Agilent PXT Wireless Communications Test Set (E6621A)

N6061A LTE Protocol Logging and Analysis User's Guide

Agilent Technologies

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Manual Part Number

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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

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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 the section on licensing in the *Agilent PXT Wireless Communications Test Set Getting Started Guide* for instructions to activate your STSC.

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1 Introduction

Welcome to the ***N6061A LTE Protocol Logging and Analysis User's Guide*** for the Agilent E6621A PXT Wireless Communications Test Set (PXT). The purpose of this guide is to provide you with installation instructions and user information for your logging and analysis software.

Latest Documentation

For the latest version of all documentation, please go to www.agilent.com/find/pxt.

Latest Software Application Releases

For the latest release of all PXT related software, please go to 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 the section on licensing in the ***Agilent PXT Wireless Communications Test Set Getting Started Guide*** for instructions to activate your STSC.

2 System Architecture

The N6061A application software runs on PCs using the Microsoft (MS) Windows XP/ Windows 7 operating systems. It displays and stores protocol and event logs of the PXT. The stored log files can be replayed and analyzed using this software and other advanced post-processing tools. The N6061A Protocol Logging and Analysis Application is connected to the PXT via a private Ethernet interface to capture MAC and PHY message exchange. The Application can operate with the PXT either in a stand-alone configuration, or in configurations where the PXT is used with the N6072A LTE Signaling Conformance Test system. Figure 2-1 shows an example N6061A log.

When used in conjunction with the Agilent N6072A LTE Signaling Conformance Test software, the N6061A can augment the built-in logging functions of the TTCN-3 environment and provide greater insight for troubleshooting and analysis.

Figure 2-1: Example N6061A log

3   Installation and Setup

Personal Computer Requirements

Processing large amounts of time critical data is an inherent requirement of the logging function. A high performance desk- top style computer with expansion capacity for additional Network Interface Cards (NIC) or adaptors is recommended.

Minimum System Requirements	
Operating System	Computer running Windows XP or Windows 7
Communication with Test Set(s)	Ethernet
RAM (Memory)	4 GB RAM (Minimum)
Processor	>2.5 GHz Intel Pentium® Quad core or equivalent
.NET Framework	Version 2.0 or later

NOTES:

1. Consideration for storage space should be given for storing logs and supporting documentation.

2. A clean installation of the Operating System is required to ensure freedom from Ad-ware, Spy-ware, updaters, and other processor resource consuming applications. For expected performance, Antivirus software should not be running.

3. Connecting the PXT and logging PC to a network is not recommended.

Downloading the Latest Version of N6061A Protocol Logging and Analysis Software

To ensure you have the latest version, the N6061A software is downloaded from the Agilent software manager web site. To access the download site, you will first need to register and activate your N6050AS Software and Technical Support Contract (STSC) for the E6621A PXT.

If you have not already done so, follow the instructions on your N6050AS Entitlement Certificate to activate your Contract. For more information on activating licenses, see the section on licensing in the ***Agilent PXT Wireless Communications Test Set Getting Started Guide***.

On the www.agilent.com/find/softwaremanager download site, locate the N6061A Protocol Logging and Analysis Software, and save it to a location on your PC.

Locate the file on your PC and double-click the setup file to install the software. Follow the on-screen instructions to complete the installation.

Before running the software, plug your N6061A USB license key into your PC.

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

4   Using the N6061A Logging and Analysis Application

Connect the PC to the E6621A PXT using an Ethernet cable, either directly or via a private Ethernet hub. Configure the IP addresses and subnet-mask as shown in the table below.

Item	Agilent E6621A PXT	Agilent N6061A Protocol Logging and Analysis PC
IP address	192.168.1.60	192.168.1.135
Subnet Mask	255.255.255.0	255.255.255.0
Gateway	not required	not required

Start the N6061A Protocol Logging and Analysis application from the Windows Start menu by selecting Start, All Programs, Agilent PXT, N6061A Protocol Logging and Analysis, N6061A, or by double-clicking on the

desktop icon.   N6061A
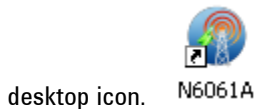
Configuring UE Attributes on the N6061A

On the N6061A, the Configuration option on the menu bar allows you to specify attributes of the UE under test.
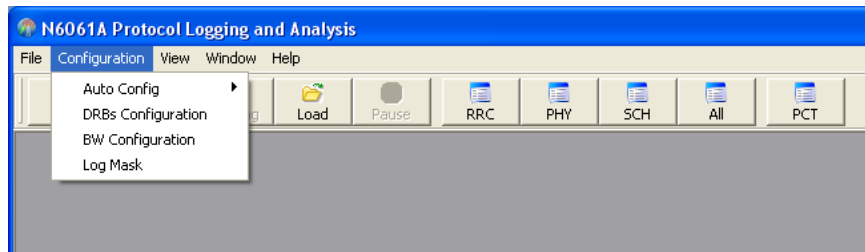
Figure 4-1: Set the Logging Attributes.

The "Auto Config" option allows you to configure the N6061A DRBs and BW configuration automatically from information sent by the PXT and stored within an LDM log file, rather than manually from the Configuration menu. LDM log files created prior to version 6.3.1.0 of the N6061A will not contain this information and will require manual configuration of the DRBs and BW.

The Configuration menu also displays the "Log Mask" submenu. Configure which channels you want to log by ensuring there is a checkmark next to each selected channel.

NOTE	For SCH PDUs, the log mask has two modes: short and long. When set to short, PDUs are truncated to save bandwidth on the connection between N6061A and E6621A. This mode is useful for seeing short messages, or to see that a PDU was present if you do not care about the specific content. When set to long, the entire PDU is transferred to the N6061A for completeness.
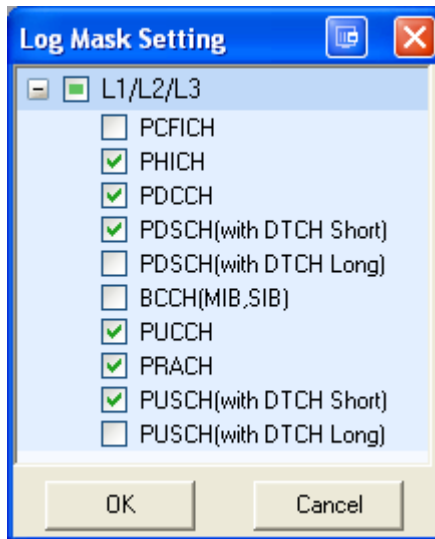
Figure 4-2: Select Logging Channels on the Log Mask

Capturing a log

Click the **Connect** button (or select **File**, **Connect**) and enter the IP address of the PXT to which you wish to connect in the pop-up window. If the connection is successful, you will see a green light and Online status message at the lower left corner of the application window, the "**Connect**" button will change to "**Disconnect**" and the "**Logging**" button will become active.
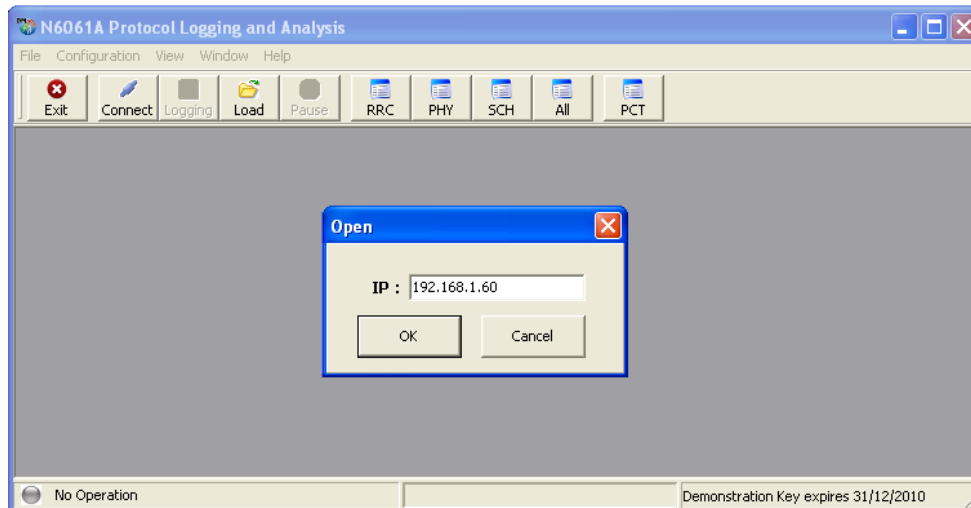
Figure 4-3: Connection Setup Window

Choose the information views you want to record and analyze. The example below shows the RRC logging view. You can select any number of the individual views. These can be arranged in a variety of ways on your display using the Window options in the menu bar.

NOTE	If you are using the N6070A Series Signaling Conformance Test, you can select the "PCT" button to display TTCN-3 information. Refer to the **N6070A Series Signaling Conformance Test Users Guide** for more information.
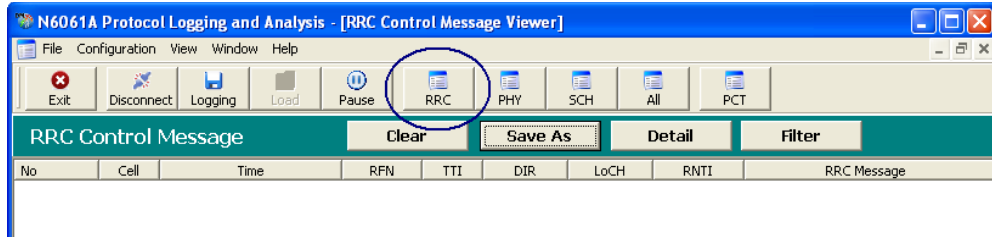
Figure 4-4: Setting Up the RRC Logging View

Viewer Setup

In each of the view windows, you have the choice of how you want to see the information. Each window has the same options:
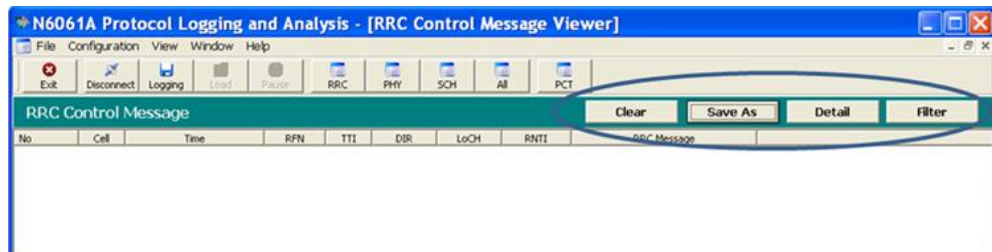
Figure 4-5: Changing the Information Display

Menu Option	Task Performed
Clear	Clears the Message Viewer
Save As	Saves a range of messages in the current view to an .ldm file. Select the 1st and last message using the "No." column as the index. Select **Apply** then select the filename to save the selected messages to a log file (.ldm)
Detail	Displays the detailed decode and the raw received hex of a selected message.
Filter	Filters the displayed messages. You can choose to enable or disable logged messages either by logical channel or by individual message types

Logging

Once the connection is established, you can start logging the over-the-air messages between the PXT and UE to a file. By simply clicking on **Logging** from the **File** menu or the **Logging** button, you can save the logging data from the enabled views.
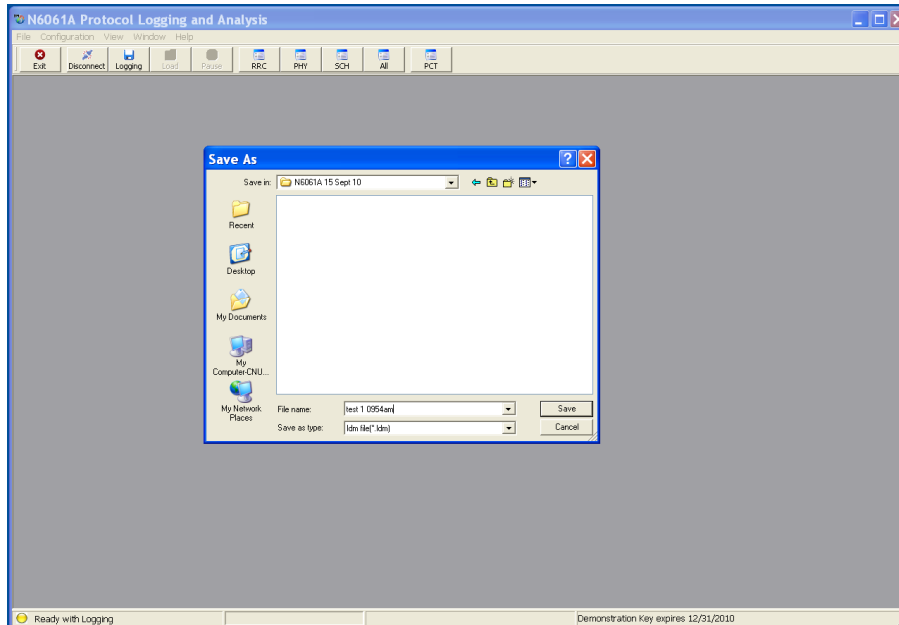
Figure 4-6: Set the Logging File Details

NOTE	Only the messages displayed in the views currently open are stored in the .ldm file when the "Logging" feature is in use.

Replaying previously recorded logs

With the N6061A, you can load and replay saved .ldm files. If the N6061A is connected to an E6621A PXT you must first select the **Disconnect** key in order to load previously-recorded message logs. When no active connection with an E6621A exists, the **Load** button (and the **File**, **Load** option) is enabled and you can load previously-recorded log files (.ldm).

NOTE	When replaying a previously-recorded message log, only the views that were open when the log was recorded are displayed.

Exporting Logs to HTML Format

To enable simple viewing of logs without the need to use the N6061A, it is possible to convert logs to HTML format for viewing with a web browser.

To convert an .ldm file to HTML, follow these steps:

NOTE	The log to be converted must already exist as an .ldm file.

1. On the **File** menu, select **Export to HTML.**

2. In the popup window, select **Open** and browse to find the .ldm file to be converted.
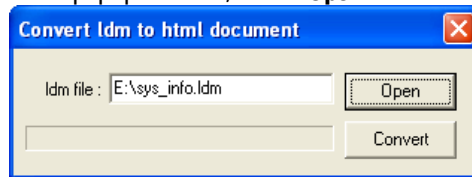
3. Select **Convert**.

4. When complete, the following pop-up is shown.
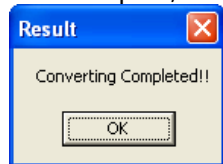
The converted log will be stored at the same location as the original .ldm file in a folder named "converted_*<original_ldm_file>*\index.html"

Figure 4-7: Converted HTML Log File

Clicking on any value for each message in the message summary frame will show the detailed decode and hex data for that message in the lower frames.

5 Using the API to control the N6061A remotely

A remote control API is provided that enables you to control the N6061A Protocol Logging and Analysis application from any programs you write. You can control the N6061A from the same PC on which the N6061A Protocol Logging Application is running or from a separate PC.
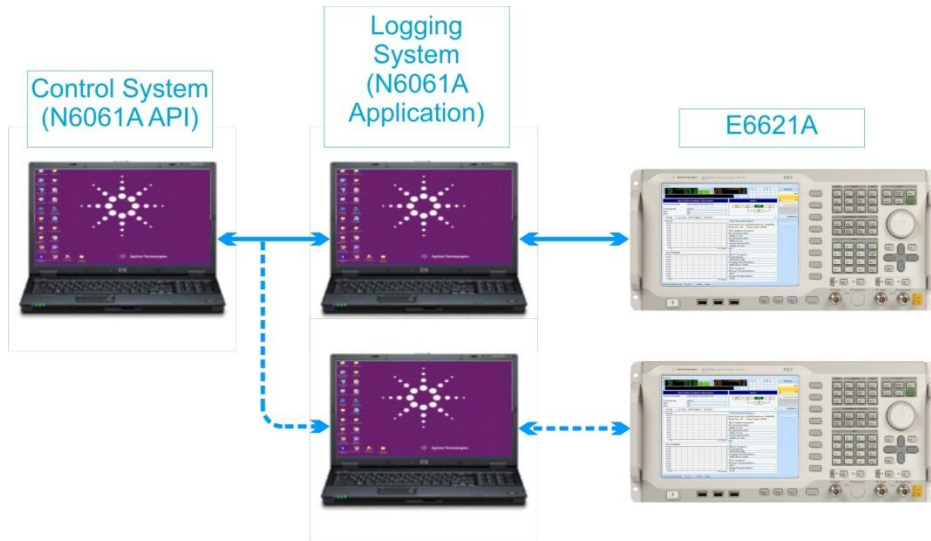
Figure 4-8: Typical API Controller Configuration

NOTE	You can control multiple "Logging Systems" from a single Control System. Each Logging System connects to a single PXT. In this configuration, the Control System and the "Logging Systems" must be on separate PC.

Downloading and installing the API

The application programming interface for the N6061A is provided via a Windows DLL designed for PCs running a Windows XP or Windows 7 operating system. It can be downloaded from www.agilent.com/find/softwaremanager by users with a current Software and Technical Support Contract (STSC). The API download package contains the DLL and header file. Please read the N6061A software release notes for the latest product information.

API Commands

The version of the N6061A Remote Control API DLL can be obtained by:
■ int **N6061A_QueryDllVersion**(char* version)
output parameter: string with API library version information
return value: Error code. See "API Error Codes" for a list of possible error codes.

The N6061A Remote API is initialized by calling:
■ int **N6061A_Initialize**(int Port)
input parameter: User-defined UDP port opened by the API and used for communication to the N6061A.
return value: Error code. See "API Error Codes" for a list of possible error codes.

The connection between N6061A Remote Control API and N6061A application is established by:

■ int **N6061A_ConnectLoggingSystem**(char* ip_addr, int port)

input parameters: IP address(string) of the system running the N6061A and the UDP port that the N6061A listens to for remote control commands (the port number is a fixed value and must be 10003).

return value: (positive value) Logging System ID, or (negative value) Error code. See "API Error Codes" for a list of possible error codes.

NOTE: The N6061A must be running on the Logging System PC prior to calling this function.

The connection between N6061A Remote Control API and N6061A application is closed by:

■ int **N6061A_DisconnectLoggingSystem**(int ID)

input parameter: Logging System ID returned from N6061A_ConnectLoggingSystem()

return value: Error code. See "API Error Codes" for a list of possible error codes.

The version of the N6061A application can be obtained by:

■ int **N6061A_QueryLoggingSystemVersion**(int ID, char* version)

input parameter: Logging System ID returned from N6061A_ConnectLoggingSystem()

output parameter: string with API library version information

return value: Error code. See "API Error Codes" for a list of possible error codes.

The connection between The N6061A application and PXT is established by:

■ int **N6061A_ConnectInstrument**(int ID, char* ip_addr, int port)

input parameters: Logging System ID, IP address(string) of the PXT to connect to, and the UDP port to use for communication between the PXT and the N6061A (the port number is a fixed value and must be 4736).

return value: Error code. See "API Error Codes" for a list of possible error codes.

The connection between the N6061A application and PXT is closed by:

■int **N6061A_DisconnectInstrument**(int ID)

input parameter: Logging System ID

return value: Error code. See "API Error Codes" for a list of possible error codes.

Logging to an .LDM file will be started by:

■int **N6061A_StartLogging**(int ID, char* filename);

input parameters: Logging System ID and full path to the logging file to be created. Note: If the file already exists, it will be silently overwritten.

return value: Error code. See "API Error Codes" for a list of possible error codes.

Logging will be stopped by:

■int **N6061A_StopLogging**(int ID);

input parameter: Logging System ID

return value: Error code. See "API Error Codes" for a list of possible error codes.

The captures LDM file can be converted to HTML by calling:

■int **N6061A_ConvertLogLdmToHtml**(int ID, char* filename);

input parameters: Logging System ID and the full path to the logging file to be converted.

return value: Error code. See "API Error Codes" for a list of possible error codes.

To finish using the API and close all ports, call:

■int **N6061A_Finalize**(void)

return value: Error code. See "API Error Codes" for a list of possible error codes.

API Error Codes

The table below describes the possible error codes returned by the N6061A API.

Error Code	Description
Positive value	Connection ID. Applicable to N6061A_ConnectLoggingSystem() only.
0	No error
-1	API not initialized. Ensure N6061A_Initialize() is called.
-2	Invalid license. Check the USB license key for the N6061A.
-3	Reserved for future use
-4	Connection failure. An attempt to connect to or control a Logging System or PXT failed. Check that IP address and ports are correct; that the Logging System or PXT has not been disconnected and that the ID is correct.
-5	Not connected. Attempting to use an ID that has not been opened.
-6	File access error. The specified file does not exist.
-7	Logging buffer is empty
-8	Logging stopped unexpectedly. N6061A_StopLogging() was called but logging was not in progress.
-9	Port error. The specified port number is already in use.
-10	No response
-11	Permission denied
-12	File conversion failed. There was a problem converting the LDM file to HTML.

Example program

The follow pseudo-code shows an example remote capture logging session including conversion of the captured log to HTML. For simplicity, no error trapping is used.

In the example, the N6061A is running on a PC with IP address 192.168.1.135 and the PXT has the IP address 192.168.1.60. The user has chosen UDP port 12345 as the port the DLL will use to communicate with the N6061A.

```
int LoggingSystemID;

N6061A_Initialize(12345);

LoggingSystemID = N6061A_ConnectLoggingSystem("192.168.1.135", 10003);

N6061A_ConnectInstrument(LoggingSystemID,"192.168.1.60", 4736);

N6061A_StartLogging(LoggingSystemID, "C:\temp\mylogfile.ldm");
// capture logging information until the user stops logging

N6061A_StopLogging(LoggingSystemID);
```

```
N6061A_DisconnectInstrument(LoggingSystemID);

N6061A_ConvertLogLdmToHtml(LoggingSystemID, "C:\temp\mylogfile.ldm");

N6061A_DisconnectLoggingSystem(LoggingSystemID);

N6061A_Finalize();
```

6 Service and Support

Calling Agilent Technologies

Agilent Technologies has offices around the world to provide you with complete support for your products. For help, to obtain servicing information or to order replacement parts, contact the nearest Agilent Technologies office listed below. In any correspondence or telephone conversations, you will need the product number, full serial number, software revision and Software and Technical Support Contract (STSC) details.

Press the **INFO** front panel key to view the product number (E6621A), serial number, and software revision information and STSC expiry date.

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:

If you have a current STSC for the E6621A, you can contact Agilent at the email addresses listed in "Software and Technical Support Contracts" on page .

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.

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Finland	Italy	Switzerland
358 (0) 10 855 2100	39 02 92 60 8484	0800 80 53 53
France	Netherlands	United Kingdom
0825 010 700*	31 (0) 20 547 2111	44 (0) 118 927 6201
*0.125 €/minute		
Germany		
49 (0) 7031 464 6333		

Other Unlisted Countries:
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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.

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 in the "Locations for Agilent Technologies" section of this document. 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.

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