

F R O S T & S U L L I V A N

FROST & SULLIVAN BEST PRACTICES AWARD

MOBILE COMMUNICATIONS SERVICES  
UNITED STATES

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**Visionary Innovation Leadership  
2019**

  
**federated**  
wireless™

FROST & SULLIVAN

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2019

BEST  
PRACTICES  
AWARD

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## Background and Company Performance

### *Industry Challenges*

Advancements in next generation wireless network technologies are accelerating the growth of innovative mobile applications, fundamentally changing the way we live, communicate, conduct business, consume content, and interact. In fact, Frost & Sullivan research indicates the number of wirelessly connected devices per household is steadily increasing throughout the world. Thus, the mobile communications services market continues to experience steady growth due to the proliferation of 'connected' devices coupled with advancements in wide area network (WAN) capabilities and coverage.

### ***Smartphone Proliferation Triggers Digital Transformation***

Frost & Sullivan research indicates that nearly 90% of the United States (US) population owned a smartphone in 2019—this metric is expected to surpass 95% by 2021. Moreover, the average US smartphone user now consumes over 6 GB of cellular data per month (and offloads a significantly larger percentage over WiFi networks). Frost & Sullivan expects this to triple over the next 5 years. Interestingly, smartphone users now dedicate approximately 90% of their mobile usage time to non-voice activities.

### ***5G Triggers Paradigm Shift in Mobile Connectivity***

Investments in next-generation wireless technologies, such as fifth-generation (5G) networks, are expected to further accelerate market growth. One common misconception about 5G is that it is only about faster data speeds. While increased speeds may be one of the first visible manifestations of 5G, there are a number of use cases envisioned in a range of industries that will have compelling applications far beyond watching videos on a smartphone. Consider some of the advantages 5G will have over 4G networks: the ability to handle significantly more data at speeds up to 10 times faster than current standard rates, enough bandwidth to connect billions of people and trillions of "things," greater than 99% service reliability, enhanced security, and greatly reduced energy demands. Thus, 5G has the potential to radically change how we think about connectivity and trigger an array of growth opportunities, not only in the consumer market, but across a wide range of industries.

### ***The Associated Surge in Mobile Data Traffic Tests Network Capacity Limits***

In this environment, mobile operators in the US increasingly require cost-effective capacity expansion solutions. The growing demand for network capacity makes it problematic for mobile operators to deploy advanced mobile communications services effectively. While the ability to offload mobile data traffic from cellular networks to small cells may serve as a near-term solution, municipal approval processes often preclude more active development of the capacity expansion plans via small cell diversification. Furthermore, the commercial LTE-U/LAA launch to take over the unlicensed 5GHz spectrum has been slow to ramp with market pushback from Wi-Fi constituents.

### ***Citizens Broadband Radio Services (CBRS): The Bridge to 5G***

In light of these current challenges, and in an effort to increase spectral efficiency to support the staggering increases in mobile data traffic, the FCC established the Citizens Broadband Radio Service (CBRS) in the 3.5 GHz radio band for nationwide spectrum sharing. CBRS provides 150MHz of untapped capacity expansion, which avoids accompanying complexities associated with unlicensed spectrum. In this regard, higher regulatory power limits and better RF propagation characteristics of the lower 3.5GHz band enable a more extended range than the 5GHz band providing flexible opportunities for more effective indoor and outdoor deployment in contrast to unlicensed spectrum choices like LTE-U/LAA.

The introduction of CBRS lays the foundation for significant growth opportunities for mobile network operators (MNOs), cable operators (MSOs), and wireless service providers (WISPs). CBRS certification and full automation is expected before the end of 2019, and licensed CBRS spectrum is anticipated in mid-2020. Importantly, Frost & Sullivan believes CBRS provides an immediate 'bridge to 5G' for market participants by enabling the efficient deployment of additional network capacity to support innovative wireless services at lower fixed costs.

### ***Focus on the Future and Best Practices Implementation***

#### **Leading the Way in the Mobile Communication Services Market**

Founded in 2012 in Arlington County, Virginia, Federated Wireless is the leading enabler of the shared spectrum ecosystem providing innovative CBRS solutions that combine high efficiency, speed, and features unmatched by the competition.

Since 2012, the company secured significant funding from SBA Communications, Pennant Investors, American Tower, GIC, Allied Minds, and Arris Group. The financing has enabled the company to further advance the availability and adoption of shared spectrum CBRS services by MNOs, MSOs, WISPs and enterprises looking to augment current and next-generation capacity for wireless services.

In particular, Federated Wireless has deepened its strategic cooperation with a variety of leading market participants in the communications market including: Verizon, Charter, American Tower, Airspan, Boingo Wireless, Cambium Networks, Cradlepoint, Contour Networks, Ericsson, ExteNet Systems, Geoverse, JMA Wireless, Landmark Dividend, Motorola Solutions, Nokia, Samsung, Telrad and Wave Wireless. Moreover, The Federated Wireless's partner ecosystem includes over 40 device manufacturers and edge partners, driving a growing ecosystem of CBRS handsets, tablets, and customer premise equipment (CPE).

#### **Excelling in Shared Spectrum**

Federated Wireless is at the forefront of shared spectrum management, enabling service providers to efficiently access shared spectrum to satisfy their growing mobile capacity demands. With the proliferation of mobile data traffic, Frost & Sullivan believes the

company's *Spectrum Controller* is the optimal solution for CBRS shared spectrum deployments.

The *Spectrum Controller* provides customers with shared spectrum management, which is implemented 'as a service' in the cloud to optimize efficiency, scalability, and ease of deployment. More specifically, the solution enables high bandwidth interference-free, while supporting enhanced wireless coverage and services. The company's *Environmental Sensing Capability (ESC)* is fully integrated into the *Spectrum Controller*, and dynamically detects incumbent activity and ensures that users are seamlessly shifted to available CBRS spectrum without service disruption. Moreover, the company's open partner ecosystem of pre-integrated CBRS OEMs, which is based on an API-centric architecture, eases integration and interoperability testing for customers, which accelerates time to market.

The *Spectrum Controller* includes the *Spectrum Lifecycle Management* tool, which allows customers to simplify and automate the deployment of networks on the shared spectrum, including planning, installation, spectrum optimization, and comprehensive spectrum analytics. These robust spectrum management capabilities allow users to lower contention and substantially increase spectrum efficiency to enhance key performance indicators (KPI) for customers.

### **Enabling Visionary Innovation: Eyes on the Future**

Frost & Sullivan not only recognizes Federated Wireless as a leader in the development of shared spectrum CBRS capabilities, but also as the first 'band manager' to complete a wide range of CBRS trials with its *Spectrum Controller*. By taking a lead role in the formation of the CBRS Alliance, Federated Wireless has emerged as a critical enabler for innovative CBRS use cases across a variety of consumer and vertical markets. More specifically, Federated Wireless has expanded its technological leadership, enabling initial commercial deployments of shared spectrum services to more than 20 customers across 36 US states.

In addition to 4G/LTE services, the CBRS alliance will support 5G industry standards by Q4 2019. In this dynamic environment, Federated Wireless is equipped to provide comprehensive support for these emerging capabilities, including edge computing and private networks. Recent CBRS deployments demonstrate a variety of innovative use cases supported by Federated Wireless:

- Federated Wireless provided first CBRS deployment at Dallas Love Field, a major US airport that serves over 15 million passengers each year. The company helped Boingo, US-based Wi-Fi provider, responsible for WI-FI at the airport to ensure seamless and secure connectivity in high-trafficked areas while also enabling private LTE network for back-office operations for the airport personnel.
- Federated Wireless helped Connectivity Wireless Solutions, a US-based IT service management company, to ensure around-the-clock surveillance and improved Wi-Fi service at the New York Times Square. Namely, Federated Wireless provided

efficient AI/ML-driven insights for security, operations, and Wi-Fi usage while enabling high-quality voice/video calls on standard smartphones in the area.

- In 2019, Federated Wireless partnered with Syniverse and Ruckus to enable companies to set up private long-term evolution (LTE) networks applying the CBRS spectrum to power secure data connectivity for the digital transformation of enterprise applications.
- The company worked with Landmark Dividend, a developer of real estate and critical infrastructure, to establish a managed wireless CBRS network for the Dallas Area Rapid Transit (DART) metro system. Supported by partners Ericsson and Cradlepoint, the solution delivers a private wireless network for critical DART data while providing public communication services from system-wide kiosks.

### *Conclusion*

As the US mobile communications market is in desperate need for cost-effective capacity expansion solutions, CBRS has emerged as an immediate opportunity to address market demands. Moreover, CBRS serves as an important 'bridge to 5G' by uniquely enabling the efficient deployment of additional network capacity to support advanced wireless services at lower fixed costs. In this environment, Federated Wireless has emerged as a leader in the shared spectrum revolution, an innovator in shared spectrum management, and a crucial partner driving compelling CBRS use cases across a variety of consumer and vertical markets.

For its ability to scout and detect unmet needs of customers, and proactively address them with solutions that complement next generation technologies, Frost & Sullivan is proud to recognize Federated Wireless with the 2019 US Visionary Innovation Leadership Award in the mobile communications market.



## Significance of Visionary Innovation Leadership

A Visionary Innovation Leadership position enables a market participant to deliver highly competitive products and solutions that transform the way individuals and businesses perform their daily activities. Such products and solutions set new, long-lasting trends in how technologies are deployed and consumed by businesses and end users. Most important, they deliver unique and differentiated benefits that can greatly improve business performance as well as individuals' work and personal lives. These improvements are measured by customer demand, brand strength, and competitive positioning.



## Understanding Visionary Innovation Leadership

Visionary Innovation is the ability to innovate today in the light of perceived changes and opportunities that will arise from Mega Trends in the future. It is the ability to scout and detect unmet (and as yet undefined) needs and proactively address them with disruptive solutions that cater to new and unique customers, lifestyles, technologies, and markets. At the heart of visionary innovation is a deep understanding of the implications and global ramifications of Mega Trends, leading to correct identification and ultimate capture of niche and white-space market opportunities in the future.

## *Key Benchmarking Criteria*

For the Visionary Innovation Leadership Award, Frost & Sullivan analysts independently evaluated two key factors—Focus on the Future and Best Practices Implementation—according to the criteria identified below.

### *Focus on the Future*

#### **Criterion 1: Focus on Unmet Needs**

Requirement: Implementing a robust process to continuously unearth customers' unmet or under-served needs, and creating the products or solutions to address them effectively

#### **Criterion 2: Visionary Scenarios through Mega Trends**

Requirement: Incorporating long-range, macro-level scenarios into the innovation strategy, thereby enabling "first-to-market" growth opportunity solutions

#### **Criterion 3: Growth Pipeline**

Requirement: Best-in-class process to continuously identify and prioritize future growth opportunities leveraging both internal and external sources

#### **Criterion 4: Blue Ocean Strategy**

Requirement: Strategic focus on creating a leadership position in a potentially "uncontested" market space, manifested by stiff barriers to entry for competitors

#### **Criterion 5: Growth Performance**

Requirement: Growth success linked tangibly to new growth opportunities identified through visionary innovation

### *Best Practices Implementation*

#### **Criterion 1: Vision Alignment**

Requirement: The executive team is aligned along the organization's mission, vision, strategy, and execution.

#### **Criterion 2: Process Design**

Requirement: Processes support the efficient and consistent implementation of tactics designed to implement the strategy.

#### **Criterion 3: Operational Efficiency**

Requirement: Staff performs assigned tactics seamlessly, quickly, and to a high-quality standard.

#### **Criterion 4: Technological Sophistication**

Requirements: Systems enable companywide transparency, communication, and efficiency.

#### **Criterion 5: Company Culture**

Requirement: The executive team sets the standard for commitment to customers, quality,



## 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 of 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 recipient</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 is able to 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

## 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.



### 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 more than 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>.