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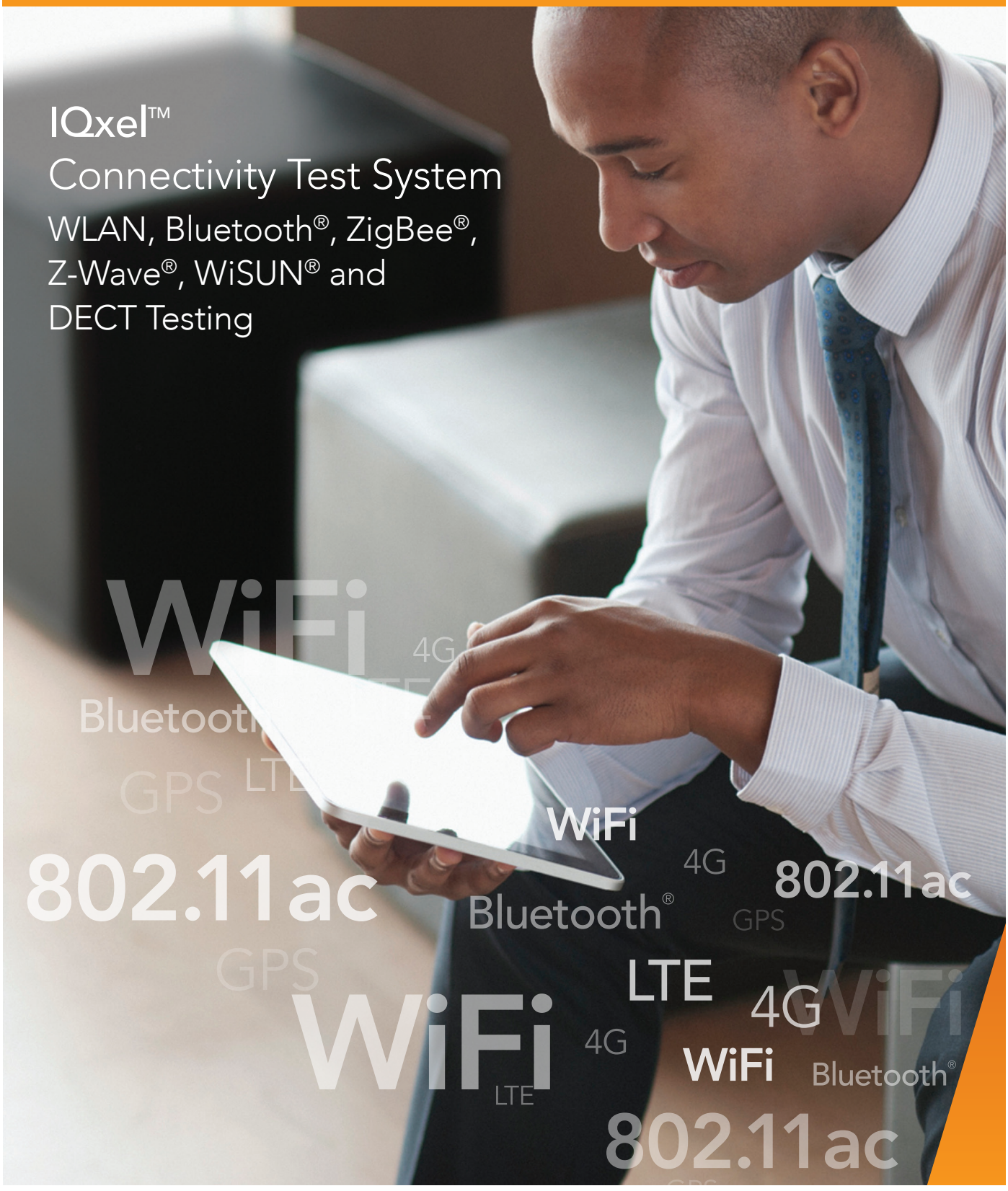
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iQxel

BROCHURE



IQxel™ Connectivity Test System

WLAN, Bluetooth®, ZigBee®, Z-Wave®, WiSUN® and DECT Testing

LITEPOINT

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Testing for the Full Range of 802.11 WLAN, Bluetooth, ZigBee, Z-Wave, WiSUN and DECT Devices

One platform with multiple configurations to fit your needs



IQxel-80

The 802.11ac Reference Standard
Reference standard in key chipset makers software



IQxel-160

Ready for Next Generation 802.11ac – 160 MHz
R&D leader for 2x2 true MIMO, non-contiguous and contiguous 802.11ac

*IQxel-80 can be upgraded to IQxel-160

Designed for Manufacturing

The LitePoint IQxel™ is the first One Box Tester (OBT) for 802.11ac devices. Its rugged design makes it simple to deploy in high-volume device manufacturing applications. IQxel delivers the quickest and easiest factory test capabilities because of its simple but robust architecture that uses a compact 2U high chassis. It requires no external PC for processing of captured measurements, and utilizes standard gigabit Ethernet communication and SCPI-compliant control commands.

IQxel uses native dual-DUT RF connections, providing built-in ping-pong test capability and eliminating the need for external RF components that can degrade accuracy and cause reliability concerns in manufacturing environments.

Comprehensive Wireless Test Solution

IQxel family testers inherit the industry leading testing capability of WiFi and Bluetooth from previous generation LitePoint tester and add the capability to test 802.11ac, ZigBee, Z-Wave, WiSUN and DECT. This provides flexibility to customers who need to test multiple wireless standards. Networking products, such as set top boxes and home gateways, are incorporating more and more wireless standards besides WiFi.

Bluetooth, ZigBee, Z-Wave, WiSUN and DECT are optional test capabilities and can be software upgraded as and when they are required. The future proofing IQxel safeguards initial hardware capital investment.

Ready for 802.11ac

The LitePoint IQxel is designed around the challenging performance needs of 802.11ac-enabled devices that support both greater bandwidth and higher modulation order to meet the ever-increasing demands for data throughput. IEEE 802.11ac requires the capability to support the analysis of 80 MHz signals and optionally support modulation and demodulation of 160 MHz contiguous and 80+80 MHz non-contiguous signals.

In addition to increased signal bandwidth, the 802.11ac specification also requires more stringent mask measurements than previous standards—240 MHz bandwidth for the 80 MHz version and 480 MHz bandwidth for the 160 MHz version. Additionally, 256-QAM modulation requires even greater signal-to-noise ratio (SNR) and distortion performance for the test system to be able to meet the stricter requirements related to EVM measurements for this standard. This translates to a more sophisticated RF design of the tester. IQxel, with its unique RF front-end architecture, is designed to exceed the demanding performance requirements of 802.11ac devices.

IQxel is also designed to test ZigBee, Z-Wave, WiSUN and DECT, classic and low energy Bluetooth devices in compliance with the industry standards, saving test time and test cost for the devices.

The flexible IQxel architecture supports MIMO testing in both R&D and manufacturing environments. In an R&D environment, IQxel provides true MIMO measurement capabilities by using both single and multiple, synchronized testers. In manufacturing environments, a composite EVM methodology can be employed using a single tester to minimize deployment cost. An R&D environment can have up to 8 IQxel units synchronized to enable generation of up to 8 independent signal streams to the DUT and 8 independent signal captures from the DUT. IQxel also has a scalable architecture that allows additional IQxel testers to be added and synchronized to each other over time as the MIMO order expands.

IQxel offers RF and differential analog baseband inputs / outputs for device characterization. The range of I/O enables IQxel to meet both RF transceiver and System on Chip (SoC) verification needs.

Seamless Transition from Existing LitePoint WLAN Test Systems to 802.11ac Testing

IQxel allows re-use of existing test scripts and software developed on the industry standard LitePoint WLAN/Bluetooth testers including IQview®, IQflex®, IQ2010™ and IQ2015™. IQxel ensures a fast and easy transition to 802.11ac testing, while still enabling existing 802.11 a/b/g/n/j/p test programs to be run on the IQxel without having to rewrite software by taking advantage of LitePoint's extensive library of IQfact™ chipset calibration and verification software.

IQxel provides users the option of developing test software in either a Windows® C/C++ API environment (IQapi) or using a Standard Commands for Programmable Instruments (SCPI) interface. The SCPI interface provides an operating system independent interface that easily interfaces with scripting languages like Python running under Windows®, Linux, or Mac® based operating systems.

The system also supports programming graphically with platforms such as LabVIEW™ using LitePoint software libraries.

System Capabilities and Features

Supports full range of WLAN and Bluetooth device testing

- Ability to fully test enhanced capabilities of IEEE 802.11ac specification that demands increased bandwidth, higher modulation order, and more stringent EVM requirements
- Ability to support 256-QAM constellation mapping
- Ability to test all existing IEEE 802.11 specifications that includes 802.11 a/b/g/n/p/j/ac
- Fully backward compatible with existing LitePoint WLAN test systems
- Ability to test all Bluetooth device standards (1.x, 2.x, 3.0, 4.x, 5)
- Ability to test ZigBee standards (IEEE 802.15.4)
- Ability to test Z-Wave (ITU-T G.9959)
- Ability to test WiSUN MR-FSK (IEEE 802.15.4g)
- Ability to test DECT standards (ETSI EN 300 176-1)

High test throughput for manufacturing

- Proprietary advanced algorithms for test speed optimization
- Built-in ping pong to minimize idle time

Scalable MIMO support

- Expandable architecture that supports up to 8x8 MIMO
- Supports testing of all key IEEE 802.11ac MIMO specification enhancements including MU-MIMO

Support for Analog Baseband I/O

- Includes differential baseband I/O for transceiver I/Q measurements and signal stimulus

Built-in Waveform Generation

- Ability to generate WLAN waveforms with custom MAC addresses directly in the tester

Flexible Programming Interface

- Ability to leverage API test routines within existing LitePoint systems and program using LitePoint IQmeasure
- Ability to program over Ethernet using text-based SCPI programming
- Ability to program graphically using platforms such as LabVIEW

Available Turnkey Test Software Solutions

- Availability of LitePoint IQfact™ software solutions for customized testing of leading chipsets
- Ability to calibrate and verify the chipsets

Specification Highlights

Wide Range of Supported Wireless Standards

- 802.11a/b/g/n/p/j
- 802.11ac (Optional)
- Bluetooth 1.x, 2.x, 3.0, 4.x, 5 (Optional)
- DECT (Optional)
- ZigBee/IEEE 802.15.4 (Optional)
- Z-Wave / ITU-T G.9959 (Optional)
- WiSUN MR-FSK / IEEE 802.15.4g (Optional)

Frequency Range

- 860 to 960 MHz (RF1, RF2)
- 1770 to 2100 MHz (RF1, RF2)
- 2200 to 2600 MHz (RF1, RF2)
- 4900 to 6000 MHz (RF1, RF2)

Instrument IF Bandwidth

- 120 MHz (IQxel-80)
- 120+120 MHz (IQxel-160)

Output Power (Maximum)

- +9 dBm (1770 to 2100 MHz, 2200 to 2600 MHz)
- +7 dBm (4900 to 6000 MHz)

Ready for robust testing of IEEE 802.11ac standards

LitePoint has been a leader in wireless device testing and brings deep expertise in the comprehensive testing of WLAN IEEE specifications. With the IEEE 802.11ac standard, LitePoint offers the IQxel systems that have been designed to fully handle all challenges of IEEE 802.11ac technology to deliver cost-effective, accurate, complete test coverage in less test time.

Support for testing increased bandwidth

IEEE 802.11ac presents new and significant challenges in testing because of increased bandwidth support that effectively makes existing test systems that have combined vector signal analyzer and vector signal generator (VSA/VSG) in a single box obsolete. The built-in support for very wide IF bandwidth in the IQxel test system family ensures full support for testing the transmission of 160 MHz contiguous and 80+80 MHz non-contiguous signals defined by the 802.11ac specification.

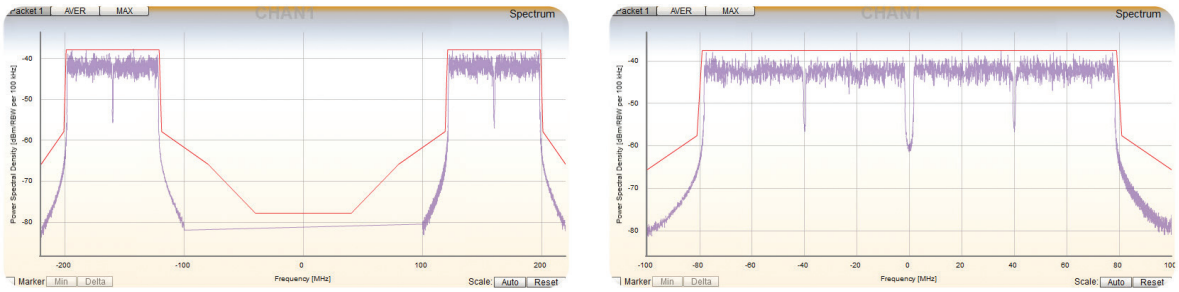


Figure 1: IQxel Test System Mask Testing of 802.11ac 80+80 non-contiguous and 802.11ac contiguous standards

Support for testing 256-QAM constellation mapping

LitePoint IQxel test systems support the newest IEEE 802.11ac optional requirement for 256-QAM constellation mapping. This mapping can be used for both 80 MHz and 160 MHz transmissions, as well as for all other key features and enhancements built into the technology to improve the user experience of existing WiFi™ networks.

Supports Versatile Development Platforms for Customization

The IQxel test system includes software libraries specific to the particular communication standard of interest. A variety of signal creation and analysis routines are provided and are available through either a graphical user interface (GUI), C++ API, or SCPI. All measurement functions are accessible from the GUI and also through the C++ API or SCPI commands that enables custom test program automation in a manufacturing or design characterization testing.

Multiple remote users can simultaneously view data captured on a single the IQxel test system that is sent to a LAN interface using TCP/IP. This is particularly advantageous in an R&D environment where multiple users can share the same station from different locations.

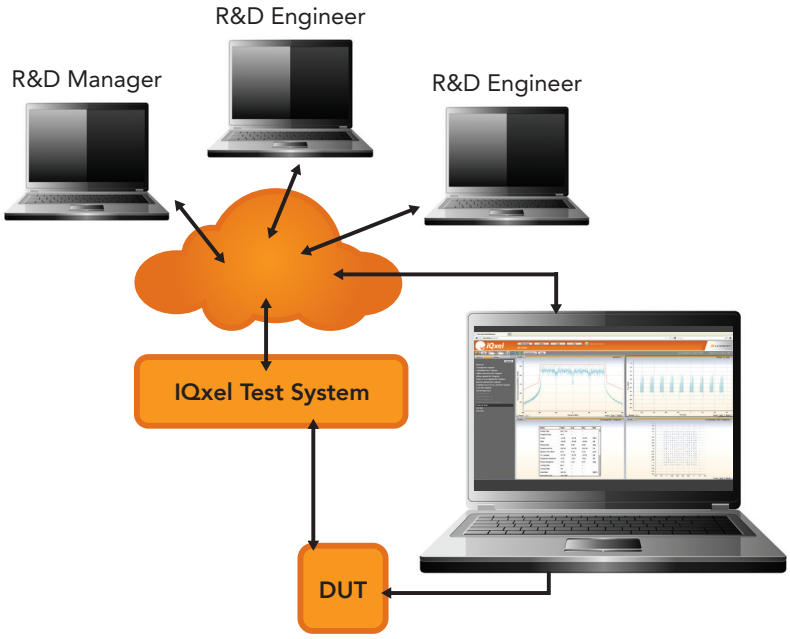


Figure 2: IQxel Test System—Connected to the control PC and to multiple users' PCs via LAN interface using TCP/IP

IQxel's browser-based, platform-independent Graphical User Interface (GUI) allows seamless display of data and instrument control over virtually any operating system using a TCP/IP connection and a web browser. This powerful interface simplifies characterization and debugging in R&D environments, with easy to use built-in graphical tools, tables, and plots.

The IQxel's GUI also includes waveform generation capabilities. These capabilities simplify the generation of 802.11 test signals for volume-production of your devices without compromising quality by verifying the conformance and interoperability, in typical and worst-case conditions, in a controlled and fully repeatable way.



Figure 3: IQxel's Graphical User Interface

IQxel-160 not only has the capability to test the additional bandwidth requirements needed for 802.11ac standards but also gives more flexibility to users with additional features:

IQxel-160:

- Support for 80 MHz 2x2 True MIMO in a single tester
- Support for 80+80/160 MHz – 2 DUT ping-pong testing



Figure 4a: IQxel-160 testing an 80 MHz, 802.11ac, 2x2 MIMO device using True-MIMO method
Figure 4b: IQxel-160 testing two 80 MHz, 802.11ac SISO devices in parallel or two 160 MHz, 802.11ac SISO devices in ping-pong

Flexible MIMO Support

LitePoint IQxel provides the flexibility to add up to 8 units to support full 802.11ac MIMO capability that can expand up to an 8x8 system. This flexibility provides the key benefit of scalability without commitment to prior capital expenditure based on the needs for MIMO testing that can change over time.

The highly flexible architecture of IQxel allows for each test system in a MIMO set up to act as a standalone system for SISO measurements where the configurations can be switched in minutes to suit laboratory or manufacturing purposes.



Figure 5: IQxel systems may be combined for MIMO applications as needed

Ease of Development

IQxel comes with the following pre-defined test functions for common 802.11 measurements that simplify the testing of all supported WiFi standards:

- Error Vector Magnitude (EVM)
- Spectral Mask (SEM)
- Packet Error Rate (PER)
- RMS Phase Noise
- Power Spectral Density (PSD)
- Spectral Flatness
- I/Q Phase Error
- I/Q Amplitude Error

Ease of Field Maintenance

Wireless device manufacturing environments must optimize equipment utilization to minimize the cost of testing very large volumes, and any downtime incurred due to instrument maintenance is a costly wasted resource. IQxel guarantees ease of field maintenance and minimization of operational costs with its innovative architecture that comes with fully serviceable RF modules

Each module is calibrated at a LitePoint service center or factory and requires no subsequent calibration until the standard warranty period expires.



Figure 6: IQxel's Fully Calibrated, Replaceable RF Module

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