

Agilent PXT Wireless Communications Test Set (E6621A)



Getting Started Guide



Agilent Technologies

Notices

© Agilent Technologies, Inc. 2010 – 2012

No part of this manual may be reproduced in any form or by any means (including electronic storage and retrieval or translation into a foreign language) without prior agreement and written consent from Agilent Technologies, Inc. as governed by United States and international copyright laws.

Trademark Notices

Windows®, MS Windows XP®, and MS Windows 7® are either registered trademarks of Microsoft Corporation in the United States and/or other countries.

Warranty

The material contained in this document is provided “as is,” and is subject to being changed, without notice, in future editions. Further, to the maximum extent permitted by applicable law, Agilent disclaims all warranties, either express or implied, with regard to this manual and any information contained herein, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. Agilent shall not be liable for errors or for incidental or consequential damages in connection with the furnishing, use, or performance of this document or of any information contained herein. Should Agilent and the user have a separate written agreement with warranty terms covering the material in this document that conflict with these terms, the warranty terms in the separate agreement shall control.

Statement of Compliance

This product has been designed and tested in accordance with accepted industry standards, and has been supplied in a safe condition. The documentation contains information and warnings that must be followed by the user to ensure safe operation and to maintain the product in a safe condition.

Manual Part Number

E6621-90001

Edition

January 2012

Version 6.3

Printed in Malaysia
Agilent Technologies, Inc.

Technology Licenses

The hardware and/or software described in this document are furnished under a license and may be used or copied only in accordance with the terms of such license.

Restricted Rights Legend

If software is for use in the performance of a U.S. Government prime contract or subcontract, Software is delivered and licensed as “Commercial computer software” as defined in DFAR 252.227-7014 (June 1995), or as a “commercial item” as defined in FAR 2.101(a) or as “Restricted computer software” as defined in FAR 52.227-19 (June 1987) or any equivalent agency regulation or contract clause. Use, duplication or disclosure of Software is subject to Agilent Technologies’ standard commercial license terms, and non-DOD Departments and Agencies of the U.S. Government will receive no greater than Restricted Rights as defined in FAR 52.227-19(c)(1-2) (June 1987). U.S. Government users will receive no greater than Limited Rights as defined in FAR 52.227-14 (June 1987) or DFAR 252.227-7015 (b)(2) (November 1995), as applicable in any technical data.

Safety Notices

The following general safety precautions must be observed during all phases of operation of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. Agilent Technologies Inc. assumes no liability for the customer’s failure to comply with these requirements.

CAUTION

A CAUTION notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

WARNING

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

Electrical Rating

Input Voltage Range: 100 to 240 VAC, automatic selection

Input Frequency Range: 50/60Hz

Input Current Rating:

5A @ 240 VAC (maximum)

7A @ 100 VAC (maximum)

Mains supply voltage fluctuates up to +/- 10% of the nominal voltage.

Transient over-voltages are typically present on the mains supply.

This instrument has an auto-ranging line voltage input, ensure the supply voltage is within the specified range.

WARNING	This is a Safety Class 1 Product (provided with a protective earthing ground incorporated in the power cord). The mains plug shall only be inserted in a socket outlet provided with a protective earth contact. Any interruption of the protective conductor inside or outside of the product is likely to make the product dangerous. Intentional interruption is prohibited.
----------------	---

WARNING	No operator serviceable parts inside. Refer servicing to qualified personnel. To prevent electrical shock do not remove covers.
----------------	---

WARNING	For continued protection against fire hazard, replace fuses, and or circuit breakers only with same type and ratings. The use of other fuses, circuit breakers or materials is prohibited.
----------------	--

CAUTION	The Mains wiring and connectors shall be compatible with the connector used in the premise electrical system. Failure, to ensure adequate earth grounding by not using the correct components may cause product damage, and serious injury.
----------------	---

CAUTION	This product is designed for use in Installation Category II and Pollution Degree 2, per IEC 61010 Second Edition and 664 respectively.
----------------	---

Warranty

This Agilent Technologies instrument product is warranted against defects in material and workmanship for a period of one year from the date of shipment. During the warranty period, Agilent Technologies will, at its option, either repair or replace products that prove to be defective. For warranty service or repair, this product must be returned to a service facility designated by Agilent Technologies. Buyer shall prepay shipping charges to Agilent Technologies. Agilent Technologies shall pay shipping charges to return the product to Buyer. However, Buyer shall pay all shipping charges, duties, and taxes for products returned to Agilent Technologies from another country.

Where to Find the Latest Information

Agilent will periodically update product documentation. For the latest information about this wireless test set, including software upgrades, operating and application information, and product and accessory information, see the following URL: <http://www.agilent.com/find/pxt>

Is your product software up-to-date?

Agilent will periodically release software updates to fix known defects and incorporate product enhancements. To search for software updates for your product, go to the Agilent Technical Support website at

<http://www.agilent.com/find/softwaremanager>

IMPORTANT	An active N6050AS software and technical support contract (STSC) is required to access the software manager website (displayed above), together with the login credentials registered by you or your company for activation. See "Redeem Your Entitlement Certificate" on page 22 for instructions to activate your STSC.
------------------	---

This page is intentionally left blank.

Table of Contents

1	Introduction	1
	Agilent E6621A PXT Overview	1
	Base Station Emulator (BSE).....	1
	Signal Analyzer (SA)	1
	General Capabilities of the Agilent E6621A PXT.....	2
	General Specifications	2
	PXT Software Applications	3
	Agilent N6050A LTE Mobile Test Software	3
	Agilent N6051A LTE RF Parametric Test with Test Mode Signaling.....	3
	Agilent N6052A LTE Functional and Application Test.....	3
	Agilent N6061A Protocol Logging and Analysis	3
	Agilent N6062A Protocol Message Editor.....	4
	Agilent N6070A series Signaling Conformance Test solution.....	4
	Latest documentation.....	4
	Software and Technical Support Contracts	4
	STSCs for the Agilent E6621A PXT	4
2	Quick-Start	5
	Initial Inspection	5
	Verifying the Contents	5
	Shipping Problems?.....	6
	Instrument Location and Rack Mounting Requirements.....	6
	Locating the Test Set.....	6
	Table Top Ambient Temperature	6
	Rack Mounting – Hardware and Temperature	7
	Turning On the Test Set for the First Time	8
	Anti-Virus Protection and Firewalls	9
	Instrument Information.....	9
	Power Requirements.....	9
	Instrument Maintenance.....	9
3	Front and Rear Panel Features.....	11
	Front Panel Features.....	11
	Rear Panel.....	14
	Front and Rear Panel Symbols	15
4	Setting Up the Equipment	16
	Equipment List	16
	Setting Network Addresses.....	17
	Using Remote Desktop to Connect to the PXT	18

5	Licensing the E6621A LTE Wireless Communications Test Set and Associated Products	19
	Checking Instrument Licenses.....	19
	Licensing Additional Products	20
	Installation Procedure over USB.....	21
	Transportable Licenses	23
6	Upgrading Your Instrument Software	24
7	Connecting the UE.....	25
	Single Input Single Output (SISO)	25
	Downlink Transmit Diversity and Multiple Input Single Output (MISO).....	25
	Downlink Multiple Input Multiple Output (MIMO)	25
	Next Steps	25
8	Troubleshooting.....	26
	Functional Check	26
	Operating System Recovery Procedure	27
	Resetting the AC Mains Circuit Breaker	28
	Returning Your Test Set for Service.....	29
	Calling Agilent Technologies	29
	Locations for Agilent Technologies.....	29
	Service and Support	30
	Software and Technical Support Contracts	31
	Web-based support.....	31
	E-mail support	31
	Phone support.....	31
9	Appendix	32

1 Introduction

Welcome to the **Getting Started Guide** for the Agilent E6621A PXT Wireless Communications Test Set (PXT). The purpose of this guide is to provide you with the basic steps to getting started with your test set and making your first measurement. It also provides an introduction on using the test set, and where you can go to get additional help information.

Your test set will help you meet your stringent time-to-market schedules and design quality goals. From protocol development through RF conformance and interoperability testing, the PXT is a powerful, scalable user equipment (UE) test platform. The advanced capabilities of the PXT include real-time, system-rate network and base station emulation. The test set also provides bench-top network emulation for quick and easy UE application and performance testing. Downlink MIMO, RF measurements and end-to-end IP data connections are just a few of the many features that will make your UE development process more efficient and successful.

Agilent E6621A PXT Overview

The Agilent E6621A PXT is designed to test and analyze the performance and signaling of LTE UEs based on the 3GPP standard. The PXT has two operating modes:



Figure 1-1 Agilent E6621A PXT Wireless Communications Test Set

Base Station Emulator (BSE)

In BSE mode, the PXT simulates the operation of an LTE eNodeB, for use in the development and test of LTE UEs. In this mode, users can setup a call, establish a link, and transmit data.

Signal Analyzer (SA)

In Signal Analyzer (SA) mode, the PXT can be used to analyze LTE signals using modulation and spectrum analysis. The Modulation Analysis mode displays the constellation and modulation errors of the signal. The Spectrum Analysis functionality, implemented using a Fast Fourier Transform (FFT) algorithm, displays the measured LTE signal in the frequency domain.

General Capabilities of the Agilent E6621A PXT

- Frequency Division Duplex (FDD) and Time Division Duplex (TDD) options
- Real-time 3GPP LTE downlink (DL) signal modulation and uplink (UL) demodulation
- eNodeB simulation with L1, L2 and L3 protocol stack
- Settable eNodeB, UE, and network operation parameters
- Settable frequency, power and modulation schemes
- SISO and MIMO testing capabilities

General Specifications

Environmental

Operating Temperature:

Location	Maximum Ambient Temperature
Rack Mount	35° C
Table Top	45° C

Storage Temperature: -20° C to +70° C

Altitude: 2000 meters (maximum)

Humidity: Maximum relative humidity is 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C

This product is designed for indoor use, only.

Physical Specifications

Weight: 27.6 Kg max (depending on product option)

Dimensions: 222 H x 444 W x 600 D mm nominal

Power Requirements

Input Voltage Range: 100 to 240 VAC, automatic selection

Input Frequency Range: 50/60Hz

Input Current Rating: 5A @ 240 VAC (maximum)

7A @ 100 VAC (maximum)

Mains supply voltage fluctuates up to +/- 10% of the nominal voltage.

Transient over-voltages are typically present on the mains supply.

WARNING	This is a Safety Class 1 Product (provided with a protective earthing ground incorporated in the power cord). The mains plug shall only be inserted in a socket outlet provided with a protective earth contact. Any interruption of the protective conductor inside or outside of the instrument is likely to make the instrument dangerous. Intentional interruption is prohibited. (IEC 348 clauses 17.3.3c & 17.3.4)
----------------	--

CAUTION	<p>This instrument has an auto-ranging line voltage input. Ensure the supply voltage is within the specified range.</p> <p>When installing the product in a cabinet the convection into and out of the product must not be restricted. The ambient temperature (outside the cabinet) must be less than the maximum operating temperature of the product by 4° C for every 100 watts dissipated in the cabinet. If the total power dissipated in the cabinet is greater than 800 watts, then forced convection must be used. It is your responsibility to ensure the ambient temperature does not exceed the rated ambient temperature stated in the specification.</p>
----------------	--

PXT Software Applications

Agilent N6050A LTE Mobile Test Software

This software application comes installed as a standard product on the PXT. It is the basis for all UE testing. N6050A-7FP provides LTE-FDD base station emulation and N6050A-8FP provides LTE-TDD base station emulation.

Agilent N6051A LTE RF Parametric Test with Test Mode Signaling

This software application is useful for RF design. It is installed in the PXT and includes a suite of LTE RF measurements that are used for characterization, calibration, and verification purposes, available while on a connection. This software application is optional.

Agilent N6052A LTE Functional and Application Test

This software application enables the PXT to provide a controlled environment where you can verify network attach, idle and connected mode operation and functional performance such as throughput. Maximum flexibility makes it possible for you to configure a range of connection and network parameters where you can test, stress, and debug the protocol and data handling capabilities of designs including DL 2x2 MIMO and handovers. This software application is optional.

Agilent N6061A Protocol Logging and Analysis

This application software is developed for use on systems running the Microsoft (MS) Windows XP or Windows 7 operating systems. It displays and stores protocol and event logs of Agilent E6621A PXT. The stored log files can be replayed and analyzed using this software and other advanced post-processing tools. Please consult the "Agilent LTE Protocol Logging and Analysis User's Guide" for more information.

Agilent N6062A Protocol Message Editor

This software application is developed for use on systems running the MS Windows XP or Windows 7 operating systems. N6062A provides the ability to define RRC/NAS messages and event-driven scenarios which can be utilized during the Base Station Emulator (BSE) operating mode of the Agilent E6621A PXT. Please consult the “Agilent LTE Message Editor User’s Guide” for more information.

Agilent N6070A series Signaling Conformance Test solution

The N6070A series signaling conformance test system verifies the protocol characteristics of LTE UEs. It provides a standards-based and flexible development environment for the LTE protocol stack development, regression test, pre-conformance and conformance. The system uses the Agilent E6621A PXT with TTCN-3 test scripts released from ETSI. Please consult the “Agilent N6070 Series Signaling Conformance Test User’s Guide” for more information.

Latest documentation

For the latest documentation and software updates for the above products, please go to www.agilent.com/find/pxt.

Software and Technical Support Contracts

Software and Technical Support Contracts (STSC) entitle you to software updates and feature enhancements, as well as direct access to a technical expert for technical support for a fixed period, usually one year.

The STSC gives you direct access to technical product experts to increase your productivity and minimize the software difficulties you encounter. These technical support engineers are experts on the N6070A series Signaling Conformance Test solution, the E6621A PXT test set, and its complementary software products. They have instant access to instruments and software to enable them to resolve your issues as quickly as possible. Agilent will investigate all software defects and operational problems reported through the technical support channel. Upon completion of the investigation, we will advise you on possible solutions and functional alternatives. Where possible, Agilent will provide software releases to address problems caused by defects in the firmware or software.

STSCs for the Agilent E6621A PXT

The N6050AS STSC covers the N6050A, N6051A and N6052A software applications running on the E6621A PXT wireless communications test set, plus the associated N6061A and N6062A PC software applications.

For more information on how to access technical support, refer to “Software and Technical Support Contracts” on page [31](#).

2 Quick-Start

This section describes how to set up your PXT and install product licenses.





The following topics are included in this section:

- Initial Inspection on page [5](#).
- Instrument Location and Rack Mounting Requirements on page [6](#).
- Turning on the Test Set for the First Time on page [8](#).
- Checking / Installing Product Licenses on page [19](#).
- Anti-Virus Software and Firewalls on page [9](#).
- Instrument Information on page [9](#).

Initial Inspection

Inspect the shipping container and the cushioning material for signs of stress. Retain undamaged shipping materials for future use, as you may wish to ship the test set to another location or to Agilent Technologies for service.

Verifying the Contents

Item	Deliverable	Description
Getting Started Guide (this document)		Provides first-time power on instructions, licensing information, operating system information, and general hardware information.
E6621A PXT Wireless Communications Test Set		CAUTION: The instrument is heavy and requires a two person lift.
License entitlement certificate(s)		Entitlement certificates for software technical support contract(s) and application software. Depends on options ordered. For example: N6051A, N6052A See “Redeem Your Entitlement Certificate” on page 22 .
License keys for N6061A and/or N6062A		USB key(s) containing license(s)
N6072A License key		Blank USB key with Entitlement Certificate
Agilent USIM (E5515-10008)		See www.agilent.com/find/usim for details.
Power Cable		Connection for Instrument Power.

Shipping Problems?

If the shipping materials are damaged or the contents of the container are incomplete:

- Contact the nearest Agilent Technologies office.
- Keep the shipping materials for the carrier's inspection.
- If you must return a test set to Agilent Technologies, use the undamaged original, or comparable, shipping materials. See "Returning Your Test Set for Service" on page [29](#).

Instrument Location and Rack Mounting Requirements

Locating the Test Set

Make sure that the rear panel fan inlet and exhaust vent areas on the top and sides of the test set are not obstructed. The minimal required clearance is 2.75 inches (7 cm).

NOTE	Install the instrument so that the detachable power cord is readily identifiable and is easily reached by the operator. The detachable power cord is the instrument disconnecting device. It disconnects the mains circuits from the mains supply before other parts of the instrument. The front panel switch is only a standby switch and is not a LINE switch. Alternatively, an externally installed switch or circuit breaker (which is readily identifiable and is easily reached by the operator) may be used as a disconnecting device.
-------------	---

Table Top Ambient Temperature

CAUTION	Do not exceed an ambient temperature of 45° C when operating the instrument on a table top.
----------------	---

Rack Mounting – Hardware and Temperature

CAUTION	<p>When mounting instrument in a rack, do not exceed the lower of:</p> <ul style="list-style-type: none">• Outside rack ambient temperature of 35° C• Or, an internal rack air temperature of 45° C.
----------------	---


Do not rack mount the test set side-by-side with any other instrument with side ventilation. Make sure the exhaust air from the first instrument is directed away from the inlet of the second unit. If the pre-heated air from the first instrument is directed into the second instrument, it can cause excessive operating temperatures in the second unit and can cause instrument failures. The test set draws air in from the rear and exhausts air from the top and sides. Do not mount other equipment immediately above the instrument. The minimal required clearance is 2.75 inches (7 cm).

CAUTION	<p>When installing the product in a cabinet, the convection into and out of the product must not be restricted. The ambient temperature (outside the cabinet) must be less than the maximum operating temperature of the product by 4° C for every 100 watts dissipated in the cabinet. If the total power dissipated in the cabinet is greater than 800 watts, then forced convection must be used.</p>
----------------	--

Turning On the Test Set for the First Time

WARNING	DO NOT remove the AC power during boot-up/shutdown of the operating system or during the process of initializing the software. This can cause damage to the system files and prevent proper operation of the instrument.
----------------	--

CAUTION	Before switching on this instrument, make sure the supply voltage is in the specified range.
----------------	--

Steps	Actions	Notes
Connect power cable	Install the instrument so that the detachable power cord is easily reached by the operator.	Ensure power outlet is provided with a protective ground as specified.
To power on: Press the power button (bottom left of instrument front panel)	The LED in the power button will illuminate.	After power-on, the operating system will boot and the instrument software will run automatically.
Wait until AFTER the splash screen has been replaced by the default PXT startup state.	The splash screen indicates the application is booting.	 <p>The splash screen displays the Agilent E6621A PXT Wireless Communications Test Set logo, a screenshot of the software interface, and the text: 'Agilent E6621A PXT Wireless Communications Test Set', 'Developed in cooperation with femowireless', 'www.agilent.com/find/pxt', 'Agilent Technologies', and '© Agilent Technologies, Inc. 2010'.</p>
To power off: Press the power button.	The screen will show the windows shut-down screen.	
Abnormal power off	Press and hold the power button for more than 5 seconds.	WARNING: Do not use the abnormal power off unless the normal procedure does not work correctly.

Anti-Virus Protection and Firewalls

The instrument is shipped with the Windows XP firewall enabled. No anti-virus software is shipped with the instrument. It is recommended that you **do not** install anti-virus protection.

WARNING

Take care to verify that USB memory devices used with the Agilent E6621A PXT are virus-free before use with the instrument.

NOTES:

1. Connecting the instrument to a LAN with internet connectivity is not recommended.
2. Do not modify the default network settings as this may cause problems with the operating system of the test set.
3. The instrument and connected PCs operate using fixed IP addresses.

Instrument Information

Power Requirements

Power line voltage does not need to be selected.

The test set is protected by a circuit breaker mounted on the rear panel above the power connector. If the breaker trips due a fault or power spike, reset it by pressing the upper part of the rocker. If it immediately trips again, see "Returning Your Test Set for Service" on page [26](#). This test set does *not* contain customer serviceable fuses.

See "Power Requirements" on page [2](#) for more information.

Instrument Maintenance

Protecting against overpowering

The input circuitry of the test set can be damaged by applying signals that exceed the maximum safe input level of +27 dBm average total power or +/- 30 VDC. Repairing damage to the input circuitry can be expensive. If the test set will be used to measure signals which might be near the maximum safe input level, use external attenuators and/or limiters to help protect the test set input. Always use the three-prong AC power cord supplied with this product. Failure to ensure adequate earth grounding by not using this cord can cause product damage.

WARNING

If this product is not used as specified, the protection provided by the equipment could be impaired. This product must be used in a normal condition (in which all means for protection are intact) only. Install the instrument so that the detachable power cord is readily identifiable and easily reached by the operator. The detachable power cord is the instrument disconnecting device. It disconnects the mains circuits from the mains supply before other parts of the instrument. The front panel switch is only a standby switch and is not a LINE switch. Alternatively, an externally installed switch or circuit breaker (which is readily identifiable and is easily reached by the operator) may be used as a disconnecting device.

Cleaning the instrument

WARNING	To prevent electrical shock, disconnect the test set from mains before cleaning. Use a dry cloth or one slightly dampened with water to clean the external case parts. Do not attempt to clean internally.
----------------	--

Cleaning connectors

Cleaning connectors with alcohol shall only be done with the instrument power cord removed, and in a well-ventilated area. Allow all residual alcohol moisture to evaporate, and the fumes to dissipate prior to energizing the instrument.

WARNING	<p>Keep isopropyl alcohol away from heat, sparks, and flame. Store in a tightly closed container. It is extremely flammable. In case of fire, use alcohol foam, dry chemical, or carbon dioxide; water may be ineffective.</p> <p>Use isopropyl alcohol with adequate ventilation and avoid contact with eyes, skin, and clothing. It causes skin irritation, may cause eye damage, and is harmful if swallowed or inhaled. It may be harmful if absorbed through the skin. Wash thoroughly after handling. In case of spill, soak up with sand or earth. Flush spill area with water.</p> <p>Dispose of isopropyl alcohol in accordance with all applicable federal, state, and local environmental regulations.</p>
----------------	---

Protecting against electrostatic discharge

Electrostatic discharge (ESD) can damage or destroy electronic components (the possibility of unseen damage caused by ESD is present whenever components are transported, stored, or used).

Test equipment and ESD

To help reduce ESD damage that can occur while using test equipment:

- Before connecting any coaxial cable to a test set connector for the first time each day, momentarily short the center and outer conductors of the cable together.
- Personnel should be grounded with a 1 M Ω resistor-isolated wrist-strap before touching the center pin of any connector and before removing any assembly from the test set.
- Be sure that all instruments are properly earth-grounded to prevent build-up of static charge.

Additional information about ESD

For more information about ESD and how to prevent ESD damage, contact the Electrostatic Discharge Association (<http://www.esda.org>). The ESD standards developed by this agency are sanctioned by the American National Standards Institute (ANSI).

3 Front and Rear Panel Features

Front Panel Features

Begin using Agilent E6621A PXT, by becoming familiar with the layout of the Front Panel and the displayed menu systems.

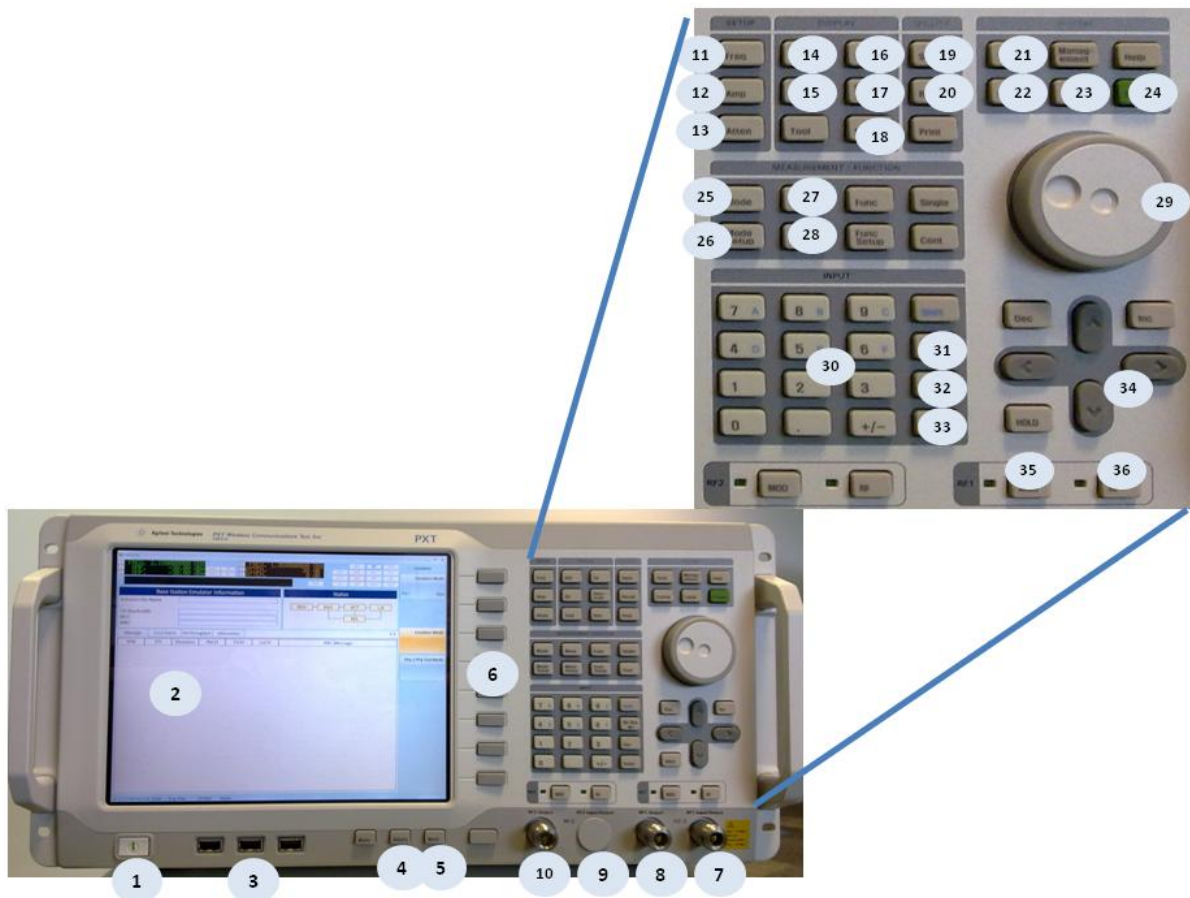


Figure 3-1 Front Panel

Number	Item	Description
1	Power	This is the On/Off button for AC power. Pressing this button when the instrument is powered off turns it on. Pressing this button briefly will shutdown the PXT and Windows Operating System safely. DO NOT power-on the PXT within 30 seconds of power-down.
2	LCD Screen	Different screen layouts are used for each mode of operation. In each layout, the screen includes the Setting Window, the Working Window, and the Context Menu.
3	USB Ports	Devices using a USB interface (for example: mouse, keyboard, or memory stick) may be connected to these ports.

Agilent PXT Wireless Communications Test Set
Getting Started Guide

Number	Item	Description
4	Return	Press the Return key to display the previous menu for the current mode.
5	More	Used to select additional Context Menu options when more than eight menu options are available.
6	Context Menu buttons	Eight buttons are available on the right-hand side of the LCD Screen for menu selection. The current menu is displayed at the right side of the screen. When more than eight menu options are available, select the More key, to see additional options.
7	RF1 Input/Output	A cable is connected to this port for communication with the UE. When duplex mode is selected, this port acts as both the RF input (UL) and output (DL) to the UE. For MIMO UE testing, the primary Tx/Rx port of the UE should be connected to this port. In simplex mode, this port is only for RF input (UL) for the primary RF channel.
8	RF1 Output	When simplex mode is selected, this port is for RF output (DL) for the primary RF channel. In duplex mode, this is not used.
9	RF2 Input/Output (optional)	This connector is only used when the UE is configured with dual transmit and/or receive RF signal paths as the secondary Tx/Rx port. In duplex mode, this is for both RF output (DL) and RF input (UL) and in simplex mode, this is only for RF input. For DL-2ch/UL-1ch option, this port is not used. Instead, RF2 Output is used for 2 nd channel output for DL MIMO signal.
10	RF Output 2	When the simplex mode is selected, this port is for RF output (DL) for the secondary RF channel. In duplex mode, this is not used. For DL-2ch/UL-1ch option, this port is always used for RF2 output (the secondary RF output channel).
11	Freq	Use this button to set frequency-related values including Center Frequency, Frequency Offset, Resolution Bandwidth (RBW), Channel Bandwidth (CBW) and SPAN. The Center Frequency is used as the starting point for the frequency parameter adjustment.
12	Amp	Use this button to adjust values related to power and attenuation, including Amplitude, Attenuation, Reference Level, Scale and Power Offsets.
13	Atten	Use this button to set the input attenuation.
14	BSE	Use this button to go to the Base Station Emulator mode.
15	SG	This function is not currently used.
16	SA	Use this button to go to the Signal Analyzer mode.
17	Spectrum	Use this button to go directly to the Spectrum Analyzer mode of SA. Key path: SA, Mode, Spectrum Analyzer
18	Info	Use this button to check System Information: installed hardware options, software version(s), licensing status, and other similar types of information.
19	Save	Use this key to save a configuration or screenshot.

Number	Item	Description
20	Recall	Use this key to recall the saved configuration.
21	Tech	Use this button for image change/reload.
22	Config	Use this button to configure the network and RF setup of the PXT.
23	Local	Use this to return the instrument to front panel control after remote interface operation.
24	Preset	Use this button to return all parameters except those held in non-volatile memory to their default values.
25	Mode	Use this button to go to the top menu of each mode: BSE, SA (Signal Analyzer)
26	Mode Setup	Use this button to configure the currently selected mode.
27	Meas	<p>Use this button to display the measurements available after selecting the Mode key.</p> <p>When the instrument is in SA mode (SA), pressing this key displays two options: Spectrum and LTE. Selecting Spectrum displays these measurement options: Spectrum, Channel Power, Occupied BW, and CCDF. Selecting LTE displays these options: Channel Power, Occupied BW, Power vs Time, Spectrum Emission Mask, ACP, and UL Demodulation.</p> <p>When the instrument is in BSE mode (BSE), this key enables you to select what type of information you wish to view on the display: Message, L1/L2 Status, ER/Throughput, (BSE) Information.</p>
28	Meas Setup	Use this button to configure each measurement.
29	Rotary Dial	Increment and decrement the value of the currently selected numeric parameter.
30	Numeric Keypad	Use to enter numeric parameters. Hexadecimal values are entered using the numeric keys and shift function.
31	Bk Spc	Press the Bk Spc (back space) key to delete the selected digit.
32	Esc	Press this button to cancel the action or choice presented in the Yes/No window.
33	Enter	Press the Enter key to apply inputs and terminate input selection. This is also used as a "yes" button for confirmation of the action or choice presented in the Yes/No window.
34	Arrow Keys	Use to move the on-screen cursor.
35	Mod	Press this button to enable modulation of the RF signal. Both the RF and MOD functions must be enabled to generate an LTE output signal.
36	RF	Press this button to enable the RF output. Both the RF and MOD functions must be enabled to generate an LTE output signal.

Rear Panel

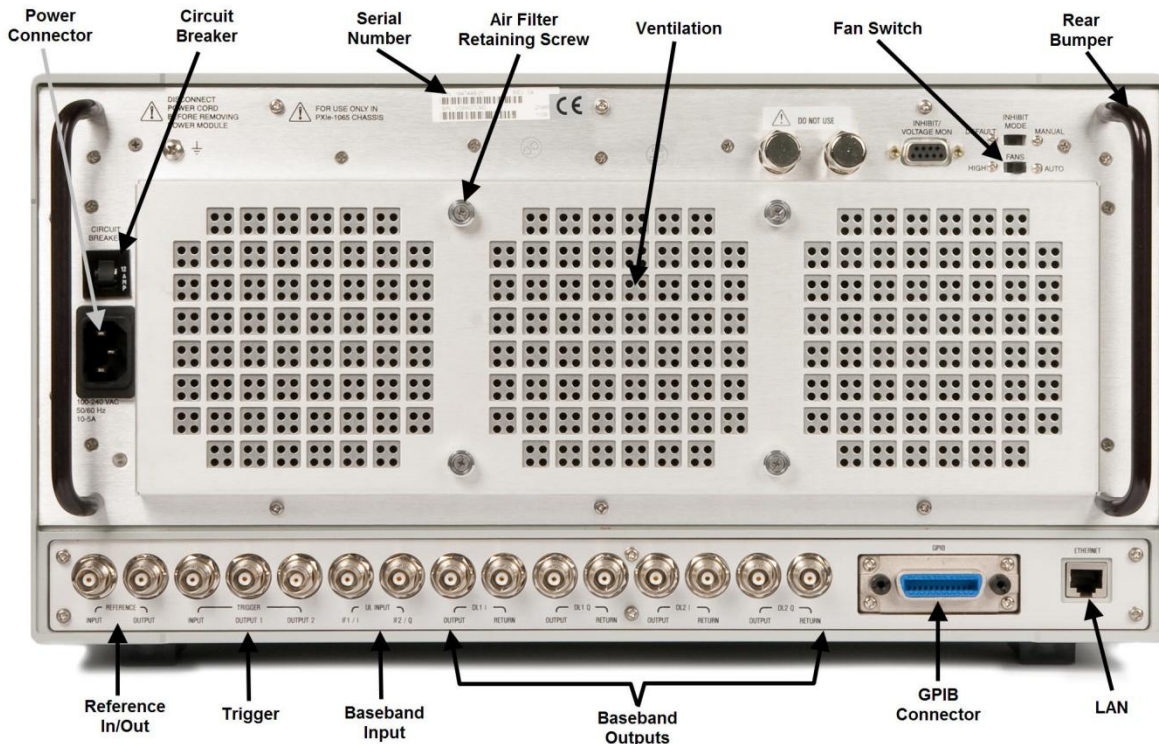


Figure 3-2 Rear Panel






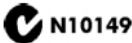





NOTES:

1. Reference clock Ports: Use the 10 MHz Clock Port to synchronize all system clocks of the units. Use the Output Port if you want to supply other units or the DUT (Device Under Test) with the instrument's clock. Use the Input Port if you want to provide one of the other unit's or the DUT's clock to the instrument.
2. Trigger ports: Use the Trigger Port to synchronize the LTE radio frame of the instrument in Emulator mode with the DUT. Use the Output Port if you want to apply the synchronization signal from the instrument to the DUT. Use the Input Port if you want to apply the signal from the DUT to the instrument.
3. Fan Switch: Set the fan on High for maximum cooling performance. Select Auto for improved acoustic performance. When set to Auto, the fan speed is determined by the instrument intake air temperature.
4. The main power cord can be used as the system disconnecting device. It disconnects the mains circuits from the mains supply.

WARNING

Do not cover or block the air flow vents.

Front and Rear Panel Symbols

	This symbol is used to indicate power ON (green LED).
	This symbol is used to indicate power STANDBY mode (yellow LED).
	This symbol indicates the input power required is AC.
	The instruction documentation symbol. The product is marked with this symbol when it is necessary for the user to refer to instructions in the documentation.
	The CE mark is a registered trademark of the European Community.
	The C-Tick mark is a registered trademark of the Australian Spectrum Management Agency.
	This is a marking of a product in compliance with the Canadian Interference-Causing Equipment Standard (ICES-001).
	This is also a symbol of an Industrial Scientific and Medical Group 1 Class A product (CISPR 11, Clause 4).
	The CSA mark is a registered trademark of the CSA International.
	This symbol indicates separate collection for electrical and electronic equipment mandated under EU law as of August 13, 2005. All electric and electronic equipment are required to be separated from normal waste for disposal (Reference WEEE Directive 2002/96/EC).
	Indicates the time period during which no hazardous or toxic substance elements are expected to leak or deteriorate during normal use. Forty years is the expected useful life of the product.
	This symbol on all primary and secondary packaging indicates compliance to China standard GB 18455-2001.

To return unwanted products, contact your local Agilent office, or see <http://www.agilent.com/environment/product/> for more information.

4 Setting Up the Equipment

Equipment List

- E6621A PXT with appropriate options and current software technical support contract
- Optional PC for N6061A Protocol Logging and Analysis and N6062A Message Editor software applications
- Optional PC for Signaling Conformance Test with current software technical support contract
- Optional Application Server PC (for data throughput testing, etc.)
- Optional second test set
- USB License keys for software applications
- Ethernet cables and hub as required
- Cables to attach device under test

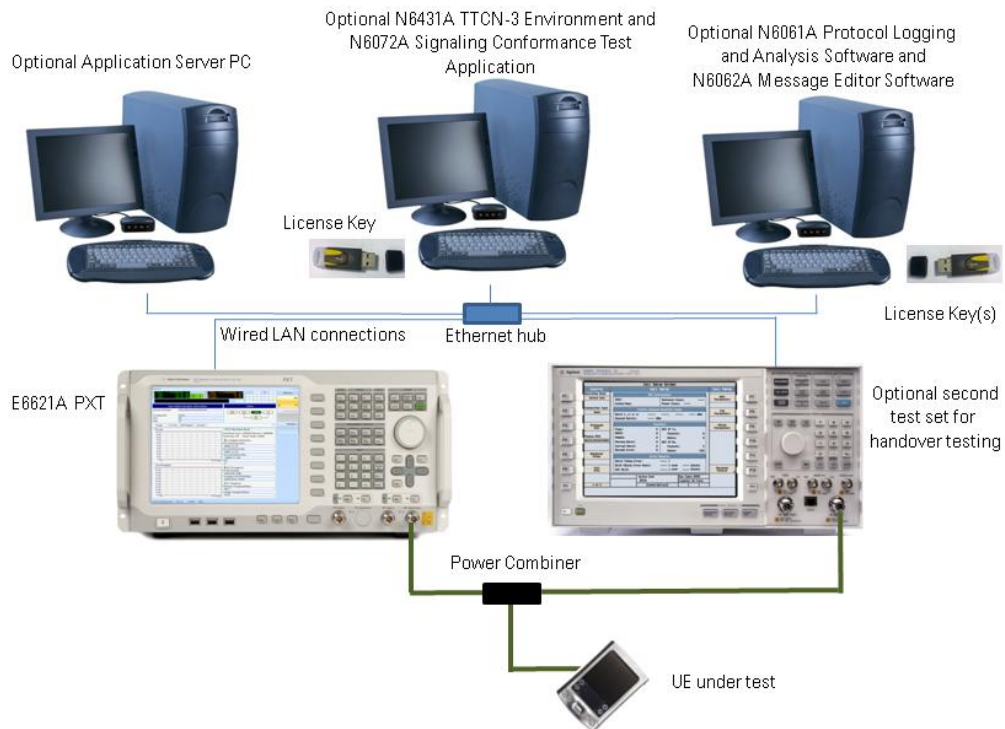


Figure 4-1: Example Test Setup

Setting Network Addresses

To set the Network setting of the PXT, press the front panel CONFIG button, and select Network Setup. The default is set as shown below. If change is needed, set each address and press OK to complete the change.

- IP address to 192.168.1.60
- Subnet Mask 255.255.255.0
- Gateway 192.168.1.230

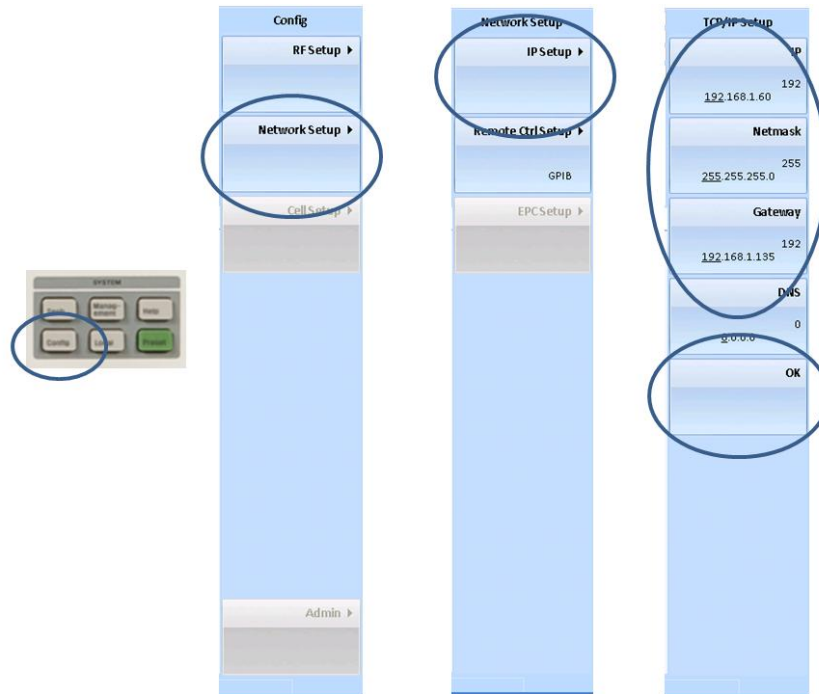


Figure 4-2: PXT Network Settings

The recommended network settings for the additional devices are shown below.

	App Server PC	Signaling Conformance Test PC	PXT	Logging and Analysis / Message Editor PC
IP	192.168.1.230	192.168.1.100	192.168.1.60	192.168.1.135
Subnet Mask	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0
Gateway	192.168.1.60	192.168.1.60	192.168.1.230	192.168.1.60

NOTES:

1. If the UE requires a client PC, it will normally be connected via USB. See the UE documentation for connection details and operating information. The client PC should not be connected to the same LAN as the other equipment.

Agilent PXT Wireless Communications Test Set Getting Started Guide

2. The N6061A Protocol Logging and Analysis software may be installed on the same PC as the N6062A Message Editor software. Other than these two applications, it is recommended that no other applications are running on this PC to ensure real-time logging is not compromised by those other applications.
3. Connecting the equipment to an in-house network is not recommended.

Using Remote Desktop to Connect to the PXT

Connecting the PXT in a configuration other than the one shown in Figure 4-1, above, is not recommended. However, if you have a specific need to control the PXT remotely, using Remote Desktop is an option.

NOTE	The Remote Desktop functionality is a Microsoft Windows XP capability. Refer to the Windows XP help documentation for more information.
-------------	---

After you connect your pc to the PXT, via Remote Desktop, you will need to know the User Name and Password. (The password is case-sensitive.)

- **User Name:** Administrator
- **Password:** agilent4u

5 Licensing the E6621A LTE Wireless Communications Test Set and Associated Products

The Agilent E6621A uses Fixed Perpetual Licenses which are pre-installed for product options purchased with the instrument. It also uses time-limited licenses for annual technical support contract tracking. Transportable licenses for associated software products which run in an external PC are supplied on USB hardware keys.

Checking Instrument Licenses

On the instrument, press the **INFO** front panel key. From the tables on the left of the display, locate the “Installed Options” and “Software and Technical Support Contract” (STSC) expiry information. For more information regarding STSC, see “Software and Technical Support Contracts” on pages [4](#) and [31](#).

From this screen, you can check the options pre-installed in your E6621A and compare the listed options with your order.

When your E6621A is delivered, the Software and Technical Support Contract area will show “Not Present” until you redeem and install your STSC license.

Your Software and Technical Support Contract is supplied as an Entitlement Certificate that you must redeem using the procedure below before using your E6621A. See “Redeem Your Entitlement Certificate” on page [22](#).

NOTE	Entitlement Certificates are only provided for software applications that are <i>not</i> pre-installed on your PXT.
-------------	---

Agilent PXT Wireless Communications Test Set Getting Started Guide

The screenshot shows the INFO screen of an Agilent PXT Wireless Communications Test Set. The top section displays test parameters for two channels (1 and 2) in a green and orange color scheme. Below this, the screen is divided into three main sections: Hardware Information, Software Information, and Software and Technical Support Contract. The Hardware Information section lists details like Serial Number (KR50320107) and installed options such as 'Frequency range from 500MHz to 6GHz'. The Software Information section shows the Software Version (6.1.0.32) and installed options like 'LTE FDD base station emulation'. The Software and Technical Support Contract section indicates the contract expires on 2011-10-04. At the bottom, the status bar shows the time (02:17:31 AM), date (MAY 24, 2011), and instrument status (Ready).

[Hardware Information]		[Module Information]	
Type	Value	Module	Version
Serial Number :	KR50320107	AES.dll	1.0.0.11
Hardware Version		APF.dll	0.9.9.97
E6621A :	6.1	SST40_HW.dll	2.0.0.18
CGU :	0xFF	iwAwtCtrlU.dll	1.0.0.11
ADU :	0x01, 0x01	iwHwCtrlU.dll	1.0.0.4
DAU :	0x01, 0x01	sa_ul_permutation.dll	1.0.0.5
Installed Options		iwFftSpectrum.dll	3.0.4.33
E6621A-506 :	Frequency range from 500MHz to 6GHz	iwLteBseCore.dll	2.0.0.419
E6621A-2D2 :	Downlink 2x2 MIMO	iwLteSigAnalDI.dll	1.8.4.86
E6621A-BB1 :	Enhanced baseband processing	iwLteSigAnalUI.dll	1.6.2.85
		inno_lib.dll	1.0.0.1
		iwRsmpl.dll	1.0.0.0
		libiomp5md.dll	5.0.2009.811
		iwcrypto.dll	1.1.2.5
		security_dll.dll	1.0.0.8
		LTEMsgEncDec.0812.dll	2008.12.6.43
		LTEMsgEncDec.0903.dll	2009.3.6.43
		LTEMsgEncDec.0906.dll	2009.6.6.43
		LTEMsgEncDec.0909.dll	2009.9.6.43
		LTEMsgEncDec.0912.dll	2009.12.6.43
		NasEncodeDLL.dll	1.0.0.2
		NasParsing_TS_All.dll	1.0.0.2
		NasParsing_TS_All_810.dll	1.0.0.2
		NasParsing_TS_All_820.dll	1.0.0.2
		NasParsing_TS_All_830.dll	1.0.0.2
		NasParsing_TS_All_840.dll	1.0.0.2
		ReadKey2.dll	1.0.3.0

Figure 5-1: INFO screen

Licensing Additional Products

Software Technical Support Contracts (STSCs) and additional product options are available for the instrument. They are provided in a kit that includes an Entitlement Certificate and license agreement.

Follow the instructions on the certificate to redeem your licenses from the Agilent license web site. License files will be sent to an e-mail address of your choice, so they can be loaded into the instrument.

A license is usually for one instrument model and serial number combination. The license will only install itself on that instrument.

To ensure you receive the latest version, PC application software is made available at <http://www.agilent.com/find/softwaremanager>.

IMPORTANT	<p>An active N6050AS software and technical support contract (STSC) is required to access the software manager website (displayed above), together with the login credentials registered by you or your company for activation. Your STSC is supplied as an Entitlement Certificate that you must redeem using the procedure below before using your E6621A. See "Redeem Your Entitlement Certificate" on page 22.</p>
------------------	--

Installation Procedure over USB

No calibration is required after a license installation. See the figure and table below for installation details.

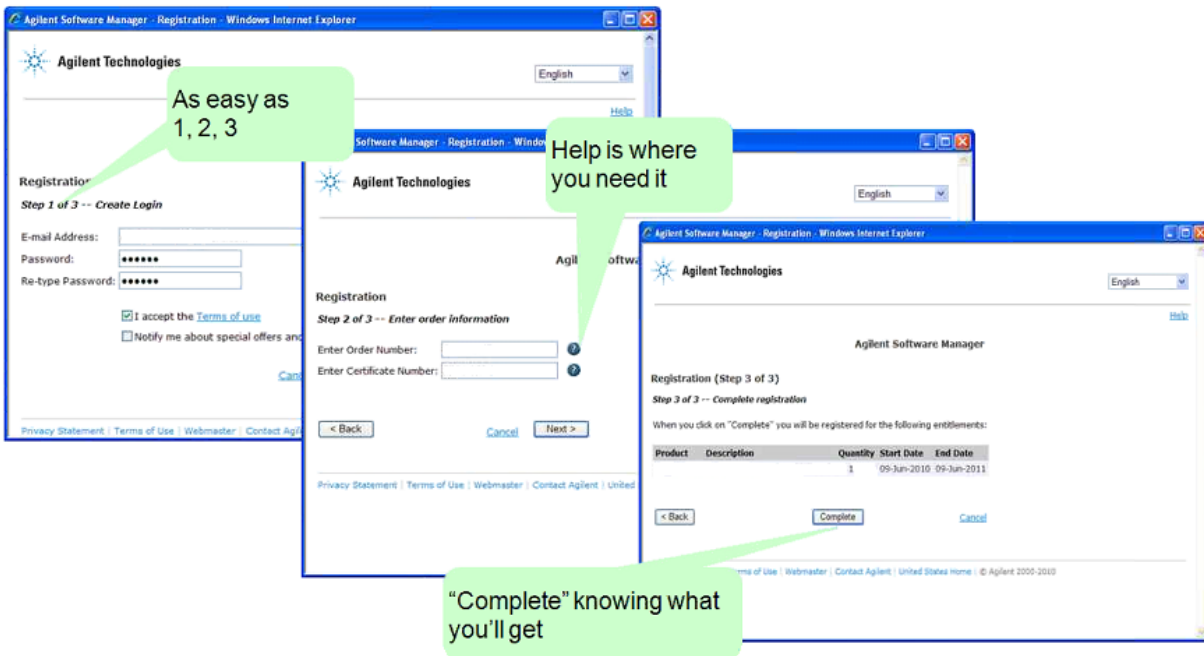


Figure 5-2: Installation Procedure

Agilent PXT Wireless Communications Test Set
Getting Started Guide

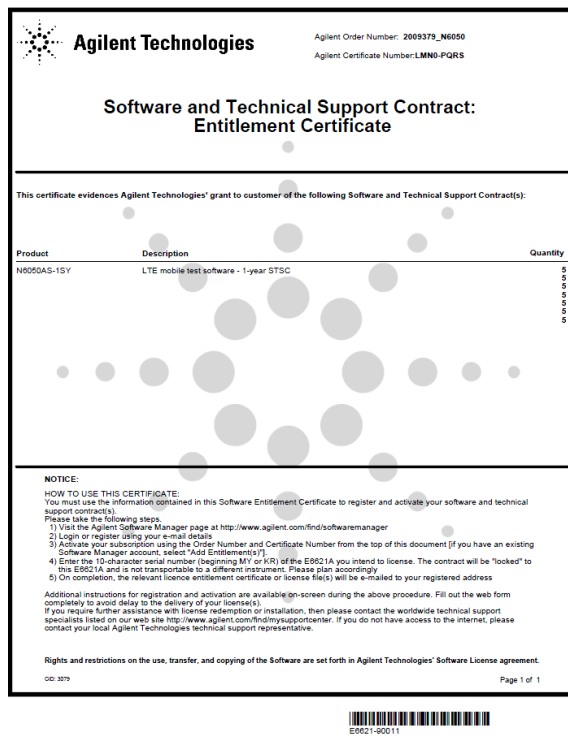


Figure 5-3: Entitlement Certificate

Installing a License on the E6621A PXT

Step	Action	Notes
1 Redeem the License Entitlement Certificate.	Follow the instructions on the Certificate. If this is your first visit to the license management web site, you will be required to register contact details.	After redeeming your License Entitlement Certificate you will receive an e-mail with an attached License File. IMPORTANT: Be sure to redeem your STSC Entitlement Certificate first.
2 Save the license file	Create a directory named "setup.e6621a" in the root directory of the USB storage device. Save the .lic file to this directory, ensuring the filename of the new file is "license.lic".	It is important to follow the naming conventions noted here, otherwise the license file will not be located correctly by the E6621A when performing the remaining license update steps.

Step	Action	Notes
3 Update the license	<ul style="list-style-type: none"> a. Connect the USB storage device to one of the E6621A USB ports. b. Once the USB storage device had been detected successfully, Press INFO (front panel key) c. Press the "Update License" key. 	<p>If the error "License file not found" occurs, the file and directory naming should be verified as outlined in step 2.</p> <p>If this (or any other) error persists, contact the Agilent support team.</p>
4 Verify installation	Verify that the new application appears in the list.	<p>When the new licenses are installed, The System Information screen will be updated to show new license status and STSC information.</p> <p>Any functions that should now be available should be accessible.</p> <p>Any functions that should no longer be available should be inaccessible.</p> <p>The license update should not need a reboot of the E6621A.</p>

If you require further assistance, please contact the Agilent support team.

Online assistance: <http://www.agilent.com/find/assist>

If you do not have access to the Internet, contact your local Agilent Technologies Sales and Service Office, or if in the United States, call 1-800-829-4444.

Transportable Licenses

Apart from the N6431A TTCN-3 Environment, which is licensed to a specific PC, software products associated with the E6621A use transportable licenses provided by USB license keys. Follow the installation instructions detailed in the User's Guide for the relevant product. You will need some or all of the following information to redeem your licenses.

- The order number for each product license
- The USB license key serial number
- The PC host name and MAC address (N6431A TTCN-3 Environment License only)

NOTE	Access to the software download site requires your Software and Technical Support Contract credentials. If you have not already done so, first register and activate your N6050AS contract for the E6621A PXT (and N6072AS contract for the N6070A Series Signaling Conformance Test software if applicable).
-------------	---

6 Upgrading Your Instrument Software

Agilent will periodically release software updates to fix known defects and incorporate product enhancements. To search for software updates for your product, go to the Agilent Technical Support website at

<http://www.agilent.com/find/softwaremanager>

IMPORTANT	An active N6050AS software and technical support contract (STSC) is required to access the software manager website (displayed above), together with the login credentials registered by you or your company for activation. See “Redeem Your Entitlement Certificate” on page 22 for instructions to activate your STSC.
------------------	---

After you download the ZIP file from the software manager website shown above, perform the following steps to complete the upgrade installation:

- Extract the ZIP file to the root of a USB memory stick. (This creates the file structure: “\setup.e6621a\setup.cab” on the USB drive.)
- Connect the memory stick to one of the E6621A USB ports.
- Wait several seconds for MS Windows operating system to recognize the USB stick.
- Press the **INFO** front-panel key.
- Press the **Update Application** softkey.
- Wait until the upgrade process is complete.
- Remove the USB memory stick.

NOTE	If the software is not found on the USB stick, or it is incompatible with the instrument hardware, a message is displayed and the software will not be installed. Contact Agilent support if you need assistance obtaining the correct software.
-------------	--

NOTE	If the software release date is after your Software and Technical Support Contract has expired, a message is displayed and the software will not be installed. Renew your Software and Technical Support Contract to allow the installation to proceed. You can install software created prior to the Software and Technical Support Contract expiry date.
-------------	--

7 Connecting the UE

The UE under test is normally connected to the PXT via the RF I/O interfaces. The UE can also be connected using baseband I/O interface at the rear panel with BNC cables. The connection configuration will depend on the required test setup.

Single Input Single Output (SISO)

Connect the UE antenna directly to the RF1 Input / Output connector. If the UE has receive diversity antennas, connect both to RF1 Input / Output via a power combiner.

Downlink Transmit Diversity and Multiple Input Single Output (MISO)

Connect RF1 Input / Output and RF2 Output to the UE via a power combiner.

Downlink Multiple Input Multiple Output (MIMO)

Connect RF1 Input / Output to the UE primary receive antenna. Connect RF 2 Output to the UE secondary receive antenna.

Next Steps

When you are satisfied that the equipment is set up correctly, please go to the relevant document for additional information to begin using the instrument.

For manual measurements, go to the **Agilent E6621A PXT Wireless Communications Test Set User's Guide** (E6621-90002).

For Signaling Conformance Testing, go to the **Agilent N6070A Series Signaling Conformance Test User's Guide** (E6621-90005).

You may also need the following:

- **Agilent N6062A LTE Message Editor User's Guide** (E6621-90003)
- **Agilent N6061A LTE Protocol Logging and Analysis User's Guide** (E6621-90004)
- **Agilent PXT Wireless Test Set Programmer's Reference** (E6621-90007)

Please see www.agilent.com/find/pxt for the latest versions of all the above documents.

NOTE	Always check the release notes for the latest information about any known issues and other important information about your product. Release notes are available for download from www.agilent.com/find/softwaremanager .
-------------	---

8 Troubleshooting

WARNING

No operator serviceable parts inside. Refer servicing to qualified personnel. To prevent electrical shock do not remove covers.

Functional Check

NOTE

This functional check is only available if you have *Option N6051A RF Parametric Test with Test Mode Signaling* installed on your PXT.

Turn on the instrument. Wait until the boot procedure completes: indicated by the appearance of the Base Station Emulator startup screen. With no cabling connected to the front panel, perform the following:

- Press the **AMP** key and set the RF1 output power to 0 dBm.
- Press the **FREQ** key and set the RF1 DL frequency to match the UL frequency.
- Press the **SPECTRUM** key. The display should be similar to the picture below. This indicates that the LTE transmit and receive functions are operational.

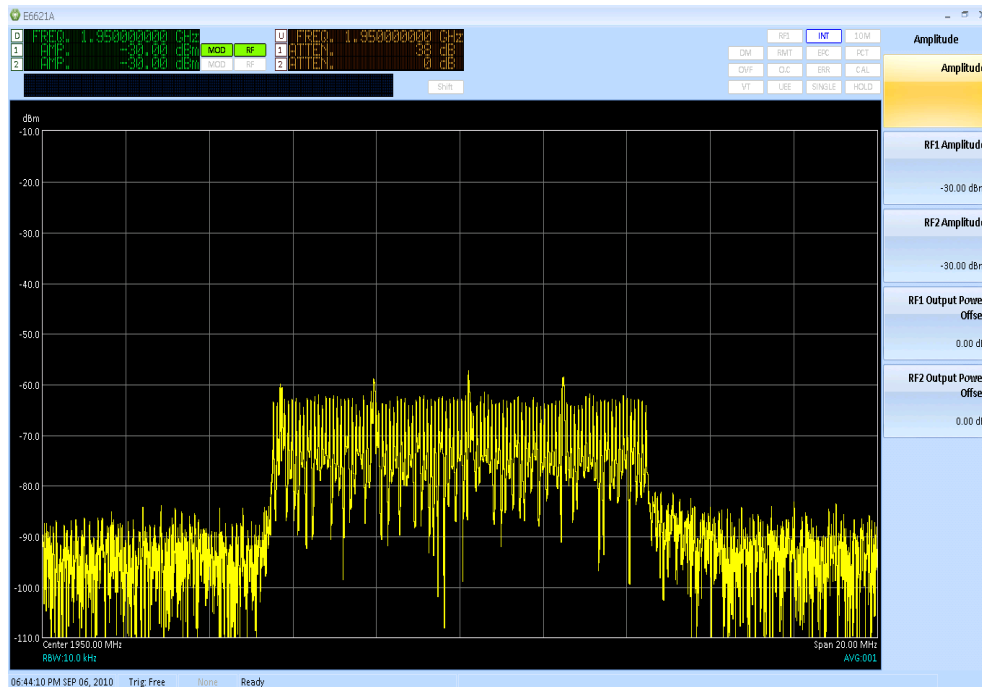


Figure 8-1: Functional Test Verification

Operating System Recovery Procedure

If you are having problems with your MS Windows operating system, it is possible to re-image your PXT without losing your User Data. Follow the instructions below:

IMPORTANT	All user data is automatically saved to the D: drive. If you have saved any data to the C: drive, you need to back this up, because the procedure below will erase the C: drive completely.
------------------	---

1. Connect a USB keyboard to perform the actions described below.
2. Turn on the PXT and before you see the screen displaying Windows, press the Escape (Esc) key repetitively until you see this hard drive recovery screen:

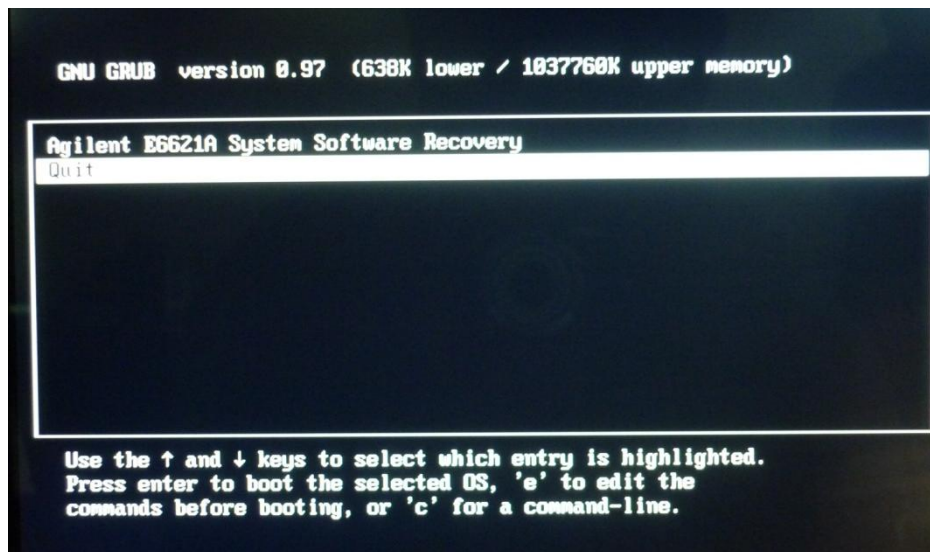
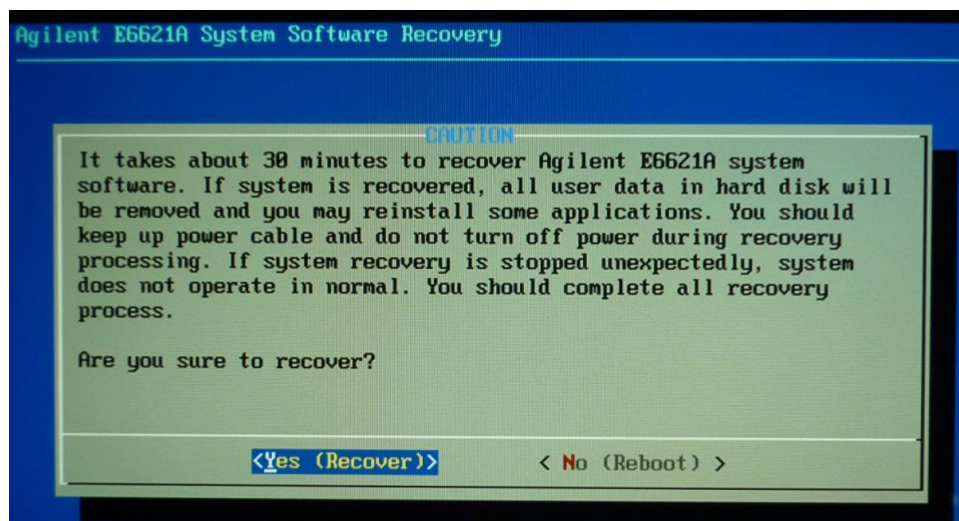


Figure 8-2: System Software Recovery Screen - 1

3. Use the Up arrow key to select, "Agilent E6621A System Software Recovery".
4. The next screen appears as shown below:



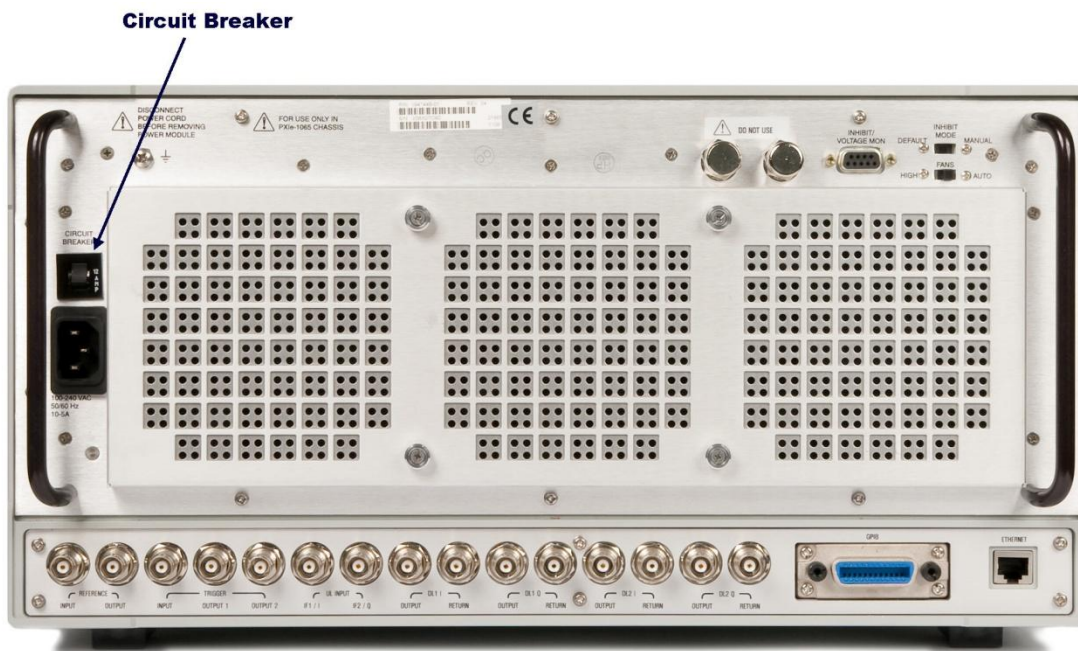
5. Using the arrow keys, select "<Yes (Recover)>" or on your keyboard, press the "Y" key to continue with the recovery process.

Resetting the AC Mains Circuit Breaker

If the PXT is connected to an AC source and encounters an over-current condition, the circuit breaker on the rear panel will trip to prevent damage to the instrument. Complete the following steps to reset the circuit breaker.

1. Turn the off the front panel power button.
2. Disconnect the AC power cable.
3. Depress the circuit breaker to reset it.
4. Reconnect the AC power cable.
5. Turn on the front panel power button.

If the circuit breaker trips again, contact Agilent customer support at the locations listed in “Service and Support” on page [31](#).



Returning Your Test Set for Service

Calling Agilent Technologies

Agilent Technologies has offices around the world to provide you with complete support for your wireless test set. To obtain servicing information or to order replacement parts, contact the nearest Agilent Technologies office listed below. In any correspondence or telephone conversations, refer to your test set by its product number, full serial number, and software revision.

Press the **INFO** front panel key to view the product number (E6621A), serial number, and software revision information. A serial number label is also attached to the rear panel of the test set. See the “Rear Panel” section on page [14](#) to help you locate the serial number.

Locations for Agilent Technologies

Online assistance: <http://www.agilent.com/find/assist>

If you do not have access to the Internet, one of these centers can direct you to your nearest representative:

(Note, if you have a Software and Technical Support Contract you can contact Agilent at the email addresses listed in “Software and Technical Support Contracts” on page [31](#).)

Should the Declaration of Conformity be required, please contact an Agilent Sales Representative, or the closest Agilent Sales Office. Alternately, contact Agilent at: www.agilent.com.

Service and Support

Americas

Brazil
(11) 4197 3600

United States
(800) 829 4444

Canada
(877) 894 4414

Mexico
01800 5064 800

Asia Pacific

Australia
1 800 629 485

China
800 810 0189

Hong Kong
800 938 693

Other Asian Countries:

www.agilent.com/find/contactus

India
1 800 112 929

Japan
0120 (421) 345

Korea
080 769 0800

Malaysia
1 800 888 848

Singapore
1 800 375 8100

Taiwan
0800 047 866

Europe & Middle East

Belgium
32 (0) 2 404 93 40

Denmark
45 45 80 12 15

Finland
358 (0) 10 855 2100

France
0825 010 700*
*0.125 €/minute

Germany
49 (0) 7031 464 6333

Other Unlisted Countries:

www.agilent.com/find/contactus

Ireland
1890 924 204

Israel
972-3-9288-504/544

Italy
39 02 92 60 8484

Netherlands
31 (0) 20 547 2111

Spain
34 (91) 631 3300

Sweden
0200-88 22 55

Switzerland
0800 80 53 53

United Kingdom
44 (0) 118 927 6201

Software and Technical Support Contracts

If you have a Software and Technical Support Contract, there are three methods of accessing your technical support:

- Web-based support: My Support Center
- E-mail support
- Phone support

For fastest response times, we recommend using the web-based or email access methods as these provide the most direct route to your technical support expert. All support cases may be viewed and tracked through the online support center (My Support Center), regardless of how you initially contacted technical support.

Web-based support

You can directly enter and manage your support requests online via www.agilent.com/find/mysupportcenter.

The first time you use My Support Center you will be asked to create a profile and provide proof of entitlement. Once your profile is created, you can use the online support center to enter your support request.

Each support request will be given a unique case number which you can use to track the progress of your support case. A technical expert will contact you via phone or email (whichever you have stated as your preferred option) to resolve your issue.

English, Japanese, Korean, and Mandarin local language support is available.

E-mail support

You can also contact our technical support at the following e-mail addresses:

- wireless_test_support_americas@agilent.com
- wireless_test_support_japan@agilent.com
- wireless_test_support_europe@agilent.com
- wireless_test_support_asia@agilent.com
- wireless_test_support_korea@agilent.com

Your support request will be routed to a technical expert who will contact you via e-mail or phone (whichever you have stated as your preferred option) to help resolve your issue.

English, Japanese, Korean, and Mandarin local language support is available.

Phone support

If you prefer to speak to someone directly, you can call the Agilent customer contact centers at the numbers given above. For Japan, please use the phone number 0120-444-823.

The customer contact center will route your request to a technical support expert, who will contact you about your support request via phone or email. Local language support is available in many countries.

For more information on STSCs, refer to “Software and Technical Support Contracts” on page 4.

9 Appendix

Abbreviations and Acronyms

- 3GPP: the 3rd Generation Partnership Project
- AC: Alternating Current
- ADC: Analog to Digital Converter
- ARQ: Automatic Repeat Request
- AWGN: Additive White Gaussian Noise
- BIOS: Basic Input/Output System
- BPSK: Binary Phase Shift Keying
- BW: Bandwidth
- CBW: Channel Bandwidth
- CCDF: Complementary Cumulative Distribution Function
- CDMA: Code Division Multiple Access
- dB: Decibel
- DL: Downlink
- DUT: Device under Test
- ESD: Electrostatic Discharge
- EVM: Error Vector Magnitude
- FEC: Forward Error Correction
- FFT: Fast Fourier Transform
- FN: Frame Number
- GUI: Graphical User Interface
- HMAC: Hashed Message Authentication Code
- IP: Internet Protocol
- LAN: Local Area Network
- LCD: Liquid Crystal Display
- LED: Light Emitting Diode
- LNA: Low noise Amplifier
- LTE: Long-Term Evolution
- O.C.: Oven Cold
- OCXO: Oven Controlled Crystal Oscillator
- OFDM: Orthogonal Frequency Division Multiplexing

Abbreviations and Acronyms (Continued)

- OFDMA: Orthogonal Frequency Division Multiple Access
- OS: Operating System
- PHY: Physical
- QAM: Quadrature Amplitude Modulation
- QPSK: Quadrature Phase Shift Keying
- RBW: Resolution Bandwidth
- RCT: Radio Conformance Test
- RF: Radio Frequency
- SA: Signal Analyzer
- SAT: Saturation
- UE: User Equipment
- UL: Uplink
- USB: Universal Serial Bus

© Agilent Technologies, Inc. 2010-2012

Printed in Malaysia

January 2012

For Agilent Internal Reference Only
Manufacturing Part Number



E6621-90001