IQxel-M

IQxel-M™
Multi-DUT/Multicom™
Connectivity Test System

IQxel-M — A Breakthrough Innovation for Wireless Testing

The new LitePoint® IQxel-M™ test system is a major advancement in the speed and efficiency for performing parallel tests on up to four wireless devices. It is the ideal solution for high-volume production environments enabling testing of numerous connectivity standards including 802.11, Bluetooth®, ZigBee®, Z-Wave®, WiSUN®, LTE-U and DECT as well as all navigation and broadcast standards, while delivering with superior reliability and test speed.
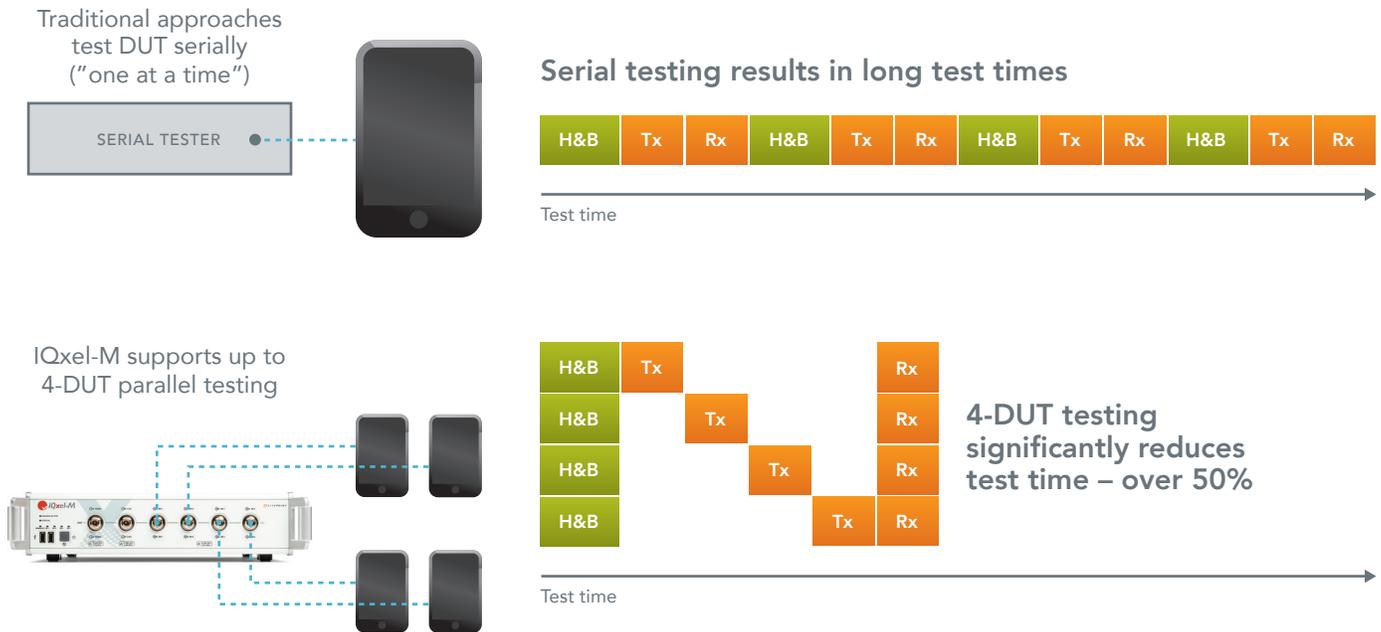
The manufacturing-optimized IQxel-M calibrates and verifies the performance of wireless devices with over 200% increase in throughput relative to single-device test systems. With its rugged and compact design, the 2U-high chassis fits in a standard 19" rack, minimizing the factory deployment footprint. LitePoint's patented Packet Engine™ technology enables test methodologies that are fine-tuned per wireless standards to enable maximum test throughput. The IQxel-M utilizes non-signaling physical layer test methods to significantly increase test throughput as compared with signaling-based methodologies typical of R&D and conformance test systems.

The IQxel-M was designed to address the worldwide demand for smart devices—over 2 billion mobile devices are produced each year and that rate is growing at over 20% per year. Adding to the challenge of addressing this volume growth comes new, more complex, connectivity standards, expanding operating bands (both below 1 GHz and above 5 GHz), and new deployments of navigation services for which compatibility is needed. The complexity of smart devices is at an all-time high.

With the 3G and 4G networks becoming increasingly overloaded due to the growing demand for video content (representing over 50% of mobile data usage), carriers are relying more and more on Wi-Fi networks to handle the burden. To ensure the ability to move smart devices from 3G/4G network service to public and private Wi-Fi network use, carriers have made Wi-Fi production test mandatory. The IQxel-M is the production solution that can keep up with these testing challenges today and into the future.

Flexible Parallel Tests on Multiple Devices

A key feature of the IQxel-M is its ability to perform parallel tests on up to four devices simultaneously. The IQxel-M has the ability to utilize both asynchronous and synchronous parallel testing methods. Asynchronous mode enables device testing that can start and stop independently of other devices in the same test station. The IQxel-M with its embedded intelligent scheduling capability leads to throughput increases over 200% relative to single-device systems. Synchronous testing best utilizes the unique architectural design of the IQxel-M by coordinating receive and transmit tests across multiple devices, providing throughput increases in the range of 250% to 350%. With other LitePoint innovations, including Sequence-Based Test (SBT), drives throughput even higher.

Traditional approaches test DUT serially ("one at a time")

SERIAL TESTER

Serial testing results in long test times

| H&B | Tx | Rx | H&B | Tx | Rx | H&B | Tx | Rx | H&B | Tx | Rx |

Test time

IQxel-M supports up to 4-DUT parallel testing

H&B	Tx			Rx
H&B		Tx		Rx
H&B			Tx	Rx
H&B				Tx	Rx

4-DUT testing significantly reduces test time – over 50%

Test time

While synchronous parallel test provides the greatest throughput advantage, configuring a factory for such a deployment has implications on initial capital expenditure, production line setup, and even employee training. Utilizing asynchronous parallel tests with the IQxel-M allows for re-use of existing capital equipment such as single-device shielded boxes, preserves the general factory setup and operator experience, while allowing the consolidation of multiple test stations into one. This frees up precious factory floor space and reduces operational expenditure including labor, power consumption, and general overhead. When further capacity expansions are needed, the IQxel-M can be re-deployed in a synchronous parallel test configuration for even greater throughput increases and operational savings.

Concurrent Testing Further Increases Throughput

IQxel-M enables multi-DUT testing: parallel testing of multiple devices. At the same time, LitePoint's Multicom™ technology enables the concurrent test of multiple technologies. So, with IQxel-M, you have the ability to test Wi-Fi, GPS, and FM, for example, all at the same time, rather than serially. Combined, these multi-DUT and Multicom capabilities can increase production test throughput by up to 500% compared to single-DUT, serial test methods. Both of these distinct features are key to providing maximum production output with a single test system implementation.

Traditional approaches
test multiple radios serially
("one at a time")

SERIAL TESTER

- WiFi/BT
- GNSS
- FM

Serial testing results in long test times

| WiFi | BT | GPS | GLONASS | FM |

Test time

IQxel-M offers concurrent
testing of multiple radios

- WiFi/BT
- GNSS
- FM

| WiFi | BT |
| GPS | GLONASS |
| FM |

**Concurrent testing reduces test time – up to 50%**

Test time

*DUT O/S must support concurrent test

Packet Engine Technology: The Central Nervous System

Now in its fifth generation, LitePoint's Packet Engine is the central nervous system of the IQxel-M. Delivering best-in-class test speeds by implementing device verification designed for the technology being tested, the Packet Engine enables signal analysis that is fully aligned with the device under test, rather than relying on time-based assumptions. As a result, your testing will be completed in the shortest period of time possible, with measurements being consistent and repeatable from device to device.

The Packet Engine in the IQxel-M is fully programmable, allowing LitePoint to add new wireless standards and test methods to the system, making it a future-proof solution for your test needs. To drive test efficiency to the next level, LitePoint has coupled the Packet Engine with our new SmartPort™ technology allowing each RF port on the IQxel-M to be independently controlled while simultaneously providing input to the Packet Engine. This enables testing on up to four devices in parallel and dramatically increases device throughput.
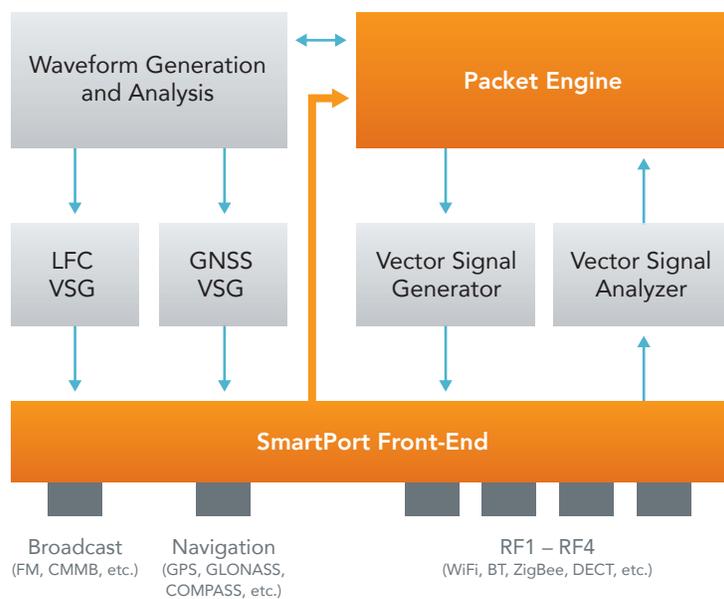
Future-Proof Test System

The IQxel-M provides comprehensive test coverage of the physical layer for the most popular wireless connectivity standards, including both legacy and new standards. With the capability to update the system's generation and analysis software, the IQxel-M is ready for the future. The IQxel-M covers test requirements of all common connectivity technologies in wireless devices including 802.11a/b/g/n/p/ac/j, Bluetooth, DECT, ZigBee, Z-Wave, WiSUN, LTE-U, GPS, COMPASS, GLONASS, FM, DAB, and DVB among others. With convenient software licensing options available, customers can expand the tester capabilities as new test standards evolve, therefore preserving your capital investment.

Ready-to-Go Solutions for All Major Chipsets

Tying together the innovations inside the IQxel-M with the wireless device to be tested is LitePoint's IQfact+™ software. Backed by a library of literally hundreds of chipset solutions that LitePoint has created by working closely with the leading chipset suppliers, IQfact+ utilizes the power of the IQxel-M's Packet Engine and SmartPort technology to deliver a total solution that accelerates time-to-market while minimizing the total cost of test of advanced wireless devices.

IQfact+ solutions are fully tested with each new chipset and verified with key semiconductor suppliers, saving you weeks or even months of development effort and correlation work. With LitePoint, you can focus on driving innovation for your customers, not spending your time programming and setting up complicated test systems. With well over 200 solutions available, covering the latest innovations in 802.11ac (including MIMO and beamforming) Bluetooth Low Energy, COMPASS, GLONASS, etc., IQfact+ can cover all of your chipset support needs and across virtually all LitePoint test platforms. More than a decade of close cooperation with major wireless chipset vendors ensures the most efficient testing possible and allows for unique, optimized calibration routines to reduce test time. You get a solution that simply works. Fast.

System Capabilities and Features

Rugged and compact design

- 2U-high chassis fits in standard 19" rack

Quickest and easiest factory test capabilities

- Integrates easily into automated test solutions and high-volume device-manufacturing applications because of its simple and robust architecture
- Standard gigabit Ethernet communication and SCPI-compliant control commands with no external PC required for signal processing

Supports full range of WLAN, Bluetooth, ZigBee, Z-Wave, WiSUN, LTE-U and DECT 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 than legacy Wi-Fi standards
- Ability to test nearly all IEEE 802.11 specifications, including 802.11 a/b/g/n/p/ac/ah/j
- 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 802.15.4-based standards including ZigBee
- Ability to test Z-Wave (ITU-T G.9959)
- Ability to test WiSUN MR-FSK (IEEE 802.15.4g)
- Ability to test LTE-U (Small Cell Downlink)
- Ability to test DECT standards (ETSI EN 300 176-1)

Supports wide range of navigation and broadcast standards testing

- Ability to test four major satellite navigation technologies: GPS, GLONASS, COMPASS and Galileo
- Ability to test major broadcast standards, such as FM and ISDB
- Dedicated hardware to enable parallel testing on multiple technologies
- Real-time waveform generation to simulate changing environmental conditions

High test throughput for manufacturing

- 5th generation of Packet Engine provides industry-leading test speed
- Built-in 4-device parallel test capability for high test system efficiency
- Concurrent test capability for bidirectional and unidirectional communications through dedicated hardware

Scalable MIMO support

- Expandable architecture to support up to 8x8 true MIMO
- Supports testing of all key IEEE 802.11ac MIMO specification enhancements, including MU-MIMO
- Supports calibration of beamforming

Built-in Waveform Generation

- Ability to generate custom waveforms for different technologies

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
- Fully backward compatible with existing LitePoint connectivity test systems

Available Turnkey Test Software Solutions

- Availability of LitePoint IQfact+ software solutions for customized testing of leading WLAN / Bluetooth chipsets
- Ability to calibrate and verify hundreds of legacy and new chipsets

Supported Wireless Standards

- 802.11a/b/g/n/p/j
- 802.11ac (optional)
- 802.11ah (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)
- LTE-U Small Cell (optional)
- GPS (optional)
- GLONASS (optional)
- COMPASS (optional)
- Galileo (optional)
- FM (optional)
- ISDB (optional)
- More standards capabilities being added...

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