



Load-Induced Frequency-Shift-Keying: A New Modulation Scheme That Enables Simultaneous Near-Field Wireless Power And Data Transmission Through A Single Set of Inductive Coils

Tech ID: 29934 / UC Case 2017-977-0

SUMMARY

UCLA researchers in the Department of Electrical Engineering have developed the first modulation system that allows simultaneous wireless power and data transmission through a single pair of inductive coils.

BACKGROUND

Next-generation Brain-Machine Interface senses neural data and stimulates the brain when needed, which requires simultaneous external power reception and outbound data transmission. The simultaneity of power and data is currently either not supported or achieved with sacrifices of device performance. Simultaneous power and data transmission may require high power consumption, limited transmission distance, or two sets of coils. There exists a need for a modulation system that allows simultaneous near-field wireless power and data transmission through a single pair of inductive coils.

INNOVATION

UCLA researchers in the Department of Electrical Engineering have developed the first modulation system that allows simultaneous wireless power and data transmission through a single pair of inductive coils. The system features Load Induced Frequency Shift Keying. The system allows for high-efficient power delivery over the entire regulating range, and high-rate (> Mbps) low-power (< mW) data communication.

APPLICATIONS

- ▶ Brain-machine interface
- ▶ Implantable microelectronics
- ▶ Wireless communication

ADVANTAGES

- ▶ Simultaneous wireless power and data transmission
- ▶ High-efficient near-field power delivery
- ▶ > Mbps data rate uplink
- ▶ < mW power consumption

STATE OF DEVELOPMENT

Functional prototype demonstrated.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,387,685	07/12/2022	2017-977

RELATED MATERIALS

- ▶ Pan, Jiacheng, Asad A. Abidi, Dejan Rozgic, Hariprasad Chandrakumar, and Dejan Markovic. "22.7 An inductively-coupled wireless power-transfer system that is immune to distance and load variations." In Solid-State Circuits Conference (ISSCC), 2017 IEEE

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INVENTORS

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OTHER INFORMATION

KEYWORDS

brain-machine interface, wireless communication, circuit, modulating scheme, power, data, frequency shift keying, inductive coils

CATEGORIZED AS

- ▶ **Biotechnology**
 - ▶ Other
- ▶ **Communications**
 - ▶ Wireless
- ▶ **Computer**
 - ▶ Hardware
- ▶ **Engineering**
 - ▶ Engineering
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