About us

SPARK Microsystems offers a unique & innovative short range wireless transceiver technology that achieves **35 times better energy efficiency** than BLE and 600 times better than ZigBee.

Our technology **enables battery-less operation** of wireless devices such as tags or sensors when paired with energy harvesting technologies.

The Problem

Wireless audio streaming has been an issue for wireless standards since the beginning. There are several reasons for this. The standards have generally focused on bandwidth and connectivity without much thought to the specific impact to audio capabilities.

For instance, the issue with WIFI is high power, latency, narrow band interference and quality of service. BLE has limited bandwidth which makes uncompressed audio or HD audio impossible, especially if multichannel streaming is required. BLE is also prone to latency and quality of service issues.

Other PAN wireless standards such as Zigbee and Z-wave have similar issues and can only handle a fraction of the bandwidth of BLE.
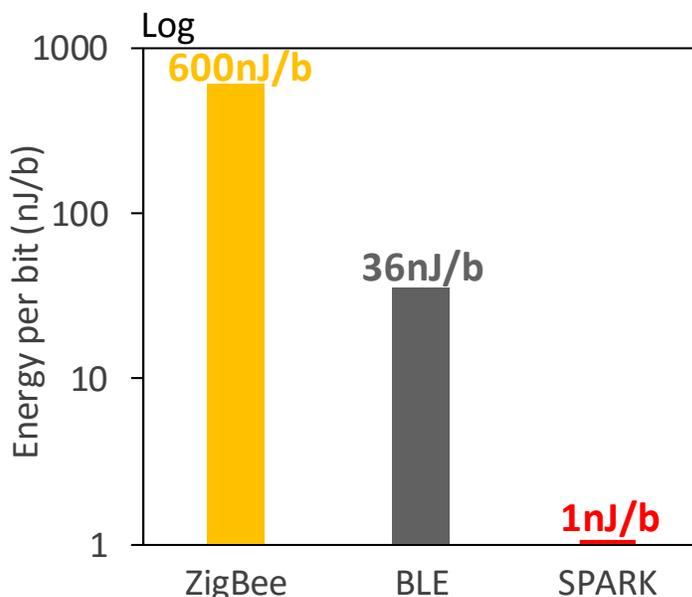
Specifications

- Ultra-low power consumption
  - ‣ < 1 nJ/bit energy efficiency (<1 mW@1 Mbps)
  - ‣ 1.8 to 3.6 V supply, 700 nA sleep current
- Scalable data rate at up to 10 Mbps
- Ultra-short latency below 50 µs
- 3-6 GHz configurable ultra-wideband spectrum
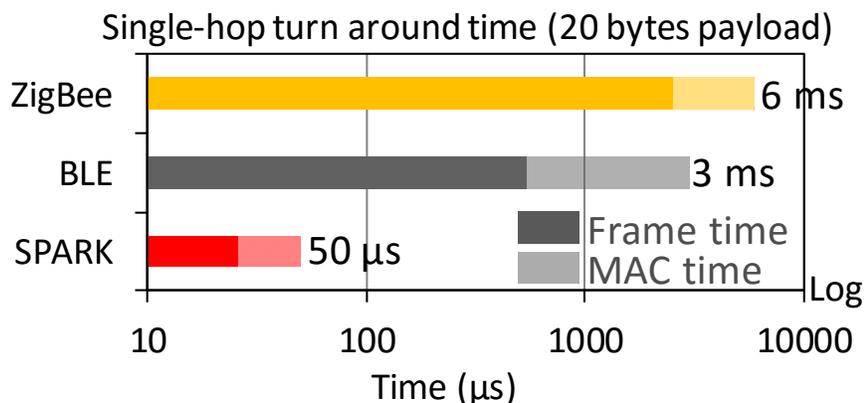 - ‣ 11 dBm TX power, 50 meters range

The Solution

The new SPARK Radio with 10 Mbps data rate can handle HD audio, as well as uncompressed audio, and multichannel streaming.

The SPARK Radio latency is 60x shorter than BLE providing a unique advantage in transmitting lost packets and ensuring uninterrupted service.

In addition, the SPARK Radio uses an ultra low emission UWB spectrum from 3-6 GHz that does not interfere with any of the other narrow band standards such as BLE, Bluetooth, and WIFI. The SPARK signal is in the noise range for those standards.

Cost is also a strong consideration. The SPARK Radio is fully integrated radio and low-cost, while enabling significant advantages in power consumption, speed, bandwidth, latency and non-interference.

Energy Efficiency

Energy per bit (nJ/b), Log scale:
- ZigBee: 600nJ/b
- BLE: 36nJ/b
- SPARK: 1nJ/b

Latency

Single-hop turn around time (20 bytes payload):
- ZigBee: 6 ms
- BLE: 3 ms
- SPARK: 50 µs

Legend: Frame time, MAC time. Time (µs), Log scale.

Example Solution

SPARK Radio dongle

Gaming console

In this example, a SPARK radio dongle attached to the gaming console provide both ultra-low-power uncompressed HD audio streaming to the headset, with high quality microphone back channel, as well as ultra short latency to several controllers enabled by the SPARK Radio's 10 Mbps bandwidth and 50 us communication latency. The low power communications channel will help to extend the battery life of the controllers by as much as 10x. The radio does not interfere with any narrow band signals such as WIFI and Bluetooth. In addition, the SPARK Radio will have capability to range the distance to each device to within centimeters.

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 ultra-low latency and energy efficiency of the SPARK Radio enables robust and high performance mesh network capabilities when compared to other protocols.
- The SPARK Radio can multiplex several users/devices in the same space.

Ranging

- In addition to communication, SPARK technology lends itself to both coarse and highly accurate location ranging based on time-of-flight: a two-way ranging system can be integrated with the SPARK radio.
- Using three fixed SPARK radio chips, the exact 3D location of another moving/fixed SPARK radio chip can be determined.

Target Markets

- Internet-of-Things
- Battery-less systems
- Medical and healthcare
- Health and fitness

- Industrial and automation, M2M
- Structural health monitoring
- Smartphones and tablets
- Smart agriculture

- Smart homes / buildings / cities
- Streaming data /audio / video
- Wireless peripherals
- Wearables