Case Study

Spectrum Monitoring Moves to the Edge with Intel® NUC Mini PCs

Tektronix pairs Intel NUC Performance Mini PCs with its USB-based signal analyzers to rapidly and cost-effectively process test and measurement data

"Intel NUC Mini PCs provide more than enough processing power to help us capture and process large amounts of wideband signal data and visualize and act on that data automatically and remotely. They offer the perfect balance of size, weight, and power for use in a variety of applications."

— Dylan Stinson, Product Manager, Tektronix, U.S.

Imagine the potential threat of an unidentified drone approaching an airport, sports arena, or military base. To monitor the perimeter of large, sensitive locations like these, military, government, and commercial organizations rely on radio frequency (RF) spectrum monitoring and analysis solutions that must operate securely and reliably, 24/7, and generate real-time alerts to protect property and potentially save lives.

Drone detection is just one of many applications for Tektronix's USB-based Real-Time Spectrum Analyzers. When paired with small, powerful Intel® NUC Performance Mini PCs, the solutions can capture spectrum data in real time and process it at the edge, reducing network traffic. Because of their small size and portability, the solutions can also be stored easily, deployed quickly, and installed in a wide range of locations, including on manufacturing lines, radio towers, sport arena rafters, ships, and vehicles. The low cost of these high-powered solutions enables Tektronix to pass cost savings on to commercial and public customers.

High Performance Demands, Tight Space, and Budget Constraints

RF spectrum monitoring and analysis is a highly compute-intensive process that requires advanced signal processing architecture and sensors that can instantaneously capture a wide spectrum of bandwidth.

Tektronix's RF sensors can stream up to 224 MB per second of data in near real-time for scanning, analyzing, and recording the radio spectrum. The sensors can also produce up to five independent simultaneous data streams for signal processing within custom user applications, with every data stream placing additional demands on the CPU.

In part because of their high-performance demands, spectrum monitoring solutions can be prohibitively expensive to install and maintain. The exponential growth of Internet of Things (IoT) solutions and other wireless devices has made it more difficult and expensive for regulators and operators to identify signals of interest in the increasingly crowded radio spectrum.

Further challenges include high manufacturing costs and test times for IoT devices. The competitive and expanding IoT market is driving down the cost of wireless devices, which places added pressure on manufacturers to find efficient, reliable testing solutions at a low cost per measurement channel.

Powerful Performance in a Small Footprint

Intel NUC Performance Mini PCs, when paired with Tektronix's USB-based Real-Time Spectrum Analyzers, offer a compact, easily portable, low-cost alternative to larger monitoring solutions featuring traditional embedded processors.

The Mini PCs and Tektronix's USB-based spectrum analyzers, including the RSA306B and RSA500 Series, can be deployed together to form a network of high-performance RF sensors. Powerful Intel® Core™ processors in Intel NUC Performance Mini PCs make it possible to analyze collected data at the edge, which dramatically reduces the amount of traffic transmitted over the network.

Along with powerful processors, Intel NUC Performance Mini PCs feature Intel® Gigabit LAN and USB 3.1 and other ports, so Tektronix can connect multiple instruments to continuously stream large data files and plug in peripherals such as keyboards and antennas.

Benefits for Public and Commercial Customers

Compared to traditional bench instrumentation or PXI-based chassis instrumentation, Tektronix spectrum analyzers paired with Intel NUC Performance Mini PCs deliver numerous benefits:

- **Low cost:** Cost-efficient solutions enable Tektronix customers to drive down the cost per measurement channel.
- **Performance:** Intel NUC Performance Mini PCs deliver powerful Intel Core processor performance to support a variety of deployments.
- **Reliability:** Tektronix has not reported any need for repair of the Intel NUC Mini PCs, which are backed by a limited Intel warranty.
- **Compact size:** Tektronix customers can store the entire solution in tight enclosures or racks as small as a textbook or shoebox.
- **Flexibility:** Businesses can run either Windows or Linux operating systems on control instruments and Intel NUC Mini PCs using Tektronix's powerful APIs and drivers. Intel NUC Mini PCs can be integrated with existing test scripts while satisfying evolving IT security constraints.

The Future of Test and Measurement

Tektronix has ambitious plans for the years ahead, including expanding its disaggregated approach to test and measurement with Intel NUC Mini PCs. By reducing the cost and increasing the portability of its spectrum monitoring and analysis solutions, Tektronix can reach more customers, streamline deployments, and provide commercial, government, and military customers with the 24/7 performance and reliability they need.

About Tektronix

Tektronix designs and manufactures test and measurement solutions to break through the walls of complexity and accelerate global innovation. Tektronix solutions have supported many of humankind's greatest advances of the past 70 years. Health. Communication. Mobility. Space. With offices in 21 countries, Tektronix is committed to the scientists, engineers, and technicians around the world who will define the future.

For more information about Tektronix, please visit **Tek.com**.

For more information on the benefits of Intel NUC Mini PCs for businesses, visit **intel.com/nucforbusiness**.

"The lower cost of the Intel NUC is helping us reach new customers and compete more effectively. We estimate that our customers are saving up to 30 percent compared to similar competitive solutions, driving down their cost per measurement channel."

— Dylan Stinson,
Product Manager, Tektronix, U.S.