Keysight Technologies
Test Solutions for
Greater Insight into
Wireless Connectivity

802.11 WLAN, Bluetooth®,
NFC/EMV, ZigBee, WiMax™,
Ultra-Wideband
Accelerate next-generation wireless

From design and development...

Keysight is an active participant in the development of test processes and measurement methods by following wireless connectivity forums and organizations: IEEE, Wi-Fi Alliance, WiMAX Forum, WiGi Alliance, and more. We are determined never to let test equipment needs stand in your way of developing innovative products for evolving wireless standards.

To integration and interoperability...

Keysight provides test equipment that can be used to help ensure your wireless products will conform to standards and interoperate with same-technology devices from multiple vendors. Keysight also provides tools and services to streamline the way you prepare for certification, helping you evaluate module performance, characterize interoperability, and make sure your integration effort results in certified products.

To manufacturing...

As technologies move into manufacturing, Keysight extends its expertise to offer stand-alone products and system solutions to help get your designs to market faster and more efficiently. And, we will continue refining our offering as technologies mature and cost-of-test issues drive manufacturing efficiency.

To installation and maintenance...

Field work continues to be demanding. Keysight’s tools allow you to do more in the field in less time and increase your ability to detect and eliminate interfering signals.

Worldwide engineering expertise

Our worldwide test engineering expertise and robust knowledge library of application notes, CDs, DVDs, videos and more are designed to help you interpret, clarify and test to continually evolving standards, giving you greater insight into your wireless connectivity designs. You face increasing technical and operational complexity. Keysight measurement and application expertise helps you anticipate these growing complexities so you can accelerate your ability to achieve both engineering and business goals.
## Wireless Connectivity presents engineering challenges

### Up to 10 meters: Wireless Personal Area Network (WPAN)
- WiMedia
- UWB
- Bluetooth®
- ZigBee
- NFC
- RFID
- 802.11 ad

### Up to 100 meters: Wireless Local Area Network (WLAN)
- WLAN 802.11ac
- WLAN IEEE 802.11a/b/g/h/j/p/n

### Up to 50 kilometers: Wireless Metropolitan Area Network (WMAN)
- 802.11ah sub-1GHz extended range WLAN
- 802.11af “White-Fi” WLAN in TV White Space
- Fixed and Mobile WiMAX™
- And more are being defined

### WPAN - Bluetooth, UWB, RFID, NFC, ZigBee

Additional enhancements to each of these technologies present a new learning curve and a new certification or compliance process. Improved functionality must not interfere with existing signals in close proximity. And package size demands tighter integration of the entire design including PHY requirements which are a new area of expertise for digital engineers.

### WLAN - Multiple WLAN versions including 802.11ac and 802.11ad

Multiple versions of the standard; 802.11a/b/g/h/j/p/n and the latest varieties 802.11ac and ad, add the challenges of backwards compatibility, embracing the latest standards, and cutting manufacturing costs with each new wave of standard development.

### WMAN - WiMAX Waves

Keeping abreast with a phased technology is never ending. WiMAX Wave 2 products include MIMO techniques; bringing a whole new complexity to antenna design and modulation schemes. In addition, your product must conform to 802.16 standards in order to be allowed to operate in defined geographic regions. These engineering challenges coexist with a pressure to bring certified high-quality, high-yield products to market quickly.
Design and Development

Whether you are designing components, or user equipment, only Keysight delivers a complete, integrated R&D design and test environment with simulation, characterization, and evaluation tools. Keysight’s broad product portfolio makes it the only test equipment supplier able to provide a single-vendor solution for the cross-domain test challenge of digital wireless designs such as DigRF.

Baseband DSP and System Design

Keysight SystemVue is a focused electronic design automation (EDA) environment for electronic system-level (ESL) design. It enables system architects and algorithm developers to innovate the physical layer (PHY) of wireless and aerospace/defense communications systems and provides unique value to RF, DSP, and FPGA/ASIC implementers. By integrating algorithms with standards-based reference libraries, RF and channel models, and stimulus-response test equipment, Keysight has created a new category of system-level design tools that move designs along much faster.

RF component design and development

Keysight offers leading-edge RF EDA tools for transceiver designers, including RFICs (GoldenGate), RF & microwave (Advanced Design System) and personal RF board design (Genesys). Then using these tools, connect them to benchtop instrumentation and verify your simulated and real designs.

Connect the Keysight PNA-X or ENA network analyzers and match real-world test results with simulation data for accelerated validation and pre-compliance.

The W1917 WLAN personality for SystemVue also links to the 89600 VSA “Custom OFDM” measurement personality to provide early stimulus-response support for the emerging 802.11ac standard.

Keysight Signal Studio and embedded software is a suite of flexible, easy-to-use, signal creation software that will cut the time you spend on signal simulation. And, with a demonstrated first-to-market track record, Keysight’s signal creation software offers insight and confidence in your design.

Test STC and MIMO features, and new IEEE 802.16Rev2 features such as CDD and FDD/H-FDD frames using N7615 Signal Studio for WiMAX.
Prototype evaluation

From standalone one-box test sets for early manual testing, to multi-channel design validation, to automated conformance test systems, Keysight has the right tools to help you fully evaluate your prototype and pre-production devices throughout your development cycle. X-Series signal analyzers have a library of more than 25 measurement applications including WLAN, WiMAX and Bluetooth.

Module design

Combine the Keysight MXG signal generator, pattern generation, and logic analysis with the Keysight MXA and the Keysight 89600 Vector Signal Analysis software, for complete characterization of digital wireless designs. Keysight’s innovations keep pace with technology development. Keysight 89600 VSA software supports newer technologies like 802.11ac. And the PXA Signal Analyzer has 160 MHz bandwidth required by some advanced technologies like 802.11ac.

The N9077A application provides FFT-based spectrum analysis, time domain analysis, general purpose digital modulation analysis and advanced 802.11 a/b/g/ac modulation analysis.

The 89600 Series VSA paired with a DSO90000 Series oscilloscope captures an entire 500 MHz UWB signal.
Manufacturing

In the manufacturing environment you feel intense time-to-market pressures, especially for new technologies where being first is key. From complete networks and hubs to end-user equipment with a lifetime of only a few months to make a return on investment, you need to get your product to market fast, while protecting your bottom line. Choose Keysight for a complete portfolio of test equipment solutions that are fast, accurate, flexible, and cost-effective.

Component test

Developing technical leading-edge components brings many unexpected problems from various factors. Use Keysight network analyzers with multi-port test sets and calibration tools to minimize reconnection and obtain optimum measurement integrity. For complicated technical issues beyond linear component characterizations, Keysight PNA-X Series is the right solution. Solve the complicated non-linear technical issues in a single instrument with a single set of connections.

A single platform is rarely the right answer for every test scenario. That’s why the Keysight portfolio includes more than traditional instruments. PXI modular products deliver measurements today and enable capabilities for the future.

E6640A EXM wireless test set

The E6640A EXM wireless test set scales with your production needs and is in sync with the latest WLAN chipsets. It delivers the speed, accuracy, and port density you need to ramp up rapidly and optimize full-volume manufacturing.

The EXM flexible sequencer uses single acquisition multiple measurement (SAMM) techniques to provide high-speed calibration and verification of your devices and modules for maximum manufacturing throughput. Should issues arise, multiple color-coded result views help you quickly identify them for quick resolution. Using the X-series measurement applications with the EXM wireless test set makes it easy to rapidly ramp up and optimize full-volume manufacturing.

X-Series measurement

The X-Series measurement applications help you easily achieve your manufacturing test goals for today’s multi-format devices. It quickly performs standards-based measurements for compliance with IEEE 802.11 series standards and other wireless connectivity technologies.

The PNA-X is an ideal tool for measuring amplifier specifications, from gain and return loss, to harmonics and IMD.
Installation and Maintenance

As operating frequencies have soared from sub-GHz levels up to 5.8 GHz, you have had to build more hubs or upgrade existing sites to maintain the same size coverage area. As a result, you need to deploy and maintain more sites and more complex and co-located networks than you previously did in the same amount of time. You need the right installation and maintenance tools that make you more productive.

Keysight’s FieldFox RF analyzers are designed to withstand your toughest working conditions. To accelerate maintenance and troubleshooting, each operating mode has a task-driven user interface that saves time in the field.

Covering frequencies from 9 kHz to 20 GHz, the Keysight HSAs have the features you need for operating in tough field environments and their measurement performance gives you confidence the job’s been done right. The Keysight HSAs let you automate routine tasks to save time and ensure consistent results.
As more and more wireless connectivity technologies aim for higher data rates with better spectrum efficiency, Multi-Input Multi-Output (MIMO) is a key technique used in wireless connectivity applications. Keysight provides a broad and powerful set of MIMO test solutions.

www.keysight.com/find/mimo

Validating MIMO designs

The M9381A PXIe Vector Signal Generator and M9391A PXIe Vector Signal Analyzer provide up to 8x8 MIMO tests with precise channel-to-channel synchronization and up to 160 MHz generation and analysis bandwidth for the more complicated spatial multiplexing MIMO and beamforming analysis.

The modular products combined with the industry proven 89600 VSA software provide the ability to demodulate and analyze up to 8 phase coherent channels simultaneously, providing insight into your latest wireless designs.

For baseband analysis the M9703A AXIe multichannel AXIe digitizer provides 8-synchronized channels with 12-bit resolution and optional, real-time, digital down-conversion (DDC) for tuning into the signal of interest. This solution is capable of capturing 802.11ac baseband IQ signals and provides up to 800 MHz analysis bandwidth at full sampling rate to address emerging wireless standards.

Download your next insight

Keysight software is downloadable expertise. From first simulation through first customer shipment, we deliver the tools your team needs to accelerate from data to information to actionable insight.

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Greater insight - web sites rich with resources

Get a jump start on learning new technologies by investigating Keysight’s wireless connectivity web sites. Here you will find white papers, application notes, eSeminars, DVDs, videos and other valuable resources to help you research, identify and implement the best test solutions to meet your specific project needs.
The right tools for the right technology

Keysight products cover the intricacies of design, integration, interoperability, manufacturing and installation. Reliable hardware and personalized software cover the spectrum of wireless connectivity technologies - from WLAN (and its many renditions) to WiMAX, MIMO, RFID, NFC, Bluetooth, UWB and Zigbee.

Accelerate next-generation wireless

Design and Simulation, Logic Analyzers, Network Analyzers, Oscilloscopes, Power Meters and Sensors, Power Supplies and Sources, Signal Analysis, Signal Generation, Test Sets, Specialty Test


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