-Ratio (SNR) of more than 40dB is achieved.

In addition a digital modulation scheme can be piggy-backed on the control information. This allows the application to handle things like handshake, identification and other customer specific information. The digital data is transmitted in parallel to the control information. This means the control information is uninterrupted all the time, control information and digital data are transmitted in independent channels.

Additionally to the proprietary modulation scheme there is the possibility to include a full active rectification. This will help to boost efficiency of the application and in turn reduce heat dissipation inside the device which is of high importance when you seal a device completely. Because there is no air flow the components need to be as cool as possible.

You can check RRC's paper on "Digitally Controlled Synchronous Bridge-Rectifier for Wireless Power Receivers" for further information on the technology behind this.

Wireless Power can help to achieve medical appliances that are more resilient. With RRC's proprietary modulation scheme there is a good way to implement wireless power in an efficient and performing way. This could lead to medical products that require less down-time for maintenance and make life in the hospital easier, cleaner and safer.