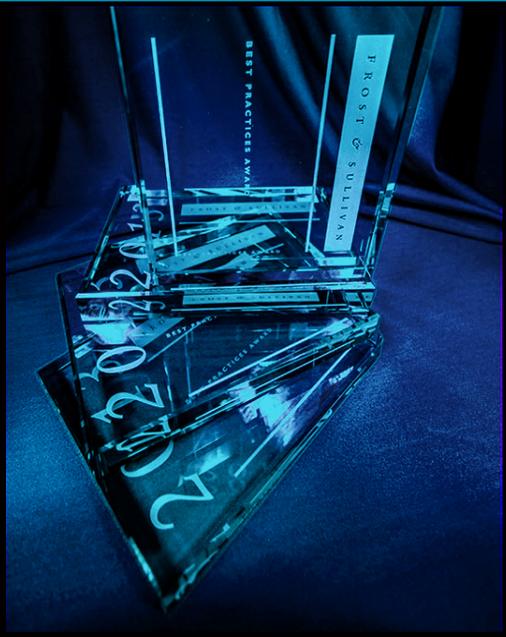


FROST & SULLIVAN



## 2016 North American Passive Sensors Enabling Technology Leadership Award



FROST & SULLIVAN

BEST  
2016 PRACTICES  
AWARD

NORTH AMERICAN PASSIVE SENSORS  
ENABLING TECHNOLOGY LEADERSHIP AWARD

2016  
**BEST PRACTICES**  
AWARDS

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## Background and Company Performance

### *Industry Challenges*

In today's connected world, the emerging concept of the Internet of Things (IoT) is enabling machine-to-machine communications for better business decisions. For example, sensors are attached to individual machine parts to monitor the health and operation of these parts. With increasing focus on higher profitability, no manufacturing unit can afford downtime. Hence, sensors are increasingly becoming the building blocks of an efficient manufacturing process.

However, deploying traditional sensors with their power and communication wiring bundles can be both complex and expensive. When deploying radio frequency (RF) sensors in industrial environments, the environment itself becomes a major challenge. RF communications is not effective when deployed near metal surfaces and in close proximity to liquids which has been an ongoing issue for vendors. Additionally, battery life and the ongoing maintenance costs to manage battery replacements adds significantly to the cost of ownership in applications where sensors constantly communicate information.

Also, it is imperative for vendors to showcase their differentiation in an effort to strengthen their position and stay competitive. Frost & Sullivan firmly believes that companies focused on developing innovative and customizable products that are energy efficient and that cater to the industries' current and future needs will be in the best position to increase market share.

### *Technology Leverage and Customer Impact*

#### **Commitment to Innovation**

RFMicron has been successful in establishing its brand image in verticals like automotive, healthcare, and industrial with its wireless smart passive sensing™ solutions, which exploits RAIN® RFID technology making them both small and very cost effective. These products exude innovation, demonstrating the best quality and reliability.

Another thing that impressed Frost & Sullivan is that RFMicron's strategy implementation has been right on, with their focus on addressing unmet market needs. Despite RAIN RFID being used widely in retail and logistics environments, its use in extreme industrial applications means that products must work efficiently in proximity to liquids and on metal surfaces. While there are products in the market that are able to operate in proximity to liquid and on metal surfaces, they tend to be big, heavy, power hungry, and expensive. Contrariwise, RFMicron has developed a single-chip solution that enables a new class of smart passive sensor™ devices that employ the company's patented Chameleon™ engine. RFMicron's approach employs an adaptive RF front-end which also doubles as sensor module. The Chameleon engine both compensates for the environment and leverages the

RF signals to effectively determine, or sense, its surroundings. It is small, light, power-efficient and also affordable. While most solutions for RF communication on metal surfaces and near liquid have trade-offs in either their design or pricing, RFMicron's sensor solution will revolutionize the connected market by achieving the smallest size and cost.

RFMicron also offers Hermes™, its Smart Edge IoT platform that ships with RFMicron's smart passive sensor moisture and temperature devices. The Hermes is a single hub connecting several sensors and is compatible with several network and connectivity protocols (ZigBee, Wi-Fi, CAN and Ethernet). A host of these value-added functionalities truly define RFMicron's commitment to innovation.

### Commercialization Success

RFMicron identified the increasing demand for a passive sensor solution that can efficiently perform in extreme conditions. Because it can sense pressure/weight, moisture, proximity



and temperature, this wireless passive sensor has become the go-to solution for several OEM's in the automotive space. Applications in the automotive industry include moisture intrusion detection (leaks) during vehicle assembly, as well as seat occupancy, climate control, fluid level detection and automatic wipers.

Plus, because the sensor is passive and does not require batteries for power, no maintenance is required. This unrivaled functionality puts RFMicron's sensor far ahead of competing sensors; Frost & Sullivan fully expects it to be rapidly adopted across other verticals like cold chain perishables, adult incontinence, infant smart diapers and infant sleep monitoring just to name a few. The sensor's affordability has also been a key reason for its pilot usage by long-term care facilities for adult incontinence applications.

Example sensors from RFMicron are flexible and incorporate an adhesive strip.

## Application Diversity

Because traditional wireless sensors have a host of issues when used in applications involving liquids and metals, RFMicron researchers focused their efforts on exploiting their semiconductor core, which enabled sensors to work on metal surfaces and near liquids. This opened it to a wide array of predictive maintenance applications across industries.



Rugged temperature maintenance-free sensors serve industrial segments.

For example, moisture detection (leaks) in automotive assembly is a game-changer for OEMs, which had deployed a time-and-labor-intensive process to identify water leaks in a car body. RFMicron's on-metal moisture sensor enables OEMs to identify leaks quickly and also locate their origins with ease. The major challenge in automotive is to perform wireless sensing and communication in metalized environments. Their strength is that RFMicron's Chameleon technology optimizes RF communication and enables proper sensing that easily overcomes this challenge. The ability to detect moisture content is a major advantage for the aerospace, food and beverage and construction sectors as well.



Unique folded "sensor" detects water intrusion during automotive assembly and high-pressure spray testing.

As mentioned previously, in the healthcare industry, incontinence management has been a major challenge for caregivers. RFMicron's sensor technology can be deployed in smart diapers for adults and infants, and can be remotely monitored by caregivers and new mothers alike.

Through these applications, RFMicron is addressing key needs in the IoT market. With the world becoming increasingly connected, this augurs well for the company's growth prospects.

## Price/Performance Value

RFMicron's sensors are cost effective and deliver superior return on investment (ROI) for users. The completed basic sensor, including the adaptive and sensing integrated circuit, costs between \$1-\$1.50 USD, although some of the more specialized versions are somewhat more expensive. Similar sensor offerings in the market are 25 times more expensive making cost a huge differentiator. It has maintained performance parity with the more expensive alternatives, even at the much-improved RFMicron price point, enabling it to set industry standards.

## Customer Purchase Experience

The perfect combination of technology and focus on customer value has provided RFMicron the right edge in delivering the ideal purchase experience. This technology performs consistently in environments where other sensor technologies fail.

Through their innovation, RFMicron's engineering team has truly redefined the RAIN RFID market. As a testament to its customer experience, RFMicron has won accolades from several automotive OEM's and been selected for pilots with leading caregivers in the United States, as mentioned earlier; these are just a few examples that show how well RFMicron has delivered best-in-class customer value.

## Brand Equity

RFMicron has developed a strong partner ecosystem to make its products accessible to customers worldwide. Its network of distributors and value-added partners/suppliers are spread across North America, Europe, and the Asia-Pacific region. This has helped the company create wide brand visibility among end users and also partner/acquire new customers by ensuring unmatched excellence and optimum customer support. Recent cooperation with Smartrac, a leading label/tag supplier in the RAIN RFID market is another example of the company's technical competence and brand equity.

## *Conclusion*

Frost & Sullivan firmly believes that RFMicron has clearly demonstrated its wherewithal for innovation and customer value. By designing sensors that easily meet market and customer needs, work flawlessly in a variety of applications and environments, and all at an affordable price, RFMicron has shown itself to be a true leader in the industry.

Because of this strong overall performance, RFMicron is recognized with Frost & Sullivan's 2016 Enabling Technology Leadership Award.

## Significance of Enabling Technology Leadership

Ultimately, growth in any organization depends upon customers purchasing from your company, and then making the decision to return time and again. In a sense, then, everything is truly about the customer—and making those customers happy is the cornerstone of any long-term successful growth strategy. To achieve these goals through technology leadership, an organization must be best-in-class in three key areas: understanding demand, nurturing the brand, and differentiating from the competition.



## Understanding Enabling Technology Leadership

Product quality (driven by innovative technology) is the foundation of delivering customer value. When complemented by an equally rigorous focus on the customer, companies can begin to differentiate themselves from the competition. From awareness, to consideration, to purchase, to follow-up support, best-practice organizations deliver a unique and

enjoyable experience that gives customers confidence in the company, its products, and its integrity.

### *Key Benchmarking Criteria*

For the Enabling Technology Leadership Award, Frost & Sullivan analysts independently evaluated two key factors—Technology Leverage and Customer Impact—according to the criteria identified below.

#### **Technology Leverage**

- Criterion 1: Commitment to Innovation
- Criterion 2: Commitment to Creativity
- Criterion 3: Stage Gate Efficiency
- Criterion 4: Commercialization Success
- Criterion 5: Application Diversity

#### **Customer Impact**

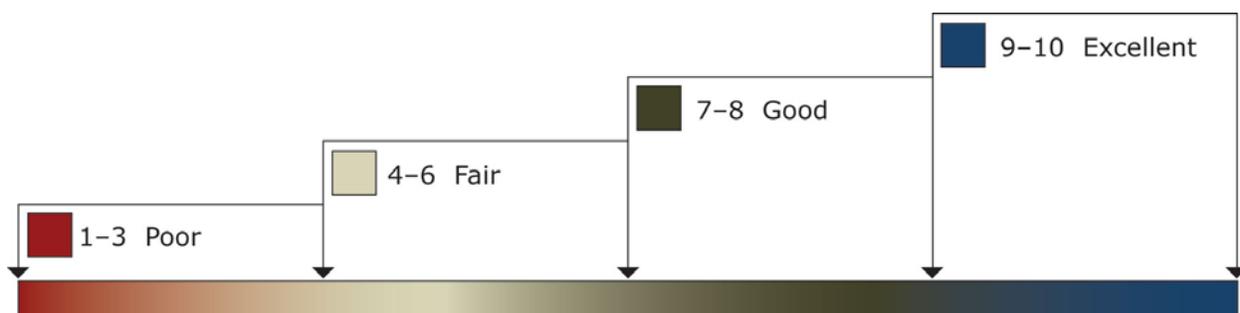
- Criterion 1: Price/Performance Value
- Criterion 2: Customer Purchase Experience
- Criterion 3: Customer Ownership Experience
- Criterion 4: Customer Service Experience
- Criterion 5: Brand Equity

## Best Practice Award Analysis for RFMicron

### *Decision Support Scorecard*

To support its evaluation of best practices across multiple business performance categories, Frost & Sullivan employs a customized Decision Support Scorecard. This tool allows our research and consulting teams to objectively analyze performance, according to the key benchmarking criteria listed in the previous section, and to assign ratings on that basis. The tool follows a 10-point scale that allows for nuances in performance evaluation; ratings guidelines are illustrated below.

#### RATINGS GUIDELINES



The Decision Support Scorecard is organized by Technology Leverage and Customer Impact (i.e., the overarching categories for all 10 benchmarking criteria; the definitions for each criteria are provided beneath the scorecard). The research team confirms the

veracity of this weighted scorecard through sensitivity analysis, which confirms that small changes to the ratings for a specific criterion do not lead to a significant change in the overall relative rankings of the companies.

The results of this analysis are shown below. To remain unbiased and to protect the interests of all organizations reviewed, we have chosen to refer to the other key players as Competitor 2 and Competitor 3.

<i>Measurement of 1–10 (1 = poor; 10 = excellent)</i>			
<b>Enabling Technology Leadership</b>	Technology Leverage	Customer Impact	Average Rating
<b>RFMicron</b>	<b>9.5</b>	<b>9.5</b>	<b>9.5</b>
Competitor 2	8.5	8.0	8.2
Competitor 3	8.0	7.5	7.7

### *Technology Leverage*

**Criterion 1: Commitment to Innovation**

Requirement: Conscious, ongoing adoption of emerging technologies that enables new product development and enhances product performances

**Criterion 2: Commitment to Creativity**

Requirement: Technology is leveraged to push the limits of form and function, in the pursuit of “white space” innovation

**Criterion 3: Stage Gate Efficiency**

Requirement: Adoption of technology to enhance the stage gate process for launching new products and solutions

**Criterion 4: Commercialization Success**

Requirement: A proven track record of taking new technologies to market with a high rate of success

**Criterion 5: Application Diversity**

Requirement: The development and/or integration of technologies that serve multiple applications and can be embraced in multiple environments

### *Customer Impact*

**Criterion 1: Price/Performance Value**

Requirement: Products or services offer the best value for the price, compared to similar offerings in the market

**Criterion 2: Customer Purchase Experience**

Requirement: Customers feel like they are buying the most optimal solution that addresses both their unique needs and their unique constraints



## The Intersection between 360-Degree Research and Best Practices Awards

### Research Methodology

Frost & Sullivan’s 360-degree research methodology represents the analytical rigor of our research process. It offers a 360-degree-view of industry challenges, trends, and issues by integrating all 7 of Frost & Sullivan’s research methodologies. Too often, companies make important growth decisions based on a narrow understanding of their environment, leading to errors of both omission and commission. Successful growth strategies are founded on a thorough understanding of market, technical, economic, financial, customer, best practices, and demographic analyses. The integration of these research disciplines into the 360-degree research methodology provides an evaluation platform for benchmarking industry players and for identifying those performing at best-in-class levels.

360-DEGREE RESEARCH: SEEING ORDER IN THE CHAOS



## Best Practices Recognition: 10 Steps to Researching, Identifying, and Recognizing Best Practices

Frost & Sullivan Awards follow a 10-step process to evaluate award candidates and assess their fit with select best practice criteria. The reputation and integrity of the Awards are based on close adherence to this process.

STEP	OBJECTIVE	KEY ACTIVITIES	OUTPUT
1 <b>Monitor, target, and screen</b>	Identify award recipient candidates from around the globe	<ul style="list-style-type: none"> <li>• Conduct in-depth industry research</li> <li>• Identify emerging sectors</li> <li>• Scan multiple geographies</li> </ul>	Pipeline of candidates who potentially meet all best-practice criteria
2 <b>Perform 360-degree research</b>	Perform comprehensive, 360-degree research on all candidates in the pipeline	<ul style="list-style-type: none"> <li>• Interview thought leaders and industry practitioners</li> <li>• Assess candidates' fit with best-practice criteria</li> <li>• Rank all candidates</li> </ul>	Matrix positioning all candidates' performance relative to one another
3 <b>Invite thought leadership in best practices</b>	Perform in-depth examination of all candidates	<ul style="list-style-type: none"> <li>• Confirm best-practice criteria</li> <li>• Examine eligibility of all candidates</li> <li>• Identify any information gaps</li> </ul>	Detailed profiles of all ranked candidates
4 <b>Initiate research director review</b>	Conduct an unbiased evaluation of all candidate profiles	<ul style="list-style-type: none"> <li>• Brainstorm ranking options</li> <li>• Invite multiple perspectives on candidates' performance</li> <li>• Update candidate profiles</li> </ul>	Final prioritization of all eligible candidates and companion best-practice positioning paper
5 <b>Assemble panel of industry experts</b>	Present findings to an expert panel of industry thought leaders	<ul style="list-style-type: none"> <li>• Share findings</li> <li>• Strengthen cases for candidate eligibility</li> <li>• Prioritize candidates</li> </ul>	Refined list of prioritized award candidates
6 <b>Conduct global industry review</b>	Build consensus on award candidates' eligibility	<ul style="list-style-type: none"> <li>• Hold global team meeting to review all candidates</li> <li>• Pressure-test fit with criteria</li> <li>• Confirm inclusion of all eligible candidates</li> </ul>	Final list of eligible award candidates, representing success stories worldwide
7 <b>Perform quality check</b>	Develop official award consideration materials	<ul style="list-style-type: none"> <li>• Perform final performance benchmarking activities</li> <li>• Write nominations</li> <li>• Perform quality review</li> </ul>	High-quality, accurate, and creative presentation of nominees' successes
8 <b>Reconnect with panel of industry experts</b>	Finalize the selection of the best-practice award recipient	<ul style="list-style-type: none"> <li>• Review analysis with panel</li> <li>• Build consensus</li> <li>• Select winner</li> </ul>	Decision on which company performs best against all best-practice criteria
9 <b>Communicate recognition</b>	Inform award recipient of award recognition	<ul style="list-style-type: none"> <li>• Present award to the CEO</li> <li>• Inspire the organization for continued success</li> <li>• Celebrate the recipient's performance</li> </ul>	Announcement of award and plan for how recipient can use the award to enhance the brand
10 <b>Take strategic action</b>	Upon licensing, company may share award news with stakeholders and customers	<ul style="list-style-type: none"> <li>• Coordinate media outreach</li> <li>• Design a marketing plan</li> <li>• Assess award's role in future strategic planning</li> </ul>	Widespread awareness of recipient's award status among investors, media personnel, and employees

## About Frost & Sullivan

Frost & Sullivan, the Growth Partnership Company, enables clients to accelerate growth and achieve best in class positions in growth, innovation and leadership. The company's Growth Partnership Service provides the CEO and the CEO's Growth Team with disciplined research and best practice models to drive the generation, evaluation and implementation of powerful growth strategies. Frost & Sullivan leverages over 50 years of experience in partnering with Global 1000 companies, emerging businesses and the investment community from 45 offices on six continents. To join our Growth Partnership, please visit <http://www.frost.com>.