BATTERY Technology

Innovations in Power & Energy Storage

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Cloud-Connected, Battery-Based IoT Devices Last Years Longer

Consumer Internet of Things (IoT) products and Wi-Fi technology are ubiquitous in homes around the world. And demand for wireless IoT cloud-connected devices is growing rapidly. Yet deploying Wi-Fi battery-based IoT products is difficult.

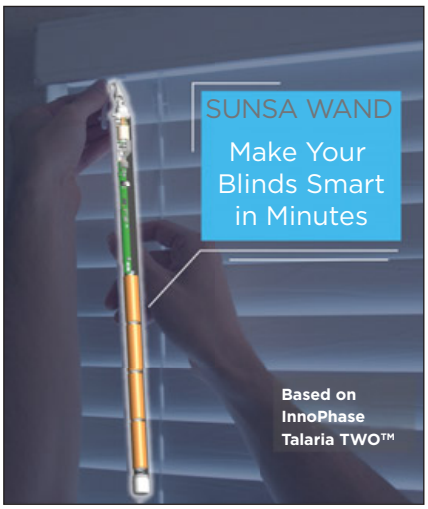
Wi-Fi typically consumes a large amount of power, draining batteries too quickly for applications such as smart door locks, doorbells, security cameras, connected sensors, and other smart devices. This is a well-known issue in the industry, which is why many smart home automation products use Bluetooth Low Energy (BLE) and Zigbee wireless communication protocols instead of Wi-Fi.

These protocols work well for a wide array of smart home applications; however, there are compelling advantages to using Wi-Fi for new direct-to-cloud designs that are integrated with more functionality, motors, intelligence, sensors, and artificial intelligence (AI) capabilities. For Wi-Fi to succeed in this space, it must achieve ultra-low power consumption on par with other wireless protocols. The other benefit to using Wi-Fi is that it eliminates the need for a separate gateway device to connect to the cloud. And it is a simpler, less complex setup for the consumer and less expensive to build for the manufacturer.

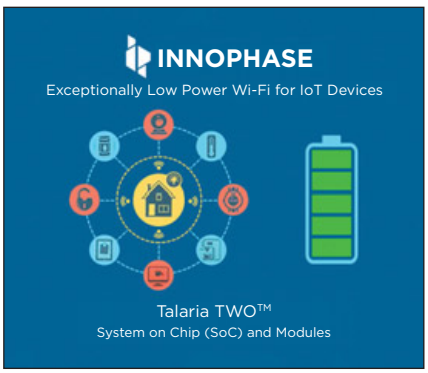
The underlying problem is that basic radio signal processing architectures used by products today are all based on a 25-year-old RF technique known as IQ radio data representation (In-phase and Quadrature — the way the RF waveform data is processed inside the radio). IQ analog-based RF architectures are used in all Wi-Fi, Bluetooth, Zigbee, Z-Wave, and most other protocol radios. Typical smart IoT applications use a significant percentage of the overall system power for wireless connectivity — sometimes as much as 80 to 90 percent — even while idly connected to the network.

A Smart Home Example

Reducing Wi-Fi's power consumption is essential to enable many devices to be battery-powered for the first time or extend device lifespan from months to multiple years. Solving this issue became the singular focus of InnoPhase, a fabless semiconductor company specializing in extreme low-power wireless solutions. They created an extremely efficient, programmable, digital polar radio architecture with ultra-low-power Wi-Fi.



The Sunsa Wand is a motorized, cloud-connected adapter that enables any standard window blind to become a smart blind.



The Talaria TWO multi-protocol system on chip (SoC) integrates Wi-Fi + BLE5 for wireless communication, an embedded microcontroller for applications processing, and advanced security elements for device security.

The platform enables wireless solutions to take full advantage of the significant low power, size, integration, and cost advantages of advanced semiconductor process technology. The digital polar design is the foundation for its Talaria TWO™ multi-protocol system on chip (SoC), modules, and solutions. The SoC integrates Wi-Fi + BLE5 for wireless communication, an embedded microcontroller for applications processing, and advanced security elements for device security.

The benefits of the Talaria TWO platform are on display in the differentiated products it enables. One of InnoPhase's first customers to integrate Talaria TWO into an IoT consumer product is Sunsa. They developed the Sunsa Wand window blind — a motorized, cloud-connected window blind adapter for consumer and commercial applications that allows any standard window blind to become a smart blind.

The Sunsa Wand uses Talaria TWO's ultra-low-power Wi-Fi to meet consumers' lifetime and functionality thresholds by delivering an expected 12+ months of battery life on four standard AA batteries. It also maintains a "direct-to-cloud" Internet connection without the need for an additional network hub. It is the easiest and most affordable way to automate and make blinds smart.

"The groundbreaking capabilities and battery power savings of InnoPhase's Talaria TWO made our product possible," said Adam Zilberbaum, founder of Sunsa. "It surpassed our expectations by delivering a wand with long battery life, ease of installation, and cost-effectiveness while connecting directly into a consumer's existing Wi-Fi networks."

The Sunsa Wand is just one example of a unique implementation but the underlying Talaria TWO technology is transferable to many other IoT applications. It also enables a wide variety of connected applications such as smart locks, water leak sensors, smart health monitors, and hazardous gas sensors. Talaria TWO opens the doors for new Wi-Fi, cloud-connected applications in all markets such as consumer, commercial, industrial, and health. The ultra-low power consumption and power-saving tools allow new products to connect to cloud services through widely available Wi-Fi networks.

According to Andrew Zignani, Principal Analyst at ABI Research, "By 2025, ABI Research expects the IoT Wi-Fi segment that can benefit from such low-power innovations to reach over 1 billion devices."

This article was written by Rob McCormick, director of product management and sales at InnoPhase, San Diego, CA. ***For more information, visit http://info.hotims.com/79417-281.***

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