

## Wideband Data Transmission Using Pulse - Delay Modulation (#6075)

*A modulation technique that uses very narrow pulses for wireless transmission of serial data bits through an inductive link*

Maysam Ghovanloo and Mehdi Kiani from the School of Electrical and Computer Engineering at Georgia Tech have developed a modulation technique that uses very narrow pulses for wireless transmission of serial data bits through an inductive link. Called Pulse-Delay Modulation (PDM), this new modulation method transmits data via a pattern of successive pulses. PDM facilitates higher data transmission rates in the presence of strong power carrier interference. This reduces power consumption on the transmitter and improves the signal-to-noise ratio of data communication.

This system includes a new wireless data link along with a conventional wireless power link. The wireless data link consists of three major components: transmitter (Tx), inductive link, and receiver (Rx). The Tx consists of a Pulse-Pattern Generator (PPG), which produces a pattern of one or two pulses for every data bit. The transmitted data pulses do not have any considerable effects on the power carrier in the power transmission path. The use of a separate inductive link for power transfer allows the power transfer efficiency to remain high while maintaining a high data transmission bandwidth.

### Benefits/Advantages

- **Faster:** Provides higher data rate wireless transmission and reception
- **Lower power:** Reduces power consumption
- **Stronger signals:** Improves signal-to-noise ratio
- **Versatile:** Can be used in a wide range of electronic devices

### Potential Commercial Applications

This invention has potential for wide application in operating and charging electronic devices that require the transmission of both power and data:

- Implantable medical devices (IMD)
- Radio-frequency identification devices (RFID)
- Contactless smartcards
- Wireless microelectronic mechanical systems (MEMS)
- Electric vehicles

### Background/Context for This Invention

This new modulation method for achieving efficient high data transmission through inductive links. Inductive links have been extensively used for short-range data and power transmission and are quickly becoming one of the most common methods to wirelessly send power and data from the power source to several electronic devices. The major challenges that limit the widespread commercialization of inductive links include achieving high power transmission efficiency, providing high data transmission bandwidth, and improving coupling sensitivity.

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**More Information**

**Publications**

**For more information about this technology, please visit:**

<https://licensing.research.gatech.edu/technology/wideband-data-transmission-using-pulse-delay-modulation>

Images:

The automated sequential delivery of multiple fluids. A varying number of delay gates imprinted in the branches are shown in the figure.

COVID-19 and flu saliva test on paper: (A) The automatic sequential delivery of multiple reagents required for virus test; (B) Water pouring into the device triggers the virus assay, allowing the presence of SARS-CoV-2 and influenza A & B viruses to be visually identified by the color changes in the corresponding detection spot

