A leading global provider of advanced defense technologies was asked to develop a complex multiport antenna for its government customer. But the antenna, comprised of multiple Transmit Receive (TR) modules, required characterization capabilities beyond its existing test equipment setup which was based on traditional Vector Network Analyzers (VNA).

The defense contractor spent two years looking for ways to add ports to its test systems without using a slow and costly switch matrix. Keysight experts partnered with the contractor’s team to show it how a new PXI Vector Network Analyzer characterizes a multiport active antenna without relying on switches.

The Challenge: Speed Development of a Complex Multiport Antenna

Traditional measurement solutions for individual TR modules are costly, slow, and complex. They also consume large amounts of rack space and power. The defense contractor sought to develop a costly multiport antenna that required several 48-port test systems and the addition of switch matrices. The complex project threatened to slow the calibration process and add up to six months of software development time. In addition, the project required a unique software framework which would add onto the software development team’s already steep learning curve.

Company:
• Global provider of advanced defense technologies

Key Issues:
• Win government contracts
• Develop complex, advanced defense technologies
• Meet project timelines

Solutions:
• Keysight PXIe Vector Network Analyzer (M9800A)
• Keysight global service and support

Results:
• Re-used PNA software cut development time by at least 6 months
• Eliminated switch matrices sped measurement process, improved accuracy, and lowered cost
• Defense contractor won the government contract and met program deadlines
The defense contractor evaluated its options which included using a legacy network analyzer with a complex switch matrix and new custom software; a competitor’s fixed configuration multiport VNA with additional switching and software which the customer purchased for another program two years ago; and the Keysight configurable multiport modular solution. The contractor ultimately selected the Keysight true multiport solution for its superior flexibility and performance, including the ability to perform pulsed measurements.

The Solution: True Multiport Network Analyzer Saves Time and Money

Keysight’s new line of PXI Vector Network Analyzers (PXI VNAs) enabled the defense contractor to approach its challenge in a different way. The true multiport PXI VNA significantly outperformed conventional switch-based network analyzer systems. It enabled the simultaneous test of multiple channels and allowed those channels to characterize multiport systems faster and at a much lower cost. And, because the defense contractor re-used its existing PNA and PNA-X software with the new system, it saved even more time and money.

In addition to cost and speed improvements, the new PXI VNA architecture provided 6 ports in 2 PXI slots which offered the contractor the scale to support future projects. The contractor evaluated a number of network analyzer systems over a two-year period. Ultimately, it purchased the Keysight solution for its superior measurement performance compared to previous test methodologies. The Keysight solution also provided advanced capabilities beyond S-Parameters, such as integrated pulse generators and modulators that enable RF pulsed measurements. Overall, the contractor realized a lower cost per port on every test system with the Keysight solution.

The contractor also expressed appreciation for Keysight’s on-site support which was a critical part of its decision criteria. Specifically, it praised Keysight ability to offer remote demonstrations of the new PXI VNA solution while in development. The Keysight R&D team offered this service to ensure the new solution would meet the defense contractor’s needs.
Key Takeaways

Using Keysight’s PXI VNA solution, the defense contractor successfully reduced design costs and total test time which gave its customer confidence that it could meet specific program deadlines.

Related Information

Compare our lineup of PXIe Vector Network Analyzers: up to 53 GHz

White Paper: The Increasing Importance of Increasing Ports: Addressing the Challenges of Multiport Test

For more information, visit: www.keysight.com/find/pxivna

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