

FROST & SULLIVAN

*WILIOT*

**2022**  
**TECHNOLOGY**  
**INNOVATION**  
**LEADER**

*NORTH AMERICAN*  
*BATTERY-FREE BLUETOOTH*  
*LOW ENERGY TAG INDUSTRY*

## Best Practices Criteria for World-Class Performance

Frost & Sullivan applies a rigorous analytical process to evaluate multiple nominees for each award category before determining the final award recipient. The process involves a detailed evaluation of best practices criteria across two dimensions for each nominated company. Wiliot excels in many of the criteria in the battery-free Bluetooth low energy tag space.

AWARD CRITERIA	
<i>Technology Leverage</i>	<i>Business Impact</i>
Commitment to Innovation	Financial Performance
Commitment to Creativity	Customer Acquisition
Stage Gate Efficiency	Operational Efficiency
Commercialization Success	Growth Potential
Application Diversity	Human Capital

### *Low-cost, Self-powered IoT Pixel Tags*

The COVID-19 impact and the evolution of omnichannel retail raised the bar for supply chain management. Brands witnessed challenges around inventory management and tracking or tracing of materials, and in turn, needed a business model that builds sustainable and effective customer relationships. Wiliot, a company established by the pioneers of millimeter wave technology, recognized the need to democratize the Internet of Things (IoT) and have it grow from being the internet of exorbitant devices to basic everyday items. The company envisions creating trillions of tags connected to the internet with not just expensive equipment but consumable and day-to-day products by harnessing the power of cloud and IoT.

With COVID-19, in-store visits have reduced drastically, and customers prefer online shopping. Retail stores are determined to enhance the in-store experience of customers. Therefore, Wiliot provides organizations with IoT Pixels, a microchip-like tag that is economical and self-powered. The tag attaches to any item or package, analyzes the physical and surrounding data, and then sends it to the Wiliot cloud. The cloud uses machine learning capabilities to securely convert the data into valuable insights, giving its customers a batch snapshot of their inventory. The minute-sized tags give visibility of products in real-time using radiofrequency energy. It securely communicates through Bluetooth to low-cost infrastructure like access points, Wi-Fi, IoT devices less than \$50, giving it a competitive advantage over a \$1,000 handheld radio-frequency identification (RFID) scanner or \$10,000 worth RFID tunnel.

The tags lead to the product or packaging crate location and give an overview of the product lifecycle from when it was placed (up to the minute, one day, a week, or a month old, depending on the last stock check). The company is in the prime position of optimizing the supply chain through innovative, eco-friendly solutions working closely with customers determined to extend the shelf life of products. It gives customers an outlook on which product was first-in-first-out and last-in-first-out, transforming to well-ordered warehouse management. The IoT Pixels detect the produce neglected by organizations' personnel and track perishable and conventional items leading to efficient inventory management with reduced wastage. Wiliot actively focuses on delivering a seamless experience for its customers with smaller teams by bringing the aspects of accuracy and technology.

The key value the Wiliot IoT Pixels deliver is helping brands and retailers tackle the challenge of overstocking. These tags will reduce the inventory in their supply chain. The organizations can save capital while decreasing their carbon footprint with a smaller space footprint and enhancing customers' operational efficiency by compressing their supply chain. The company is empowering its customers to evolve their supply chains leading to increased profits, efficient and dynamic deliveries. Wiliot impresses Frost & Sullivan with its IoT Pixel tags designed to perform tasks productively and quickly while maintaining high-quality standards.

### **Design of Chip**

What creates differentiation for the company is its relentless pursuit to innovate. It built the chip with a low-energy Bluetooth-based microcontroller unit, designed from scratch. The chip and its architecture is

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**- Ruman Ahmed,  
Best Practices Research Analyst**

not a modification but a redesign using standard off-the-shelf production processes. With relatively low magnitude power consumption and high sensitivity in harvesting, the chip can capture the weakest signal. To break the processing down to a pipeline, it uses wave computing where the monolithic processing performed by conventional CPUs is broken down into smaller code fragments that are executed in a sequence as waves of radio power are harvested. The

output from each processing step is saved in retention memory. It keeps the values in registers even when the power drops to deficient levels. The chip is not just low-power computing but incorporates a whole system designed from chip to cloud packaged in an RFID inlay. A regular chip has a crystal component to calibrate time. This drove Wiliot's decision to be battery-free and have a crystal-free radio that can operate with fluctuating power levels. Wiliot impresses Frost & Sullivan with its capabilities of communicating with existing and low Bluetooth infrastructure rather than the expensive infrastructure typical of RFID.

The chip provides a predictable high level of performance, meeting the customer expectations where the chip can source energy by deploying a reliable energy point. The company plans to announce a three-tier architecture comprising gateways and bridges that are cost-effective radio devices providing a predictable energy source that broadcasts efficiently. For this reason, Wiliot partnered with Energous

and other device manufacturers to address the challenge of efficient energy transfer. The Wiliot IoT pixels are fused with this energy harvesting technology.

The company developed tags that are flexible and connected to the cloud. The information feeds to the cloud in an encrypted format and is decrypted in the cloud securely. The data is unpacked and processed, turned into an event with valuable insights on temperature change, pick-up, or movement.

*“The company embarked on the journey towards a battery-free Bluetooth low energy tag with a consulting approach and evolved to a packaged approach by closely participating with customers. Wiliot launched an Early Advantage Program, with large enterprises making massive investments to get early access to its state-of-the-art technology. The company fabricates applications and cultivates prototypes, proof of concepts, and pilots using this funding.”*

**- Krithika Shekar,  
Senior Research Analyst**

The company can support multiple applications like supply chain, cloud-based, or any new technology applications with its unique technology. As the customers move towards serialization where each product has a unique identity, traceability requirements will increase, accelerating the adoption of Wiliot’s IoT Pixel.

It caters to industries like the food, pharmaceutical, healthcare, and retail industry having the desire to assign a

unique identity to production units, a batch, a case, drugs, and clothes. The company enhances the customer ownership experience by quickly identifying quality issues. Wiliot successfully eliminates the dependency on manual intervention with the continuous Bluetooth broadcast. The company links equipment and medicines with its tags and evaluates parameters like temperature and dilution for the healthcare industry. It automatically tracks, identifies, and detects hospital inventory and assets efficiently. Wiliot plans on transforming the retail sector by creating a circular economy, extending product intelligence, and emphasizing reuse, return, and recycling. It provides counterfeit product detection, seamless traceability, and refills shelves accurately. The company uses its cutting-edge technology to identify shelf life and reduce food wastage in the food industry. It also measures food longevity and adjusts the prices based on expiry dates. Its auto-replenishment feature gives the IoT Pixels a distinctive advantage. When exhausted, it effortlessly restocks the customers’ items and suggests products based on their historical trends.

### ***The Path to Success***

The company followed a structured lean approach to incubate new technologies focused on high-risk innovation projects. It heavily invests in expanding IoT and maintaining sustainability. It pursues a rapid development process with multiple test chips made simultaneously (up to six a year) based on time-to-market and scale. The company recently received \$200-million series C round funding, which will be used to continue to expand its product, engineering, sales, and marketing teams in the United States, Israel, and worldwide.<sup>1</sup>

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<sup>1</sup> <https://www.wiliot.com/>

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Wiliot built its pillars brick by brick with the deep expertise of talented eminent individuals. The company is staffed with a well-accomplished team of distinguished experts to unlock the true potential of IoT and its capabilities, leading to battery-free low energy tags communicating through Bluetooth. Wiliot's culture derives from these individuals' expertise, reflected in its top-notch technology and solutions. Its leadership team is closely involved in supporting customers and its seasoned professionals. The unrivaled and extensive domain knowledge to meet specific customer needs sets the company apart from other industry participants.

## Conclusion

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As brands faced challenges around inventory management and traceability of materials, Wiliot, an Israel and United States-based company, identified the need to democratize the Internet of Things (IoT) and have it grow from being accessible only with expensive devices to one designed for everyday items. The company envisions creating trillions of economical tags that connect consumable and day-to-day products empowered by cloud and IoT. With this vision in mind, Wiliot developed IoT Pixels, a stamp-sized tag that fixes to any item or package, analyzes the physical and surrounding data, and then sends it to the Wiliot cloud. The chip can capture the weakest signal with relatively low magnitude power consumption and high sensitivity harvesting. It brings together the best-in-class product developed through its deep expertise.

With its IoT Pixels, vision, and expertise, Wiliot earns Frost & Sullivan's 2021 North American Technology Innovation Leadership Award in the battery-free bluetooth low energy tag industry.

## What You Need to Know about the Technology Innovation Leadership Recognition

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Frost & Sullivan's Technology Innovation Leadership Award recognizes the company that has introduced the best underlying technology for achieving remarkable product and customer success while driving future business value.

### Best Practices Award Analysis

For the Technology Innovation Leadership Award, Frost & Sullivan analysts independently evaluated the criteria listed below.

#### *Technology Leverage*

**Commitment to Innovation:** Continuous emerging technology adoption and creation enables new product development and enhances product performance

**Commitment to Creativity:** Company leverages technology advancements to push the limits of form and function in the pursuit of white space innovation

**Stage Gate Efficiency:** Technology adoption enhances the stage gate process for launching new products and solutions

**Commercialization Success:** Company displays a proven track record of taking new technologies to market with a high success rate

**Application Diversity:** Company develops and/or integrates technology that serves multiple applications and multiple environments

#### *Business Impact*

**Financial Performance:** Strong overall financial performance is achieved in terms of revenues, revenue growth, operating margin, and other key financial metrics

**Customer Acquisition:** Customer-facing processes support efficient and consistent new customer acquisition while enhancing customer retention

**Operational Efficiency:** Company staff performs assigned tasks productively, quickly, and to a high-quality standard

**Growth Potential:** Growth is fostered by a strong customer focus that strengthens the brand and reinforces customer loyalty

**Human Capital:** Commitment to quality and to customers characterize the company culture, which in turn enhances employee morale and retention



## About Frost & Sullivan

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## The Growth Pipeline Engine™

Frost & Sullivan's proprietary model to systematically create ongoing growth opportunities and strategies for our clients is fuelled by the Innovation Generator™.

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### Key Impacts:

- **Growth Pipeline:** Continuous Flow of Growth Opportunities
- **Growth Strategies:** Proven Best Practices
- **Innovation Culture:** Optimized Customer Experience
- **ROI & Margin:** Implementation Excellence
- **Transformational Growth:** Industry Leadership



## The Innovation Generator™

Our 6 analytical perspectives are crucial in capturing the broadest range of innovative growth opportunities, most of which occur at the points of these perspectives.

### Analytical Perspectives:

- **Mega Trend (MT)**
- **Business Model (BM)**
- **Technology (TE)**
- **Industries (IN)**
- **Customer (CU)**
- **Geographies (GE)**

