

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

2024 NEW PRODUCT INNOVATOR

*IN THE GLOBAL 4G/5G
NETWORK OPTIMIZATION
INDUSTRY*

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

BEST
2024 PRACTICES
AWARD



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. DGS excels in many of the criteria in the 4G/5G network optimization space.

AWARD CRITERIA	
<i>New Product Attributes</i>	<i>Customer Impact</i>
Match to Needs	Price/Performance Value
Reliability	Customer Purchase Experience
Quality	Customer Ownership Experience
Positioning	Customer Service Experience
Design	Brand Equity

Spectrum Background

Cellular technology uses radio frequency (RF) spectrum to transmit and receive data. What may not be obvious is that spectrum is a limited resource. Think of a specific RF channel as somewhat like a pipe that transports water. No matter how big the pipe is, there is a point at which it is at capacity and can accommodate no additional water. To continue the analogy, a pipe in perfect condition can transport a maximum volume of water in a given period, but any defect—whether a partial blockage (such as from sediment) or structural damage (such as a dent)—would reduce that capacity. Returning to RF, a specific RF channel has a limit to the volume of data that can be transmitted, even under the best conditions. The capacity of the RF channel is reduced if “imperfections” (such as interference) occur, affecting data-carrying capacity, reliability, and latency.

As more and more devices (the many tens of billions of mobile and IoT devices) use the available spectrum, that limited spectrum becomes even more valuable. Each nation controls its own spectrum and licenses the use of that spectrum, often for the equivalent of billions or hundreds of billions of dollars.

Because spectrum is a limited resource, creative solutions have provided more spectrum for cellular use. In the United States, one example has been the CBRS spectrum, which ranges from 3.55 to 3.7 GHz, right in the middle of the most valuable mid-band spectrum. The CBRS spectrum is “shared” between incumbent users (primarily the US Navy), newly awarded license holders (up to seven per county), and everyone else. Access is managed by what is called the Spectrum Access System (SAS), which tries to reduce potential interference. The sharing mechanism does not use real-time information, which means

that is more of an allocation method and will struggle as CBRS use scales up. New ranges of spectrum in the United States that become available will require more advanced spectrum-sharing approaches leveraging the lessons learned from CBRS. (Other countries are also watching CBRS to inform their own spectrum allocation.)

In November 2023, the Biden-Harris administration issued a landmark National Spectrum Strategy and a Presidential Memorandum on modernizing US spectrum policy. One of the pillars of this announcement calls for the development of dynamic spectrum sharing to help alleviate spectrum congestion.

Positioning and Design

Founded in 2013 and headquartered in Virginia, Digital Global Systems specializes in RF spectrum monitoring and management. DGS has been awarded 160 patents to support its hardware and software solutions that provide persistent, real-time situational awareness and help optimize the use of spectrum.

One of DGS's solutions (and the subject of this award) is DGS CLEARSITE, which provides a number of capabilities highlighted below.

- **Spectrum utilization:** Utilizing DGS's patented technologies, CLEARSITE provides a real-time view of devices using their wireless spectrum by monitoring frequency, time, and space, along with their signal characteristics. Without this crucial information, optimizing spectrum use is not possible. This capability ensures a network operator is using the highest quality and quantity of spectrum available.
- **Interference analysis:** Interference happens, even in the best-engineered networks. DGS's solution automatically detects, characterizes, and locates any interfering signals, enabling the elimination of the problem and increasing network reliability.
- **Competitive benchmarking:** Communication service providers (CSPs) invest significant sums in their cellular network infrastructure and in licensing spectrum. CSPs in a particular country or area compete on "having the best network," but do not have a clear view into the drivers of their network performance (or that of other CSPs.) CLEARSITE provides deep insights into network performance and enables CSPs to remedy any performance shortfalls.
- **Infrastructure management:** Network infrastructure is a significant investment. DGS's persistent RF environmental data provides input data that helps optimize planning (and investment).
- **Dynamic spectrum sharing:** Spectrum sharing schemes (such as is done with CBRS) are not using real-time information and lack scalability. CLEARSITE provides up-to-date, real-time utilization statistics to both the RAN and the SAS, enabling true dynamic spectrum sharing and supporting the recently released National Spectrum Strategy by the US government.

Quality and Reliability

Spectrum is the lifeblood of cellular networks, making it extremely valuable to

- CSPs whose existence depends on adequate spectrum;

- enterprises that are constructing private cellular networks to solve business problems that other technologies cannot solve; and
- cellular infrastructure suppliers and tower companies that work with CSPs and enterprises.

CLEARSITE provides valuable and timely information that enables organizations to optimally utilize all of their spectrum and improve their network performance. DGS believes the product and its technologies can make dynamic spectrum sharing possible. As new spectrum becomes available, it is likely that most of it will be shared, so improving the sharing mechanism with CLEARSITE is a win for all users.

“Spectrum is a limited resource and the lifeblood of cellular networks. DGS CLEARSITE provides valuable and timely information that enables organizations to optimally utilize all of their spectrum and improve their network performance.”

- Troy M Morley
Industry Principal, ICT

CLEARSITE provides direct support for the dynamic spectrum sharing principles highlighted in the National Spectrum Strategy document issued by NTIA. Since the solution will detect an incumbent before the operating network is interfering, the incumbent can be protected through directions provided to the Radio Access Network. Protection of high-altitude mobile radar is a critical requirement for access to the 3.1 – 3.45 GHz spectrum bands.

CLEARSITE provides the information needed to optimize the use of existing 4G and 5G spectrum, making it ideal for CSPs, enterprises deploying private 4G and 5G networks, infrastructure vendors (particularly RAN suppliers), tower companies, and more. While 5G did add spectrum for use, that spectrum will become congested. Most of the ecosystem that depends on spectrum cannot afford to wait till 6G (approximately 2030) for more spectrum: they must use the spectrum they have, as efficiently as possible, and CLEARSITE makes that possible.

Customer Experience

Backed by 160 patents (as of December 2023), CLEARSITE is positioned perfectly to provide needed RF information that no one else (currently) can provide. The product meets or exceeds customer expectations and features best-in-class quality with a full complement of tools and features to meet customer needs.

Optimizing spectrum use may not be a provocative concern for the average person, but it grows more important with each passing day (at least for providers and users of public and private cellular networks.) CLEARSITE provides essential information that no one else can.

The value of a brand can be hard to define, especially for a relatively young company with a new product. But when that product meets the needs of an entire ecosystem and is positioned as well as CLEARSITE is, Frost & Sullivan believes the result will be significant growth in the value of the company’s (and the product’s) brand.

Conclusion

Spectrum is the lifeblood of 4G and 5G wireless networks. At the same time, spectrum is a limited resource and only grows more valuable as more networks (public and private) and more devices consume more of the available spectrum. While allocating new spectrum takes many years, it is essential that every 4G and 5G network maximizes use of its existing spectrum and has the tools available to optimize performance. DGS CLEARSITE provides CSPs, enterprises, network infrastructure suppliers, tower companies, and SAS providers with the real-time information and tools to make the most of their spectrum resources.

With its strong overall performance, DGS earns Frost & Sullivan's 2024 Global New Product Innovation Award in the 4G/5G network optimization industry.

What You Need to Know about the New Product Innovation Recognition

Frost & Sullivan's New Product Innovation Award recognizes the company that offers a new product or solution that uniquely addresses key customer challenges.

Best Practices Award Analysis

For the New Product Innovation Award, Frost & Sullivan analysts independently evaluated the criteria listed below.

New Product Attributes

Match to Needs: Customer needs directly influence and inspire product design and positioning

Reliability: Product consistently meets or exceeds customer performance expectations

Quality: Product offers best-in-class quality with a full complement of features and functionality

Positioning: Product serves a unique, unmet need that competitors cannot easily replicate

Design: Product features an innovative design that enhances both visual appeal and ease of use

Customer Impact

Price/Performance Value: Products or services provide the best value for the price compared to similar market offerings

Customer Purchase Experience: Quality of the purchase experience assures customers that they are buying the optimal solution for addressing their unique needs and constraints

Customer Ownership Experience: Customers proudly own the company's product or service and have a positive experience throughout the life of the product or service

Customer Service Experience: Customer service is accessible, fast, stress-free, and high quality

Brand Equity: Customers perceive the brand positively and exhibit high brand loyalty

