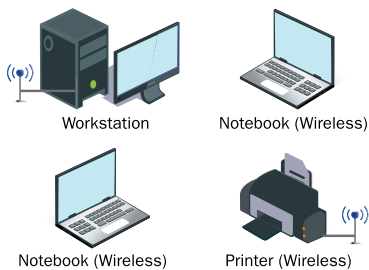


# NTS Services Spotlight: 802.11x Product Testing

## Specialists in Testing and Evaluation



NTS is an industry leader in wireless testing. Let us help you make sure your product is ready for release!



Our years of experience can help you get your wireless peripherals tested and certified, no matter what they are!



NTS has the tools and experience to help make sure your products are ready for market!

### Wireless Compatibility, Interoperability and Functionality

NTS has years of experience performing compatibility and functionality testing specifically on IEEE-802.11x wireless products. Testing covers all the latest and greatest protocols and technologies, including 802.11a, 802.11b, 802.11g, 802.11n, and 802.11ac, along with any new protocols released by the IEEE-802.11 working groups.

NTS can perform testing of your wireless hardware in a wide range of configurations designed to exercise each product in a "real-world" configuration. Our coverage can be customized to your particular product, and may include compatibility test points such as interoperability with other access point/routers, notebooks, desktops, and operating systems. In addition, NTS can cover a wide range of ad-hoc mode and infrastructure mode tests, including throughput, media streaming, power management, roaming, and security (WEP, WPA1 [TKIP], WPA2 [TKIP and AES], and Extended EAP [PEAP, PEAPv1, EAP-MD5, EAP-SIM, EAP-FAST, EAP-TLS, TKIP-SSN, Cisco-Leap, RIPv1&2, etc.]). NTS also performs RF testing, flat channel, multipath, and testing to custom specifications. **NTS will be offering antenna pattern testing soon.**

### Wireless Performance Testing

Performance testing allows companies developing wireless solutions to test their products against various competitive products in standardized test environments to measure throughput vs. distance for their products. Each test environment is selected to measure particular commonly encountered wireless situations. In order to measure performance, NTS has developed three typical "real-world" test environments: 1). Commercial Business environment, line of sight, 2). Indoor Office environment, non-line of sight and 3). Open Field environment, line of sight testing.

Testing is typically performed using tools such as IxChariot, an industry-standard tool used for emulating real-world performance scenarios for performance measurements. Measurements are typically performed using a long file send/receive which allows time for a "ramp" at the beginning of the connection and ultimately steady-state performance. These measurements are repeated at regular intervals (e.g., every 10 meters from the wireless access point) until the signal drops off completely.

### Wireless Interference Testing

Over the past few years, the 2.4GHz ISM Band has become increasingly crowded with various wireless technologies, as well as some every day home products that radiate into the same bandwidth. If your product works in this band, it might be a good idea to see how your product will function in "real-world" situations, as well as a "worst-case" scenario to measure the impact on your product's performance. Testing will be performed with a variety of products that work in the 2.4GHz band, including 802.11x products, Bluetooth devices, cordless home phones, microwave oven, ZigBee and other technologies in the same range. We can also use a signal generator to blast white noise onto the channel to determine how well your product either handles the noise or switches to alternate channels for better performance. Better to find out now how your product performs rather than waiting until your customers call to complain to your customer service department.

### About NTS

NTS is a world leader in assisting organizations to access domestic and international markets. We are a single source for a full range of integrated engineering solutions, product testing, standards compliance, project management staffing solutions, engineering and managed services. Globally accredited by leading regulatory agencies, NTS can provide cost-effective programs to meet your requirements at one of our many U.S. or international facilities, or we can provide on-site solutions. NTS is the nation's largest independent standards compliance and product testing company serving companies within the aerospace, defense, automotive, telecommunications, electronics, power, medical device, computer, software and financial markets.



Technology, skills, and experience to test all of your technology products.



NTS uses the latest technology to verify the compatibility, functionality and compliance of your products.



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## Highlights and Primary Test Specifications

### Compliance & Certification Testing

- ▶ USB Compliance Testing – Covering the entire spectrum of USB certifications, including:
  - USB 3.0 SuperSpeed Certification testing of devices & system/hub/host controllers
  - USB 2.0 High-speed, full/low-speed devices, silicon, and system/hub/host controllers
  - USB On-The-Go for high-speed and full-speed products
  - USB Embedded Host testing for high-speed and full-speed products
  - Wireless USB certification testing
- ▶ ZigBee Certification – Covering all the ZigBee products and profiles, including:
  - ZigBee Platform (PHY, MAC & ZCP) and ZigBee Network Devices (Gateways, etc.)
  - Smart Energy Profile 1.X – 2.0 coming soon!
  - Home Automation Profile, Remote Control/RF4CE Profile, Health Care Profile
  - Building Automation Profile, Input Device Profile, Light Link Profile
  - Retail Services Profile, Telecom Services Profile, 3D Sync Profile
  - In addition, custom test harnesses to verify the various profiles – the same tools used by NTS for certification!
- ▶ Multimedia over Coax Alliance (MoCA) certification testing for your home entertainment networking devices
- ▶ DIRECTV certification testing, covering Mid-RF & DECA – Hi-RF coming soon!
- ▶ Sirius XM certification testing for all your satellite radios – only authorized lab
- ▶ Wireless Compliance Institute ISA100.11a certification testing for wireless systems for industrial automation
- ▶ Microsoft WHQL/DTM/WHCK – Support for all product categories
- ▶ Compliance/Certification Program Development – Let NTS assist you in the development of a program to validate your standard/specification!

### Quality Assurance Testing

- ▶ Compatibility – Exercising software or hardware under an array of supported operating systems, additional software applications and supported hardware
- ▶ Interoperability – Exercising hardware with a selection of hardware and software to confirm “harmonious coexistence” of the products
- ▶ Stress/Performance/Load/Scalability – Using either actual users or virtual users with tools such as LoadRunner, WebLoad, WinRunner, WebFT, TCL, Test Director, Visual Test and Open Source
- ▶ Benchmarking – Using internal-developed or third-party benchmark tools
- ▶ Competitive Analysis – Comparing client’s product with competitor’s product
- ▶ Usability/Look-&Feel – Provide end-user analysis with various user experience (i.e., novice, intermediate, expert, etc.)
- ▶ Functionality – Exercising the various execution paths, either manually or through automated scripting tools such as WinRunner, Visual Test and WebFT
- ▶ Website Testing – Functionality, Browser Compatibility, Load/Stress/Performance using automation tools such as LoadRunner or WebLoad
- ▶ Security – Test to various security standards such as Common Criteria, ICASA, IEEE 802.1x, etc. using various third-party tools
- ▶ Localization – Software compatibility and functionality test across 35 different languages, such as FIGS, CCJK, etc.
- ▶ Custom Test Harness – Develop custom hardware and software tools in order to perform repeatable, automated testing on standards or specifications. Custom harnesses include ones developed for the ZigBee certification program.
- ▶ Automated Test Scripting – Develop automated scripts using various test tools, LoadRunner, WebLoad, WinRunner, WebFT, TCL Test Director, Visual Test, Open Source, C, C++, Delphi, Visual Studio and Visual Basic
- ▶ Test Plan/Test Case Development – Develop customized test plan/test case based on client’s specification and/or product documentation