

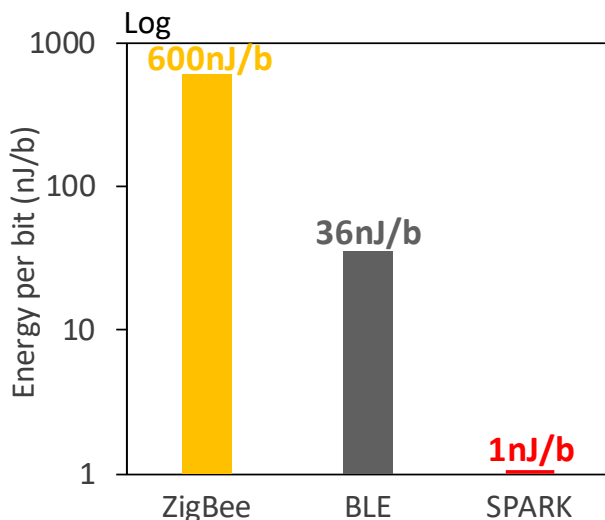
About us

SPARK Microsystems offers a unique & innovative wireless transceiver technology that achieves **40x more energy efficiency, 60x lower latency, and 10x more data throughput** as compared to BLE. In addition, the patented Spark UWB radio does not interfere with other narrow band radios such as WiFi, BLE, Zigbee, Z-Wave and cellular bands.

The Problem

Wireless connections in the medical field have to be robust, reliable, ultra low power and EMI. The world of narrowband radios such as WiFi/BT not only consume too much power for battery operated devices but have higher levels of EMI and interfere that become a reliability issue for critical systems and monitors. These narrow band signals do not function with energy harvesting sources such as thermal or motion which could use body heat or vibration to power an energy source to enable communication.

Energy Efficiency



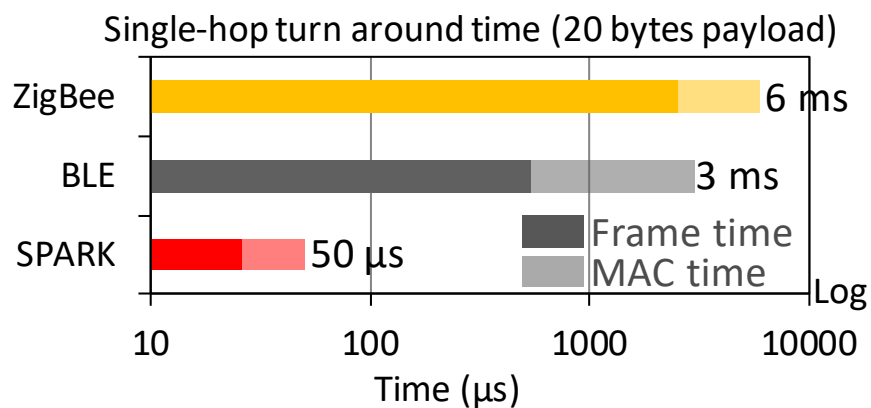
Specifications

- Ultra-low power consumption
 - 1.5 nJ/bit energy efficiency (1 mW @1 Mbps)
 - 1.8 to 3.3 V supply,
 - 55 nA Hibernate, 750 nA deep sleep (with timing)
- Scalable data rate at up to 10 Mbps payload
- Ultra-short wireless latency below 50 μ s @ 1 Kb
 - Down to 3 ms for uncompressed CD quality audio
- 3-9 GHz configurable ultra-wideband spectrum
- 10 dBm TX power
- 80 dB link budget
- 50 m range @3 Mbps; 100 m range @ 500 Kbps

The Solution

The need for small secure interconnected wireless disposable sensors in the medical field is large and compelling. First, it leapfrogs the interference issues that can plague the crowded clinical spectrum that Bluetooth and WiFi play in. Second, it uses so little power, it can be powered by any number of sources including tiny solar cells, small super-caps or even the heat of the patient's body. Third, the UWB transmitted power is orders of magnitude below RF output transmitted by BT and WiFi, and that makes it perfect for use around the most sensitive patients, like neonates. Finally, the data rates achievable with SPARK UWB would allow medical sensors or groups of sensors to report a rich amount of data, primed for the era of big data analytics.

Latency



Applications

- Pulse/EKG
- Blood pressure
- Glucose
- Temperature
- Motion
- Respiration
- Hydration
- Brain activity



Diagnostic Device

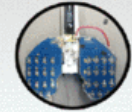


Swallowable camera
(Pilcam™, Given Imaging)

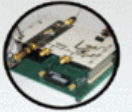


Wireless Gait analyzing Shoe
(Morris, IEEE EMBS 2002) [1]

Surgical instruments



Intraoperative Tensioner for Total Knee Arthroplasty
(Gu IEEE sensor 2010) [2]



Ultra wide band surgical navigation
(Kuhn, IEEE BioWireSS, 2011) [3]

Remote Monitoring

Patient monitoring



Wireless Oximeter
(Avant®4000, Nonin)



Implantable monitoring device
(Rohmann, Med Engr& Phys, 2007) [4]

Patient tracking



RFID tracker
(Shenzhen Chuangxinja RFID Tag Co., Ltd)

The Wireless Operating Room

- Eliminating clutter, reducing wireless congestion of all narrow bands like WiFi/BT, impacting connectivity reliability in critical procedures

Flexibility

- The SPARK Radio can support device-to-device, star, and mesh network configurations. These features allow for increased connectivity and reliability, as well as better coverage of large areas
- The SPARK Radio can multiplex several users/devices in the same space (audio channels, controllers, keyboard, mouse, etc)

Spark Audio Demo Kit (available now)

- ARM Cortex-M4 MCU
- Expansion header for custom applications
 - (ie: sensors, controllers, keyboard, mouse)
- USB interface
- Built in audio I/O for audio streaming demo
- Uncompressed audio
 - Range 50 m (LOS)
 - Short latency (5 ms)
- Point to Point Firmware w/ Link quality statistics

