Ultra-Low Power Personal Area Network Radio Transceiver

UQAM – 080
February 26, 2015

355 Peel Street ♦ Suite 503 ♦ Montreal QC H3C 2G9 ♦ www.aligo.ca

ALIGO INNOVATION

Partner institution :
UQAM

BACKGROUND

Pulse based wireless communication has come a long way since being first allowed by the Federal Communications Commission (FCC) over a decade ago.

The FCC defines ultra-wideband as radio technology with a bandwidth exceeding the lesser of 500 MHz or 20% of the arithmetic center frequency. Able to offer either high data rates or very energy efficient transmissions over short ranges, multiple techniques have been developed for ultra-wideband (UWB) communication including multi-band orthogonal frequency division multiplexing (MB-OFDM), impulse radio (IR-UWB) and frequency modulation (FM-UWB) each with its specific strengths.

The potential for very low power communications and precise ranging has seen the inclusion of UWB radios in multiple standards aimed for different applications like low-rate wireless personal area networks (WPAN) with IEEE 802.15.4a and more recently wireless body area networks (WBAN) with IEEE 802.15.6.

Traditional applications of ultra-wideband exist in non-cooperative radar imaging, sensor data collection, precision locating, and tracking applications.

TECHNOLOGY

A digitally programmable transmitter for ultra-wideband impulse-radio using an on-off keying modulation scheme on a 65nm CMOS process.

The entire transmitter is power cycled and operates from a 1.2 V supply. The measured power consumption is as low as 0.9 mW at a 10 Mbps data rate, depending on the frequency and length of pulses. The transmitter contains a digitally programmable pulse generator, an oscillator and an amplifier able to generate pulse width ranging from 1.2 ns to 2.5 ns and centered at frequencies ranging from 3.1 GHz to 10.6 GHz.

A new frequency hopping technique is presented, which provides of more efficient spectrum usage. It also allows the dynamic allocation of the spectrum which can be used to dynamically avoid transmitting in highly congested frequency bands.

COMPETITIVE ADVANTAGES

- New transmission method provides a more efficient use of the Ultra Wide Band (UWB) spectrum, allowing transmitting more energy while respecting UWB limits.

- Robustness to interference.
- Ultra low power consumption.
-Real-time modulation and dynamic adjustment of bandwidth and central frequencies.

APPLICATIONS

Several potential applications exist in the fields of biomedical devices, military, sports, security, and body area networks (BAN) in general.

TECHNOLOGY DEVELOPMENTAL STAGE

A functional prototype including a transmitter and receiver has been created on CMOS 0.13µm and successfully tested. Currently generating and testing the 65nm version.

PATENT STATUS

Pending for the US.

BUSINESS OPPORTUNITY

Licensing, co-development, and investment opportunities in a potential new start-up commercializing the invention.

For Information please contact:
Richard Romagnino
Senior Director, Business Development
T.: 514 840-1226, ext. 3005 / rromagnino@aligo.ca