

Keysight E7515A UXM Wireless Test Set

Brochure

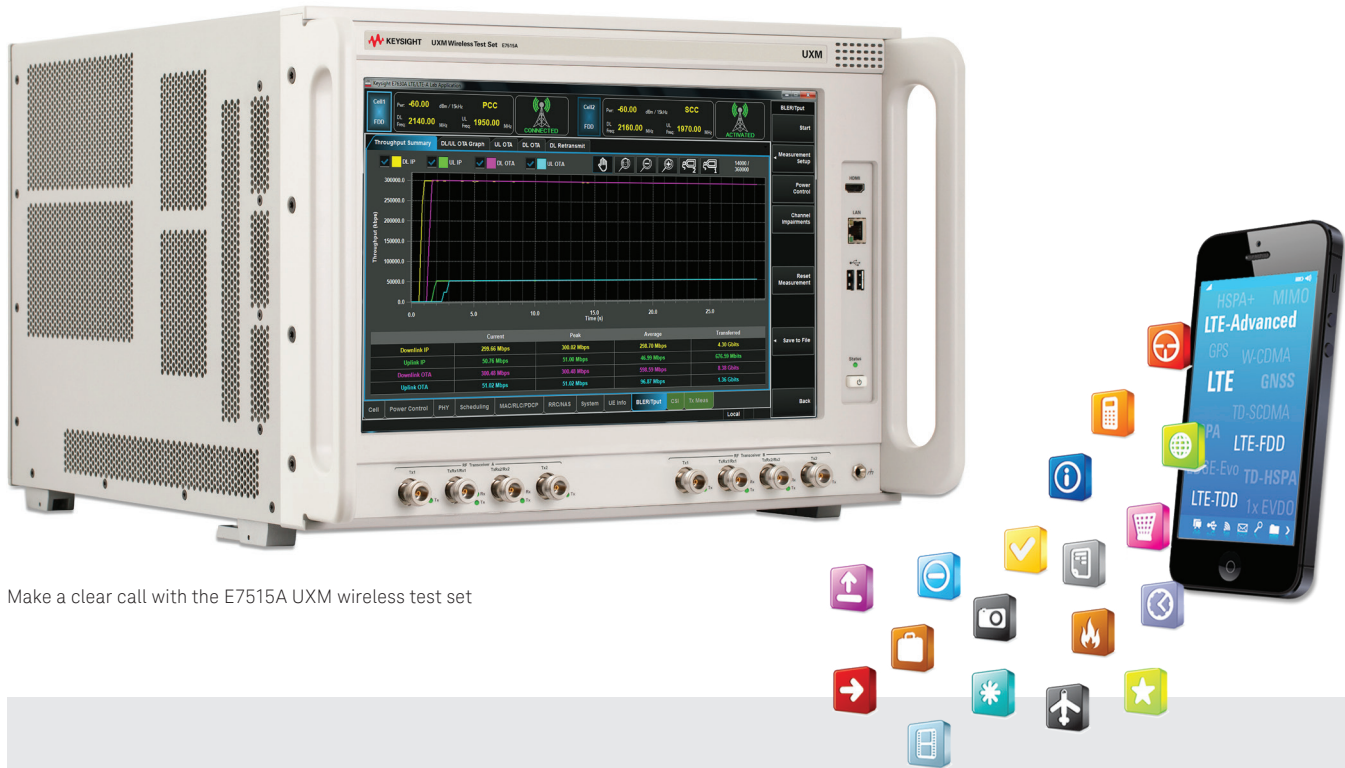


Make a Clear Call

The team looks to you: will a new chipset or UE pass the crucial tests? Clarity comes from accumulated insights, and that's the idea behind the Keysight Technologies, Inc. UXM wireless test set. When the team counts on you, count on the UXM to help you make a clear call.

Assess Design Readiness with Greater Confidence

The UXM is a highly integrated signaling test set created for functional and RF design validation in the 4G era and beyond. It provides the capabilities you need to test the newest designs, delivering LTE-Advanced (LTE-A) category 4/6/7 now and handling more complex requirements later.



Make a clear call with the E7515A UXM wireless test set

Gain new insights with a broad range of integrated capabilities

- Stable, bi-directional, end-to-end data throughput and flexible receiver test
- Highly integrated solution with multiple cells, carrier aggregation, multiple-input/multiple-output (MIMO), internal fading, and built-in server
- Emulation of complex network scenarios for extensive functional performance test
- Proven Keysight X-Series measurement science for RF performance test

Be ready for functional and RF design validation in 4G and beyond

- Future-ready, multi-format-capable platform to handle the next advancements in antenna techniques, component carriers, and data rates
- Extensible architecture includes high-speed interconnects, upgradeable processors, and multiple expansion slots
- Versatile display capabilities with 15-inch touch screen interface

Make a seamless transition to the UXM

- New-yet-familiar user interface based on popular Keysight solutions
- Compatible test plans and automation

Wireless Design Validation: Market Trends and Test Challenges

An incredible amount of technology is packed into every smartphone and tablet. The list is long and getting longer: new and legacy cellular formats, multiple wireless-connectivity links, GPS capabilities, cameras, music players, Web browsers, and more. As wireless applications multiply and more users adopt data-centric devices over traditional voice and text-only cell phones, networks are experiencing an explosion of data consumption.



In response, the latest cellular standards include advanced techniques such as MIMO and carrier aggregation (CA) to help operators squeeze more capacity, better coverage, and higher data rates from their existing frequency spectrum. Operators must also provide high-quality voice services on all-IP networks such as LTE/LTE-A, and have an opportunity to offer a better overall voice experience with integrated services such as video, chat, and file sharing.

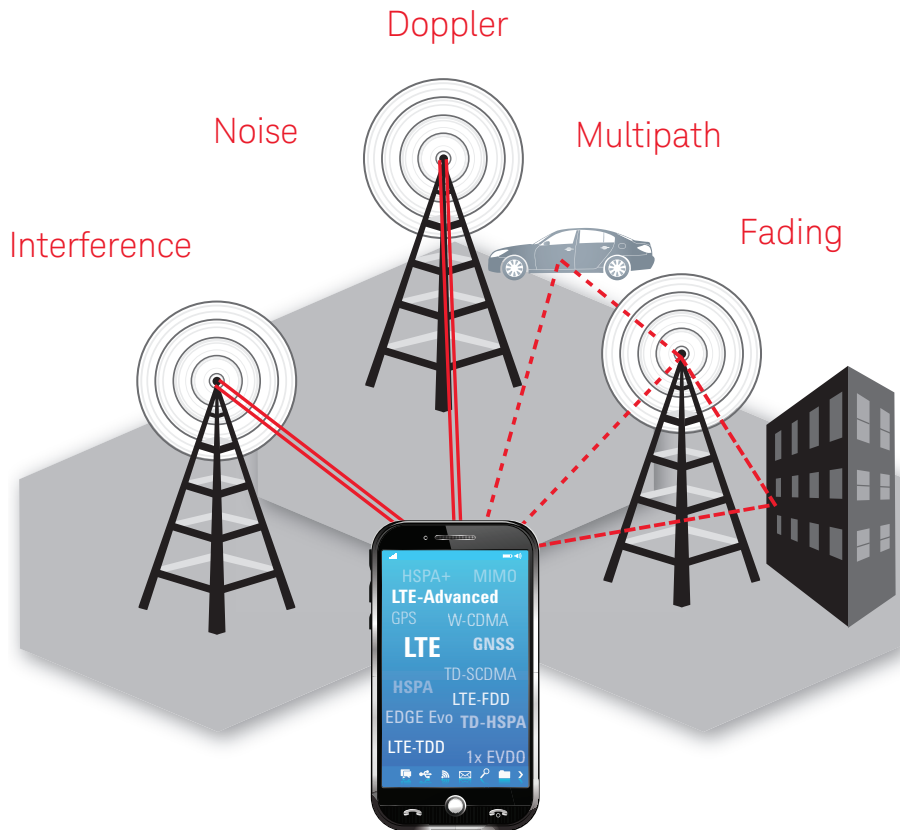


This innovation and evolution presents challenges for device design validation, as it adds complexity to characterizing the performance of transmitters and receivers, and evaluating the behavior of an assembled device. Using wireless test sets such as the Keysight UXM simplifies device validation. These “one-box testers” provide integrated sources for receiver testing, analyzers for transmitter testing, standards-based measurements, and a host of built-in functions to validate the user equipment’s (UE’s) functional and RF performance while on a connection.



Real-World Functional and RF Test with the UXM

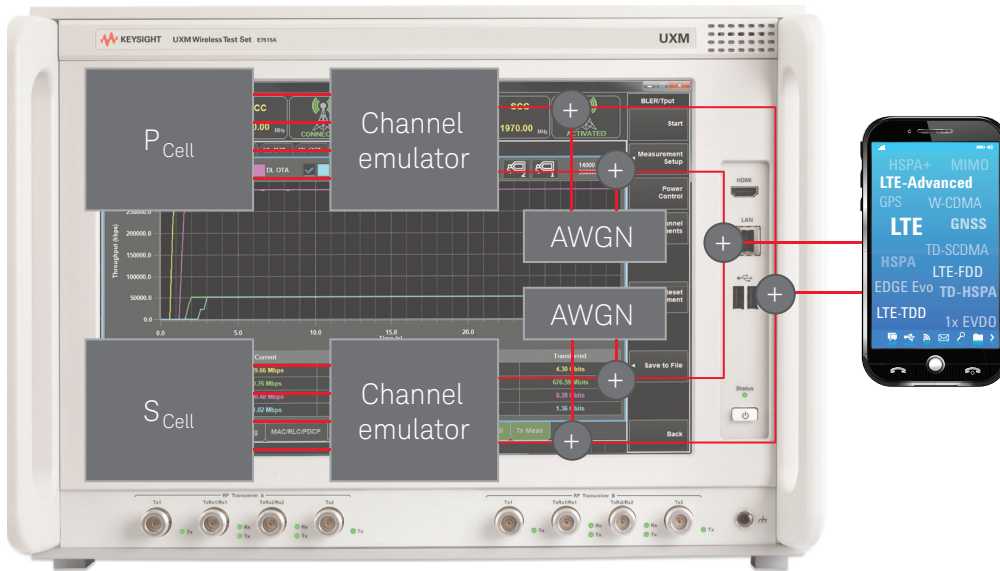
Today's wireless devices must perform in highly dynamic environments. Users expect a high-quality experience regardless of complexities created by higher data rates, mobility, MIMO, carrier aggregation, fading, noise, and interference. LTE-A networks are designed to adapt to these real-world operating conditions with dynamic link allocation and complex handover scenarios. This variability results in thousands of potential scenarios under which the mobile device is expected to perform well.



Today's UEs must perform under demanding network and channel conditions

This strenuous environment makes testing UE performance degradation, recovery, and responsiveness imperative as well as challenging. To fully assess LTE-A design performance requires emulating both the network and the wireless channel. Testing devices under both ideal and non-ideal network and channel conditions helps isolate design issues early, and ultimately ensure a high-quality user experience.

Effectively emulating this dynamic and demanding environment requires incorporation of fading, noise, and network emulation, often resulting in a complex test setup with various components that is prone to stability and calibration issues. The UXM eliminates that complexity by providing integrated base station and channel emulation along with flexible control, measurement capability, and diagnostic ability.



The UXM simplifies your bench-top with integrated network and channel emulation

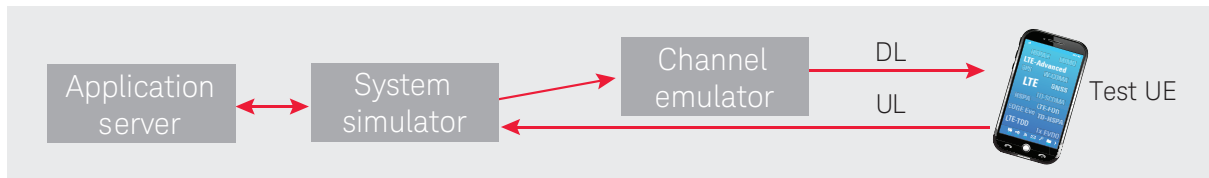
The UXM's test application (TA) software provides the tools RF design validation engineers need to be confident about their device's RF performance. The TA includes flexible receiver test, trusted X-Series transmitter measurement science, and basic network emulation. This enables you to set up defined conditions with varying frequencies, power, and modulation, measure to limits, and determine the root-cause of failures with reliable, repeatable results that can be automated and easily shared. You can also test from early designs to finished products, as the UXM supports both signaling and non-signaling test, making it easy to "just connect."

The UXM's lab application (LA) software provides both functional and RF test capabilities, for overall device design validation. The LA includes the receiver and transmitter test functionality of the TA, plus IP data-based capabilities such as end-to-end data throughput, and advanced network emulation such as complex handover scenarios, sleep modes, and support for VoLTE (when paired with Keysight's E6966B IMS-SIP network emulator software). This added functional test capability helps design validation engineers verify connection continuity, data rate performance, concurrent application behavior, battery drain, and protocol messaging.

Gain New Insights with a Broad Range of Integrated Capabilities for LTE-A Design Validation

Ensure LTE/LTE-A devices can sustain maximum category 4/6/7 rates and handle realistic fading and MIMO scenarios

In order to satisfy user expectations, today's wireless devices must reach and sustain their full specified data rate, and maintain that connection throughout changing channel and network conditions. The UXM's powerful hardware architecture provides stable, bidirectional, end-to-end data throughput at 300 Mbps downlink / 100 Mbps uplink, ensuring any data rate issues encountered are those of the UE, not the test set.

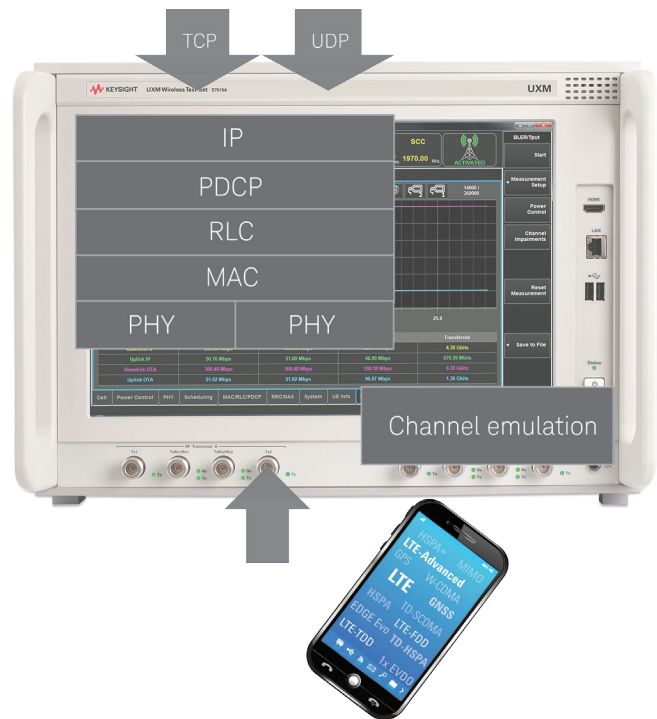


Realistic end-to-end data throughput testing is essential for today's wireless devices

To fully assess your design's data throughput performance, it is critical to test at both the physical and application layers, with both TCP and UDP, and in different RLC modes (acknowledged and unacknowledged). The UXM's end-to-end data throughput functionality allows you to isolate throughput bottlenecks and integration issues. You can also easily test receiver performance under varying channel conditions and downlink configurations with the UXM's integrated fading, highly configurable downlink allocation, and closed-loop receiver test capabilities.



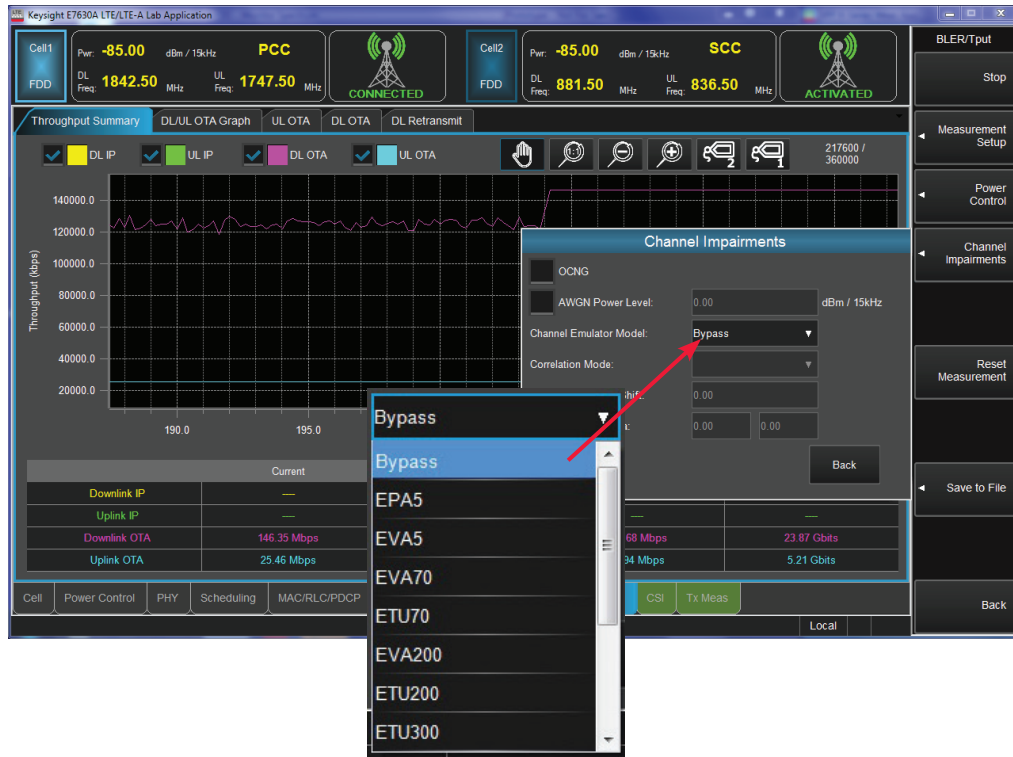
The UXM provides stable, bidirectional end-to-end data throughput



Thoroughly test your device's throughput performance to isolate and resolve issues

Reduce bench-top complexity

The UXM is highly integrated, offering multiple cells, carrier aggregation, MIMO, built-in fading, and an internal application server. The UXM makes it easy to verify receiver performance with independent fading and noise available for each component carrier, bringing complex test capability to your bench-top in one simple interface.

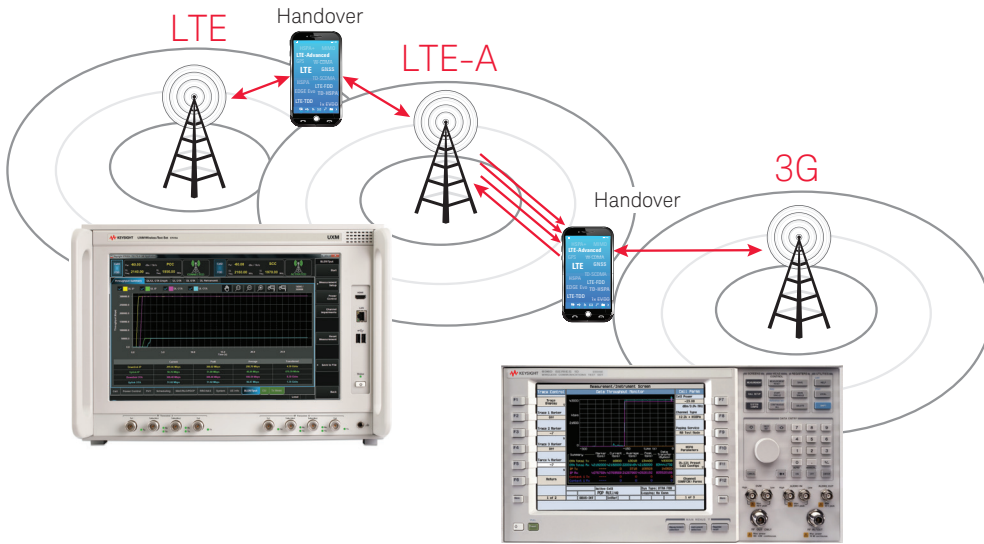


Easily add and remove fading and noise to either or both component carriers and evaluate the resulting changes to throughput

Go deeper in functional test

In addition to testing throughput and receiver performance, the UXM's comprehensive network emulation capabilities let you go deeper in functional test by emulating a wide range of complex operations such as handovers, VoLTE, and sleep modes (for battery and current drain characterization).

Check handover behavior with two independent built-in cells, or connect to an E5515C or E5515E 8960 Series 10 wireless communications test set to verify the increasing number of interRAT handover scenarios.



Test the various handover scenarios required to provide high-quality continuity of service

With the UXM and Keysight's E6966B IMS-SIP network emulator software, verify your UE fully supports VoLTE features such as SPS, multi-DRB, and RoHC, as well as end-to-end voice calls (VoIP).



URI	Contact Address	Call-ID	Call State
sip:bob@test.Sip.com	ip:192.168.1.101:5060	12345678901234567890	Active
sip:bob@test.Sip.com	ip:192.168.1.101:5060	12345678901234567890	Active

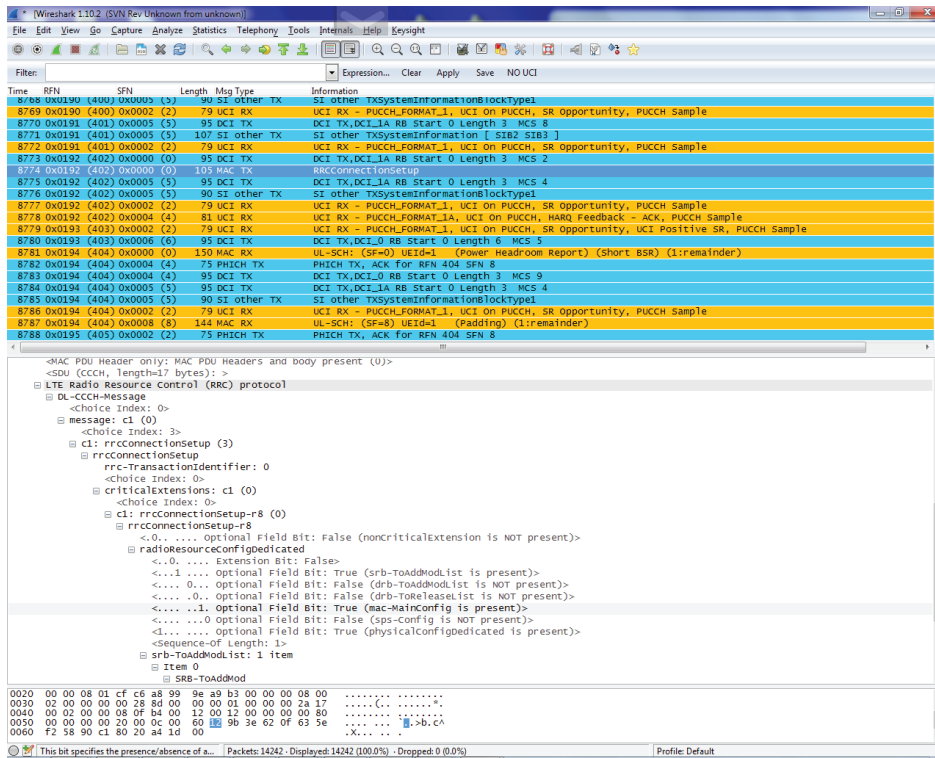
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0:00	IMS SIP Server	ip:100.0.0.0@test.Sip.com	200 OK (PESQ-TEER)
0:00	ip:100.0.0.0@test.Sip.com	IMS SIP Server	REGISTER
0:00	IMS SIP Server	ip:100.0.0.0@test.Sip.com	200 OK (PESQ-TEER)

Verify your UE fully supports the complex demands of VoLTE with the UXM and E6966B

Use the UXM's protocol logging capabilities to analyze and troubleshoot network and UE messaging. Keysight has created protocol logging and analysis software for use with the UXM, leveraging the open-source Wireshark network protocol analyzer software.

Log and decode both wireless protocols (MAC, RLC, RRC, NAS, and PDCP) and IP protocols (UDP, TCP, FTP, SDP, SIP, and RTP), all within the familiar Wireshark interface.

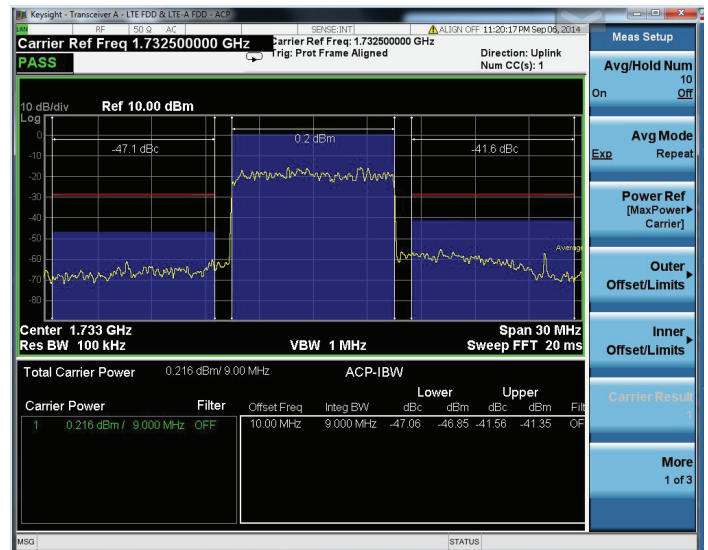
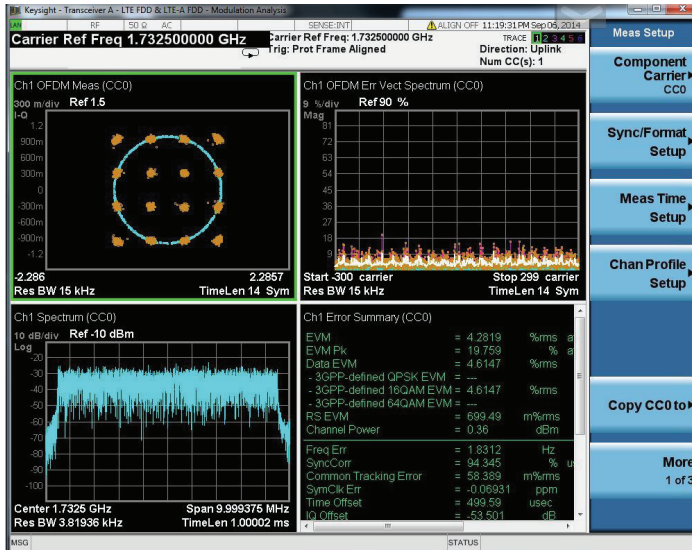
The protocol logging and analysis software supports both real-time and post-capture analysis, and synchronized logging between multiple cells.



Use filtering to log and view only the data of interest, and color display options to identify messages from different technologies and test sets.

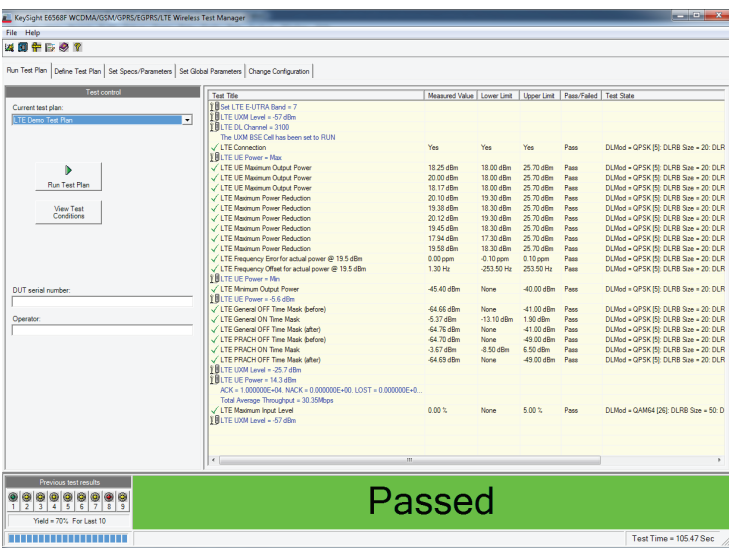
Achieve greater confidence in RF performance

Every UXM test and lab application software product includes the trusted X-Series measurement applications for consistent, repeatable transmitter testing. Run measurements per the 3GPP 36.521 test specifications, or use the full range of X-Series capabilities to explore beyond the specifications. The X-Series applications' comprehensive test coverage, built-in context-sensitive help, and familiar user interface get you up-and-running quickly, with the flexibility required to check compliance and troubleshoot tough transmitter issues.



The UXM's built-in X-Series measurement applications provide consistent, repeatable transmitter testing

Coupling your UXM with Keysight's Wireless Test Manager (WTM) software allows you to quickly automate RF measurements based on the 3GPP test specifications and test to the full range of prescribed channel configurations. WTM makes it easy to set up test plans with pre-defined test steps from 3GPP specifications, and includes the flexibility to customize the tests to suit your specific device validation requirements.



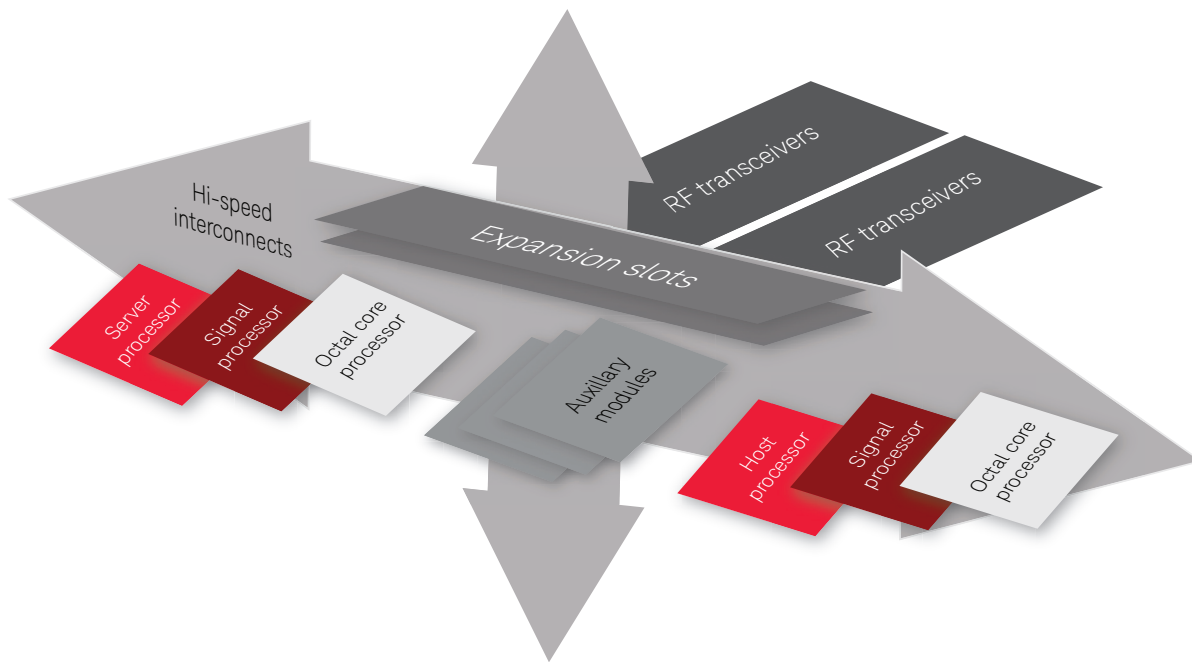
Easily test the full range of 3GPP channel configurations using the proven wireless test manager software

Be Ready for Functional and RF Design Validation in 4G and Beyond

Test the latest LTE-A features now and easily expand capabilities and test coverage later

The UXM's power-packed hardware is ready to meet the 4G demands of today, and the test challenges of tomorrow. Eliminate the cost and downtime of upgrades with UXM's future-ready, multi-format capable platform that will handle the next advancements in antenna techniques, component carriers, and data rates.

The UXM features two, fully-independent 100-MHz RF transceivers, and every source and analyzer is MIMO-enabled. This flexible foundation enables multiple cells, carrier aggregation, higher order MIMO, and integrated fading, to address wireless test needs now and into the future.



The UXM is built on a future-ready platform to handle the test challenges of tomorrow

Evolve as technology changes

The UXM was designed with the future in mind. Its extensible architecture includes high-speed interconnects, upgradeable processors, and multiple expansion slots, so it can readily adapt to the evolution of wireless technology.



The UXM was designed to easily evolve with technology

The UXM's powerful backplane can readily handle the high data flows required for today's 4G applications and was architected for extensibility. Multiple UXMs can be interconnected, enabling numerous synchronized cells and component carriers.

The UXM also includes several rear expansion slots, for easy addition of internal servers and extension of processing power and FPGA capabilities to support complex antenna configurations and advanced modulation formats.

Easily handle tomorrow's demanding test needs

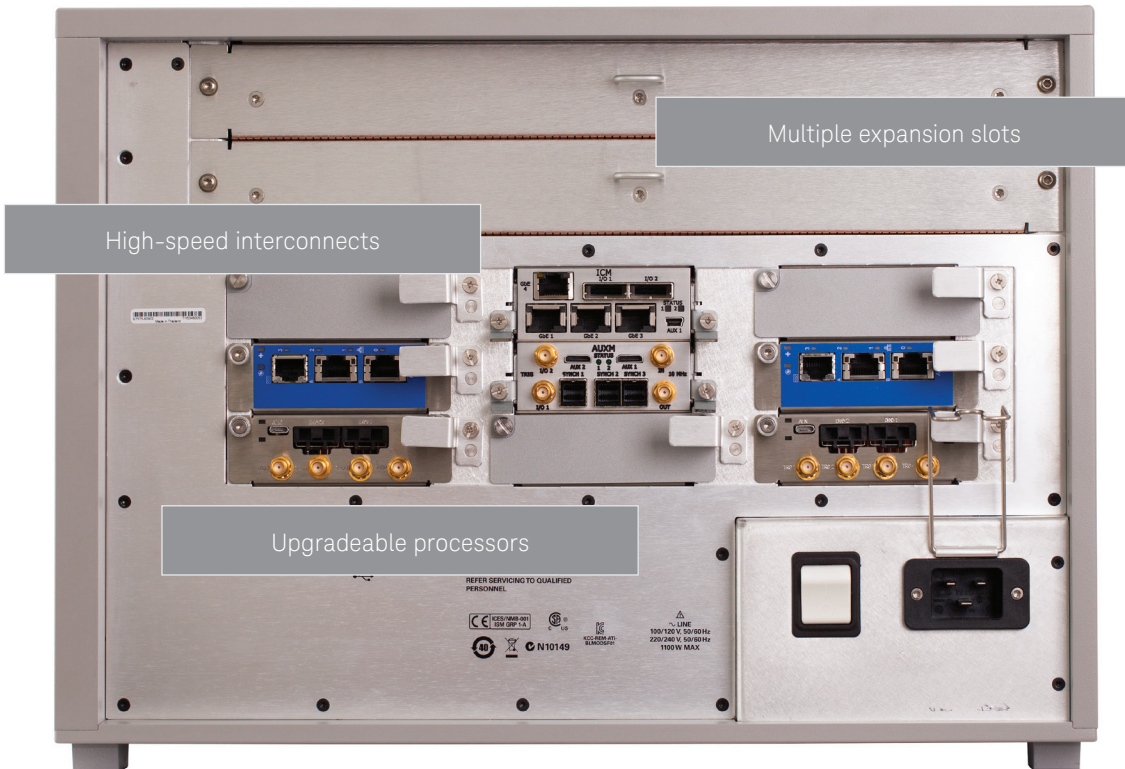
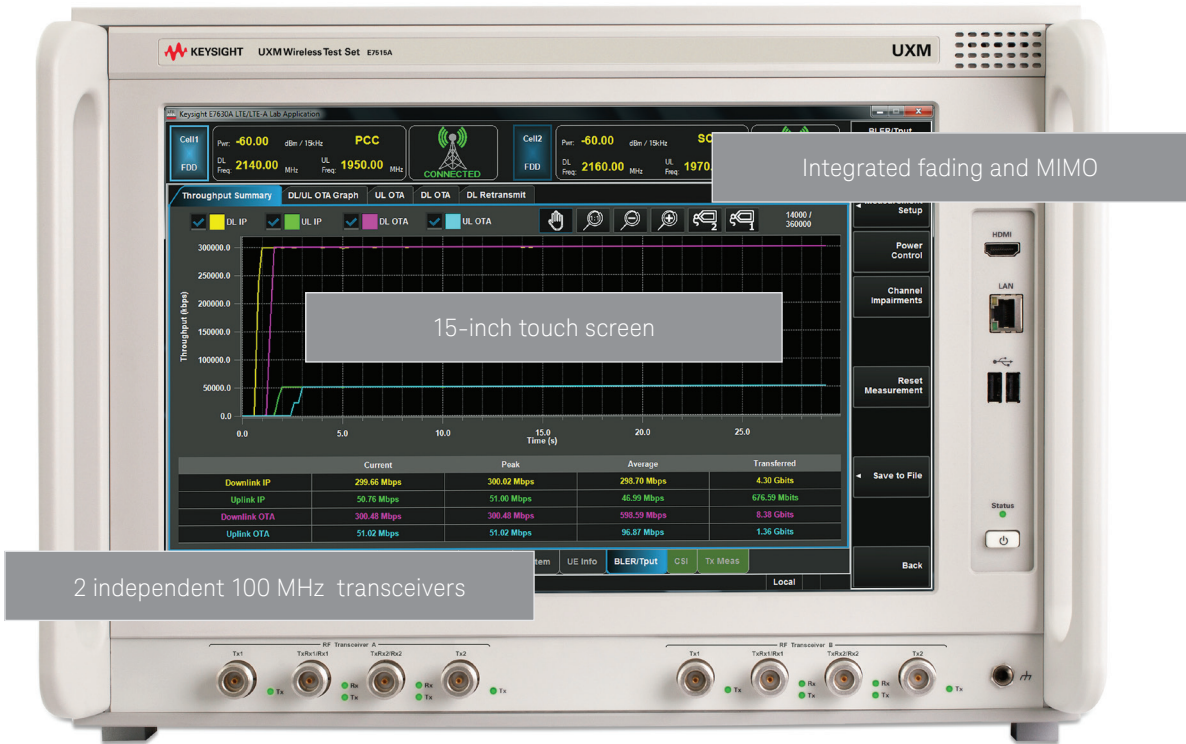


The UXM's versatile 15-inch touch-screen interface affords ultimate flexibility for the future and intuitive ease of use today.

With a click of a mouse or the touch of a finger, efficiently navigate UXM's depth of features and configurability, investigate issues, and get to the root of problems quickly.

The UXM's soft key and tab-driven interface makes true remote instrument control a reality, without the need for hardkey emulation.

UXM: Designed with the Future in Mind



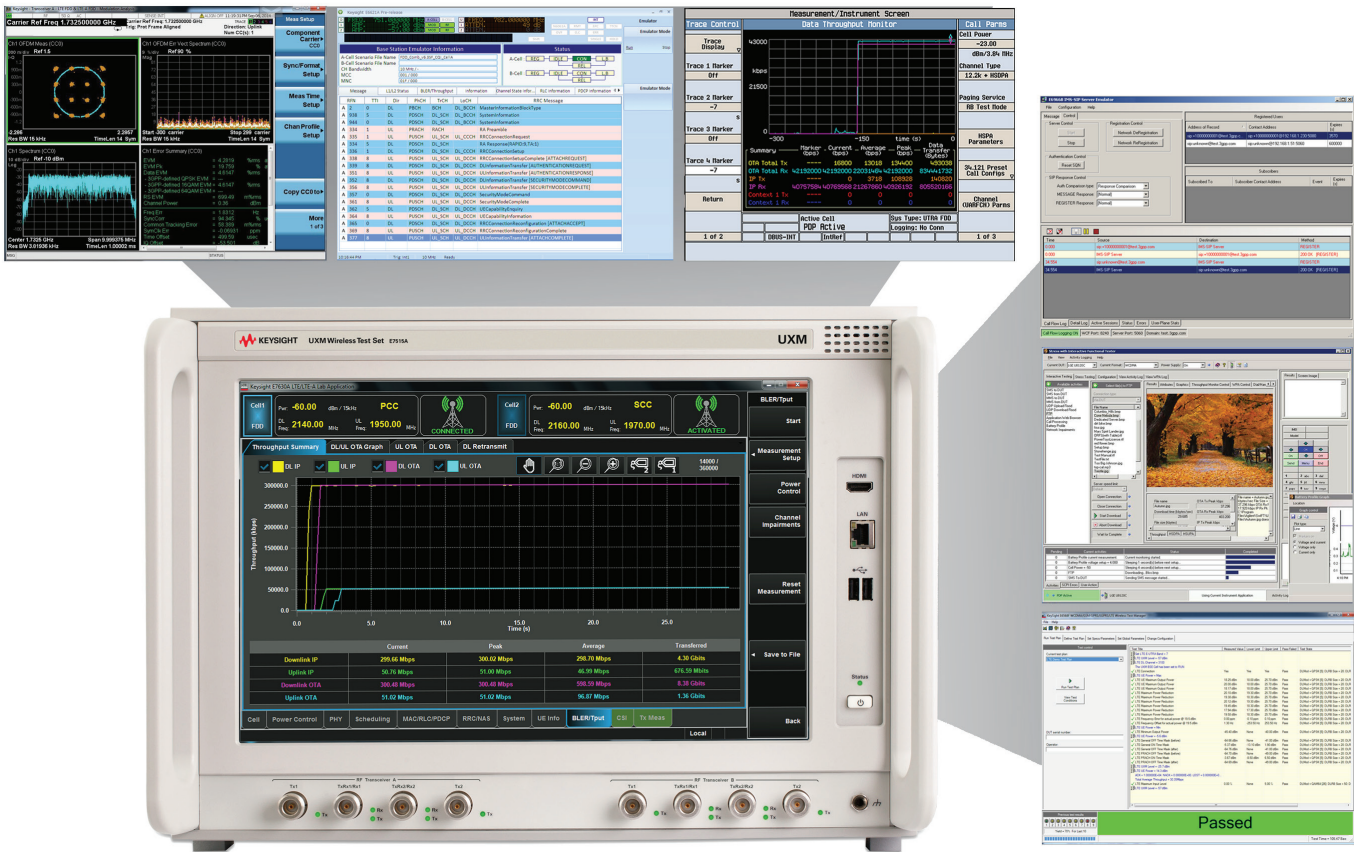
Make a Seamless Transition to the UXM

Leverage existing test software and product experience

The UXM's new-yet-familiar user interface allows you to apply your knowledge of X-Series measurement applications and Keysight's other wireless test sets and supporting software to get up and running quickly.

Save time. The UXM is SCPI-compatible with X-Series measurement applications and the Keysight E6621A PXT wireless communications test set's call setup and receiver test code. Leverage existing test plans and software and simplify your transition with the expertise of local application engineers.

Get more from every budget dollar through Keysight's tradition of investment protection. Find the optimum migration path with programs such as cost-effective upgrades, bundled offerings, and trade-in credits.



The UXM is built on a foundation of trusted Keysight solutions

Related Resources

- E7515A UXM Wireless Test Set, flyer, literature number 5991-3849EN
- E7515A UXM Wireless Test Set, configuration guide, literature number 5991-4078EN
- E7515A UXM Wireless Test Set, data sheet, literature number 5991-4634EN

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