Benchmark

CASE STUDY

New Product Introduction of Cellular Connected Device

About

In the smart city/connectivity and telecommunications markets, flexibility is critical. Innovation moves at the speed of light and there's a great deal of competition to get to market first with a product that meets customer needs. That's why more providers are turning to trusted partners like Benchmark to add speed, talent, and flexibility to their new product development initiatives. Working with an EMS partner who incorporates engineering, manufacturing, and test support lets telco OEMs get to market ahead of the technology curve.

The Challenge

In a recent engagement with a leading smart cities infrastructure provider, Benchmark was the joint development partner on a connectivity device for energy management innovation, where speed to market was critical. As this was a completely new product, the customer wanted to collect data on performance in the field and continue iterating on the software while simultaneously ramping production of the hardware. The product was designed to be connected using a cellular network and deployed throughout a city to manage municipal energy costs and improve public safety.

The engagement called for a highly collaborative process, as the customer took on the responsibility of software development while Benchmark developed the hardware and test processes. When the hardware design was ready, Benchmark transitioned the product into manufacturing. The device needed to meet environmental, FCC, and Underwriters Laboratories standards.

To ensure each unit was correctly built and met the required standards, Benchmark needed to develop the full suite of in-circuit tests and firmware verification testing, as well as over-the-air tests. Over-the-air testing aims to predict the performance of the device in the real world. Conducting over-the-air testing outside of the geographic area where a device will be deployed can be costly since the device's network is not available in that area.

To facilitate rapid deployment and continued iteration, the customer also asked Benchmark to be responsible for loading the firmware onto the chips in the factory rather than ordering the chips pre-loaded with static firmware. This capability allowed for continued iteration of the software. The final challenge was transitioning the product to higher-volume production.

The key to success for this customer was working with an agile partner to meet all requirements while delivering the product to market faster.

The Solution

Solving these challenges meant managing multiple processes simultaneously. With its deep expertise in the New Product Introduction (NPI) process and its all-in-one design, engineering, and test capabilities, Benchmark

was the ideal partner. Benchmark worked with the customer to ensure the team communicated effectively so each process step—often parallel to other process steps—could go as smoothly as possible.

For an over-the-air test solution, Benchmark provided the customer with two options that would meet their performance and reliability goals while offering different types of test result data and price points:

1. Installing LTE simulators that allow the units to connect to the network in Benchmark's facility. This option is the traditional solution but is very costly.
2. Utilizing a signal generator that works with the frequency of LTE. It's an effective option for ensuring the device can go online but not confirm it can connect to the specific network. However, it comes with a much lower price tag.

Benchmark worked with the customer to evaluate the pros and cons of each option, and the team collaboratively agreed on the second. A signal generation solution allowed extensive antenna and signal analysis testing, which provided critical data to improve manufacturability. Another critical test performed using the signal generator was calibration. Since the unit needs to report data back to an operations center, the calibration tests confirmed the settings for data collection.

When the customer asked that the firmware be loaded at the factory, Benchmark took on the responsibility. At the beginning of the product launch, firmware changes were frequent. Benchmark changed the software version in the production floor management system, loaded the software onto each unit, and conducted testing to ensure the software worked properly.

Benchmark's proprietary production floor management system recorded the software version loaded onto each piece of hardware. The same data was entered directly into the customer's proprietary database in real-time, giving the customer visibility into deployed software versions. Sending the data electronically also allowed the customer to take advantage of direct shipment to customers managed by Benchmark, saving the hassle of managing warehouse and shipment operations.

The Results

After seven months of developing and testing different software iterations, the customer stabilized the software solution. Benchmark arranged for the chip supplier to program chips at the factory to speed up production as the product transitioned to high-volume manufacturing and continued direct order fulfillment.

Benchmark's ability to develop complete test solutions in parallel with product development and load software in-factory allowed the customer to improve the product quickly, get to market at an accelerated rate, and be rapidly adopted in major metropolitan areas.

The agile NPI process let the customer consistently meet increased demand and resulted in dozens of significant deployments across the U.S. Their smart city product is helping reduce energy costs, carbon footprints, taxpayer expenditures, and costs.

Benchmark has made critical investments in telco and smart cities capabilities to provide a one-partner solution for meeting performance and regulatory standards and requirements. Benchmark proved its ability to provide the customer with all necessary in-house services to reduce the burden on the customer and ultimately deliver a better product to the market quickly.

To learn more about Benchmark's work in next-gen telco, connected devices, and smart cities, visit the website at www.bench.com.

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