EXT
Wireless Communications Test Set

Transforming Manufacturing Test

EXT

EXT

E6607B 10 MHz to 3.8 GHz

- Multiport adapter
- X-Series measurement applications
- Sequence Studio software
- Signal Studio software
- Chipset software

Anticipate ___Accelerate ___Achieve

Agilent Technologies

Get your latest wireless devices to market faster

Wireless technologies are evolving rapidly and more wireless bands and formats are being implemented on chipsets, smartphones, and other wireless communication devices. Manufacturers are looking for fast and cost-effective ways to produce these complex devices. Reducing the time and cost of test will go a long way toward achieving this goal.

Non-signaling is widely accepted as the fastest, most cost-effective technique for testing next-generation wireless devices in manufacturing. By taking advantage of test modes built into the new chipsets, non-signaling test can eliminate costly signaling overhead from the manufacturing test process, increasing throughput while maintaining the integrity of the test and quality of the finished product.

The Agilent EXT is the only one-box test set designed and optimized solely for non-signaling test in wireless device manufacturing. Its integrated hardware and innovative, industry-leading software tools provide the fastest route from pre-production through high-volume manufacturing.

Using the E6617A multiport adapter, the EXT's capacity expands to provide eight fully-calibrated RFIO interfaces and four GPS ports, enabling parallel device testing, dramatically

increasing the production throughput, and further reducing the cost of test.

The EXT is your best choice for calibration and verification measurements:

- Integrated one-box test set combines a vector signal analyzer, vector signal generator, test sequencer, multiport adapter, and modern, scalable platform.

- Fast measurements and flexible sequencer techniques work in synch with your device's chipset test modes to execute test plans at the highest speed for maximized throughput.

- Unique, graphical Sequence Studio software dramatically streamlines test plan creation and troubleshooting, saving code development time to move from NPI to volume manufacturing.

- Fast, standards-based measurements and modulation analysis capability are based on proven Agilent X-Series measurement algorithms—add new formats quickly.

- Save time and lower the cost of manufacturing test with the industry's most flexible, accurate, future-proof solution.

An easier transition

The EXT works in conjunction with chipset test modes using fast measurements and flexible sequencer techniques to speed calibration and verification of your devices and modules. With the EXT's tools to facilitate test plan development and execution, the need for additional chipset vendor support is minimized, making your transition to non-signaling test easy and efficient. And if you need additional support, you'll have the backing of the field and factory application experts from the world's metrology leader.

Future-ready

Agilent's solution is integrated into most of the main stream chipset vendors' manufacturing software tools and we continue work with chipset vendors to help shape the test modes of the future to ensure that the EXT is ready to test next-generation wireless devices.
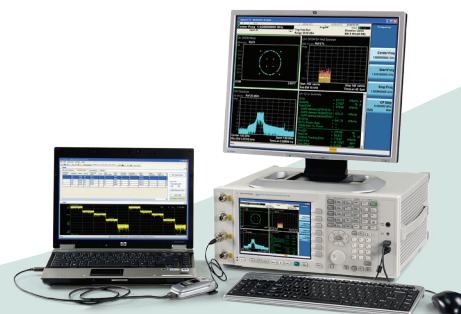
Key EXT benefits

Anticipate your wireless device manufacturing test needs

Multiple formats

Tests new and existing radio formats including LTE TDD/FDD, W-CDMA, HSPA+, cdma2000®/1xEV-DO, TD-SCDMA, *Bluetooth*®, WiMAX™ and more

Full cellular band coverage

Supports up to 3.8 GHz for LTE TDD band 43 with standard EXT configuration

Lower costs

Architecture optimized for lower-cost non-signaling test with superior hardware and software scalability

Accelerate test development

Simplify

Creates standards-based waveform files to control and test your wireless devices

Streamline

Reduces engineering time required to develop and troubleshoot non-signaling test plans for volume manufacturing

Turnkey

Remains current with wireless chipsets now and in the future through collaboration between Agilent and chipset vendors

Achieve fast and accurate measurements

Speed

Reduces test time and increases manufacturing throughput with advanced test sequencer, single acquisition, multiple measurements, and multi-technology sweeps

Accuracy

Delivers high first-pass yields and measurement confidence with repeatable results that are accurate to industry standards

Parallel test

Unique multiport adapter enables simultaneous device receiver testing for maximum manufacturing throughput

Achieve accurate measurements fast

Fast setup and measurement of multi-format devices greatly reduce calibration and verification times. With the EXT's powerful sequence analyzer, you'll test faster across different power and frequency ranges. When you move to fast-sequenced verification test with full control of the chipset, the EXT is ready to exploit this capability with fast, sequenced measurements of multiple formats, frequencies, and power levels.

## Powerful source and analyzer sequencing

The EXT features two independent sequencers: a source list sequencer and an analyzer list sequencer/ sequence analyzer. Both sequencers come standard on the EXT.

The powerful sequence analyzer function, which includes a set of full-featured analysis tools, synchronizes the EXT's source and signal analyzer, facilitates measurement of the device under test, and provides a host of other capabilities to increase speed and throughput in non-signaling manufacturing test.

- Fast frequency and amplitude switching enables fast device tuning with less delay.
- Precision control of test intervals, test levels, and measurement timing. Capture and measure only what you need.
- Deep measurement capture, large arbitrary waveform storage, and playback memory handle complex transmission scenarios.
- The sequence analyzer uses single acquisition and multiple measurement techniques to help reduce the overall test time from initiation to result.
- "Built-in" core measurements include IQ data, PAvT, and typical calibration measurements such as transmit power, phase, and frequency.
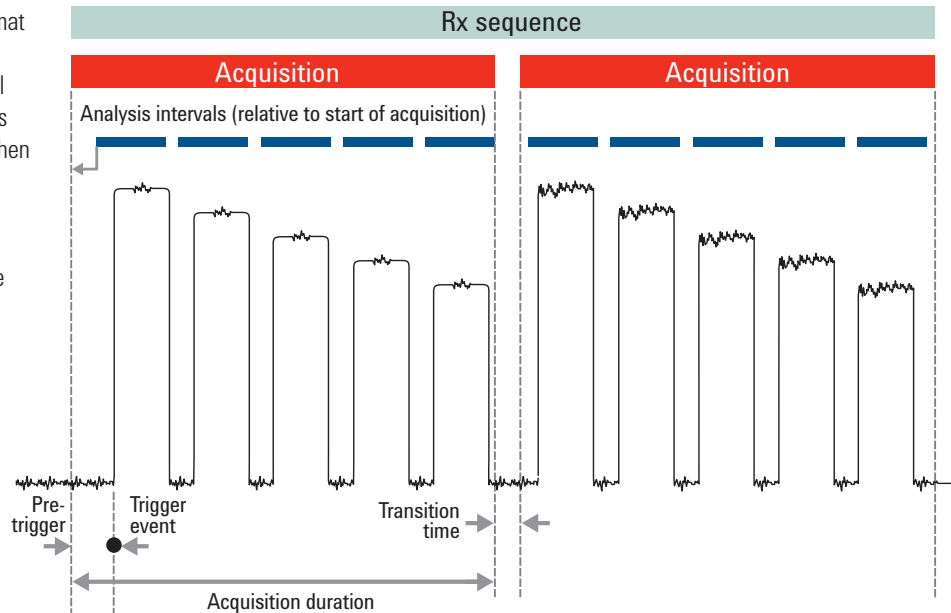
This example shows a receiver test sequence consisting of two acquisitions (red bars), each with multiple analysis intervals (blue bars).
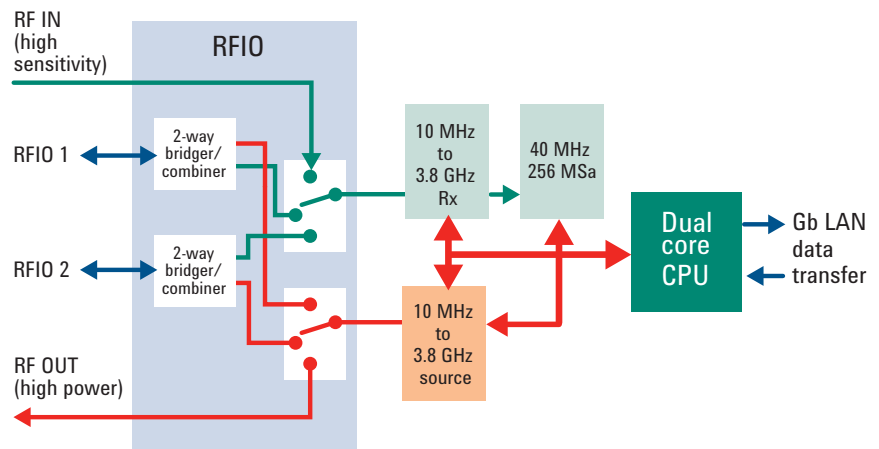
Innovative 4-port RFIO enables multi-device insertion configuration. Switchable ports allow insertion or extraction of one device while a second device is being tested.

Multiport adapter—Achieve the highest manufacturing throughput

The wireless device industry is experiencing an expansion driven by the increasing demand for multi-media communication tools such as smartphones and tablets. This expansion, coupled with the need to support multiple wireless bands and formats on a single device, creates a rapidly growing challenge for device manufacturers to quickly and accurately test these devices. Parallel device testing is one of the key approaches to meet this challenge while maintaining, or improving, throughput and has the added benefit of lowering costs.

The revolutionary E6617A multiport adapter (MPA) works with the EXT wireless communications test set to provide a seamless extension of the test plane to support multiple DUTs. The compact and cost-effective MPA provides simultaneous receiver testing, sequential transmitter testing, and simultaneous GPS testing for up to eight single-antenna devices or four dual-antenna devices, dramatically improving throughput while reducing the footprint and cost of test equipment.

The multiport adapter offers sophisticated, instrument-grade performance in the following areas:
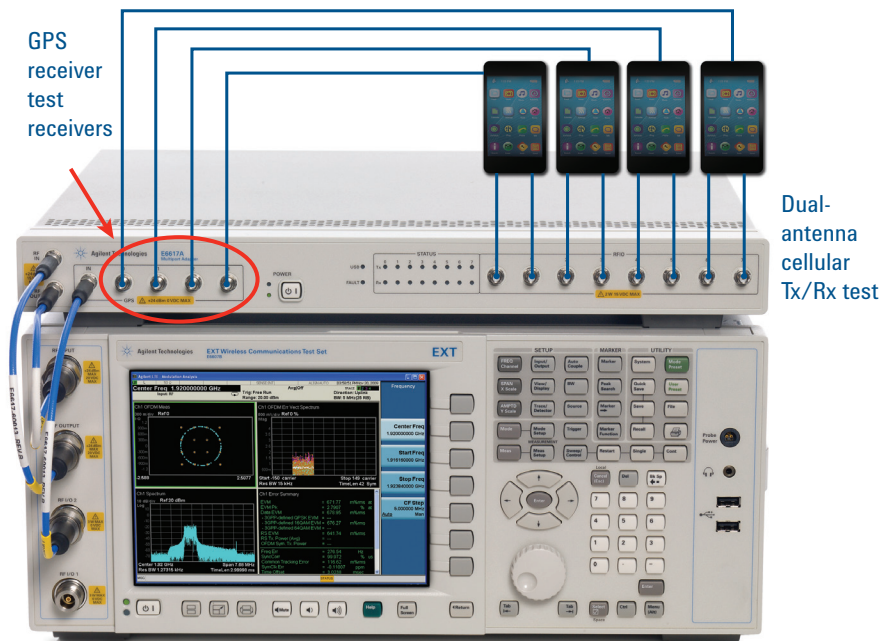
Parallel device test

The MPA extends the EXT's capacity to eight fully-calibrated RFIO interfaces and four GPS ports for parallel device testing. This configuration enables you to simultaneously verify your DUTs' receivers and test your devices' GPS receivers without extra fixturing or device handling.

E6617A multiport adapter.

GPS receiver test receivers

Dual-antenna cellular Tx/Rx test

The EXT and MPA solution with four dual-antenna devices being tested along with GPS receiver test.

Plug-and-play EXT connectivity

The MPA and EXT are connected through a user-friendly USB plug-and-play mechanism to offer trouble-free start-up and operation. The EXT senses the MPA connection and automatically modifies the user interface to enable the extra capabilities to be selected. In addition the MPA's calibration data is transferred to the EXT upon connection, ensuring the specified accuracy and port balancing.

Metrology grade precision and balancing

The EXT's reliable hardware platform and industry-proven measurement accuracy remain intact when you extend the EXT's testing capacity with the MPA. Carefully designed and highly accurate active compensation via the MPA's onboard FPGA maintains measurement accuracy and the required port-to-port balancing. EXT + MPA = Trusted measurement results.

Low integration overhead

The MPA is fully integrated into the EXT's sequence analyzer and other modes of operation. The MPA connection to the EXT allows you to select additional I/O ports (including parallel output ports) for your testing during sequenced operation. Previous coding done for the EXT can be easily and quickly extended to incorporate the MPA by simply by adding the port selection.

Accelerate test development

Reducing the time from pre-production to full-scale manufacturing is an important step in meeting cost control and time-to-market goals. The Agilent EXT is designed with hardware and software to help you shorten the test development cycle.

Developing a test plan is faster with the EXT's application-specific measurements and SCPI programmability. Additional software tools help you create calibration and verification routines and generate waveforms quickly and easily. You can try out various measurement sequences using the pushbutton simplicity of the test set's front panel and viewing results on the screen. Powerful analysis software lets you quickly correlate measurement results from multi-format devices and speeds your benchmarking and debugging tasks.

Sequence Studio—streamline test plan development

Developing a test plan can be a bottleneck when you are trying to find the best solution for your manufacturing process. Now you can dramatically reduce the time it takes to develop and troubleshoot test plans with Agilent Sequence Studio. This breakthrough software tool, exclusive to the EXT, makes it easy to use the EXT's powerful source list sequencer and sequence analyzer.

The graphical capabilities of Sequence Studio simplify test plan development and rework, reducing the amount of programming support you'll need from test vendors. Instantly capture signals from a device and view them onscreen while you drag and drop analysis interval bars and burst timings. Retrieve results from captured signals and iteratively compare measurement results. With Sequence Studio, you'll be able to troubleshoot and optimize your test plan much more quickly.
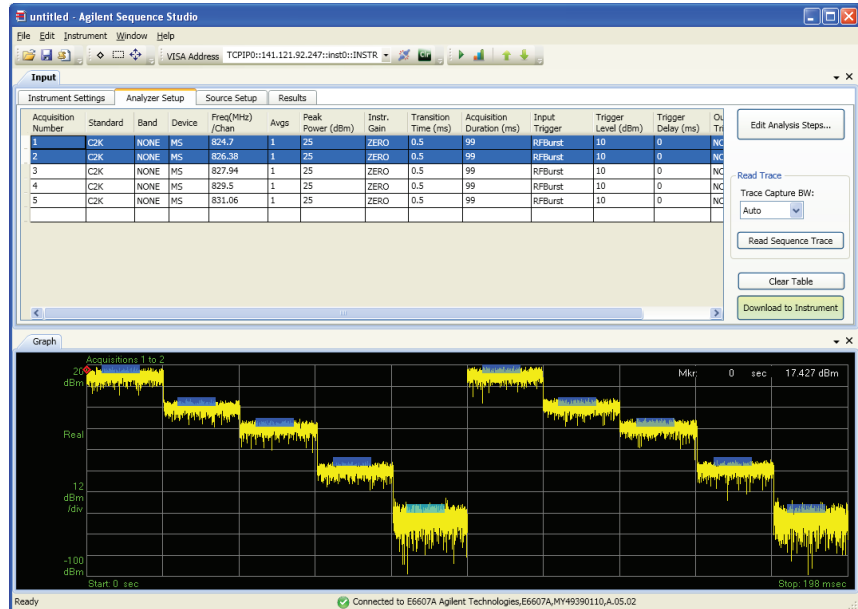
Sequence Studio lets you quickly implement calibration and verification routines. For example, the fast device tune measurement is greatly simplified.
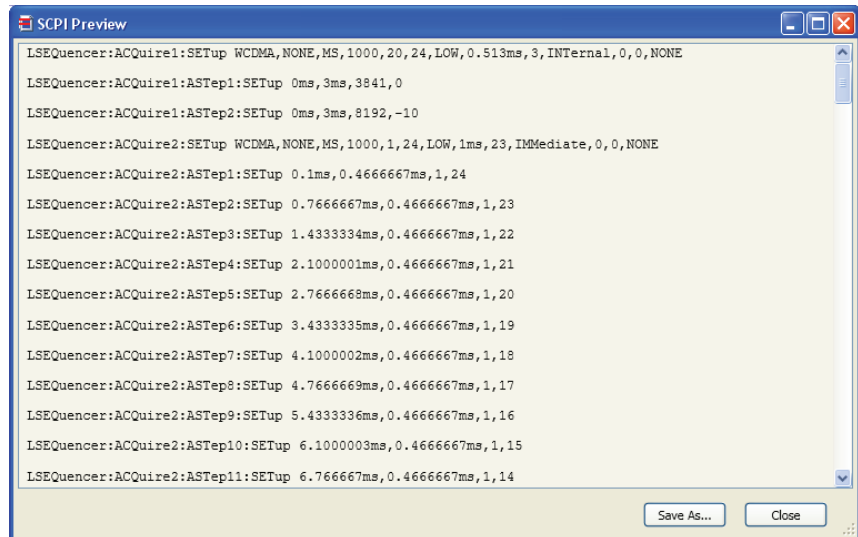
Automatically generate SCPI test code commands, ready for your test executive, with the click of a mouse.
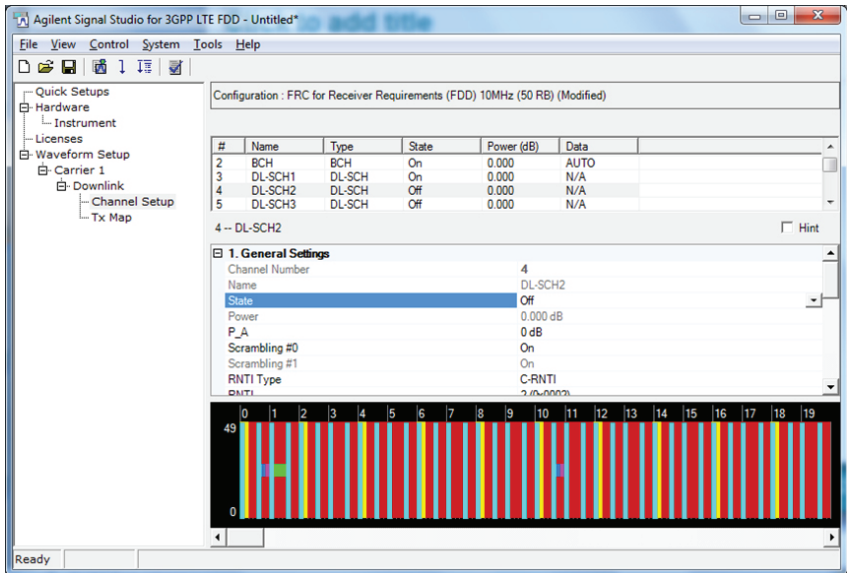
Signal Studio—Simplify signal creation

Next-generation, non-signaling test equipment uses arbitrary waveform files to transmit signals to the device under test. Test engineers can create standards-based arb files more easily using Signal Studio, the industry's premier waveform creation software. These arb files can be used both to test the device's receiver and—with today's chipsets—to obtain synchronization to test the transmitter as well.

Used in conjunction with the EXT, Signal Studio lets you create complex waveforms automatically using a multi-technology graphical interface. You can create advanced downlink carriers and fully channel-coded signals for receiver BER, FER, BLER, and PER analysis. Agilent ensures that waveforms validated in Signal Studio meet the current standards for major wireless technologies.

With Signal Studio for the EXT, you'll spend less time researching specifications, coding the waveform, and validating the output. You'll also spend less time getting your phone or chipset to synchronize to the simulated base station, and you'll rely less on your test vendor for arb file creation support.

Using Signal Studio software simplifies the creation of standards-based arbitrary waveform files for 2G, 3G, LTE, and beyond.

The full version of Signal Studio can be licensed for waveform development. Signal Studio for the EXT comes standard with two 5-pack waveform licenses, enabling generation of 10 user-configured Signal Studio waveform files. For lower cost deployment on the production floor, additional 5-pack and 50-pack waveform licenses are available as needed.

The EXT also works with other standard tools used for waveform development, such as MATLAB.

Chipset software—accelerate time to volume manufacturing

Wireless device manufacturers face the challenge of moving faster during the new product introduction (NPI) cycle in today's competitive market. Manufacturers want an off-the-shelf solution to free them from the engineering efforts required to keep pace with the rapidly advancing chipset technology and the up-to-date measurement techniques for the next generation non-signaling device test. Agilent has been collaborating with chipset vendors to enable the rapid implementation of EXT into manufacturing lines by integrating EXT into wireless chipset makers' test software.

Qualcomm, as one of the leading wireless chipset vendors, granted Agilent a worldwide Factory Test Technology License (FTTL). This agreement enables the EXT to leverage Qualcomm's factory test technology and ensures that device manufacturers can overcome their time-to-market challenges.

Alternatively, Agilent has developed a software platform that allows the optimization of calibration and verification procedures for leading wireless chipsets. This Agilent chipset software can be run on the lab bench by NPI engineers using a simple command line interface (CLI) or a graphical user interface (GUI). Also, a highly flexible COM application programming interface (COM API) is ready for you to reference in developing your own test executives.
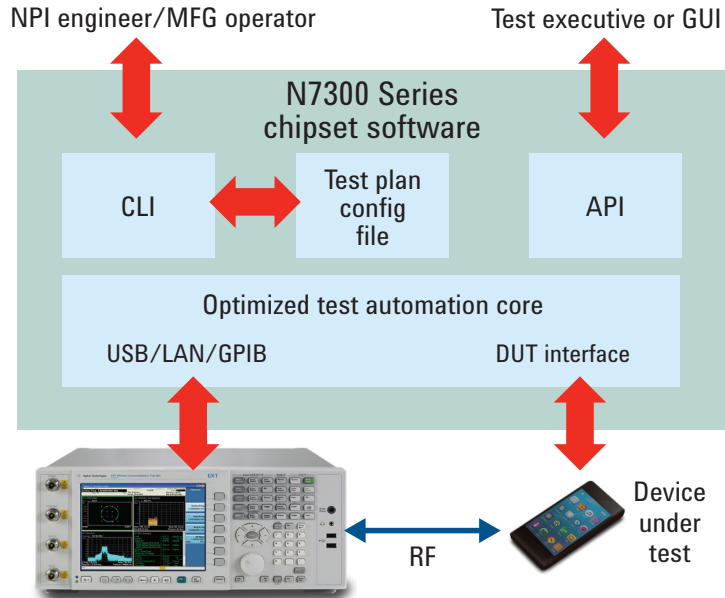
Chipset software for the EXT can be run in the lab via the CLI or integrated into the test executive of an automated production line.

Agilent's ongoing collaboration with chipset vendors ensures the readiness of the EXT to work with wireless chipsets now and in the future. Wireless chipset vendors will benefit from Agilent's industry proven measurement expertise to achieve the highest test speed possible for specific chipsets in manufacturing lines. New chipset models will be added quickly to keep pace with latest technology advances. Device makers will benefit from the turn-key solution, which enables them to save engineering time and cost on the details of what RF hardware and software components do, and concentrate more on their core business in device design and development. So whether you implement the chipset vendors' test tools or incorporate the Agilent chipset software directly into your production line, you can select the EXT with confidence.

Support for multiple formats

The EXT will support all common radio formats, allowing you to test more devices using less equipment. With Agilent's wireless measurement applications, you can test a broad range of new and existing formats including LTE TDD/FDD, HSPA+, W-CDMA/ HSPA, cdma2000/1xEV-DO, GSM/EDGE/ EDGE-EVO, TD-SCDMA, *Bluetooth*, WiMAX, and more. Additional formats are being added quickly.

Format-specific measurements are based on the proven measurement algorithms of the Agilent X-Series signal analyzers.

Key applications and tests	
LTE	Modulation analysis, CHP, ACP, SEM, OBW, transmit On/Off power, conformance EVM
W-CDMA/ HSPA/HSPA+	CHP, ACP, SEM, OBW, CDP, modulation accuracy, QPSK EVM
GSM/EDGE/ EDGE EVO	GMSK PvT, GMSK PFER, GMSK ORFS, EDGE PvT, EDGE EVM, EDGE ORFS, Tx power
1xEV-DO	CHP, ACP, SEM, OBW, R-link modulation accuracy, QPSK EVM
cdma2000	CHP, ACP, SEM, OBW, modulation accuracy, QPSK EVM, CDP
TD-SCDMA	Tx power, ACP, PvT, SEM, OBW, code domain, composite EVM
Analog demodulation	AM, FM, phase modulation
Bluetooth	Tx analysis, EDR spurious (in band), LE spurious (in band), ACP, OBW
WiMAX	CHP, ACP, SEM, modulation accuracy

Lowest capital investment

The EXT has just the capability you need to help reduce manufacturing costs in today's competitive manufacturing environment. The test set is designed to take advantage of the long-term savings made possible with non-signaling test.

Superior hardware and software scalability make the EXT ready for technology advances. Pay for what you need today, and add more capability in the future.

The standard hardware configuration offers full cellular-band coverage up to 3.8 GHz (including LTE TDD Band 43). A two year calibration cycle is standard.

All major cellular and complementary radio formats are supported in a single box, so there's no need to purchase additional instruments. As technology changes, simply add new software measurements to fit your production needs. Flexible licenses (temporary, permanent, or transportable) support your budget so that you buy just what you need, when you need it, and installation is easy.

Less risk

Flexibility and scalability make the EXT a great investment for non-signaling test, and Agilent is working closely with silicon vendors to ensure that chipset test modes are in place to enable the innovative sequencer techniques that will streamline your calibration and verification testing— with the least amount of vendor support.

Flexible and accurate

The EXT delivers high first-pass yields in manufacturing with accurate, repeatable results. Measurements are based on the industry-leading Agilent X-Series signal analyzers, so they are traceable throughout the lifecycle, from earliest development through manufacturing.
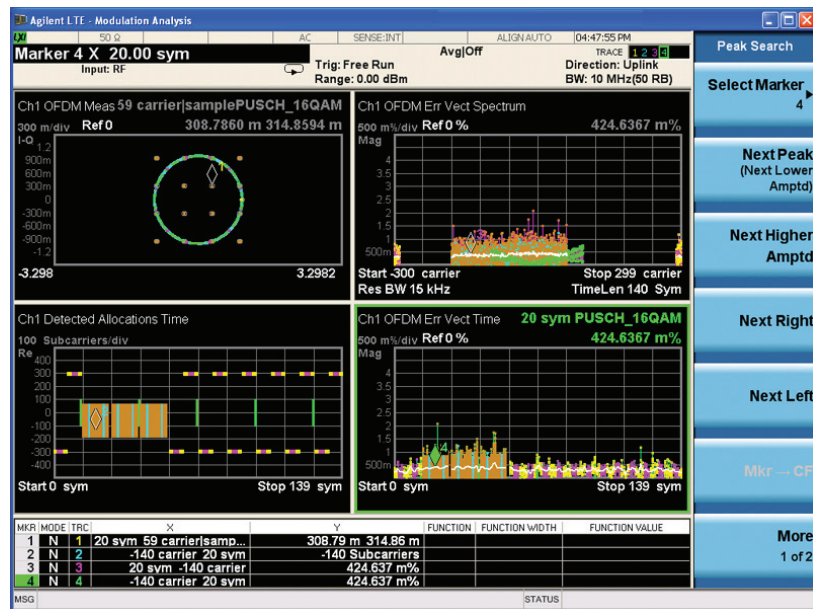
LTE uplink modulation analysis measurement.

Easy to use

Use trace and detector functions simultaneously.

For easy viewing of results, mark the frequency or position of a trace with up to 12 markers.

Identify signals and view information easily on the high definition, 21 cm XGA color display.

Soft keys allow quick navigation of menus.

Save files quickly at the push of a button with the quick save feature.

RF input/output.

Navigate the user interface and help system using the instrument front panel keys with added PC functionality, or use a mouse and keyboard.

Get answers to your questions using the comprehensive, context-sensitive embedded help.

Two USB 2.0 ports are conveniently located on the front panel of the instrument.

Use the EXT in various environments with 50/60 Hz power input.
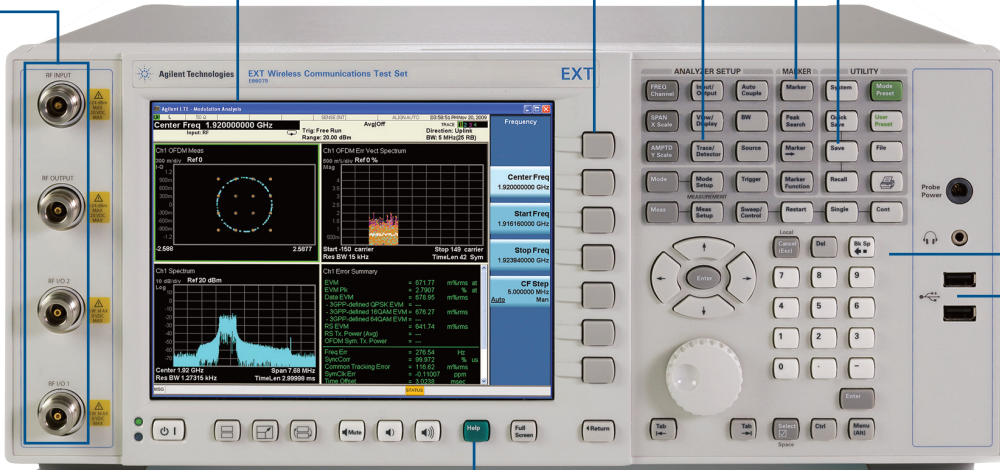
Upgrade the instrument easily in the future. Expansion slots enable future capabilities.

Connect external peripherals, such as a DVD drive, keyboard, mouse, and USB flash drive, and transfer data via the USB 2.0 (type-A port) interface.

Send and receive SCPI commands over the GPIB interface. Choose GPIB mode from controller or device.
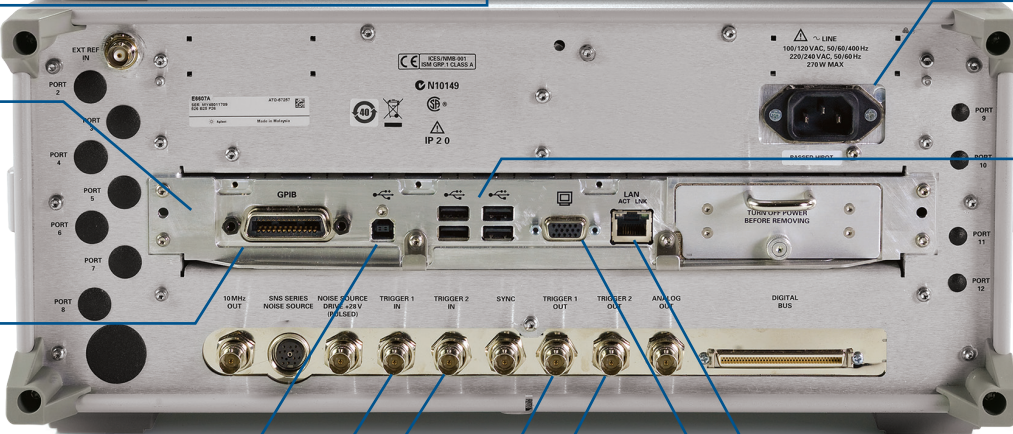
Acquire IQ waveform data quickly and control the EXT remotely from an external PC over the USB 2.0 (type-B port) interface.

Start measurements based on a specific incident using an external trigger input signal.

View the display on an external monitor by connecting it to the VGA video monitor out.

Control the EXT remotely over the 1000 Base-T LAN interface.

Synchronize other test equipment with the analyzer using the external trigger output signals.

Transforming manufacturing test

Easy to use *Continued...*

Extend EXT RF input/output to MPA

Extend EXT RFIO1 or RFIO2 for GPS downlink signal

4X parallel GPS receiver test

Fully calibrated 8X RFIO for 8X parallel receiver test and 8X sequential transmitter test

Status lights for each RFIO's Tx/Rx signal

Extend EXT RFIO1/2 MPA for GPS downlink signal

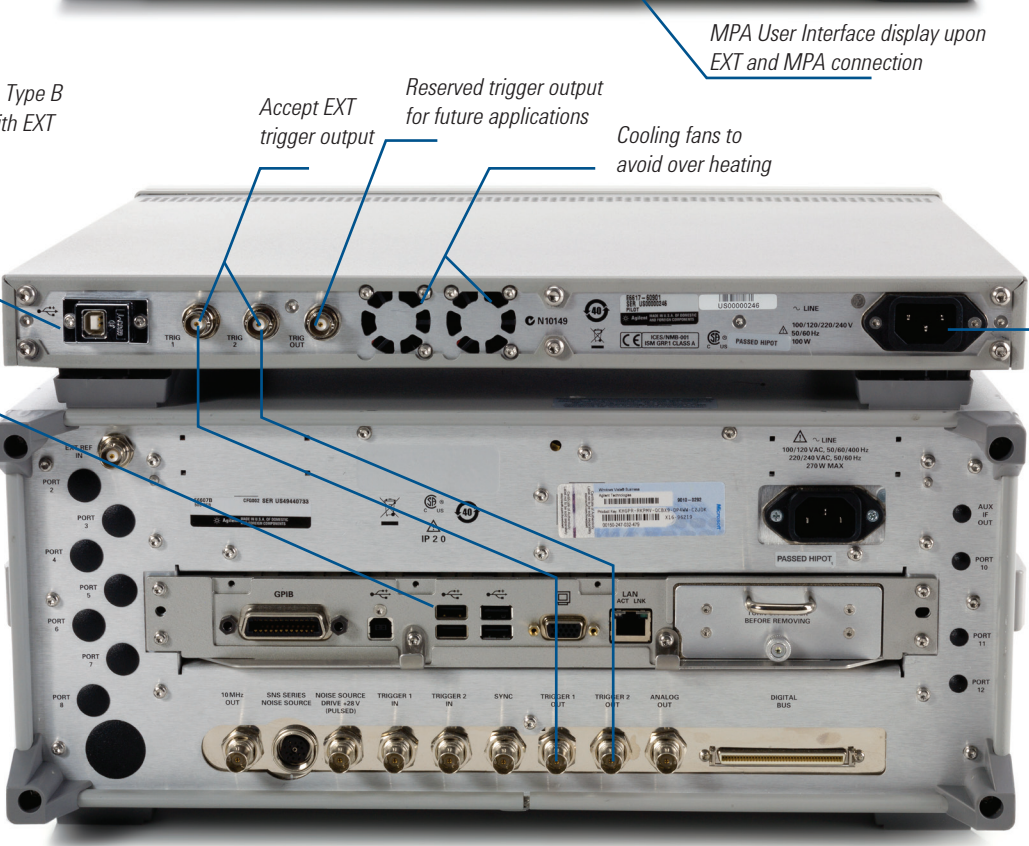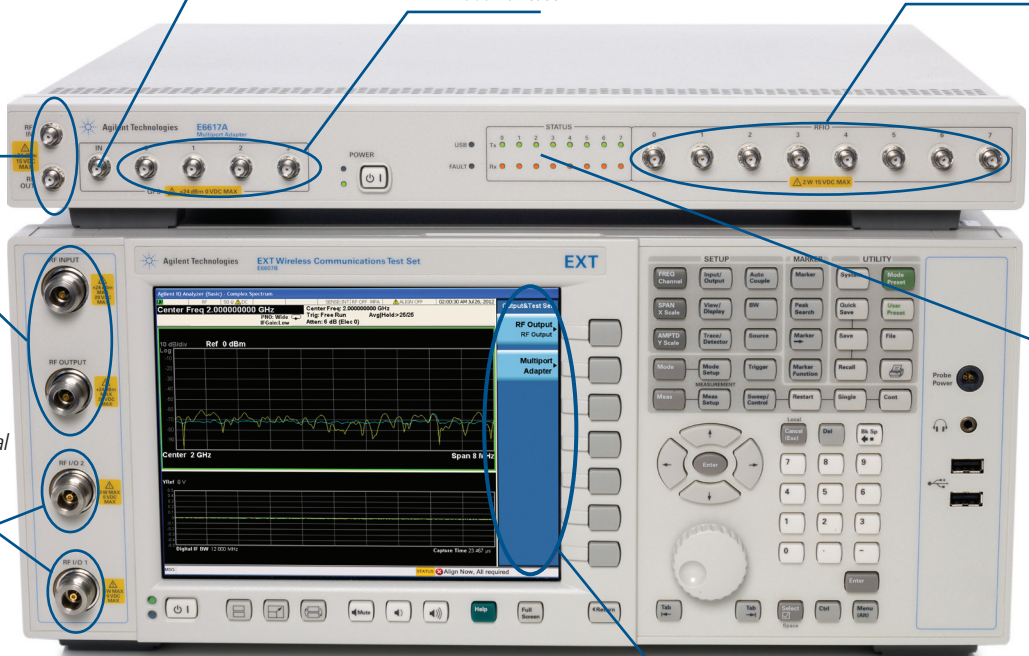MPA User Interface display upon EXT and MPA connection

USB 2.0 port, Type B to connect with EXT

Accept EXT trigger output

Reserved trigger output for future applications

Cooling fans to avoid over heating

Use the MPA in various environments with 50-60 Hz power input

More information

E6607B EXT Wireless Communications Test Set, Flyer,
Literature number 5990-9255EN

E6607B EXT Wireless Communications Test Set, Configuration Guide,
Literature number 5990-9373EN

E6607B EXT Wireless Communications Test Set Non-signaling Test Overview,
Application Note,
Literature number 5990-9256EN

Solutions for Manufacturing Next-Generation Wireless Devices,
Application Note,
Literature number 5990-7209EN

E6607B EXT Wireless Communications Test Set, Data Sheet,
Literature number 5990-9543EN

E6617A Multiport Adapter,
Data Sheet,
Literature number 5991-0315EN

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