

Agilent PXT Wireless Communications Test Set (E6621A)



N6061A LTE Protocol Logging and Analysis User's Guide



Agilent Technologies

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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 software manager 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 <i>Agilent PXT</i>
	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 <u>http://www.agilent.com/find/softwaremanager</u>.

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
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	your STSC.
	registered by you or your company for activation. See the section on licensing in the <i>Agilent PXT Wireless Communications Test Set Getting Started Guide</i> 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 log files can also be exported as HTML or pcap file types. The export to pcap and subsequent import into Wireshark allows examination of signaling above the IP layer. The N6061A Protocol Logging and Analysis Application is connected to the PXT via a private Ethernet interface to capture MAC and PHY message exchange. Figure 2-1 shows an example N6061A log.

"> N6061A	N6061A Protocol Logging and Analysis - [PCT Event Viewer]												
📑 File	Configuration View Wind	low Help										-	Ξ×
Exit	O O												
PCT E	PCT Event Message Clear Save As Detail Filter												
No	Time	RFN	ΠI	DIR	Protocol	RNTI	Layer	Channels	Length	PDU Me	essage	Note	•
6856	2010/06/0301:42:47.169	-		DL	LTE	0xFFFF	RRC	BCCH	15	SystemInforam	tionBlockType		
6857	2010/06/0301:42:47.186	22	5	DL	LTE	0xFFFF	MAC	DCI	7	DCI For	mat 1a		
6858	2010/06/0301:42:47.186	22	5	DL	LTE	0xFFFF	PHY	PDCCH	7	PHY_0	DATA		
6859	2010/06/0301:42:47.186	-		DL	LTE	0xFFFF	RRC	BCCH	15	SystemInforam	tionBlockType		
6860	2010/06/0301:42:47.229	24	0	DL	LTE	0xFFFF	MAC	DCI	7	DCI For	mat 1a		
6861	2010/06/0301:42:47.229	24	0	DL	LTE	0xFFFF	PHY	PDCCH	7	PHY_C	DATA		
6862	2010/06/0301:42:47.229	-		DL	LTE	0xFFFF	RRC	BCCH	34	SystemInforam	tionBlockType		
6863	2010/06/0301:42:47.231	24	5	DL	LTE	0xFFFF	MAC	DCI	7	DCI For	mat 1a		
6864	2010/06/0301:42:47.231	24	5	DL	LTE	0xFFFF	PHY	PDCCH	7	PHY_0			
6865	2010/06/0301:42:47.232	-		DL	LTE	0xFFFF	RRC	BCCH	15	SystemInforam	tionBlockType		
6866	2010/06/0301:42:47.241	26	5	DL	LTE	0xFFFF	MAC	DCI	7	DCI For	mat 1a		
6867	2010/06/0301:42:47.241	26	5	DL	LTE	0xFFFF	PHY	PDCCH	7	PHY_DATA			
6868	2010/06/0301:42:47.241			DL	LTE	0xFFFF	RRC	BCCH	15	SystemInforamtionBlockType			
6869	2010/06/0301:42:47.251	28	5	DL	LTE	0xFFFF	MAC	DCI	7	DCI For	mat 1a		
6870	2010/06/0301:42:47.251	28	5	DL	LTE	0xFFFF	PHY	PDCCH	7	PHY_0	DATA		
6871	2010/06/0301:42:47.251	-		DL	LTE	0xFFFF	RRC	BCCH	15	SystemInforam	tionBlockType		
6872	2010/06/0301:42:47.279	30	5	DL	LTE	0xFFFF	MAC	DCI	7	DCI For	mat 1a		
6873	2010/06/0301:42:47.279	30	5	DL	LTE	0xFFFF	PHY	PDCCH	7	PHY_C	DATA		
6874	2010/06/0301:42:47.280	-	-	DL	LTE	0xFFFF	RRC	BCCH	15	SystemInforam	itionBlockType		
6875	2010/06/0301:42:47.287	32	0	DL	LTE	0xFFFF	MAC	DCI	7	DCI For	mat 1a		
6876	2010/06/0301:42:47.287	32	0	DL	LTE	0xFFFF	PHY	PDCCH	7	PHY_0	DATA		
6877	2010/06/0301:42:47.287		1.1	DL	LTE	0xFFFF	RRC	BCCH	34	SystemInforam	tionBlockType		
6878	2010/06/0301:42:47.289	32	5	DL	LTE	0xFFFF	MAC	DCI	7	DCI For	mat 1a		
6879	2010/06/0301:42:47.289	32	5	DL	LTE	0xFFFF	PHY	PDCCH	7	PHY_C	DATA		
6880	2010/06/0301:42:47.290	-	-	DL	LTE	0xFFFF	RRC	BCCH	15	SystemInforam	itionBlockType		
6881	2010/06/0301:42:47.306	34	5	DL	LTE	0xFFFF	MAC	DCI	7	DCI For	mat 1a		
6882	2010/06/0301:42:47.306	34	5	DL	LTE	0xFFFF	PHY	PDCCH	7	PHY_0	DATA		
6883	2010/06/03 01:42:47.307	-		DL	LTE	0xFFFF	RRC	BCCH	15	SystemInforam	tionBlockType		
6884	2010/06/0301:42:47.352	36	5	DL	LTE	0xFFFF	MAC	DCI	7	DCI For	mat 1a		
6885	2010/06/0301:42:47.352	36	5	DL	LTE	0xFFFF	PHY	PDCCH	7	PHY_C	DATA		
6886	2010/06/0301:42:47.352			DL	LTE	0xFFFF	RRC	BCCH	15	SystemInforam	tionBlockType		-
😑 No 0	peration	_					Loaded	File Name:succe	ss tm500 rrc.ldm	Den	nonstration Key e	xpires 31/12/2010	11.

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	Ethernet						
with Test Set(s)							
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 <u>www.agilent.com/find/softwaremanager</u> 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.

ltem	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.

@ h	🐢 N6061A Protocol Logging and Analysis								
File	Configuration View Window Help								
	Auto Config DRBs Configuration BW Configuration Log Mask								

Figure 4-1: Set the Logging Attributes.

The "Auto Config" option enables you to configure the N6061A Dedicated Radio Bearers (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 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.



Log Mask Setting 🛛 📴 🔀
🖃 🔳 L1/L2/L3
PCFICH
PHICH
PDCCH
PDSCH(with DTCH Short)
PDSCH(with DTCH Long)
BCCH(MIB,SIB)
PUCCH
PRACH
PUSCH(with DTCH Short)
PUSCH(with DTCH Long)
OK Cancel

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.

The second secon	
File Configuration View Window Help	
Stit Connect Logging Load Pause RRC PHY SCH All PCT	
Open 🔀	
ID • 192 168 1 60	
19.192.100.1.00	
OK Cancel	
No Operation Dev	monstration Key expires 31/12/2010

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.

(2) N6061	N6061A Protocol Logging and Analysis - [RRC Control Message Viewer] Image: Image: I										
📑 File	Configuratio	n View	Window	Help		-					_ 8 ×
Exit	Connect	Logging	Load	Pause	Olear All	RRC		PHY S	CH All	PC	T
RRC Control Message					Clear	r	5	Save As	Deta	ail	Filter
No	Cell ID		Time	RFN	SFN	DIF	۱ ا	LoCH	RNTI		RRC Message

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:

N6061A Protocol Logging and Analysis - [RRC Control Message Viewer]										
📑 File (Configuratior	n View Windo	w Help							_ 8 ×
Exit	Connect	Logging Lo	ad Pause C) Clear All	RRC	DHY	SCH	All	PCT	
RRC Control Message Clear Save As Detail Filter										
No	Cell ID	Time	REN	SEN	DIR	1.0	н	RNTT	F	RC Message

Figure 4-5: Changing the Information Display

NOTE	There is now a Clear All option on the left-hand side of the RRC view selection
	shown in Figure 4-5, above. Selecting this button enables you to clear all views at
	the same time.

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 1 st 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.
	In software version ≥ 6.4, there are two additional filter options for DCI Format 1A: DCI Format 1a (SI) enables you to exclude all DCI Format 1A System Information messages (these occur very frequently and can make it hard to see other messaging). DCI Format 1a (Other) enables you to exclude these DCI Format 1A messages: RA-RNTI, P-RNTI, and C-RNTI.

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.

WN6061A Protocol Logging and Ana	lysis	
Contract Logging Contra	AS Sere IC Print Park International Internat	
O Ready with Logging		Demonstration Key expires 12/31/2010

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.

NOTE	In software version ≥ 6.4 , you can change the maximum file size you wish to save by selecting File > Max Log File Size . The default value is 50 Mbytes, but you can modify the maximum size to fit your requirements. When the maximum file size is reached, a new log file will be created – this prevents log files reaching unmanageably large sizes.

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).



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:



- 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.

Open
Convert

- 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".

🌈 Message List for Message Log Message Analy	/zer E:	sys_in	fo.ldm	- Wii	ndow	rs Int	terne	et Exp	lorer							
🕒 🗸 🖉 E:\Convert to sys_info.ldm\index.htm	1								•	• >		re Se	arch			P -
<u> Eile E</u> dit <u>V</u> iew F <u>a</u> vorites <u>T</u> ools <u>H</u> elp																
🚖 🏘 🌈 Message List for Message Log Message Ar	halyzer E	:\s								4	• •	2	-	• 🗗 P	age 🕶 🔘	T <u>o</u> ols • »
Message Analyzer E:\sys_info.ldm																
No. Time RFN SFN DIR Protoco	I RNTI	Layer	Chann	els Le	ngth		P	DU M	essage		Not	e				
1 2010/09/22 15:23:44.858 DL LTE	0xFFF	F RRC	<u>BCCH</u>	<u>6</u>		Mas	terInt	format	ionBlo	<u>ck</u>						
2 2010/09/22 15:23:45.062 <u>DL LTE</u>	0xFFF	F <u>RRC</u>	BCCH	<u>16</u>		Syst	emIn	foram	ionBlo	ckTy	<u>e</u>					
<u>3 2010/09/22 15:23:45.158 - DL LTE</u>	0xFFF	F <u>RRC</u>	BCCH	25		Syst	emIn	foram	ionBlo	ckTy	<u>e</u>					
<u>4 2010/09/22 15:23:45.179 DL LTE</u>	<u>0xFFF</u>	F <u>RRC</u>	BCCH	<u>6</u>		Syst	emIn	foram	<u>ionBlo</u>	ckTy	<u>)e</u>					
Frame 4 (6 bytes)	<u>^</u>							c								
. TMD PDU		JEESEI	00	01 02	. 03	04 0		6 07		9 0A	08 0		D 0E (23456783	ABCDEF
. LTE RRC Layer (DL_BCCH)		000000	00 00	04 00	20	22 4	10								. "@	
BCCH_DL_SCH_Message_PDU	=															
message c1 : systemInformation :																
criticalExtensions systemInformation-r8 :																
sib-TypeAndInfo																
q-Hyst dB0																
uncsnoervingLow 0,	-															

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.

Exporting Logs to pcap Format

To enable simple viewing of logs without the need to use the N6061A, it is possible to convert logs into the pcap format for viewing with *Wireshark* which is a network protocol analyzer tool.

pcap is the file format used by the *Wireshark* logging tool. Together with a custom plug-in dissector dll, these pcap files can be read by the *Wireshark* tool enabling access to the feature set.

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

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

- 1. On the File menu, select Export to PCAP.
- 2. In the popup window, select **Open** and browse to find the .ldm file to be converted.

Convert Idm to pcap	X
ldm file : C:\Log_Files\TC_204_2.ldm	Open
	Convert

- 3. Select Convert.
- 4. When complete, the following pop-up is shown.



The converted log is stored at the same location as the original .ldm file. The file is named "<original_ldm_file>.pcap".

C_204_1.pcap [Wireshark 1.8.1 (SVN Rev 43946 from /trunk-1.8)]		
<u>File Edit View Go Capture Analyze Statistics Telephony Tools Inte</u>	ernals <u>H</u> elp	
Bi Bi Bi Bi Bi Di Bi X 2 🗄 I Q, 🗢 🔿 주 🔽		I 🐺 🗹 🥵 🔆 🙀
Filter:	Expression Clear Apply	Save
No. Time Source Destination	Protocol	Length Info
1 0.000000	PXT/N6061A	44 Random Access Preamble
3.0.015600	PXT/N60614	46 REConnectionRequest
4 0.015600	MAC-LTE	47 RAR (RA-RNTI=2, SF=0) (RAPID=7: TA=1, UL-Grant=77484, Temp C-RNTI=12)
5 0.015600	PXT/N6061A	57 RRCConnectionSetup
6 0.031200	LTE RRC DL_CCCH	67 RRCConnectionSetup
7 0.046800 8 0.046800	RLC-LTE PXT/N6061A/NAS_EPS	/89 [UL] [AM] SRB11 [UATA] (P) SN=0 [00-Dytes] 95 ReconnectionSaturcomplete Attack request RDN connectivity request
9 0.046800	PXT/N6061A/NAS-EPS	79 DLInformationTransfer , Authentication request
10 0.046800	RLC-LTE	45 [DL] [AM] SRB:1 [CONTROL] ACK_SN=1
11 0.046800	RLC-LTE	89 [DL] [AM] SRB:1 [DATA] (P) sn=0 [44-bytes]
13 0. 202800	RLC-LTE RLC-LTE	789 [UL] [AM] SKB:1 [CONIROL] ACK_SN=1 789 [UL] [AM] SKB:1 [DATA] (P) sn=1 [27-hytes]
14 0.202800	PXT/N6061A/NAS-EPS	62 ULINFORMATIONTRANSFER, AUthentication failure
15 0.202800	PXT/N6061A/NAS-EPS	79 DLInformationTransfer , Authentication request
16 0.218400	RLC-LTE	45 [DL] [AM] SRB:1 [CONTROL] ACK_SN=2 80 [DL] [AM] SRB:1 [CONTROL] ACK_SN=2
18 0.218400	RLC-LTE	789 [UL] [AM] SRB:1 [CONTROL] ACK_SN=2
19 0.405601	RLC-LTE	789 [UL] [AM] SRB:1 [DATA] (P) SN=2 [15-bytes]
20 0.405601	PXT/N6061A/NAS-EPS	50 ULINformationTransfer , Authentication response
21 0.421201	PXT/N6061A/NAS-EPS	>> DLINTORMATIONTRANSTER, SECURITY MODE COMMAND
23 0.421201	RLC-LTE	66 [DL] [AM] SRB11 [DATA] [P) Sn=2 [21-bvtes]
24 0.436801	RLC-LTE	789 [UL] [AM] SRB:1 [CONTROL] ACK_SN=3 [UL] [AM] SRB:1 [DATA] (P) sn=3 [16-bytes]
25 0.436801	PXT/N6061A/NAS-EPS	51 ULINformationTransfer , Security mode complete
₹	PXI/NOUGIA	43 SecurityModeCommand
■ Frame 14: 62 bytes on wire (496 bits), 62 bytes captu	red (496 bits)	
DLT: 155, Payload: pxt (PXT Protocol)		
PXT Protocol Header Physical call Id: 0		
Bandwidth: 10 MHz BW (0x10)		
RFN: 516		
TTI: 8		
Channel Type: DCCH (0x62) Direction: Unlink (1)		
Layer: RRC (0x01)		
RNTI: 0x000c		
UL-DCCH-Message		
■ message: C1 (0) ■ c1: ultrformationTransfer (9)		
ulinformationTransfer		
criticalExtensions: c1 (0)		
□ c1: ulInformationTransfer-r8 (0)		
dedicatedInfoType: dedicatedInfoNAS (0)		
dedicatedInfoNAS: 075c15300ecd2d35456	0a8a85ac0273c4b09b4	
Non-Access-Stratum (NAS)PDU 0000 Security based on the securit	lain MC massage	t country protocted (0)
0000 = Security header type: P 0111 = Protocol discriminator:	FPS mobility manage	t security protected (U) ment messages (UVD)
NAS EPS Mobility Management Message	Type: Authenticatio	n failure (0x5c)
EMM cause	and and such as	
Authentication Failure Parameter (U	MIS and EPS authenti	cation chailenge)
0000 16 00 01 00 00 00 00 00 10 04 02 00 00 08 62 01	b.	
0010 03 0C 00 00 00 00 00 00 00 00 00 00 00 00		
0030 a5 a6 a8 ac 15 15 0b 58 04 e7 89 61 36 80	Xa6	
Frame (62 bytes) Unaligned OCTET STRING (19 bytes)		
UL-DCCH-Message (Ite-rrc.UL_DCCH_Mess Packets: 3623 Displayed: 36	23 Marked: 0 Load time: 0:00.04	2

5. Now you can open the file using *Wireshark* as shown in the figure below.

Figure 4-8: Converted PCAP Log File viewed using Wireshark

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

Wireshark Instructions

The following information explains how to install, set preferences, and use filters to view log files in Wireshark.

Installation

Install Wireshark onto your PC - either a 32 bit or 64 bit version of the tool. Wireshark versions 1.6.x and 1.8.x versions are supported with version 1.0.0 of the DLL. Wireshark versions 1.10.x are supported with versions 1.0.10 of the DLL. Earlier (or later) versions may not be compatible with the custom plug-in dissector DLLs. (Obtain this dissector DLL here:

www.agilent.com/find/N6061A-wireshark-dissector.)

To find out the version required for windows 7, click on start, right-click on computer, and select properties. In the system section you should see the system type, either 32 or 64 bit.

Sv	stem		
-,	Manufacturer:		
	Model:		
	Rating:	4.0 Windows Experience	Index
	Processor:	Intel(R) Core(TM) i5 CPU	M 560 @ 2.67GHz 2.67 GHz
	Installed memory (RAM):	4.00 GB (3.80 GB usable)	
	System type:	64-bit Operating System	
	Pen and Touch:	No Pen or Touch Input is a	- vailable for this Display

Figure 4-9: PC Operating System

To determine the version of the DLL, hover over the file icon of the file or right-click on the file, select Properties, and then Details.

2. Place the appropriate supplied DLL into the following directory.

C: \Program Files\Wireshark\plugins\<Wireshark version number>\

This assumes Wireshark has been installed into the default location - if not, find the install location

and locate the sub-directory named "plugins\<Wireshark version number>"

There are two versions of the DLL named either:

- pxt_win32.dll or
- pxt_win64.dll

Win32 *Wireshark* on win32 should use the win32 DLL and Win64 *Wireshark* on win64 should use the win64 DLL.

Choose the version of the DLL based on the version of Wireshark that you are using (see step 1, above).

3. The Wireshark shortcut contains a link to Wireshark with a "-o" option as shown below.

C:\Program Files\Wireshark\wireshark.exe -o "uat:user_dlts:\"User 8 (DLT=155)\",\"pxt\",\"0\",\"\",\"0\",\"\""

NOTE	The path to the Wireshark executable may need to be altered, depending on
	your original installation location. If you installed Wireshark in the default
	location, the supplied shortcut is correct.

4. You can now load pcap files generated by the N6061A tool into *Wireshark*.

Setting Wireshark User Preferences

A few user preferences must be set inside Wireshark to enable recursive decodes (for example: SIP packets contained in IPv6 packets, PDCP packets, RLC packets, and MAC transport blocks can be decoded in one step).

1. On *Wireshark*, select **Edit**, **Preferences**. A pop-up box is displayed.

2. Select the + sign next to **Protocols** on the left-hand side menu and select **MAC-LTE**. Then click on the **LCID ->DRB Mappings Table** as shown below.

Wireshark: Preferences - Profile	: Def	ult	
	^	MAC-LTE	
LLI		Number of Re-Transmits before expert warning triggered:	3
LIVIP		1 5 55	
LSC		Attempt to decode BCH, PCH and CCCH data using LTE RRC dissector:	V
		Dissect frames that have failed CRC check:	
LWAPP		The Hausistic LTE MAC aver UDD framings	
LWIRES MODA		Thy neurosuce the total naming:	
M2UA		Attempt to dissect LCID 1&2 as srb1&2:	V
MBUA		Source of LCID -> drb channel settings:	From static table
MAC-LTE			
MAC-Leinet		LCID -> DRB Mappings Table	<u></u> <u>E</u> dit
MATE	=	BSR size when warning should be issued (0 - 63):	50
MDS Header		The shirts and CD an Abia U.S.	
MEGACO		Track status of SKS within UES:	V
MEMCACHE		Which layer info to show in Info column:	RLC Info 💌
MGCP			
MIKEY			
MIME multipart			
MONGO			
MP4V-ES			
MPLS			
MPLS Echo	Ŧ		
Help			OK <u>Apply</u> Cancel

Figure 4-10: LCID -> DRB Mappings Table

The **LCID** -> **DRB Mappings Table** must be edited to match the radio bearer configuration inside your scenario file. The tool needs the mapping of logical channel identity (LCID) onto RLC mode of operation (AM, UM with sequence length 10 or UM with sequence length 5). For many scenario files, including the default ones you received in software version 6.4, the settings below should suffice for **MAC-LTE**.



🗾 Static LCID -> drb T	able - Profil	le: Default				
<u>Up</u> <u>D</u> own	Icid drb LCID 3 1 LCID 4 2 LCID 5 3	id (1-32) RLC Channel Typ UM, SN Len=10 UM, SN Len=10 UM, SN Len=10	2			
New Edit Copy Delete						
Help	L			<u>O</u> K	Apply	<u>C</u> ancel

Figure 4-11: Static LCID -> drb Table – Profile Default

3. Inside the preferences for **RLC-LTE**, set the **Call PDCP Dissector for DRB PDUs** to '12 bit SN' (the most commonly used option – if your scenario file uses smaller SN length for PDCP, select this). This passes the contents of RLC PDUs to the PDCP layer for analysis.

Wireshark: Preferences - Profile: D	efault	
QUARENTOILED	DLC LTC	
RADIUS	RLC-LIE	
RANAP	Do sequence analysis for AM channels: No-Analysis	
RDT	Do sequence analysis for UM channels: No-Analysis	
RELOAD	Call PDCP dissector for SRB PDUs:	
RIP		
RLC-LTE	Call PDCP dissector for DRB PDUs: 12-bit SN	
RPC	Call RRC dissector for CCCH PDUs:	
RPCAP		
RSVP	Try Heuristic LTE-RLC over UDP framing:	
RSYNC	May see RLC headers only:	
RTCP		
RTMPT		
RTP		
RTP Event		
RTPS2		
RTSP		
RUA		
RUDP		
SIAP		
SAMETIME		
SASP		
SCCP -	JL	
Help		y <u>C</u> ancel

Figure 4-12: Wireshark Preferences – RLC-LTE

4. Inside the preferences for **PDCP-LTE**, select the checkbox labeled **Show Uncompressed User-Plane data as IP**. This sends the contents of PDCP PDUs to the IP layer for decode.

Wireshark: Preferences - Profile: D	Default 🗖 🗖 💌
■ OSI	PDCP-LTE
P MUL	Show uncompressed User-Plane data as IP: 🛛 🗹
PacketBB	Show unciphered Signalling-Plane data as RRC:
PAPI	Do sequence number analysis: No-Analysis
PCAP	Attempt to decode ROHC data:
PCLI	
PDCP-LTE	
PER	Which layer info to show in Info column: Traffic Info
PGM	
PGSQL	
PKCS12	
PKT CCC	
PN-RT	
POP	
PPI	
PPP	
PPP MP	
PPPoED	
PRES	
PRP	
PVFS	
Q.931	
QUAKE +	J
Help	OK Apply Cancel

Figure 4-13: Wireshark Preferences – PDCP-LTE

If you are using *Wireshark* 1.8.x or later, inside the preferences for **PDCP-LTE**, set the drop-down box that selects **Which Layer Info to Show in Info Column** to 'Traffic Info'.

Verifying Wireshark Preferences

To test if the DLL is being used by *Wireshark* and if the user preferences are taking effect, load an example log file. (You can use the "pinglog.pcap" file that is available when you obtained the other N6061A .dlls.) The decode should look a little like that shown below. Note that the **Filter** box at the top left of the main page has been configured to ignore 'PHY' messages by entering the following term: !(pxt.header.layer == "PHY").

III ninning nean (Wireshark 1.6 Testen (SVN Rey Unknown ferm)	unknownil			
File Fift View Go Canture Analyze Statistics Telephone	ov Took Internak Hain			
The for the go capture presse protons reepto				
Filten (pst.heeder.layer == "PHY")	Expression Clear Apply			
Ne. Detection Time 11 up1*rik 2012-05-29 16:00:002.38216 14 Down1*rik 2012-05-29 16:00:002.38216 15 Down1*rik 2012-05-29 16:00:002.38216 15 Down1*rik 2012-05-29 16:00:002.150124 16 Down1*rik 2012-05-29 16:00:002.179122 19 up1*rik 2012-05-29 16:00:002.179122 20 Down1*rik 2012-05-29 16:00:002.249114 21 Down1*rik 2012-05-29 16:00:002.249114 21 Down1*rik 2012-05-29 16:00:002.249114 21 Down1*rik 2012-05-29 16:00:002.249114 21 Down1*rik 2012-05-29 16:00:002.01019 21 Down1*rik 2012-05-29 16:00:002.010109 21 Down1*rik 2012-05-29 16:00:002.010109 21 Down1*rik 2012-05-29 16:00:002.010109 21 Down1*rik 2012-05-29 16:00:002.0110109	Source Destination	Dentecol Length RFN LTE R.F.O.LCCH 789 R.CLTE 45 LTE R.F.O.LCCH 53 LTE R.F.O.LCCH 53 LTE R.F.O.LCCH 134 LTE R.F.O.LCCH 45 LTE R.F.O.LCCH 43 LTE R.F.O.LCCH 789 R.C-LTE 45 43 LTE R.F.O.LCCH 789 R.C.LTE 45 45 LTO 107 107	8NTI 391 0x000c 392 0x000c 392 0x000c 394 0x000c 395 0x000c 395 0x000c 397 0x000c 403 0x000c 407 0x000c 407 0x000c 408 0x000c	Mode Mode [UL] [AM] SBE:1 [CONTROL] ACC.SN-3 SecurityModeComplete MAC-0X/038830 [UL] [AM] SBE:1 [CONTROL] ACC.SN-3 SecurityModeComplete MAC-0X/038830 [UL] [AM] SBE:1 [CONTROL] ACC.SN-3 SecurityModeComplete MAC-0X/038830 [UL] [AM] SBE:1 [CONTROL] ACC.SN-4 SecurityModeComplete MAC-0X/038830 [UL] [AM] SBE:1 [CONTROL] ACC.SN-5 SECURATIVYINFORMATION MAC-0X/0464 [UL] [AM] SBE:1 [CONTROL] ACC.SN-5 SECURATIVYINFORMATION MAC-0X/0464 [UL] [AM] SBE:1 [CONTROL] ACC.SN-6 SECURATIVYINFORMATION MAC-
24 Down110k 2012-05-29 16:00:13.742965 25 unlink 2012-05-29 16:00:13.764063	156.141.112.222156.141.112.22	1CMP 107 1CMP 789	528 0x000c	Echo (ping) request id=0x0001, seq=61/15616, ttl=128(60 bytes data) [62-bytes]
25 oprilink 2012-05-29 16:00:14.769801 26 bownlink 2012-05-29 16:00:14.727866 27 uplink 2012-05-29 16:00:14.742865 28 bownlink 2012-05-29 16:00:15.742765 29 uplink 2012-05-29 16:00:15.742765	156.141.115.37 156.141.112.22 156.141.112.222 156.141.115.37 156.141.112.222 156.141.115.37 156.141.115.37 156.141.112.22 156.141.112.222 156.141.115.37	ICMP 107 ICMP 289 ICMP 107 ICMP 107 ICMP 789	626 0x000c 628 0x000c 727 0x000c 728 0x000c	Echn (ping) request id=0x0001, seq=67/15872; t1=128(60 bytes data) [62-bytes] Echn (ping) request id=0x0001, seq=67/15872; t1=128(60 bytes data) [62-bytes] Echn (ping) request id=0x0001, seq=67/16218; t1=128(60 bytes data) [62-bytes] Echn (ping) request id=0x0001, seq=67/16218; t1=128(60 bytes data) [62-bytes]
<pre></pre>	<pre>> PH < 11 (33) 0 (P) sn=0 [92-bytes] 01) 0 POU (0x00) rt is requested (0x01) begins a Buc SOU and last byt. 10ms from the octet following r: 0 lane=signalling)]</pre>	e ends a RLC SDU (OxOO) The fixed part of the he	ader (0x00)	

Figure 4-14: Wireshark Filter – View: Ignoring PHY Messages

2. Wireshark offers a rich variety of options for filtering and presentation. For example, enter 'icmp' into the **Filter** box on the main page to view only the ICMP entries (see below). These entries are decoded from MAC transport blocks, containing RLC PDUs, containing PDCP PDUs – and all of the additional header information.

pinglog.pcap [W	reshark 1.6.7 peteg (SVN Rev Unknown f	from unknown)]									
Eile Edit View S	o <u>Capture</u> <u>Analyze</u> <u>Statistics</u> Tel	lephony Iools Interr	als <u>H</u> elp								
	KIB 🛛 X 🖉 🗛 🔍 🤞	*****	Q Q Q	् 🖸 🖉 ।	2 🛃 🗱 🔛						
Filter: icmp		• 8	pression Clear	pply							
lo. Direction	Time	Source	Destination	Protocol	Length RFN	RNTI	Info				
24 Downlin	k 2012-05-29 16:00:13.742	965 156,141,115.	37 156.141.112	.22 ICMP	107	528 0x000c	Echo (pin	g) request	id=0x0001,	seq=61/15616,	ttl=128(60 byte
25 Up I 1nk	2012-05-29 16:00:13.764	963 156.141.112.	222156.141.115	. 37 ICMP	789	530 0x000c	Echo (pin	g) reply	1d=0x0001,	seq=61/15616,	tt1=255(60 byte
26 Downing	k 2012-05-29 16:00:14.72/	800 150.141.115.	3/ 156.141.114	. 22 ICMP	10/	626 0x000c	Ecno (pin	g) request	10=0x0001,	seq=62/158/2,	tt1=128(60 byte
27 Up 11nk	2012-05-29 16:00:14.742	805 156.141.112.	222156.141.115	. 3/ ICMP	/89	628 0X000C	ECNO (pin	g) reply	10=0x0001,	seq=62/158/2,	tt1=255(60 byte
28 Downin	x 2012-05-29 16:00:15.727	767 156.141.115.	37 150.141.112	22 ICMP	107	727 0x000C	Echo (pin	g) request	10=0x00001,	seq=03/10128,	ttl=128(60 byte
29 Optink	2012-05-29 16:00:15.742	667 156 141 112.	222 100. 141. 113	32 TOND	107	23 0x000c	Echo (pin	g) reply	1d=0x00001,	seq=03/16128,	tt1=255(60 byte
30 Down11r	K 2012-05-29 16:00:16.72/	00/ 130.141.113.	3/ 100.141.11/	27 1000	10/	827 0x000c	Echo (pin	g) request	1d=0x0001,	seq=04/10384,	ttl=128(60 byte
22 Optimic	2012-05-29 16:00:16.742	641 156 141 112.	27 156 141 113	37 TONP	107	828 0x0000C	Echo (pin	g) reply	1d=0x00001,	500-55 (16640	**1-138(60 byte
32 Uolinh	2012-05-29 10:00:26.900	640 156 141 113.	2222156 141 112	37 7040	780	828 0x000c	Echo (pin	g) request	id=0x0001	Seq=03/10040,	ttl=128(00 byte
24 Downlin	2012-05-29 10:00:20.990	EA1 156 141 112.	27 156 141 117	33 TCHP	107	029 0x00000	Echo (pin	g) reply	id=0x0001,	Seq=03/10040,	11-138/60 byte
25 Unlink	2012-05-29 10:00:27.9/8	541 156.141.115.	2222156 141 115	27 7040	780	928 0x000c	Echo (pin	g) request	id=0x0001	seq=66/16806	Tt1-255(60 byte
35 Oprink	2012-05-29 10:00:27.990	441 156 141 115	27 156 141 113	37 ICMP	107	4 0x000c	Echo (pin	g) repry	id=0x0001	seq=00/10090,	TT]=138(60 byte
27 unlink	2012-03-29 10:00:20.902	441 156 141 113.	222156 141 115	27 TCMP	780	6 0x000C	Echo (pin	g) request	id=0x0001	Seq=67/17152	TE1=255(60 byte
28 nounlie	2012-05-29 10:00:29.040	241 156 141 115	27 156 141 113	22 1040	107	101 0x000c	Echo (pin	g) reply	id=0x00001	seq=69/17409	rr]_128(60 byte
20 unlink	2012-05-29 16:00:29.9/0	220 156 141 112	222156 141 110	27 1040	790	106 0x0000	Echo (pin	a) cooly	id-0x0001	seq=68/17408	rr]_255(60 burg
aa oprink	2012-03-29 10.00.30.000	339 130.141.112.		. 37 2000	789	TOU OXOOOL	Ection Chan	g) reply	TUBOX0001,	and and the sector	cerezis(oo byce
						m					
[Chann [Chann [PDU L [W 52 © UM heade 0000 0 0 © PDCP-LTE © [Confi [Dir [Pir [Pir [Pir [Chan [Chan [Chan [Chan]] [No	<pre>ei rype: UKB (5)] ei lot 1] ength: 64] guence number length: 10] r = Reserved: 0 = Rraming Info: First 1 00 0000 0000 = Sequence 1 (SN=0)(60 bytes data) guration: (direction=Down! ection: Downlink (L)] nnel type: UCCH (L)]</pre>	byte begins a RL d follows from t number: O ink, plane=User)	c SDU and last he octet follow]	byte ends a ring the fixe	RLC SDU (O) d part of the head	der (0)					

Figure 4-15: Wireshark Filter - View: ICMP Entries Only

3. Go to the lower pane of the *Wireshark* log and select the + sign next to the MAC-LTE DL-SCH header. The RLC-LTE data is revealed. Select the + sign next to the RLC-LTE header and the PDCP data is revealed. Select the + sign next to the PDCP-LTE header to reveal the PDCP content.

Notes

 If RLC PDUs are segmented, it is possible for *Wireshark* to re-assemble and then decode the PDCP PDUs (and therefore the IP packets inside) in version 1.10 and later. Make sure you enable sequence analysis as 'Only-MAC-frames' in the RLC-LTE configuration, as shown below.

Wireshark: Preferences - Profile: D	efault	
RELOAD	RIC-LTE	
RIP	Do sequence analysis for AM channels:	Only-MAC-frames
RLC	bo sequence analysis for Aim enaminers.	only mate numes
RLC-LTE	Do sequence analysis for UM channels:	Only-MAC-frames
RPC	Call PDCP dissector for SRB PDUs:	
RPCAP	Call PDCP dissector for DRB PDUs:	12-bit SN 💌
RSH	Call BBC discaster for CCCU DDUr.	
RSL	Call RRC dissector for CCCH PDUs:	
RSVP	Try Heuristic LTE-RLC over UDP framing:	
RSYNC	May see RLC headers only:	
RTCP	Attempt SDU reassembly:	

Figure 4-16: Wireshark Preferences – RLC-LTE

2. In PDCP-LTE, it may be useful to check the box named "Show Unciphered Signaling Plane Data as RRC" if you have converted from an SCH only N6061A file.

Tips

- Ensure that you have the correct plug-in: 32 or 64 bit. See Installation, <u>step 1</u>, above.
- Verify that you have the correct version of DLL for the version of Wireshark you are using (see the <u>Installation instructions</u> above).
- Verify that you located the plug-in in the correct location. There may be several different versions of *Wireshark* on your PC. If several versions of *Wireshark* are installed, verify that you have copied the dll to the correct directory in use. A new installation of *Wireshark* may require you to copy the dll to the new version folder.
- Verify that there are not duplicate copies of the plug-in. Using different names, does not prevent problems with start-up. *Wireshark* crashes halfway through the start up process, if you have multiple copies of the dll on your PC even though they have different names.
- Verify that the shortcut points to the Wireshark .exe location.

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 5-1: 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_QueryDIIVersion(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:

mint 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: mint 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

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.			

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

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 <u>25</u>.

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.

Americas

Brazil (11) 4197 3600

United States (800) 829 4444

Asia Pacific

Australia 1 800 629 485

China 800 810 0189

Hong Kong 800 938 693

Other Asian Countries: www.agilent.com/find/contactus

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 Canada (877) 894 4414 Mexico 01800 5064 800

1 800 112 929 Japan

India

0120 (421) 345

Korea 080 769 0800

Ireland

Israel

Italy

1890 924 204

972-3-9288-504/544

39 02 92 60 8484

31 (0) 20 547 2111

Netherlands

Malaysia 1 800 888 848

Singapore 1 800 375 8100

Taiwan 0800 047 866

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

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 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
- <u>E-mail support</u>
- 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.

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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