Docket #: S15-396

A Reconfigurable, Highly Efficient Power Receiver

Stanford researchers have developed a miniaturized reconfigurable receiver to efficiently capture acoustic power. The receiver can be operated with programmable components in an adaptive closed-loop system such that power transfer is maximized under different operating conditions or undesired link aberrations. Additionally, the external power transmitter is also reconfigurable, providing further degrees of freedom for maximizing overall system efficiency. This tech has been demonstrated for wireless ultrasonically powered implantable medical devices, but can also be applied to other types of receivers and energy harvesters.

Applications

- **Power links:** RF, inductive and ultrasonic
- **Energy harvesting:** mechanical, thermal, vibrational, wind and solar energy
- **Examples:** wireless links for Internet of Things (IoT), powering miniaturized implantable medical devices, power transmission

Advantages

- Closed-loop system which can sense many major nodes in the system and tune parameters of both the receiver and the transmitter for dynamically (in real time) maximizing energy efficiency
- Efficiency of the wireless power transfer link is maximized over a wide range of operating conditions

Publications

- T.C. Chang, M. Weber, J. Charthad, A. Nikoozadeh, B.T. Khuri-Yakub, and A. Arbabian, "Design of High-Efficiency, Miniaturized Ultrasonic Receivers for Powering Medical Implants with Reconfigurable Power Levels." IEEE IUS, Taipei, Oct. 21-24, 2015.

Patents

- Published Application: 20170117753
- Issued: 10,177,606 (USA)

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