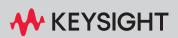
# N109310CA SFF-8431 Compliance Test Application



**GETTING STARTED GUIDE** 

# Notices

© Keysight Technologies 2014 - 2024

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 Keysight Technologies as governed by United States and international copyright laws.

Software Version

Version 1.20.3.0 or greater

Edition

March 2024

Available in electronic format only

Keysight Technologies 1900 Garden of the Gods Road Colorado Springs, CO 80907 USA

#### 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, KEYSIGHT 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, KEYSIGHT SHALL NOT BE LIABLE FOR ERRORS OR FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH THE FURNISHING, USE, OR PERFORMANCE OF THIS DOCUMENT OR ANY INFORMATION CONTAINED HEREIN. SHOULD KEYSIGHT 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 WILL CONTROL.

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.

### U.S. Government Rights

The Software is "commercial computer software," as defined by Federal Acquisition Regulation ("FAR") 2.101. Pursuant to FAR 12.212 and 27.405-3 and Department of Defense FAR Supplement ("DFARS") 227.7202, the U.S. government acquires commercial computer software under the same terms by which the software is customarily provided to the public. Accordingly, Keysight provides the Software to U.S. government customers under its standard commercial license, which is embodied in its End User License Agreement (EULA), a copy of which can be found at http://www.keysight.com/find/sweula. The license set forth in the EULA represents the exclusive authority by which the U.S. government may use, modify, distribute, or disclose the Software. The EULA and the license set forth therein, does not require or permit, among other things, that Keysight: (1) Furnish technical information related to commercial computer software or commercial computer software documentation that is not customarily provided to the public; or (2) Relinquish to, or otherwise provide, the government rights in excess of these rights customarily provided to the public to use, modify, reproduce, release, perform, display, or disclose commercial computer software or commercial computer software documentation. No additional government requirements beyond those set forth in the EULA shall apply, except to the extent that those terms, rights, or licenses are explicitly required from all providers of commercial computer software pursuant to the FAR and the DFARS and are set forth specifically in writing elsewhere in the EULA. Keysight shall be under no obligation to update, revise or otherwise modify the Software. With respect to any technical data as defined by FAR 2.101, pursuant to FAR 12.211 and 27.404.2 and DFARS 227.7102, the U.S. government acquires no

greater than Limited Rights as defined in FAR 27.401 or DFAR 227.7103-5 (c), as applicable in any technical data.

Safety Notices

#### 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.

# Contents

### 1 Introduction

Installing the N109310CA SFF-8431 Compliance Test Application5Recommended Equipment7Installing N109310CA and N1010A FlexDCA on a PC9Installing the N109310CA on a PC without FlexDCA12Installing N109310CA on the 86100D or N1000A Oscilloscope17Starting the N109310CA SFF-8431 Compliance Test Application20Connecting to External Instruments21

# 2 Installing N109310CA and N1010A FlexDCA on a PC

Connecting the Equipment 36	
Installing the I/O Library Suite 36	
Installing the N1010A FlexDCA Application 37	
Installing the N109310CA SFF-8431 Compliance Test Application	42
Connecting N1010A FlexDCA to 86100D or N1000A 46	
Connecting N1010A FlexDCA to N109X Oscilloscope and N107X	52
Starting the N109310CA SFF-8431 Compliance Test Application	53
Connecting to the Network Analyzer 55	
Installing WDP Measurement Script 57	

## 3 Installing N109310CA on a PC Without N1010A FlexDCA

**Connecting the Equipment** 64 Installing the I/O Library Suite 64 Installing the N109310CA SFF-8431 Compliance Test Application 65 Validating DCA-X Oscilloscope's SCPI Server Setup 69 Adding 86100D or N1000A to Keysight Connection Expert 70 Connecting N1010A FlexDCA to N109X Oscilloscope and N107X 78 Starting the N109310CA SFF-8431 Compliance Test Application 79 Connecting to the Network Analyzer 81 Installing WDP Measurement Script 83

## 4 Installing N109310CA on the 86100D or N1000A

Connecting the Equipment88Installing the I/O Library Suite88Installing the N109310CA SFF-8431 Compliance Test Application89Connecting N1010A FlexDCA to N109X Oscilloscope and N107X93Starting the N109310CA SFF-8431 Compliance Test Application94Connecting to the Network Analyzer95Installing WDP Measurement Script97

Keysight N109310CA SFF-8431 Compliance and Debug Application Getting Started

# 1 Introduction

Use the instructions in this Guide to install and set up the N109310CA SFF-8431 Compliance Test Application. Once the procedures in this document are completed, you can begin compliance testing. Information on using the application is included in the application's Online Help.

Your licenses determine where you install the N109310CA and FlexDCA applications. The N109310CA license allows you to install the application on either a specific PC or a specific 86100D DCA-X or N1000A DCA-X instrument. This selection is made at the time you redeem your licenses.

Configuration	DCA-X Supported Configurations	DCA-M Supported Configurations
N109310CA on a PC with FlexDCA	A PC attached to N1000A or 86100D DCA-X oscilloscope (in Legacy configuration) over LAN. The PC has N109310CA SFF-8431, N1010A FlexDCA, 86100DU-401 or N1010100A License, Microsoft Excel, and IO Connection Expert installed on it.	A PC directly connected to the N109X with a USB cable. The PC has N109310CA SFF-8431, N1010A FlexDCA, N109x-401 or N1010100A License, Microsoft Excel, and IO Connection Expert installed on it.
N109310CA on a PC without FlexDCA	A PC attached to N1000A or 86100D DCA-X oscilloscope (in Standard configuration) over LAN. The PC has N109310CA SFF-8431, 86100DU-401 or N1010100A License, Microsoft Excel, and IO Connection Expert installed on it.	<ul> <li>Configuration 1: Connect the primary test system PC to a low-cost modern PC via LAN. The FlexDCA interface resides on the second PC. The second PC is then connected to the N109X via USB. This eliminates most issues of compatibility between an existing test system PC and the N109X hardware and can greatly simplify converting an 86100D system to an N109X system.</li> <li>Configuration 2: An N1000A or 86100D mainframe connected to the N109X with a USB cable. The N1000A or 86100D has FlexDCA installed on it. The N1000A or 86100D can then be controlled via GPIB or LAN by a PC that has N109310CA installed on it.</li> <li>The PC with N109310CA has N109x-401 or N1010100A License, Microsoft Excel, and IO Connection Expert installed on it.</li> </ul>
N109310CA on the oscilloscope	N1000A or 86100D DCA-X oscilloscope in Standard configuration. The oscilloscope has N109310CA SFF-8431, 86100DU-401 or N101010A License, Microsoft Excel, and IO Connection Expert installed on it.	An N1000A or 86100D mainframe connected to the N109X with a USB cable. The N1000A or 86100D has FlexDCA and N109310CA installed on it.

NOTE

If you plan to run all of the N109310CA tests, the N109310CA license will suffice. If using older licenses, host testing requires option N1014A-HST and Module Testing requires option N1014A-MOD.



Installing the N109310CA SFF-8431 Compliance Test Application

- 1 Select from one of three different test-equipment configurations shown in the following pages. The configuration that you select depends on where the N109310CA SFF-8431 Compliance Test Application is installed, as determined by the licenses, and whether you are using the N1010A FlexDCA application.
- 2 After locating the figure that matches your setup, follow the recommended procedure.

# Recommended Equipment and Software

#### Table 1 Recommended equipment to run tests on the N109310CA SFF-8431 Compliance Test Application

Equipment	Configuration				
	Single Plug-In Module Setup	Multiple Module Setup			
Oscilloscope	N1000A DCA-X				
		ow jitter timebase			
		n lock trigger hardware			
		ion under N1010100A R&D package Ier N1010100A R&D package			
		Or			
	86100D DCA-	X <sup>*</sup> with options:			
		Extended Trigger			
		ed Jitter Analysis option under N1010100A R&D package			
		Q Equalizers option under N1010100A R&D package			
		of these Two Electrical Channels			
		ectrical Channels			
		ectrical Channels			
86100D Plug-In Module	86108A or 86108B with options LBW/HBW and 216/232.	86112A, 54754A, 86117A, or 86118A-H01.			
-	Option JSA provides improved jitter measurement accuracy	86107A (any option).			
	(optional).	N1045A, N1045B, N1055A, N1046A 75/85/100 GHz.			
	N1060A for N1000A.				
Clock/Data Recovery and		ta Recovery & Demultiplexer. <sup>†</sup>			
Demultiplexer	N1076 A/B, N1077A, N10	078A Clock Data Recovery.			
Software		Compliance Application.			
		Software <sup>†</sup> (Optional)**			
		e <sup>tt</sup> or F-AEYE under N1010100A R&D package. ner, 16.3 if running N1010A on a PC.			
		el 2007 or greater			
		Run Time (MCR) 7.10			
Performance Network Analyzer	Any 4-port model with frequ	iency range of at least 12 GHz			
(PNA) or Economy Network Analyzer (ENA)	(ENA also covers the 1 MH	z termination mismatch test)			
Matched Cable Set	86108	8B-CA3			
Phase Trimmers	86108B-PT	3 (quantity 2)			
DC Blocks	86108B-DC3, N9398C, N93	399C, or 11742A (quantity 2)			
Pick-Off	N/A	N4915A-015 (quantity 2)			

 If you have access to the clock for the device, you can connect the clock to the 86100D's Trigger input instead of using the N4877A

\* Revision A.05.80 or greater

\*\*Required if running FlexDCA on the PC

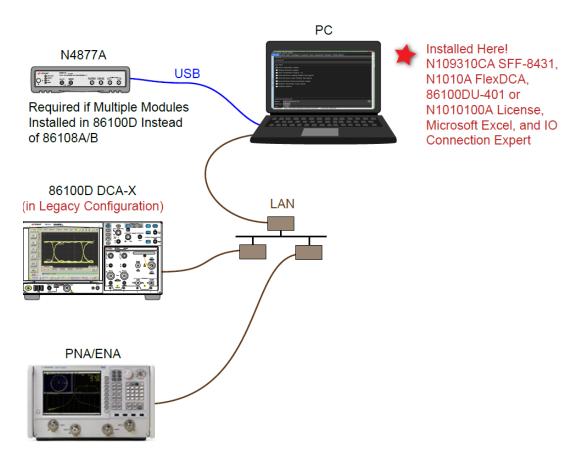
++ A version of the 86100DU-401 is automatically installed with the N109310CA. However, the *license* must be purchased and installed



The N109310CA SFF-8431 Compliance Test Application *cannot* be installed on an 86100A, 86100B, or 86100C.

### Installing N109310CA and N1010A FlexDCA on a PC

If your licenses allow for installing the software as marked by the red star in the following diagrams, go to Chapter 2, "Installing N109310CA and N1010A FlexDCA on a PC".



N109310CA and N1010A FlexDCA installed on PC connected to 86100D DCA-X Oscilloscope

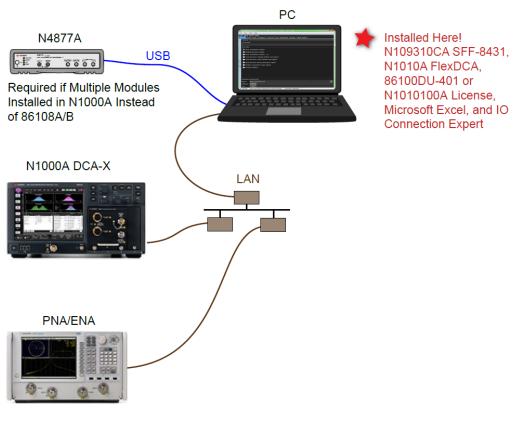


Figure 1 N109310CA and N1010A FlexDCA installed on PC connected to N1000A DCA-X Oscilloscope

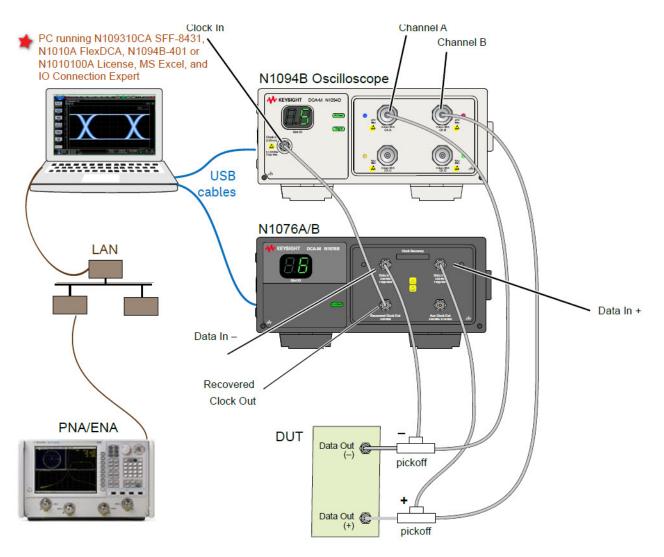


Figure 2 N109310CA and N1010A FlexDCA Installed on PC connected to N1094B DCA-M Oscilloscope

Installing the N109310CA on a PC without FlexDCA

If your licenses allow for installing the software as marked by the red star in this diagram, go to Chapter 3, "Installing N109310CA on a PC Without N1010A FlexDCA".

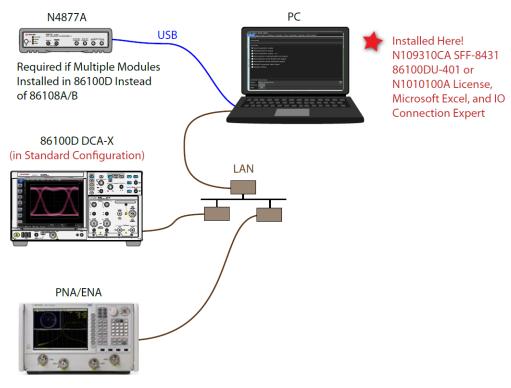


Figure 3 N109310CA Installed on PC connected to 86100D DCA-X Oscilloscope

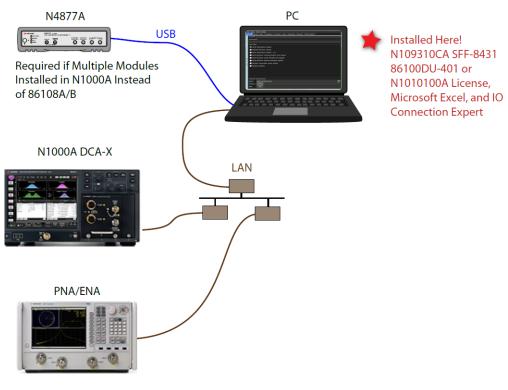


Figure 4 N109310CA Installed on PC connected to N1000A DCA-X Oscilloscope

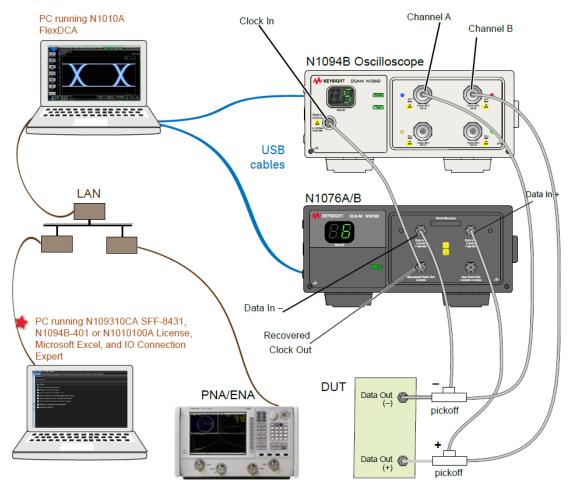


Figure 5 N109310CA Installed on PC Without N1010A FlexDCA connected to N1094B DCA-M Oscilloscope via another PC

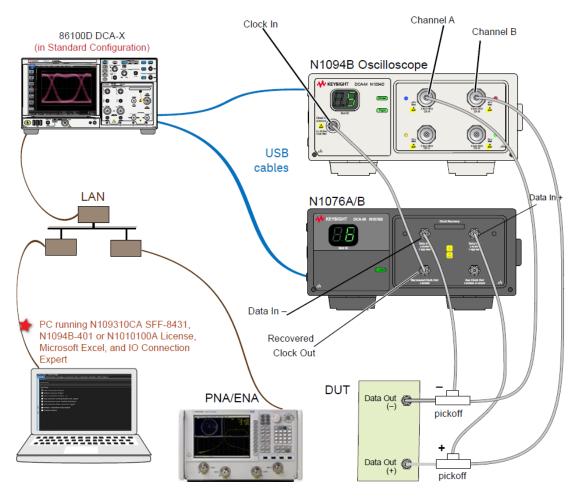


Figure 6 N109310CA Installed on PC Without N1010A FlexDCA connected to N1094B DCA-M Oscilloscope via 86100 DCA-X Oscilloscope

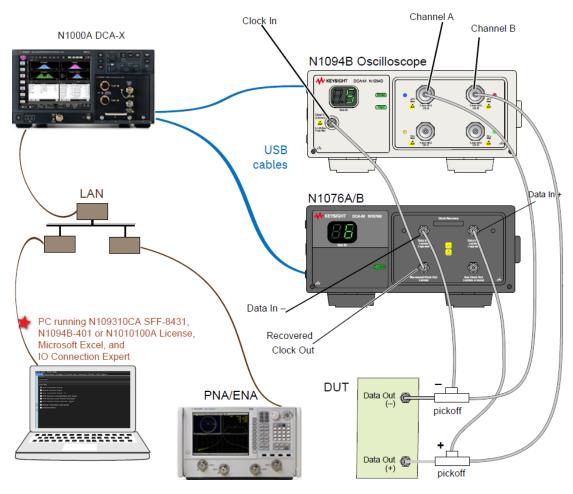


Figure 7 N109310CA Installed on PC Without N1010A FlexDCA connected to N1094B DCA-M Oscilloscope via N1000A DCA-X Oscilloscope

#### Installing N109310CA on the 86100D or N1000A Oscilloscope

If your licenses allow for installing the software as marked by the red star in this diagram, go to Chapter 4, "Installing N109310CA on the 86100D or N1000A".

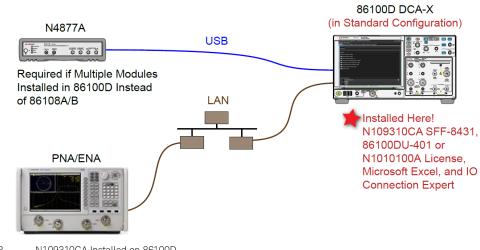


Figure 8 N109310CA Installed on 86100D

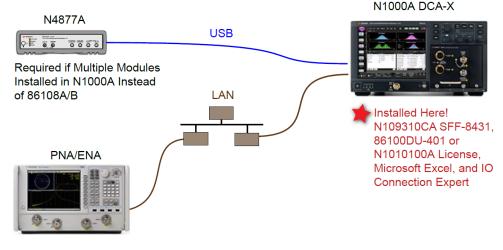


Figure 9

N109310CA Installed on N1000A

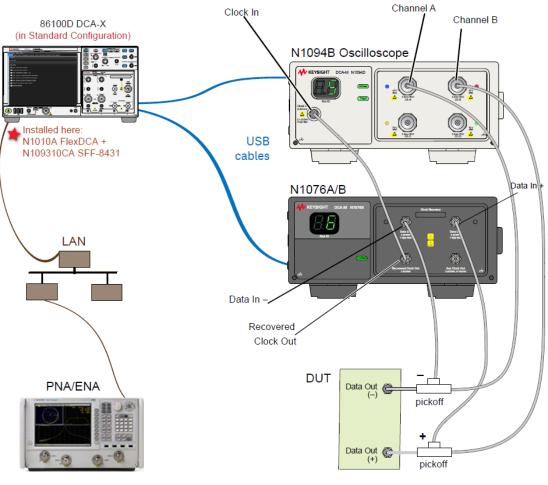


Figure 10 N109310CA Installed on N1000A connected to a DCA-M setup

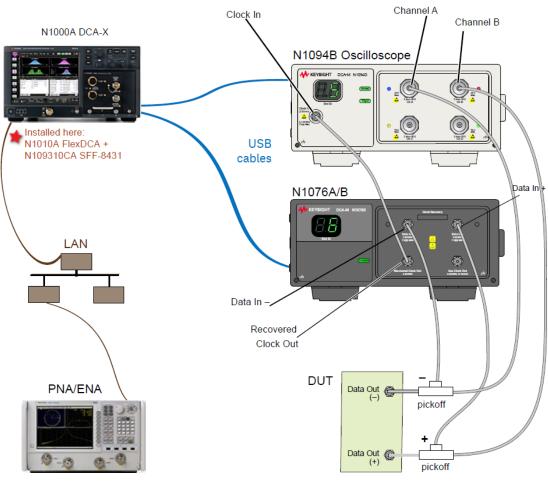


Figure 11 N109310CA Installed on N1000A connected to a DCA-M setup

### Starting the N109310CA SFF-8431 Compliance Test Application

After you install the N109310CA SFF-8431 Compliance Test Application on a PC (with or without the N1010A FlexDCA interface) or on the 86100D or N1000A Oscilloscope, refer to the following sections to start the N109310CA SFF-8431 Compliance Test Application:

- If the N109310CA SFF-8431 Compliance Test Application and the N1010A FlexDCA Software are installed on the same PC and the DCA-X or DCA-M Oscilloscope is being accessed remotely, see "Starting the N109310CA SFF-8431 Compliance Test Application" on page 53.
- If the N109310CA SFF-8431 Compliance Test Application is installed on a PC (but the N1010A FlexDCA Software is not installed) and the DCA-X or DCA-M Oscilloscope is being accessed remotely, see "Starting the N109310CA SFF-8431 Compliance Test Application" on page 79.
- If the N109310CA SFF-8431 Compliance Test Application is installed on the 86100D or N1000A Oscilloscope, see "Starting the N109310CA SFF-8431 Compliance Test Application" on page 94.

#### Connecting to External Instruments

Most of the measurements in the N109310CA SFF-8431 Compliance Test Application use an 86100D or N1000A DCA-X or a supported DCA-M (N1092C/E, N1094A, N1094B) sampling oscilloscope. However, for S-Parameter measurements, a network analyzer is required. If properly configured, the Compliance Test Application can communicate with a network analyzer for making the measurements, and include the S-parameter results in the test application report.

Previous versions of the N109310CA SFF-8431 Compliance Test Application required Instrument protocol connections to the LAN for ENAs and Socket connections for PNAs. However, version 1.11 and higher require Socket connections for ENAs as well as PNAs.

Note that the Keysight I/O Library Suite must be installed before you proceed with connecting to the network analyzer. The user interface for Keysight Connection Expert 2017 (Version 18.0) and higher is slightly different from its previous versions, such as Version 17.2 or earlier.

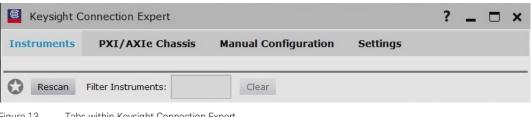
#### Connection using Keysight Connection Expert v17.2 (or earlier)

- 1 Locate and record the ENA/PNA instrument's Hostname (Full Computer Name). Refer to the respective network analyzer's documentation for locating this information.
- 2 From the Windows Start menu, click All Programs>Keysight Connection Expert to launch Connection Expert. Refer to Keysight IO Libraries Suite for information on how to install the Keysight Connection Expert.



Figure 12 Launching the Keysight Connection Expert

3 In Keysight Connection Expert, click the Manual Configuration tab.



Tabs within Keysight Connection Expert Figure 13

4 Under Add New Instruments / Interfaces, select LAN instrument.

Keysight Connection Expert		
Instruments PXI/AXIe Chassis	Manual Configuration	Settings
Add New Instruments/Interfaces	Edit Existing Instruments/	Interfaces
LAN instrument	Add a LAN device	
Serial instrument on ASRL3		

Figure 14 Performing Manual Configuration in Keysight Connection Expert

- 5 In the Add a LAN device pane,
  - a Under **Set LAN Address:**, enter the Hostname (recorded in step 1) in the **Hostname or IP Address:** field. Note that your Hostname entry will be different from what is shown in the image.
  - *b* Under **Set Protocol:**, select **Socket** and enter the port number.
  - c Under Verify Connection:, click Test This VISA Address to verify the connection.

Keysight Connection Expert			? _ 🗆 ×		
Instruments PXI/AXIe Chassis	Manual Configuration	Settings			
Add New Instruments/Interfaces	Edit Existing Instruments/Interfaces				
LAN instrument	Add a LAN device				
Serial instrument on ASRL3 LAN interface Remote serial instrument	Set LAN Address:		_		
Remote GPIB interface Remote USB interface	Hostname or IP Address	: К-Е5080А-xxxx ТСРІРО	▼		
	Set Protocol:				
	Instrument	Remote Name:	inst0		
	Socket	Port Number:	5025		
	HiSLIP	Remote Name:	hislip0		
	Verify Connection: Allow *IDN Query Test This VISA Address	TCPIP0::K-E508	0A-xxxxx::5025::SOCKET		
	View Web Page: Instrument Web Interf	ace			
			Accept Cancel		
Messages: 0     Clear	Remote IO Server	r On 32-Bit Keysight VIS	5A is Primary 17.2.20828.2		

Figure 15 Adding a LAN device information in the Keysight Connection Expert

6 Once you verify the entered data, click **Accept** to complete the process.

- 7 Copy Network Analyzer SICL Address to the Clipboard:
  - a Click the Instruments tab of the Keysight Connection Expert.
  - *b* Click the ENA/VNA listing on the left pane, and copy the SICL address using *Ctrl* + *C* keys. Note that the address on your end will be different from what is shown in the image.

Keysight Connection Expert	? _ 🗆 ×
Instruments PXI/AXIe Chassis Man	ual Configuration Settings
Instruments       PXI/AXIe Chassis       Manual         Image: Comparison of the system of the	Details for Keysight Technologies E5080A          Manufacturer:       Keysight Technologies         Model:       E5080A         Serial Number:       xxxxxxxxx         Firmware Version:       A.11.70.00         Connection Strings         VISA Addresses         Image: Composition of the series
	VISA Aliases <no aliases="" configured="" visa=""> • SICL Addresses lan,5025[K-E5080A-xxxxx] Installed Drivers</no>
	<no drivers="" installed=""></no>
Messages: 0 Clear Remote :	IO Server On 32-Bit Keysight VISA is Primary 17.2.20828.2

Figure 16 Copying Network Analyzer's SICL Address

8 Start the N109310CA SFF-8431 Compliance Test Application. Refer to "Starting the N109310CA SFF-8431 Compliance Test Application" on page 20 for instructions.

9 Connect to the Network Analyzer:

External 1	(nstruments
Name:	N4877A/N1076/7A
Address:	Connect
IDN:	Get

Figure 17 Default view of External Instruments area in the N109310CA SFF-8431 Application

a In the Name: field of the External Instruments area at the bottom of the N109310CA SFF-8431 application's main window, select either N4877A/N1076/7A, VNA or ENA from the drop-down list, depending on your network analyzer. In the example below, ENA is selected.



Figure 18 Selecting a Network Analyzer in the N109310CA SFF-8431 Application

b Click Connect. The Connect to ENA window appears.



Figure 19 Connecting to the selected Network Analyzer

- c In the Enter/Select VISA address/alias (or SICL address) field, paste the SICL address using Ctrl + V keys.
- *d* Click **Get** to confirm the connection.
- e Click **OK** to close the dialog box.
- *f* The **External Instruments** field displays the relevant information once the connection to the selected network analyzer is established.

#### Connection using Keysight Connection Expert 2017 (v18.0) and higher

- 1 Locate and record the ENA/PNA instrument's Hostname (Full Computer Name). Refer to the respective network analyzer's documentation for locating this information.
- 2 From the Windows **Start** menu, click **All Programs>Keysight Connection Expert** to launch Connection Expert 2017. Refer to Keysight IO Libraries Suite for information on how to install the Keysight Connection Expert 2017.



Figure 20 Launching the Keysight Connection Expert 2017

3 In Keysight Connection Expert 2017, click the **+ Add** button to manually add instruments and interfaces.

Keysight Connection Expert 2017		
Instruments PXI/AXIe Chassis		
My Instruments + Add 😂 🗮 🕇	Details for Keysig	ht Technolog
✓ LAN (TCPIPO)     Manually add instr	ruments and interfaces	×
86100D, Keysight Technologies 141.121.82.130	Check Edit Status	Remove Inter I
	Manufacturer:	Keysight T
86100D, Keysight Technologies 141.121.84.15	Model: Serial Number:	86100D MY551803

Figure 21 Adding LAN device manually in the Keysight Connection Expert 2017

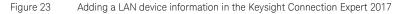
4 From the drop-down list that appears, select **LAN instrument**.

Keysight Connection E	xpert 2017
Instruments PXI/AX	Ie Chassis
My Instruments	+Add 🕄 🎛 🕇 Details for Key
✓ LAN (TCPIP0)	LAN instrument Serial instrument on ASRL3
86100D, Keys 141.121.82.130	Domoto corial instrument
	Remote USB interface

Figure 22 Selecting LAN instrument in the Keysight Connection Expert 2017

- 5 In the Add a LAN device window,
  - a Select the Enter Address tab.
  - *b* Under **Set LAN Address:**, enter the Hostname (recorded in step 1) in the **Hostname or IP Address:** field. Note that your Hostname entry will be different from what is shown in the image.
  - *c* Under **Set Protocol:**, select **Socket** and enter the port number.
  - *d* Under Verify Connection:, click Test This VISA Address to verify the connection.

Add a LAN device		×
Select from List Enter Ac	Idress	
Set LAN Address:		
Hostname or IP Address:	K-E5080-xxxxx	
TCPIP Interface ID:	TCPIP0	•
Set Protocol:		
Instrument (VXI-11)	Remote Name:	inst0
HiSlip	Remote Name:	hislip0
Socket	Port Number:	5025
Verify Connection:		
✓ Allow *IDN Query		
Test This VISA Address		
View Web Page:		
Instrument Web Interface		
		OK Cancel



6 Once you verify the entered data, click **OK** to complete the process.

- 7 Copy Network Analyzer SICL Address to the Clipboard:
  - a Click the Instruments tab of the Keysight Connection Expert 2017.

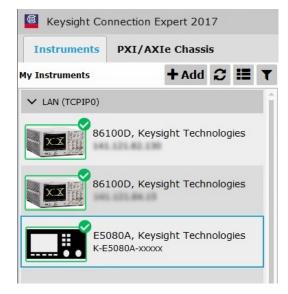


Figure 24 Selecting the connected Network Analyzer for SICL Address information

*b* Click the ENA/VNA listing on the left pane, and copy the SICL address using *Ctrl* + *C* keys. Note that the address on your end will be different from what is shown in the image.

							\$	?	-	
Details fo	or Kevsiał	nt Techr	ologies	E5080A						
					(=		Æ			
C	Ø	×	-	CX.	-		₩+			
Check Status	Edit	Remove	Interactiv IO	e IO Monitor	Command Expert	BenchVue	Web UI		Front nel	
Manufa	acturer:	Keys	ight Techr	nologies			- F			-
Model:		E508	AOA						Ľ	
Serial N	Number:	XXXXXX	XXXXXXX						ΞĹ	Л
Connectio	on String	S								
Connecti		S Address			Aliases	5	SICL Addres	55		
Connectio	VISA A	Address	)A-xxxxx::5	025::SOCKE			SICL Addres		A-xxxx	x]
Connecti	VISA A	Address	)A-xxxxx::5	025::SOCKE					A-xxxx	×]
Connection Installed Dr		Address 0::K-E5080	)A-xxxxx::5	025::SOCKE					A-xxxx	∞]
Installed Dr	VISA A	Address D::K-E5080 Jpdate	)A-xxxxx::5	025::SOCKE					A-xxxx	x]
Installed Dr		Address D::K-E5080 Jpdate	)A-xxxxx::5	025::SOCKE					A-xxxx	×
Installed Dr	VISA A	Address D::K-E5080 Jpdate	)A-xxxxx::5	025::SOCKE					A-xxxx	×
Installed Dr	VISA A	Address D::K-E5080 Jpdate	JA-20000::5	025::SOCKE					A-xxxx	×
Installed Dr	VISA A	Address D::K-E5080 Jpdate	)A-xxxxx::5	025::SOCKE					A-xxxx	×
Installed Dr	VISA A	Address D::K-E5080 Jpdate	)A-xxxxx::5	025::SOCKE					A-xxxx	x

Figure 25 Copying Network Analyzer's SICL Address

8 Start the N109310CA SFF-8431 Compliance Test Application. Refer to "Starting the N109310CA SFF-8431 Compliance Test Application" on page 20 for instructions.

9 Connect to the Network Analyzer:

External 1	Instrumer	nts
Name:	N4877A/	N1076/7A
Address:	Connect	
IDN:	Get	

Figure 26 Default view of External Instruments area in the N109310CA SFF-8431 Application

a In the **Name:** field of the **External Instruments** area at the bottom of the N109310CA SFF-8431 application's main window, select either **N4877A/N1076/7A**, **VNA** or **ENA** from the drop-down list, depending on your network analyzer. In the example below, **ENA** is selected.

External 1	nstruments	
Name:	ENA	$\mathbf{\mathbf{v}}$
Address:	N4877A/N1076/7A	
IDN:	VNA	
<u></u>	ENA	k

Figure 27 Selecting a Network Analyzer in the N109310CA SFF-8431 Application

b Click Connect. The Connect to ENA window appears.

Connect to ENA	?			
Currently connected to: Change to Alias/Address:	<nothing></nothing>			
IDN:	<unknown> Get</unknown>			
Enter/Select VISA address/alias (or SICL address):				
Select from Keysight Connection Expert 'My Instruments':				
	OK Cancel			
Ready				

Figure 28 Connecting to the selected Network Analyzer

- c In the Enter/Select VISA address/alias (or SICL address) field, paste the SICL address using Ctrl + V keys.
- *d* Click **Get** to confirm the connection.
- e Click OK to close the dialog box.
- *f* The **External Instruments** field displays relevant information once the connection to the selected network analyzer is established.

#### 1 Introduction

Keysight N109310CA SFF-8431 Compliance and Debug Application Getting Started

# 2 Installing N109310CA and N1010A FlexDCA on a PC

Follow the instructions in this chapter when you are installing both the N109310CA SFF-8431 application and the N1010A FlexDCA application on the PC. You must purchase and install a license for the 86100DU-401 or N1010100A.

NOTE

When you redeem an N109310CA SFF-8431 license, you must select whether to install the application on a supported DCA-X or DCA-M Oscilloscope or a specific PC.

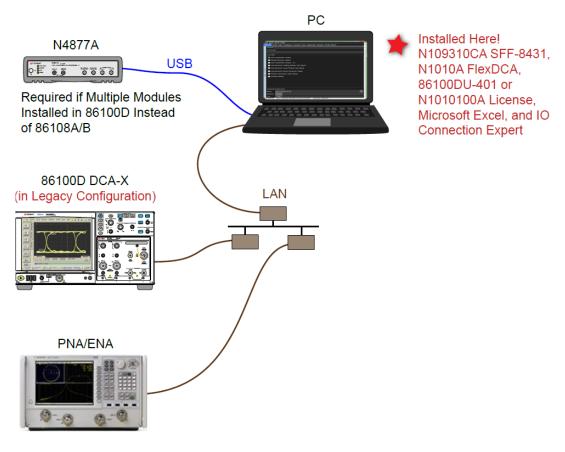


Figure 29 N109310CA and N1010A FlexDCA Installed on PC (using 86100D DCA-X oscilloscope)



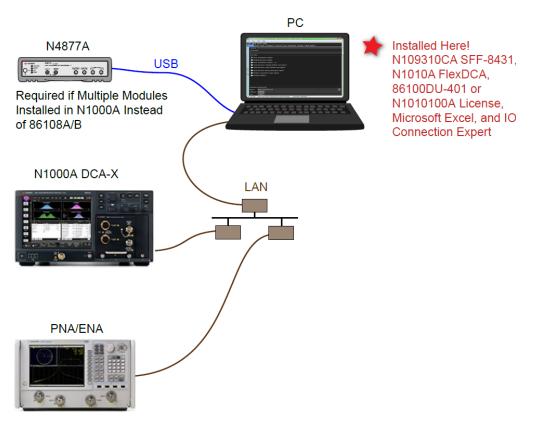


Figure 30 N109310CA and N1010A FlexDCA Installed on PC (using N1000A DCA-X oscilloscope)

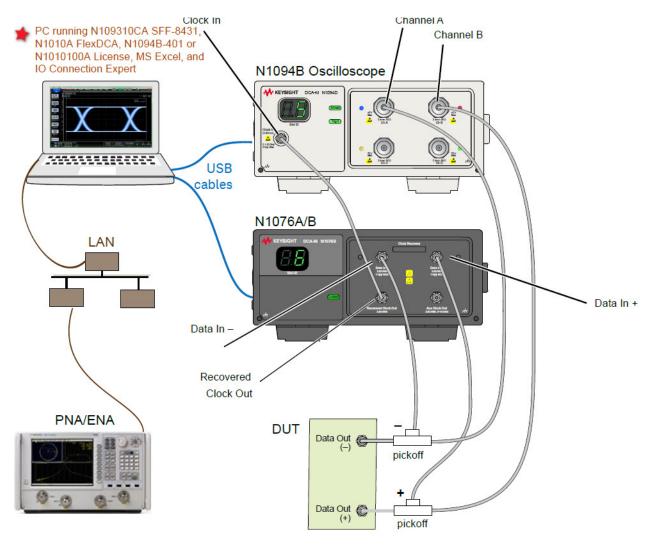


Figure 31 N109310CA and N1010A FlexDCA Installed on PC connected to N1094B DCA-M Oscilloscope

#### NOTE

If you do not connect a network analyzer, you will not be able to perform the S-parameter Tests and Impedance Tests for the following test categories: Host Transmitter Output, Module Receiver Output, Host Receiver Limiting Module Test Signal, Host Receiver Linear Module Test Signal, and Module Transmitter Input Signal.

#### Connecting the Equipment

1 For a DCA-X oscilloscope, install one of the module combinations listed in Table 2 into the oscilloscope.

#### Table 2 Module combinations for DCA-X Oscilloscope

Installed Module Configurations	Single Plug-In Module Setup	Multiple Plug-In Module Setup	Description
86108A/B	Available		The 86108B can have either options LBW or HBW plus 216 or 232.
86112A, 54754A, 86117A, or 86118A-H01 86107A (any option) N4877A, N1076 A/B, N1077A, N1078A Clock Data Recovery Options 216/232 <sup>*</sup> N1045A, N1045B, N1055A, N1046A 75/85/100 GHz, N1060A		Available	Option 216 provides a maximum data rate of 16 Gb/s. Option 232 provides a maximum data rate of 32 Gb/s.

\* If you have access to the clock for the device, you can connect the clock to the oscilloscope's Trigger input instead of using the CDR.

2 For a DCA-M oscilloscope, keep in mind the information in the following table.

#### Table 3 Supported configurations for DCA-M Oscilloscope

Configurations for DCA-M	Requires N107x
N1094A	√ (N107xA-232)
N1094B	√ (N107xA-232)
N1092 C/E	√ (N107xA-232)

- 3 Connect the equipment as shown in the connection diagrams above and power on all of the instruments.
- 4 Install Microsoft Excel on the PC.

#### Installing the I/O Library Suite

1 Navigate to www.keysight.com/find/iosuite and download the Keysight I/O Library Suite.

NOTE

Keysight's I/O Library Suite is free software that automatically detects instruments connected to your PC and configures the interfaces. It reduces the overall setup and configuration time. The N109310CA SFF-8431 Compliance Test Application requires I/O Libraries Suite 16.3 or higher.

2 Install the I/O Library Suite on the PC.

## Installing the N1010A FlexDCA Application

Follow the steps below to install the N1010A FlexDCA Software and its license as well as the license for the 86100DU-401.

- 1 Search for N1010A FlexDCA Software from the Keysight website.
- 2 Download the installer file and install the application on the PC for which you have redeemed the license.

When you redeem an N1010A FlexDCA Remote Access Software license, you must specify the information for the PC, where the software will be installed for remotely accessing the Oscilloscope.

- 3 Save the license file that you received from Keysight in a folder on the local disk or in an accessible memory device.
- 4 From the Windows **Start** menu, click **All Programs>Keysight License Manager** to launch the Keysight License Manager.

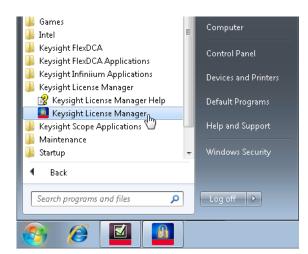


Figure 32 Launching Keysight Connection Expert from the Start menu

NOTE

NOTE

Keysight License Manager version 5.1 (and higher) have a different user interface than version 5.0 (or earlier). Even though the path to launch the Keysight License Manager is the same for both versions, refer to the *Keysight License Manager Online Help* for the respective versions to find more information about the functionality of the application.

#### To install the N1010A FlexDCA Software license using Keysight License Manager version 5.1 or higher

1 Click the **Tools** icon on the top-right corner of the Keysight License Manager window.

🗕 Keysight License M	lanager	× ? _ □ ×
Connections     Add Connection	Licenses on (localhost) C Full computer name: msr.is.keysight.com	Why do I need these tools? Install License File Install License from Text View License Alerts
Manage licenses remotely	Feature Description Version Expiration Type	Explore Transport URLs About Keysight License Manage Count Location

2 Click Install License File.... The Select License File(s) to Install on <PC Hostname> appears.

Select License File(s) to Install on XXXXXXXX(localhost)								
COO V 🖟 « Keysight 🕨	Licenses 🗸	Search Licenses	٩					
Organize 🔻 New folder		!≡ ▼ 🚺	0					
🚺 Downloads 🔺	Name	Date modified Ty	pe					
E Recent Places	1677859_1002001660.lic	5/15/2017 11:35 PM LI	C File					
Cloud Photos	1677859_20170515120537.lic	5/15/2017 11:36 PM LI	C File					
icioud Photos	1001740845_1634928.lic	1/25/2017 2:29 PM LI	C File					
Desktop Libraries Documents Music Pictures Videos ANANTHANARA Computer Network								
- · · · ·			4					
File nan	ne: 1677859_20170515120537.lic	✓ License files (*.lic)     Open      Cancel	<ul> <li>■</li> <li>■</li> </ul>					

Figure 34 Selecting license file from the folder

- 3 Navigate to the folder where the N1010A FlexDCA Software licenses are saved.
- 4 Select the license and click **Open**. The license files are installed and an entry is displayed in the Keysight License Manager.

Figure 33 Installing license file on Keysight License Manager version 5.1 & above

Keysight License M	anager					∢?	_ 🗆 ×
Connections     Add Connection		es on 💥 🕅		-			
(localhost)	Host ID:		******				
Manage licenses remotely	Feature	Description	Version	Expiration	Туре	Count	Location
by connecting to the Keysight License Service	FlexDca_Demo	FlexDca_Demo	1.000	2018/05/15	Fixed	Unlimited	Local

Figure 35 Licenses displayed in Keysight License Manager version 5.1 & above

5 Close the Keysight License Manager.

To install the N1010A FlexDCA Software license using Keysight License Manager version 5.0 or earlier

1 From the Keysight License Manager window's main menu, click **File>Install...** or right-click within the left pane of the Keysight License Manager window and select **Install...**.

	Keysight License Manager		
	File Edit View Tools Help		
Install	localhost	Host System	
Delete	⊷© Local Licenses ⊟⊸© Product 86100	Host Name :	×××××××××××××××
Transport	EnhancedJ	Host ID :	××××××××××××××××
Connect	₽ @ Product 86100	Interface Type	Windows
Exit		Licensed Product	s and Features

Figure 36 Installing license file on Keysight License Manager version 5.0 or earlier

2 The Install License File(s) dialog box appears.

Install License File(s)				×		
😋 🔾 🗢 📕 🕨 Libraries	▶ Documents ▶ FlexDCA ▶ Apps ▶ Licenses	•	<ul> <li>✓→ Search Licenses</li> </ul>	٩		
Organize 🔻 New folder	r			•		
ጵ Favorites 📃 Desktop	Documents library	Arrange by: Folder 🔻				
🚺 Downloads 🗐 Recent Places	Name	Date modified	Туре	Size		
	1677859_1002001660.lic	5/15/2017 11:05 AM	LIC File	1 KB		
🥽 Libraries	1677859_20170515120537.lic	5/15/2017 11:06 AM	LIC File	1 KB		
🐏 Computer ੱ SystemDrive (C:) 👝 UserData (D:) 📬 Network						
File na	me: 1677859_20170515120537.lic		✓ License files (*.lic Open ↓	Cancel		

Figure 37 Selecting license file from the folder

3 Navigate to the folder where the N1010A FlexDCA Software licenses are saved.

4 Select the license and click **Open**. The license files are installed and an entry is displayed in the Keysight License Manager.

Figure 38 Licenses displayed in Keysight License Manager version 5.0 or earlier

5 Close the Keysight License Manager.

Installing the N109310CA SFF-8431 Compliance Test Application

Follow the steps below to install the N109310CA SFF-8431 Compliance Test Application and its license as well as the license for the 86100CU-401 or N1010100A. A version of the 86100CU-401 is automatically installed for use with the N109310CA.

# NOTE If you plan to run all of the N109310CA tests, the N109310CA license will suffice. If using older licenses, host testing requires option N1014A-HST and Module Testing requires option N1014A-MOD.

- 1 Search for the N109310CA SFF-8431 Compliance Test Application on the Keysight website.
- 2 Download the installer file and install the application on the PC for which you have redeemed the license.

NOTE

When you redeem an N109310CA SFF-8431 license, you must select whether to install the application on the Oscilloscope or a specific PC.

- 3 Save the license file that you received from Keysight in a folder on the local disk or in an accessible memory device.
- 4 If not already done, purchase an 86100DU-401, N109x-401, or N1010100A license. Save the license file that you received from Keysight in a folder on the local disk or in an accessible memory device.
- 5 If the N1010A FlexDCA is running on your PC, close FlexDCA.
- 6 From the Windows **Start** menu, click **All Programs>Keysight License Manager** to launch the Keysight License Manager.

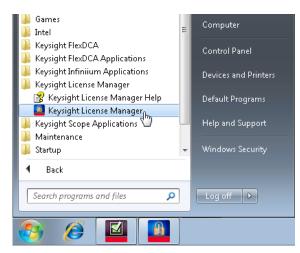


Figure 39 Launching Keysight Connection Expert from the Start menu

NOTE

Keysight License Manager version 5.1 (and higher) have a different user interface than version 5.0 (or earlier). Even though the path to launch the Keysight License Manager is the same for both versions, refer to the *Keysight License Manager Online Help* for the respective versions to find more information about the functionality of the application.

To install the N109310CA SFF-8431 Compliance Test Application's license using Keysight License Manager version 5.1 or higher

1 Click the **Tools** icon on the top-right corner of the Keysight License Manager window.

📕 Keysight License M	anager	× ? _ □ ×
<ul> <li>Connections</li> </ul>	Licenses on 🗰 (localhost) 🖒	Why do I need these tools? Install License File
+ Add Connection	Full computer name: XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	Install License from Text View License Alerts
		Explore Transport URLs About Keysight License Manage
Manage licenses remotely	Feature Description Version Expiration Type	Count Location

Figure 40 Installing license file on Keysight License Manager version 5.1 & above

2 Click Install License File.... The Select License File(s) to Install on <PC Hostname> appears.

Select License File(s) to Insta Select License File(s) to Insta Keysight		Search Licenses	× م
Organize  New folder			1 0
organize + New Ioider	*		
쑦 Favorites 👘	Name	Date modified	Туре
🔕 Creative Cloud Fi	1677859_1002001660.lic	5/15/2017 11:35 PM	LIC File
🧮 Desktop	1677859_20170515120537.lic	5/15/2017 11:36 PM	LIC File
🐌 Downloads 🔤	1001740845_1634928.lic	1/25/2017 2:29 PM	LIC File
📃 Recent Places 🦷			
🝊 OneDrive			
licloud Photos			
📃 Desktop			
🥽 Libraries			
Documents			
a) Music			
Pictures			
🗧 Videos 👻 🗸	(		
File nar	me: 1677859_1002001660.lic 🗸	License files (*.lic)	•
		Open 🔽 Car	icel

Figure 41 Selecting license file from the folder

- 3 Navigate to the folder where the N109310CA SFF-8431 licenses are saved.
- 4 Select the license and click **Open**. The license files are installed and an entry is displayed in the Keysight License Manager.

<ul> <li>Connections</li> </ul>	Licenses on 💥	Licenses on 🛲 (localhost) 🖒						
+ Add Connection		XXXXXXXXX.png.is.keysight.com						
(localhost)	Host ID:							
Manage licenses remotely	Feature	Description	Version	Expiration	Туре	Count	Location	
by connecting to the Keysight License Service SFF-8431	SFF-8431_Host_Meas_Suite	SFF-8431 Host Measurement Suite	1.000	None	Transpo	Unlimited	Local	
	SFF-8431_Module_Meas_Suite	SFF-8431 Module Measurement Suite	1.000	None	Transpo	Unlimited	Local	
This is useful when transporting a license from one machine to another. Tell me more								

Figure 42 Licenses displayed in Keysight License Manager version 5.1 & above

5 Close the Keysight License Manager.

To install the N109310CA SFF-8431 Compliance Test Application's license using Keysight License Manager version 5.0 or earlier

1 From the Keysight License Manager window's main menu, click **File>Install...** or right-click within the left pane of the Keysight License Manager window and select **Install...**.

	🧕 Keysight License Manager		
	File Edit View Tools Help		
Install	localhost	Host System	
Delete	I      Local Licenses     b      Product 86100	Host Name :	*****
Transport	EnhancedJ	Host ID :	
Connect	□ @ Product 86100	Interface Type	Windows
Exit	⊡ AdvancedV ⊡∮ Product 86100	Licensed Product	s and Features

Figure 43 Installing license file on Keysight License Manager version 5.0 or earlier

2 The Install License File(s) dialog box appears.

Install License File(s)	• Documents ► FlexDCA ► Apps ► Licen	ses 🗸	✓ Search License	5 P				
Organize  New folder		Ses •		, , , , , , , , , , , , , , , , , , ,				
Favorites	Documents library		Arrange by: Folder ▼					
🐌 Downloads 🗐 Recent Places	Name	Date modified	Туре	Size				
	1677859_1002001660.lic	5/15/2017 11:05 AM	LIC File	1 KB				
<ul> <li>☐ Libraries</li> <li>▲ Computer</li> <li>▲ SystemDrive (C:)</li> <li>→ UserData (D:)</li> <li>▲ KINGSTON (E:)</li> <li>▲ KINGSTON (E:)</li> </ul>								
File na	me: 1677859_1002001660.lic		<ul> <li>✓ License files (*.li</li> <li>Open</li> </ul>	c)  Cancel				

Figure 44 Selecting license file from the folder

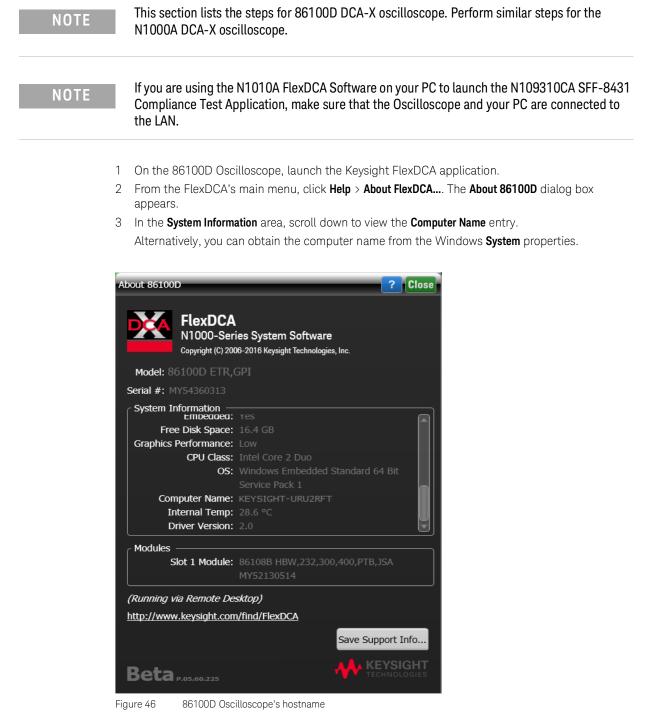
- 3 Navigate to the folder where the N109310CA SFF-8431 licenses are saved.
- 4 Select the license and click **Open**. The license files are installed and an entry is displayed in the Keysight License Manager.

Keysight License Manager							x
File Edit View Tools Help							
⊡	•	Host System					_
	Ш	Host Name :	$\boxtimes$		*****	Сору	1
e-√ Product 86100D-200 └── EnhancedJitterAnalysis (1.000)	L	Host ID :	$\mathbb{X}$	******	*****	Copy	
₽-¢ Product 86100D-201		Interface Type	_	Windows			
AdvancedWaveformAnalysis (1.000	Ш		1				
₽-••• Product 86100D-202		Licensed Products	s an	d Heatures			_
AdvancedTDRAnalysis (1.000)	-	Product/Feature		Version	Description	Туре	<u>^</u>
₽-•• Product 86100D-300		Product 86100D	-2				Ε
AmplitudeAnalysis (1.000)		EnhancedJitte	ər	1.000	Enhanced Jitter Analysis	Remova	
🖻 🗐 Product 86100D-401		Product 86100D	-2				
		AdvancedWa	ve	1.000	Advanced Waveform Analy	Remova	
⊨ 🗇 Product 86100D-500		Product 86100D	-2				
ProductivityPackage (1.000)		AdvancedTDF	R	1.000	Enhanced Impedance and	Remova	-
			-			F.	
localhost							

Figure 45 Licenses displayed in Keysight License Manager version 5.0 or earlier

5 Close the Keysight License Manager.

## Connecting N1010A FlexDCA to 86100D or N1000A



4 Record the Computer Name (corresponds to hostname) as you will need this name later in this procedure.

86100D Computer Name: \_\_\_\_\_

5 Close the **About 86100D** dialog box.

**NOTE** If you are accessing the 86100D Oscilloscope's FlexDCA interface remotely on your PC using any remote connectivity applications, Keysight recommends closing the remote-connection application before you try establishing connectivity between FlexDCA Software and the remote 86100D Oscilloscope.

6 On the Windows **Start** menu on your PC, click **All Programs>Keysight FlexDCA>Keysight FlexDCA** to launch the N1010A FlexDCA Software.

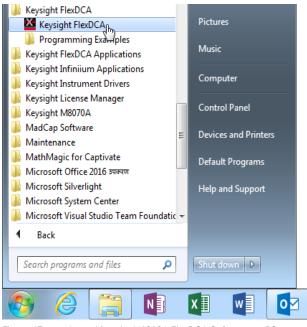
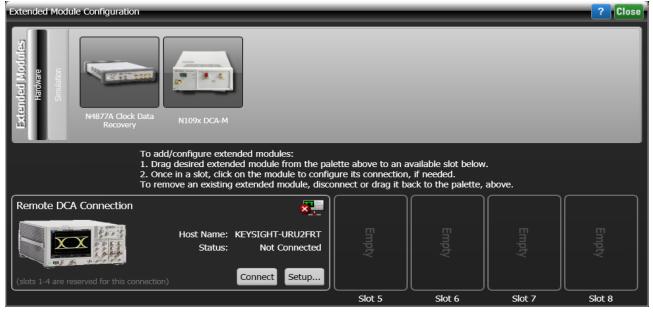


Figure 47 Launching the N1010A FlexDCA Software on PC



7 When FlexDCA starts, the **Extended Module Configuration** window is displayed automatically. Click **Connect** if the 86100D Oscilloscope's Hostname is already displayed else click **Setup**.

Figure 48 Extended Module Configuration dialog box for connecting N1010A FlexDCA to 86100D

If the **Extended Module Configuration** window does not appear, from the FlexDCA interface's main menu, click **Setup>DCA Connection Setup**.

- 8 On the FlexDCA Connection Setup dialog box,
  - a Ensure that LAN is selected in the Connect Using: area.
  - *b* Enter the 86100D's **Hostname** that you recorded in step 4.

Alternatively, you may also enter the IP Address of the remote 86100D Oscilloscope.

FlexDCA Connection Setup	? Close						
Remote DCA Connect Using:	Not Connected						
Hostname: KEYSIG	HT-URU2RFT						
DCA Connection Mode O Standard (Recommended) Compatibility							
On Connect / Disconnect							
Pull State from Instrument on	Connect						
Push State to Instrument on Disconnect							
Disconnect	Connect						

Figure 49 N1010A FlexDCA Connection Setup to connect to 86100D Oscilloscope

#### 9 Click Connect.

If connection is established successfully, the **FlexDCA Connection Setup** dialog box displays status as **Connected**.

FlexDCA Connection Setup	? Close							
Remote DCA								
Connect Using:	- · · · 🔎 📟							
IAN O GPIB	Connected							
Hostname:	KEYSIGHT-URU2RFT							
DCA Connection Mode								
Standard (Recommended)	Compatibility							
On Connect / Disconnect								
Pull State from Instrument of	n Connect							
✓ Push State to Instrument on Disconnect								
Disconne	ct Connect							

Figure 50 86100D Oscilloscope connection status on the FlexDCA Connection Setup

- 10 Click Close to exit the FlexDCA Connection Setup dialog box.
- 11 Click Close to exit the Extended Module Configuration window.



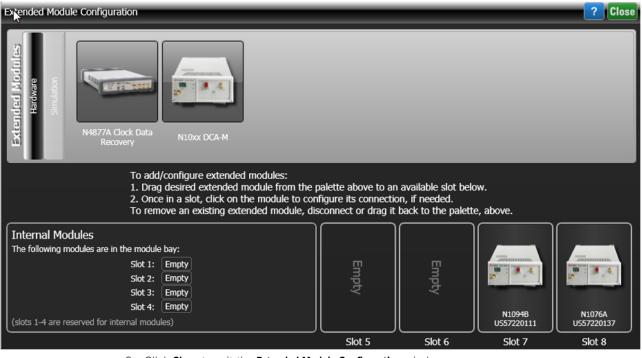
Figure 51 86100D Oscilloscope connection status on the Extended Module Configuration window

12 Once the connection is established, you may proceed to launch the N109310CA SFF-8431 Compliance Test Application on your PC.

## Connecting N1010A FlexDCA to N109X Oscilloscope and N107X

Perform the following steps to connect your N109X oscilloscope with N107X clock data recovery using FlexDCA:

- 1 Launch FlexDCA.
- 2 When FlexDCA starts, the **Extended Module Configuration** window is displayed automatically. If the **Extended Module Configuration** window does not appear, from the FlexDCA interface's main menu, click **Setup>Configure Extended Modules...**.
- 3 Configure Slot 7 to be the N109X module.
- 4 Configure Slot 8 to be the N107X module.
- 5 Remove any other N109X/N107X that is configured for Slot 5 and Slot 6.



- 6 Click Close to exit the Extended Module Configuration window.
- 7 Once the connection is established, you may proceed to launch the N109310CA SFF-8431 Compliance Test Application on your PC.

#### Starting the N109310CA SFF-8431 Compliance Test Application

After you install the N109310CA SFF-8431 Compliance Test Application on a PC along with the N1010A FlexDCA interface, start the N109310CA SFF-8431 Compliance Test Application in one of the following ways:

#### Access the N109310CA SFF-8431 Compliance Test Application directly from the Start menu

Refer to "Starting the N109310CA SFF-8431 Compliance Test Application" on page 79, where the procedure to start the application directly (that is, without launching the N1010A FlexDCA Software) is described.

## Access the N109310CA SFF-8431 Compliance Test Application using the N1010A FlexDCA Software on your PC

- 1 Ensure that the N1010A FlexDCA Software is connected to the Oscilloscope. Refer to "Connecting N1010A FlexDCA to 86100D or N1000A" on page 46.
- 2 After a connection between the N1010A FlexDCA Software and the Oscilloscope is established, the N1010A FlexDCA Software on your PC may indicate that it is remotely controlled, as shown in Figure 52.

	SIGHT	Under Remote Con	trol Local control is locke	d out	_	Local
Wavefor	vrm 🕑					
Time ■						
Rise Time						Signals 🔿
Fall Time						
		+				

Figure 52 N1010A FlexDCA under Remote Control

To view the N1010A FlexDCA's main menu, click the **Local** button (towards the upper right corner).

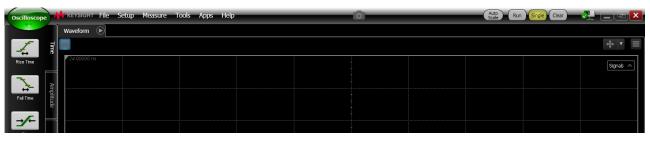


Figure 53 N1010A FlexDCA free from Remote Control

- 3 From the FlexDCA's main menu, click Apps>Automated Test Apps>N109310CA SFF-8431.
- 4 The N109310CA SFF-8431 Compliance Test Application banner appears. Afterwards, the default view of the N109310CA SFF-8431 Compliance Test Application appears.

F	ile Vie	ew Tools He	lp								
s	et Up	Select Tests	Configure	Connect	Run	Automate	Results	HTML Report		-	
	Gene	ral								^	
L	Comments										
L											
L	Test I	Filter —									
L	O 1	Host Transmitt	er Output								
L		Module Receive	er Output								
L	•	lost Transmitt	er Output -	Cu							
L	•	lost Receiver I	Limiting Mod	dule Test S	ignal						
S	•	Host Receiver I	Linear Modu	le Test Sig	nal						
Ξ	•	Host Receiver	Stress Gene	rator Signa	al						
⊂		Module Transm	litter Input S	- Signal							
P		Deskew Utilitie		5							
L			5								
L											
L											
	Extor	nal Instrumen	to								
L	Name		N1076/7A								
L			N1076/7A						¥		
		ess: Connect									
	IDN:	Get								v	

Figure 54 Default window of the N109310CA SFF-8431 Compliance Test Application

## Connecting to the Network Analyzer

Refer to "Connecting to External Instruments" on page 21 for connecting to the network analyzer you are using.

NOTE

It is recommended to connect VNA/ENA through VNC for S-parameter tests in order to allow the test application to capture and include required measurement screen-shots in the HTML Report.

#### Configuring the Network Analyzer on the N109310CA SFF-8431 Application

After you establish a connection with a network analyzer, you must configure certain settings to run the S-parameter and Impedance Tests on the N109310CA SFF-8431 Compliance Test Application.

- 1 In the N109310CA SSF-8431 Compliance Test Application, click the **Configure** tab.
- 2 With the **Mode:** option set to **Compliance** (for compliance testing), select **Source for S-parameter values** on the left pane.
- 3 In the corresponding **Settings For:** pane, select the type of network analyzer that is connected.

Se	et Up	Select Tests	Configure	Connect	Run	Auto	mate	Results	∣нт	ML Report	
	Mode:	O Compliand	ce 🔵 Debu	9	_	_		_	_		
1		Tests				<u>^</u>	Sett	ings For: :	Sou	rce for S-parameter Values	
		Signalling Rate	e (10E+09)			- 1	Sele	ct a value	:		
		Lane (Lane 1) Channels for N		A (Chann		/1 D'	ENA				
		Channel Atten				TD				Į	
		CDR Loop Ban		-06)		- 1	Not	Selected		upports the use of the Performance	
		CDR State (Or				- 1	ENA	1		work Analyzer families. Please	
		Trigger Divide				- 1				hat you are using.	
		Number of Pat				- 1				erface (Arsl) ====	
		Number of Wa			)	- 1	N10	)55A		ine Utility: arsl -a <ip address="" of<="" th=""></ip>	
		Number of Pat				- 1	scor	be> -c "<			
		Pattern for Ris Pattern for UJ		359)	59)						
		Source for TJ a		531)		- 1	<b>  </b>	- IRemote	Ate	Methods	
T		Precision Time					GetConfig 'Src4S_P'				
		Receiver Filter		()		- 11	11				
2		Receiver Filter				- 1	Set	Config 'Sr	c4S_	_P' ' <value>'</value>	
R		Source for S-p				- 1	III	- Paramet	ore		
m		Source for Ter			lues (E	Inte				of the following:	
		Remove Cable		ers (Off)		1		lot Select		si che following.	
		86108A/B JSA SIRC Function				- 1	E E	NA			
		SIRC Channel		th order l	Bessel		P	NA			
		SIRC Channel			, action		N	11055A			
		Measurement			attern	s (6					
		Channel Bandy		g (BAND1)	)	- ( )				arameter Discovery	
		ToleranceRate				- II	Get	AllOptions	For	Member 'ConfigValues' 'Src4S_P'	
		Channels for N			A/7B)	- II	For	more info	rma	ation, please see the N5452A Remote	
		Variable Equal Loop Bandwidt								olkit documentation	
		Optimize for R								om/find/rpi).	
	<					> <sup>•</sup>					

Figure 55 Configuring S-parameter value source

- 4 Select Source for Termination Mismatch Values on the left pane.
- 5 Select ENA if you are using an ENA. For VNA, select Enter Manually.

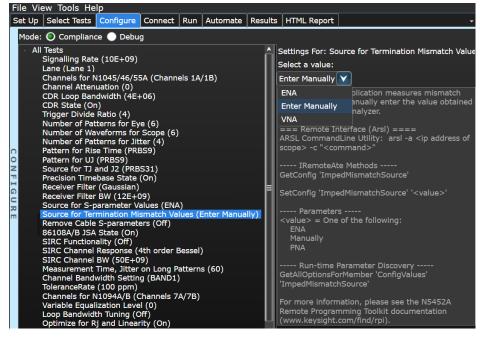


Figure 56 Configuring Termination Mismatch value source

The setup of the N109310CA SFF-8431 Compliance Test Application with N1010A FlexDCA installed on PC is now complete. You may begin to select, setup, and run compliance tests. Refer to *Keysight N109310CA SFF-8431 Compliance Test Application Online Help* to understand the functionality of the application to run tests.

## Installing WDP Measurement Script

This step is required before you can perform the following TWDP (Transmitter Waveform Dispersion Penalty) test, which is selected under the "Host Transmitter Output - Cu" tests in the application:

Output TWDPc - Host Cu

This step is also required for the following WDP (Waveform Dispersion Penalty) test, which is selected under the "Host Receiver Stress Generator Signal" tests in the application:

- WDP of ISI Gen Host Stress Gen
- 1 On your PC's web browser, go to the following site:

#### https://ta.snia.org/higherlogic/ws/public/documents

- 2 On this site, locate and open the **SFF-8431.PDF** file.
- 3 In the document, go to APPENDIX G MATLAB CODE FOR TWDP.
- 4 Copy the script and place it in a text editor.
- Comment out line 40 and add a new line after line 40. The two lines should look like the following:
   % TXDataFile = 'prbs9\_950.txt';

## TXDataFile = 'C:\Temp\XmitBits.csv';

- 6 Compile the WDP script file in a 32-bit MATLAB (Version 2009a & above) to create an executable to run on the 86100D or PC.
- 7 Name the executable file SFF8431xWDP.exe, and save the file in the following folder:

C:\ProgramData\Keysight\N5467A\User Defined Application\uda\ distrib\_CSIDL\_COMMON\_APPDATA\App\ExternalAppScripts\SFF8431xWDP.exe 2 Installing N109310CA and N1010A FlexDCA on a PC

Keysight N109310CA SFF-8431 Compliance and Debug Application Getting Started

Installing N109310CA on a PC Without N1010A FlexDCA

Follow the instructions in this chapter when you are installing the N109310CA SFF-8431 application on a PC, but you are *not* installing the N1010A FlexDCA application on the same PC. You must purchase and install a license for the 86100DU-401 or N1010100A.

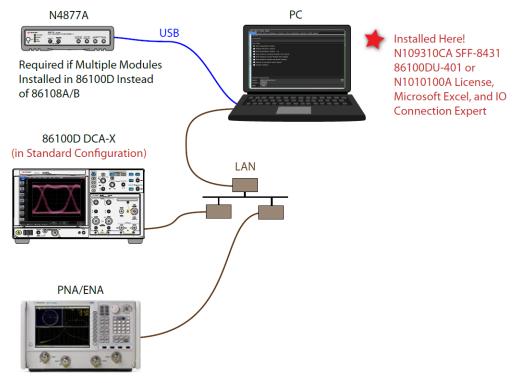


Figure 57 N109310CA Installed on PC Without N1010A FlexDCA connected to 86100D DCA-X Oscilloscope



3

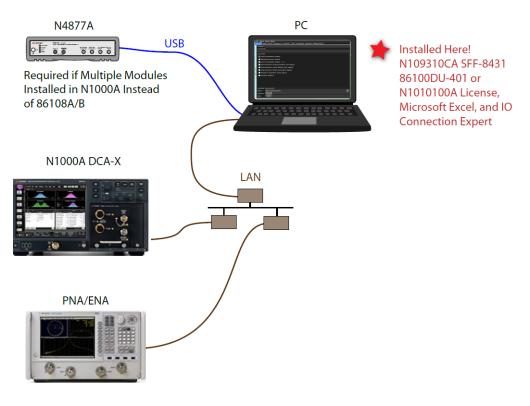


Figure 58 N109310CA Installed on PC Without N1010A FlexDCA connected to N1000A DCA-X Oscilloscope

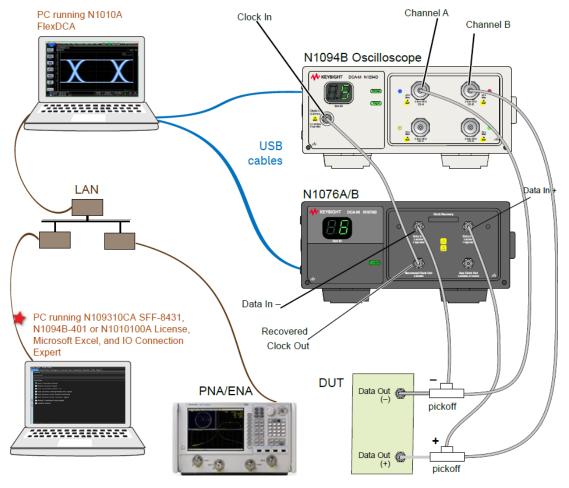


Figure 59 N109310CA Installed on PC Without N1010A FlexDCA connected to N1094B DCA-M Oscilloscope via another PC

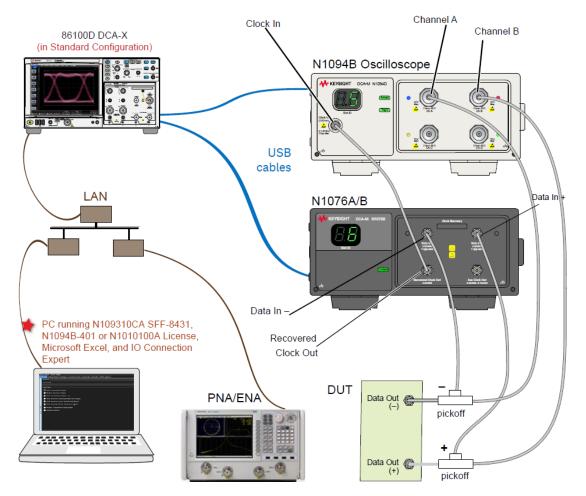


Figure 60 N109310CA Installed on PC Without N1010A FlexDCA connected to N1094B DCA-M Oscilloscope via 86100 DCA-X Oscilloscope

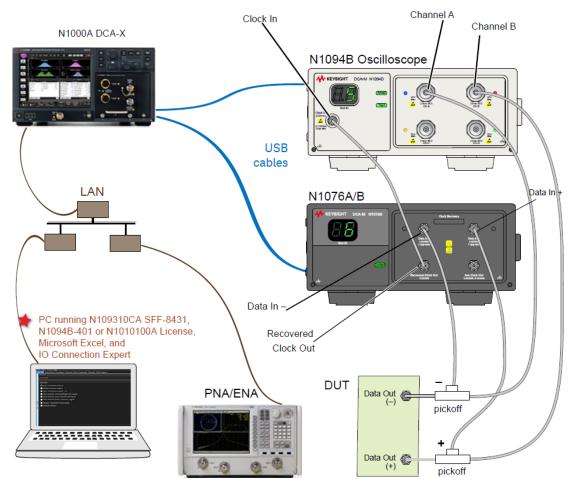


Figure 61 N109310CA Installed on PC Without N1010A FlexDCA connected to N1094B DCA-M Oscilloscope via N1000A DCA-X Oscilloscope

NOTE

If you do not connect a network analyzer, you will not be able to perform the S-parameter Tests and Impedance Tests for the following test categories: Host Transmitter Output, Module Receiver Output, Host Receiver Limiting Module Test Signal, Host Receiver Linear Module Test Signal, and Module Transmitter Input Signal.

## Connecting the Equipment

1 For a DCA-X oscilloscope, install one of the module combinations listed in Table 4 into the oscilloscope.

#### Table 4 Module combinations for DCA-X Oscilloscope

Installed Module Configurations	Single Plug-In Module Setup	Multiple Plug-In Module Setup	Description
86108A/B	Available		The 86108B can have either options LBW or HBW plus 216 or 232.
86112A, 54754A, 86117A, or 86118A-H01 86107A (any option) N4877A, N1076 A/B, N1077A, N1078A Clock Data Recovery Options 216/232 <sup>*</sup> N1045A, N1045B, N1055A, N1046A 75/85/100 GHz, N1060A		Available	Option 216 provides a maximum data rate of 16 Gb/s. Option 232 provides a maximum data rate of 32 Gb/s.

\* If you have access to the clock for the device, you can connect the clock to the DCA-X oscilloscope's Trigger input instead of using the CDR.

2 For a DCA-M oscilloscope, keep in mind the information in the following table.

#### Table 5 Supported configurations for DCA-M Oscilloscope

Configurations for DCA-M	Requires N107x
N1094A	√ (N107xA-232)
N1094B	√ (N107xA-232)
N1092 C/E	√ (N107xA-232)

- 3 Connect the equipment as shown in the connection diagrams above and power on all of the instruments.
- 4 Install Microsoft Excel on the PC.

## Installing the I/O Library Suite

1 Navigate to www.keysight.com/find/iosuite and download the Keysight I/O Library Suite.

NOTE

Keysight's I/O Library Suite is a free software that automatically detects instruments connected to your PC and configures the interfaces. It reduces the overall setup and configuration time. The N109310CA SFF-8431 Compliance Test Application requires I/O Libraries Suite 16.3 or higher.

2 Install the I/O Library Suite on the PC.

#### Installing the N109310CA SFF-8431 Compliance Test Application

Follow the steps below to install the N109310CA SFF-8431 Compliance Test Application and its license as well as the license for the 86100DU-401 or N1010100A. A version of the 86100DU-401 is automatically installed for use with the N109310CA.

# NOTE If you plan to run all of the N109310CA tests, the N109310CA license will suffice. If using older licenses, host testing requires option N1014A-HST and Module Testing requires option N1014A-MOD.

1 Search for the N109310CA SFF-8431 Compliance Test Application on the Keysight website. Install the application on the PC for which you have redeemed the license.

NOTE

When you redeem an N109310CA SFF-8431 license, you must select whether to install the application on the Oscilloscope or a specific PC.

- 2 Save the license file that you received from Keysight in a folder on the local disk or in an accessible memory device.
- 3 If not already done, purchase an 86100DU-401 or N1010100A license. Save the license file that you received from Keysight in a folder on the local disk or in an accessible memory device.
- 4 If the N1010A FlexDCA is running on your PC, close FlexDCA.
- 5 From the Windows **Start** menu, click **All Programs>Keysight License Manager** to launch the Keysight License Manager.

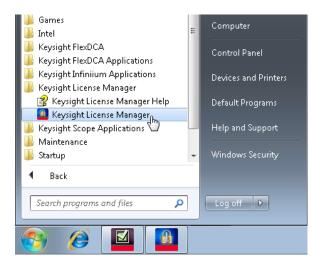


Figure 62

62 Launching Keysight Connection Expert from the Start menu

NOTE

Keysight License Manager version 5.1 (and higher) have a different user interface than version 5.0 (or earlier). Even though the path to launch the Keysight License Manager is the same for both versions, refer to the *Keysight License Manager Online Help* for the respective versions to find more information about the functionality of the application.

To install the N109310CA SFF-8431 Compliance Test Application's license using Keysight License Manager version 5.1 or higher

1 Click the **Tools** icon on the top-right corner of the Keysight License Manager window.

Keysight License Manager		4	? _ 🗆 ×
Connections	Licenses on 💥 (localhost) 🖒		Why do I need these tools?
+ Add Connection	Full computer name:		Install License File Install License from Text
(localhost)	Host ID:		View License Alerts
			Explore Transport URLs
Manage licenses remotely Fea	ure Description Version Expiration Type	Cou	About Keysight License Manage Int Location

Figure 63 Installing license file on Keysight License Manager version 5.1 & above

2 Click Install License File.... The Select License File(s) to Install on <PC Hostname> appears.

🖉 🗸 🖌 🖉 🗸 🖉	<ul> <li>Licenses - 4</li> </ul>	Search Licenses	Q
Organize 👻 New folde	r	!≡ ▼	
☆ Favorites	Name	Date modified	Туре
🔞 Creative Cloud Fi	1677859_1002001660.lic	5/15/2017 11:35 PM	LIC File
🧮 Desktop	1677859_20170515120537.lic	5/15/2017 11:36 PM	LIC File
🐌 Downloads 🔤	1001740845_1634928.lic	1/25/2017 2:29 PM	LIC File
🖳 Recent Places 🛑			
🝊 OneDrive			
iCloud Photos			
📃 Desktop			
🥃 Libraries			
Documents			
👌 Music			
Pictures			
😸 Videos 📼	•		
File na	ame: 1677859_1002001660.lic 🔹	License files (*.lic)	•

Figure 64 Selecting license file from the folder

- 3 Navigate to the folder where the N109310CA SFF-8431 licenses are saved.
- 4 Select the license and click **Open**. The license files are installed and an entry is displayed in the Keysight License Manager.

<ul> <li>Connections</li> </ul>	Licenses on 💥	🗱 (localhost) 🖒								
+ Add Connection	Full computer name: XXXXXXXXX, png.is.keysight.com									
(localhost)										
Manage licenses remotely	Feature	Description	Version	Expiration	Туре	Count	Location			
by connecting to the Keysight License Service	SFF-8431_Host_Meas_Suite	SFF-8431 Host Measurement Suite	1.000	None	Transpo	Unlimited	Local			
on a LAN connected instrument or PC.	SFF-8431_Module_Meas_Suite	SFF-8431 Module Measurement Suite	1.000	None	Transpo	Unlimited	Local			
This is useful when										
transporting a license from one machine to										
another.										
Tell me more										

Figure 65 Licenses displayed in Keysight License Manager version 5.1 & above

5 Close the Keysight License Manager.

To install the N109310CA SFF-8431 Compliance Test Application's license using Keysight License Manager version 5.0 or earlier

1 From the Keysight License Manager window's main menu, click **File>Install...** or right-click within the left pane of the Keysight License Manager window and select **Install...**.

	🧧 Keysight License Manager			- • ×
	File Edit View Tools Help			
Install	localhost	Host System		
Delete	⊢∕ Local Licenses ⊨√ Product 86100	Host Name :		Сору
Transport	EnhancedJ	Host ID :		Сору
Connect	Product 86100		Windows	
Exit	Product 86100	Licensed Product	s and Features	

Figure 66 Installing license file on Keysight License Manager version 5.0 or earlier

2 The Install License File(s) dialog box appears.

Install License File(s)					×
😋 🔵 🗢 📕 🕨 Libraries 🕨	Documents + FlexDCA + Apps + Licenses	•	Search Licenses	;	Q
Organize 🔻 New folder				≣ ▼ 🚺	0
☆ Favorites ■ Desktop	Documents library		Arrange	by: Folder 🔻	
ڸ Downloads 🖳 Recent Places	Name	Date modified	Туре	Size	
Mecent Places	1677859_1002001660.lic	5/15/2017 11:05 AM	LIC File	1 KB	
<ul> <li>Libraries</li> <li>Computer</li> <li>SystemDrive (C:)</li> <li>UserData (D:)</li> <li>KINGSTON (E:)</li> <li>Network</li> </ul>					
File nam	ne: 1677859_1002001660.lic		License files (*.li     Open	c) Cancel	•

Figure 67 Selecting license file from the folder

- 3 Navigate to the folder where the N109310CA SFF-8431 licenses are saved.
- 4 Select the license and click **Open**. The license files are installed and an entry is displayed in the Keysight License Manager.

Keysight License Manager					[	- • ×	
File Edit View Tools Help							
□		Host System					
É- <i>f</i> Local Licenses É- <i>f</i> Product 86100D-200		Host Name :				Сору	
EnhancedJitterAnalysis (1.000)		Host ID :	$ \otimes $			Сору	
Product 86100D-201	E	Interface Type					
□ □ □ Product 86100D-202	Licensed Products and Features						
AdvancedTDRAnalysis (1.000)		Product/Feature		Version	Description	Туре 🔺	
₽ 🗇 Product 86100D-300		Product 86100D-	-2			E	
AmplitudeAnalysis (1.000)		EnhancedJitte	r	1.000	Enhanced Jitter Analysis	Remova	
Product 86100D-401		Product 86100D-	-2				
401AdvancedEye (1.000)		AdvancedWa	/e	1.000	Advanced Waveform Analy	. Remova	
🖻 🗐 Product 86100D-500		Product 86100D-	-2				
ProductivityPackage (1.000)	-	AdvancedTDF	ł	1.000	Enhanced Impedance and	. Remova 🗸	
			-			P.	
localhost		,					

Figure 68 Licenses displayed in Keysight License Manager version 5.0 or earlier

5 Close the Keysight License Manager.

## Validating DCA-X Oscilloscope's SCPI Server Setup



This section lists the steps for 86100D DCA-X oscilloscope. Perform similar steps for the N1000A DCA-X oscilloscope.

- 1 On the 86100D Oscilloscope, launch the Keysight FlexDCA application.
- 2 Click Tools > SCPI Programming Tools > SCPI Server Setup.
- 3 In the **SCPI Server Setup** dialog, confirm that the **Sockets** and **HiSLIP** interfaces are selected and enabled as shown in Figure 69.

SCPI Server Setup							
The following interfaces are available to remotely control this software:							
Interface	Enabled	VISA Address	SICL Address				
GPIB (Address 7)	$\checkmark$	GPIB0::7::INSTR	gpib0,7	Setup			
VXI-11 ("inst0", Address 7)		TCPIP0::KEYSIGHT-URU2RFT::inst0::INSTR	lan[KEYSIGHT-URU2RFT]:inst0	Setup			
Telnet (Port 5024)	◄	(not applicable)	(not applicable)	Setup			
Sockets (Port 5025)	$\checkmark$	TCPIP0::KEYSIGHT-URU2RFT::5025::SOCKET	lan,5025[KEYSIGHT-URU2RFT]	Setup			
HiSLIP ("hislip0", Port 4880)	<	TCPIP0::KEYSIGHT-URU2RFT::hislip0,4880::INSTR	lan,4880;hislip[KEYSIGHT-URU2RFT]:hislip0	Setup			

Figure 69 86100D's SCPI Server Setup Dialog Box

4 Close the SCPI Server Setup dialog box.

### Adding 86100D or N1000A to Keysight Connection Expert

Most of the measurements in the N109310CA SFF-8431 Compliance Test Application use a supported DCA-X or DCA-M sampling oscilloscope.

## NOTE This section lists the steps for 86100D DCA-X oscilloscope. Perform similar steps for the N1000A DCA-X oscilloscope.

Note that the Keysight I/O Library Suite must be installed before you proceed with connecting to the network analyzer. The user interface for Keysight Connection Expert 2017 (Version 18.0) or higher is slightly different from its previous versions, such as Version 17.2 or earlier.

#### Connection using Keysight Connection Expert v17.2 (or earlier) or higher

- 1 On the 86100D Oscilloscope, launch the Keysight FlexDCA application.
- 2 From the FlexDCA's main menu, click Help > About FlexDCA.... The About 86100D dialog box appears.
- 3 In the System Information area, scroll down to view the Computer Name entry. Alternatively, you can obtain the computer name from the Windows System properties.

About 86100D	? Close					
FlexDCA N1000-Series System Software Copyright (C) 2006-2016 Keysight Technologies, Inc.						
Model: 86100D ETR,0	GPI					
Serial #: MY54360313						
System Information — Empeaded: Free Disk Space:	· · · · ·					
Graphics Performance:						
	Windows Embedded Standard 64 Bit Service Pack 1					
Computer Name:	KEYSIGHT-URU2RFT					
Internal Temp:	28.6 °C					
Driver Version:	2.0					
⊂ Modules ———						
Slot 1 Module:	86108B HBW,232,300,400,PTB,JSA MY52130514					
(Running via Remote Desktop) http://www.keysight.com/find/FlexDCA						
	Save Support Info					
Beta P.05.60.225	KEYSIGHT TECHNOLOGIES					

Figure 70 86100D Oscilloscope's hostname

4 Record the Computer Name (corresponds to hostname) as you will need this name later in this procedure.

86100D Computer Name: \_\_\_\_\_

- 5 Close the About 86100D dialog box.
- 6 On the Windows **Start** menu of your PC, click **All Programs>Keysight Connection Expert** to launch Connection Expert. Refer to Keysight IO Libraries Suite for information on how to install the Keysight Connection Expert.

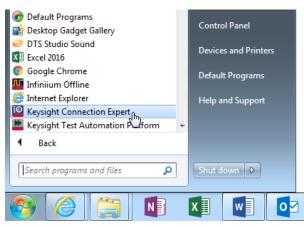


Figure 71 Launching the Keysight Connection Expert

7 In Keysight Connection Expert, click the Manual Configuration tab.

Keysight Connection Expert					-	×
Instruments	PXI/AXIe Chassis	Manual Configuration	Settings			
Rescan	Filter Instruments:	Clear				 

Figure 72 Tabs within Keysight Connection Expert

8 Under Add New Instruments / Interfaces, select LAN instrument.

Keysight Connection Expert					
Instruments PXI/AXIe Chassis	Manual Configuration Settings				
Add New Instruments/Interfaces	Edit Existing Instruments/Interfaces				
LAN instrument	Add a LAN device				
Serial instrument on ASRL3					

Figure 73 Performing Manual Configuration in Keysight Connection Expert

#### 9 In the Add a LAN device pane,

- a Under **Set LAN Address:**, enter the Hostname (recorded in step 1) in the **Hostname or IP Address:** field. Note that your Hostname entry will be different from what is shown in the image.
- *b* Under **Set Protocol:**, select **Socket** and enter the port number.
- c Under Verify Connection:, click Test This VISA Address to verify the connection.

Keysight Connection Expert					?	-		×
Instruments PXI/AXIe Chassis	Manual Configuration	Settings						
Add New Instruments/Interfaces	Edit Existing Instruments/Interfaces							
LAN instrument Serial instrument on ASRL1 Serial instrument on ASRL3 MAwg instrument MDsr instrument LAN interface Remote serial instrument Remote GPIB interface Remote USB interface	Add a LAN device Set LAN Address: Hostname or IP Address TCPIP Interface ID: Set Protocol: Instrument Socket HISLIP Verify Connection: Allow *IDN Query Test This VISA Address	TCPIP0 Remote Name: Port Number: Remote Name:	▼ inst0 5025 hislip0	] ] slip0::INSTR				
	View Web Page:							
				Accept		Cano	el	

Figure 74 Adding the 86100D device information in the Keysight Connection Expert

10 Once you verify the entered data, click Accept to complete the process.

- 11 To verify that the 86100D Oscilloscope is connected, click the **Instruments** tab of the Keysight Connection Expert.
- 12 Click the 86100D Oscilloscope's listing on the left pane. A check mark encircled in green indicates that the Oscilloscope is connected to your PC remotely on the LAN. Note that the address on your end will be different from what is shown in the image.

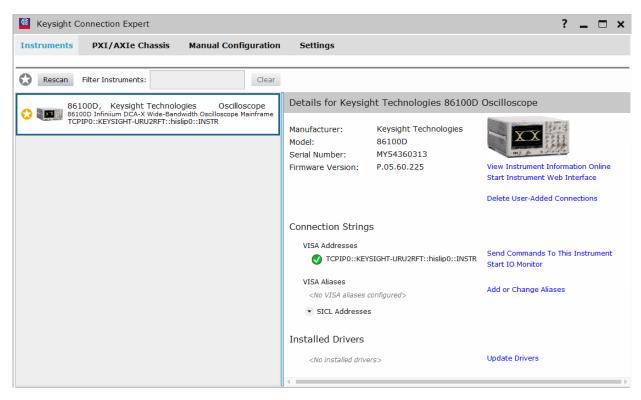


Figure 75 Validating 86100D Oscilloscope's connection

13 Close the Keysight Connection Expert window.

#### Connection using Keysight Connection Expert 2017 (v18.0)

- 1 On the 86100D Oscilloscope, launch the Keysight FlexDCA application.
- 2 From the FlexDCA's main menu, click **Help** > **About FlexDCA...**. The **About 86100D** dialog box appears.
- 3 In the **System Information** area, scroll down to view the **Computer Name** entry. Alternatively, you can obtain the computer name from the Windows **System** properties.

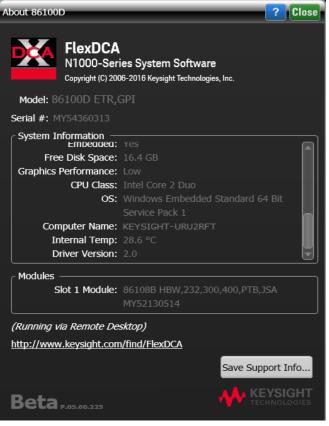


Figure 76 86100D Oscilloscope's hostname

4 Record the Computer Name (corresponds to hostname) as you will need this name later in this procedure.

86100D Computer Name:

- 5 Close the About 86100D dialog box.
- 6 On the Windows Start menu of your PC, click All Programs>Keysight Connection Expert to launch Connection Expert 2017. Refer to Keysight IO Libraries Suite for information on how to install the Keysight Connection Expert 2017.

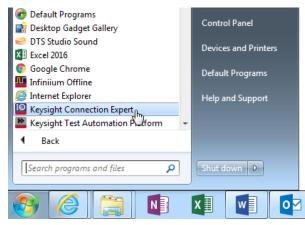


Figure 77 Launching the Keysight Connection Expert 2017

7 In Keysight Connection Expert 2017, click the **+ Add** button to manually add instruments and interfaces.

Keysight Co	nnection Expert 2017
Instruments	PXI/AXIe Chassis
My Instruments	★Add         C         III         ▼         Detail for TCPIP0
✓ LAN (TCPIP0)	Manually add instruments and interfaces
Instruments found o your list.	on local subnet, click [+Add] to add to Connection Addresses

Figure 78 Adding 86100D Oscilloscope manually in the Keysight Connection Expert 2017

8 From the drop-down list that appears, select LAN instrument.

Keysight Connection Ex	pert 2017		
Instruments PXI/AXI	e Chassis		
My Instruments	+Add 2 🗄 T Detail for TC	PIP0	
V LAN (TCPIP0)	LAN instrument Serial instrument on ASRL3	Edit	+ Instrument
Instruments found on local subne your list.	LAN interface	ddresses	
✓ COM (ASRL3)	Remote serial instrument Remote GPIB interface		TODIDO
No Instruments Found	Remote USB interface	e ID:	TCPIP0



- 9 In the Add a LAN device window,
  - a Select the Enter Address tab.
  - *b* Under **Set LAN Address:**, enter the Hostname (recorded in step 1) in the **Hostname or IP Address:** field. Note that your Hostname entry will be different from what is shown in the image.
  - *c* Under **Set Protocol:**, select **Socket** and enter the port number.
  - d Under Verify Connection:, click Test This VISA Address to verify the connection.

Add a LAN device					×
Select from List	Enter Add	ress			
Set LAN Address:					
Hostname or IP	Address:	KEYSIGHT-URU2R	FT	]	
TCPIP Interface	ID:	TCPIP0	•	]	
Set Protocol:					
Instrument	(1)(1 1 1)	Remote Name:	inst0		
HiSlip	(V/I-11)	Remote Name:	hislip0		
Socket		Port Number:	5025		
Verify Connection	:				
✓ Allow *IDN	Query				
Test This VISA	Address				
View Web Page:					
Instrument Web I	interface				
				OK Can	cel

Figure 80 Adding 86100D Oscilloscope's device information in the Keysight Connection Expert 2017

10 Once you verify the entered data, click **OK** to complete the process.

- 11 To verify that the 86100D Oscilloscope is connected, click the **Instruments** tab of the Keysight Connection Expert.
- 12 Click the 86100D Oscilloscope's listing on the left pane. A check mark encircled in green indicates that the Oscilloscope is connected to your PC remotely on the LAN. Note that the address on your end will be different from what is shown in the image.

Keysight Connection Expert 2017				*?_□×
Instruments PXI/AXIe Chassis				
My Instruments + Add 😂 🗮 🕇	Details for Keysight Technologies 86100D			
V LAN (TCPIP0)	3 🗹 🗙 🔜 🔤	(=	.≡	
86100D, Keysight Technologies KEYSIGHT-URU2RFT	Check Edit Remove Interactive IO Monitor Status	Command BenchVu Expert	ue Web UI Soft Fron Panel	t
✓ COM (ASRL3)	Manufacturer: Keysight Technologies Model: 86100D			
No Instruments Found	Serial Number: MY54360313 Firmware Version: P.05.60.225			THE A SPECT
No Instruments Found	Web Information: Product Page			
	Connection Strings			
	VISA Address	Aliases	SICL Address	
	TCPIP0::KEYSIGHT-URU2RFT::hislip0::INSTR		lan,4880;hislip[KEYSIGH	IT-URU2RFT]:hislip0
	Installed Drivers  B Update			
	<no drivers="" installed=""></no>			
	Remote	IO Server Off 32-Bi	it Keysight VISA is Primary	Version: 18.0.21916.2

Figure 81 Validating 86100D Oscilloscope's connection

13 Close the Keysight Connection Expert window.

## Connecting N1010A FlexDCA to N109X Oscilloscope and N107X

Perform the following steps to connect your N109X oscilloscope with N107X clock data recovery using FlexDCA:

- 1 Launch FlexDCA.
- 2 When FlexDCA starts, the **Extended Module Configuration** window is displayed automatically. If the **Extended Module Configuration** window does not appear, from the FlexDCA interface's main menu, click **Setup>Configure Extended Modules...**.
- 3 Configure Slot 7 to be the N109X module.
- 4 Configure Slot 8 to be the N107X module.
- 5 Remove any other N109X/N107X that is configured for Slot 5 and Slot 6.



- 6 Click Close to exit the Extended Module Configuration window.
- 7 Once the connection is established, you may proceed to launch the N109310CA SFF-8431 Compliance Test Application on your PC.

## Starting the N109310CA SFF-8431 Compliance Test Application

After you install the N109310CA SFF-8431 Compliance Test Application on a PC without the N1010A FlexDCA interface, follow the steps below to start the N109310CA SFF-8431 Compliance Test Application:

- 1 Ensure that the 86100D or N1000A Oscilloscope is added to the Keysight Connection Expert and that the connection is active. Refer to "Adding 86100D or N1000A to Keysight Connection Expert" on page 70.
- 2 From the Windows Start menu, navigate to Start>All Programs>Keysight FlexDCA Applications>N109310CA SFF-8431 and click Launch 'N109310CA SFF-8431'.
- 3 The N109310CA SFF-8431 Compliance Test Application banner appears followed by the **Connect to FlexDCA** dialog.

Connect to FlexDca	? [ ] ] ]
Currently connected to:	<nothing></nothing>
Change to	
Alias/Address:	_
IDN:	<unknown> Get</unknown>
Enter/Select VISA a	ddress/alias (or SICL address):
Select from Keysight	t Connection Expert 'My Instruments':
	OK Cancel

Figure 82 N109310CA SFF-8431 Application Connect to FlexDCA dialog

- 4 Enter the SICL address or VISA alias, if known, else select the **Select from Keysight Connection Expert** option to find the SICL Address/VISA alias.
- 5 Click **OK** to connect.

F	ile Vi	ew Tools He	elp						
1	Set Up	Select Tests	Configure	Connect	Run	Automate	Results	HTML Report	-
Γ	Gene	eral			-				^
L	Com	ments							
L									
L	Test	Filter							
L		Host Transmitt	er Output						
L		Module Receiv	er Output						
L		Host Transmitt	er Output -	Cu					
L		Host Receiver	Limiting Mod	dule Test S	ignal				
۵.		Host Receiver	Linear Modu	le Test Sig	nal				
-		Host Receiver	Stress Gene	rator Signa	al				
		Module Transm	nitter Input S	Signal					
ľ		Deskew Utilitie	s						
L									
L									
L									
	Exte	rnal Instrumer	nts —						
L	Nam	e: N4877A/	N1076/7A						
	Addr	ess: Connect							
	IDN:	Get							
									V

• The default view of the N109310CA SFF-8431 Compliance Test Application appears.

Figure 83 Default window of the N109310CA SFF-8431 Compliance Test Application

NOTE

If you click the View 'N109310CA SFF-8431' in Demo Mode option under Start>All Programs>Keysight FlexDCA Applications>N109310CA SFF-8431, click File>Connect to Scope... to access the Connect to FlexDCA dialog. However, since it is a demo application, it has limited features.

#### Connecting to the Network Analyzer

Refer to "Connecting to External Instruments" on page 21 for connecting to the network analyzer you are using.

Configuring the Network Analyzer on the N109310CA SFF-8431 Application

After you establish a connection with a network analyzer, you must configure certain settings to run the S-parameter and Impedance Tests on the N109310CA SFF-8431 Compliance Test Application.

- 1 In the N109310CA SSF-8431 Compliance Test Application, click the **Configure** tab.
- 2 With the **Mode:** option set to **Compliance** (for compliance testing), select **Source for S-parameter values** on the left pane.
- 3 In the corresponding Settings For: pane, select the type of network analyzer that is connected.

Se	et Up	Select Tests Configure	Connect	Run	Auto	mate	Results	НТ	ML Report	-
	Mode:	🔘 Compliance 🔵 Debu	g							
	- All	Tests			4	Sett	ings For:	Sou	rce for S-pa	arameter Values
		Signalling Rate (10E+09)			- 1	Sala	ct a value			
		Lane (Lane 1)	/							
		Channels for N1045/46/5 Channel Attenuation (0)	5A (Chann	els 1A	/18	ENA		$\mathbf{\vee}$		
		CDR Loop Bandwidth (4E-	L06)		- 1	Not	Selected		upports the	use of the Performance
		CDR State (On)	-00)		- 1	ENA	7			zer families. Please
		Trigger Divide Ratio (4)			- 1				hat you are	using.
		Number of Patterns for Ey			- 1	VN/	4		nitrae (Arel	
		Number of Waveforms for			- 1	N10	)55A		erface (Arsl	) ==== arsl -a <ip address="" of<="" th=""></ip>
		Number of Patterns for Jit			- 1	scot	be> -c "<			
		Pattern for Rise Time (PRI Pattern for UJ (PRBS9)		- 1	<b>II</b> I'					
z		Source for TJ and J2 (PRB	S31)		- 1				Methods	
т		Precision Timebase State			. 8	Get	Config 'Sr	c4S	_P'	
		Receiver Filter (Gaussian)			- 1			-40	D <sup>1</sup> Lovelines	~ 1
č		Receiver Filter BW (12E+)			- 1	Sec	coning Sr	C45	_P' ' <value:< th=""><th>&gt;</th></value:<>	>
찌		Source for S-parameter V Source for Termination Mi			I	<b>  </b>	- Paramet	ers		
m		Remove Cable S-paramet		iues (i	ente	<va< th=""><th>lue&gt; = O</th><th>ne c</th><th>of the follow</th><th>/ing:</th></va<>	lue> = O	ne c	of the follow	/ing:
		86108A/B JSA State (On)			1		lot Select	ed		
		SIRC Functionality (Off)			- 1		NA			
		SIRC Channel Response (		Bessel	)		NA 11055A			
		SIRC Channel BW (50E+0				III ''	ILUSSA			
		Measurement Time, Jitter			s (6	<b>  </b>	- Run-tim	e Pa	arameter Di	scovery
		Channel Bandwidth Settin ToleranceRate (100 ppm)	g (BAND1)	)	1					onfigValues' 'Src4S P'
		Channels for N1094A/B (	Channels 7	A/7B)	- 1					
		Variable Equalization Leve		,,	L					e see the N5452A Remote
		Loop Bandwidth Tuning (C							olkit docume	
		Optimize for Rj and Linea	rity (On)		<b>`</b>	(WW	w.keysigi	nt.ct	om/find/rpi)	
	<	111			>					

Figure 84 Configuring S-parameter value source

- 4 Select Source for Termination Mismatch Values on the left pane.
- 5 Select ENA if you are using an ENA. For VNA, select Enter Manually.

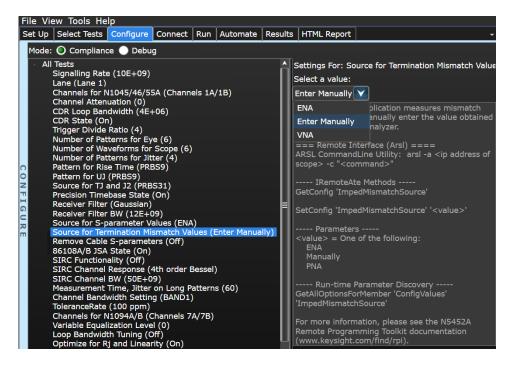


Figure 85 Configuring Termination Mismatch value source

The setup of the N109310CA SFF-8431 Compliance Test Application without N1010A FlexDCA installed on PC is now complete. You may begin to select, setup, and run compliance tests. Refer to *Keysight N109310CA SFF-8431 Compliance Test Application Online Help* to understand the functionality of the application to run tests.

### Installing WDP Measurement Script

This step is required before you can perform the following TWDP (Transmitter Waveform Dispersion Penalty) test, which is selected under the "Host Transmitter Output – Cu" tests in the application: Output TWDPc – Host Cu

This step is also required for the following WDP (Waveform Dispersion Penalty) test, which is selected under the "Host Receiver Stress Generator Signal" tests in the application:

WDP of ISI Gen - Host Stress Gen

1 On your PC's web browser, go to the following site:

#### https://ta.snia.org/higherlogic/ws/public/documents

- 2 On this site, locate and open the **SFF-8431.PDF** file.
- 3 In the document, go to APPENDIX G MATLAB CODE FOR TWDP.
- 4 Copy the script and place it in a text editor.
- Comment out line 40 and add a new line after line 40. The two lines should look like the following:
   %% TXDataFile = 'prbs9\_950.txt';

# TXDataFile = 'C:\Temp\XmitBits.csv';

- 6 Compile the WDP script file in a 32-bit MATLAB (Version 2009a & above) to create an executable to run on the 86100D or PC.
- 7 Name the executable file SFF8431xWDP.exe, and save the file in the following folder:

C:\ProgramData\Keysight\N5467A\User Defined Application\uda\ distrib\_CSIDL\_COMMON\_APPDATA\App\ExternalAppScripts\SFF8431xWDP.exe 3 Installing N109310CA on a PC Without N1010A FlexDCA

Keysight N109310CA SFF-8431 Compliance and Debug Application Getting Started

4 Installing N109310CA on the 86100D or N1000A

Follow the instructions in this chapter when you are installing both the N109310CA application and the FlexDCA application on the 86100D or N1000A oscilloscope. You must purchase and install a license for the 86100DU-401 or N1010100A.

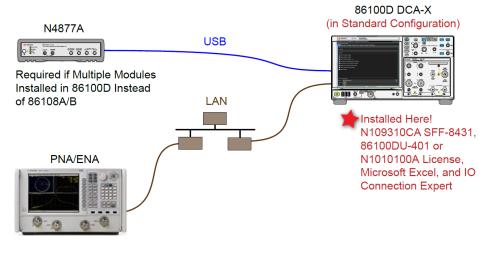
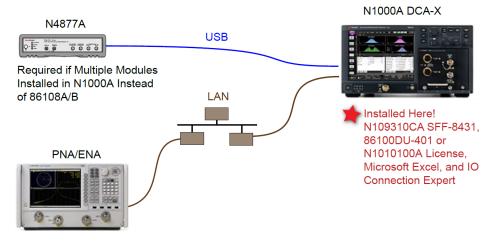


Figure 86 N109310CA Installed on 86100D







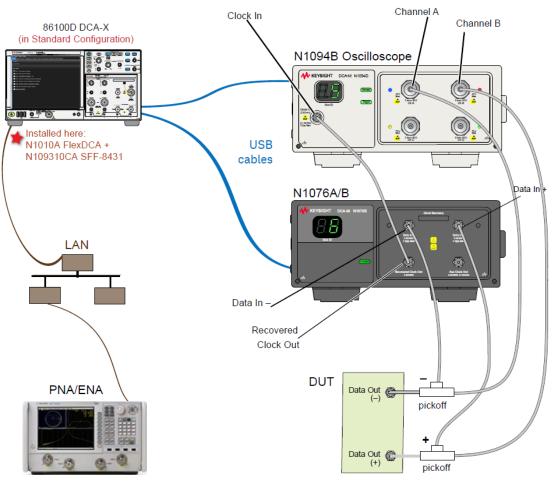


Figure 88 N109310CA Installed on 86100D connected to a DCA-M setup

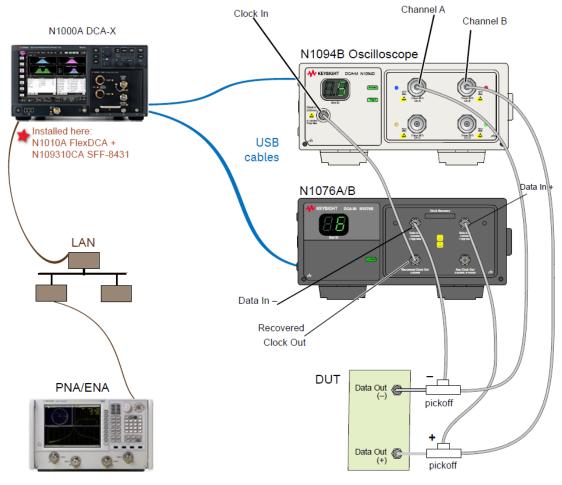


Figure 89 N109310CA Installed on N1000A connected to a DCA-M setup

## NOTE

If you do not connect a network analyzer, you will not be able to perform the S-parameter Tests and Impedance Tests for the following test categories: Host Transmitter Output, Module Receiver Output, Host Receiver Limiting Module Test Signal, Host Receiver Linear Module Test Signal, and Module Transmitter Input Signal.

## Connecting the Equipment

1 For a DCA-X oscilloscope, install one of the module combinations listed in Table 6 into the oscilloscope.

#### Table 6 Module combinations for DCA-X Oscilloscope

Installed Module Configurations	Single Plug-In Module Setup	Multiple Plug-In Module Setup	Description
86108A/B	Available		The 86108B can have either options LBW or HBW plus 216 or 232.
86112A, 54754A, 86117A, or 86118A-H01 86107A (any option) N4877A, N1076 A/B, N1077A, N1078A Clock Data Recovery Options 216/232 <sup>*</sup> N1045A, N1045B, N1055A, N1046A 75/85/100 GHz, N1060A		Available	Option 216 provides a maximum data rate of 16 Gb/s. Option 232 provides a maximum data rate of 32 Gb/s.

\* If you have access to the clock for the device, you can connect the clock to the oscilloscope's Trigger input instead of using the CDR.

2 For a DCA-M oscilloscope, keep in mind the information in the following table.

#### Table 7 Supported configurations for DCA-M Oscilloscope

Configurations for DCA-M	Requires N107x
N1094A	√ (N107xA-232)
N1094B	√ (N107xA-232)
N1092 C/E	√ (N107xA-232)

- 3 Connect the equipment as shown in the connection diagrams above and turn on all of the instruments.
- 4 Install Microsoft Excel on the oscilloscope.

## Installing the I/O Library Suite

1 Navigate to www.keysight.com/find/iosuite and download the Keysight I/O Library Suite.

NOTE

Keysight's I/O Library Suite is free software that automatically detects instruments connected to your PC and configures the interfaces. It reduces the overall setup and configuration time. The N109310CA SFF-8431 Compliance Test Application requires I/O Libraries Suite 16.3 or higher.

2 Install the I/O Library Suite on the PC.

#### Installing the N109310CA SFF-8431 Compliance Test Application

Follow the steps below to install the N109310CA SFF-8431 Compliance Test Application and its license as well as the license for the 86100DU-401. A version of the 86100DU-401 is automatically installed for use with the N109310CA.

# NOTE If you plan to run all of the N109310CA tests, the N109310CA license will suffice. If using older licenses, host testing requires option N1014A-HST and Module Testing requires option N1014A-MOD.

1 Search for the N109310CA SFF-8431 Compliance Test Application on the Keysight website. Install the application on the Oscilloscope for which you have redeemed the license.

NOTE

When you redeem an N109310CA SFF-8431 license, you must select whether to install the application on the Oscilloscope or a specific PC.

- 2 Save the license file that you received from Keysight in a folder on the local disk or in an accessible memory device.
- 3 If not already done, purchase an 86100DU-401 or N1010100A license. Save the license file that you received from Keysight in a folder on the local disk or in an accessible memory device.
- 4 If the N1010A FlexDCA is running on the Oscilloscope, close FlexDCA.
- 5 From the Windows **Start** menu, click **All Programs>Keysight License Manager** to launch the Keysight License Manager.



Figure 90 Launching Keysight Connection Expert from the Start menu

## NOTE

Keysight License Manager version 5.1 (and higher) have a different user interface than version 5.0 (or earlier). Even though the path to launch the Keysight License Manager is the same for both versions, refer to the *Keysight License Manager Online Help* for the respective versions to find more information about the functionality of the application.

To install the N109310CA SFF-8431 Compliance Test Application's license using Keysight License Manager version 5.1 or higher

1 Click the **Tools** icon on the top-right corner of the Keysight License Manager window.

Keysight License M	lanager	* ? _ 🗆 ×
<ul> <li>Connections</li> </ul>	🔲 Licenses on 💥 (localhost) 🖒	Why do I need these tools?
+ Add Connection	Full computer name:	Install License File Install License from Text
(localhost)	Host ID:	View License Alerts
		Explore Transport URLs About Keysight License Mana
Manage licenses remotely	Feature Description Version Expiration Type	Count Location

Figure 91 Installing license file on Keysight License Manager version 5.1 & above

2 Click Install License File.... The Select License File(s) to Install on <PC Hostname> appears.

Select License File(s) to Insta	II on XXXXXXXXX(localhost)		X
O v ↓ Keysight ↓	Licenses 👻 🐓	Search Licenses	Q
Organize 🔻 New folder			1 0
☆ Favorites	Name	Date modified	Туре
🔞 Creative Cloud Fi	1677859_1002001660.lic	5/15/2017 11:35 PM	LIC File
🧮 Desktop	1677859_20170515120537.lic	5/15/2017 11:36 PM	LIC File
🗼 Downloads 🔤	1001740845_1634928.lic	1/25/2017 2:29 PM	LIC File
🗐 Recent Places 🗮			
🝊 OneDrive			
iCloud Photos			
Nesktop			
📜 Libraries			
Documents			
J Music			
Pictures			
🚼 Videos 🔻 🗸			•
File nan	ne: 1677859_1002001660.lic 🗸	License files (*.lic)	•
		Open 🔻 Car	ncel

Figure 92 Selecting license file from the folder

- 3 Navigate to the folder where the N109310CA SFF-8431 licenses are saved.
- 4 Select the license and click **Open**. The license files are installed and an entry is displayed in the Keysight License Manager.

<ul> <li>Connections</li> </ul>	Licenses on 💥	🗱 (localhost) 🖒							
+ Add Connection									
(localhost)									
Manage licenses remotely	Feature	Description	Version	Expiration	Туре	Count	Location		
by connecting to the Keysight License Service	SFF-8431_Host_Meas_Suite	SFF-8431 Host Measurement Suite	1.000	None	Transpo	Unlimited	Local		
on a LAN connected instrument or PC.	SFF-8431_Module_Meas_Suite	SFF-8431 Module Measurement Suite	1.000	None	Transpo	Unlimited	Local		
This is useful when									
transporting a license from one machine to									
another.									
Tell me more									



5 Close the Keysight License Manager.

To install the N109310CA SFF-8431 Compliance Test Application's license using Keysight License Manager version 5.0 or earlier

1 From the Keysight License Manager window's main menu, click **File>Install...** or right-click within the left pane of the Keysight License Manager window and select **Install...**.

	Keysight License Manager						
F	File Edit View Tools Help						
Install	Iocalhost	Host System					
Delete	⊢© Local Licenses ⊟-© Product 86100	Host Name :		Сору			
Transport	EnhancedJ			Сору			
Connect	🖻 🥥 Product 86100	I INTERIACE IVE	Windows				
Exit	- 🗋 AdvancedV		1				
EXIL	📃 🖯 🗇 Product 86100	Licensed Product	s and Features				

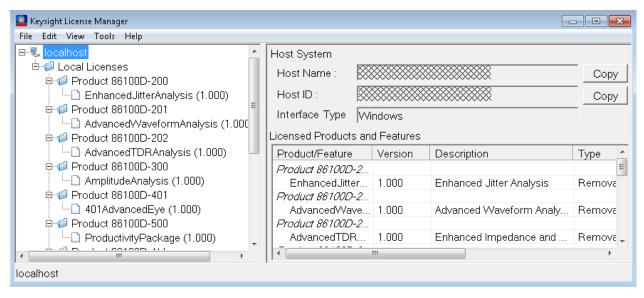
Figure 94 Installing license file on Keysight License Manager version 5.0 or earlier

#### 2 The Install License File(s) dialog box appears.

	Documents   FlexDCA   Apps   Licenses	•	← Search Licenses	
Organize 🔻 New folder				•
숨 Favorites 📃 Desktop	Documents library		Arrange	by: Folder 🔻
🗼 Downloads	Name	Date modified	Туре	Size
📃 Recent Places	1677859_1002001660.lic	5/15/2017 11:05 AM	LIC File	1 KB
🖳 Computer				
<ul> <li>SystemDrive (C:)</li> <li>UserData (D:)</li> <li>KINGSTON (E:)</li> </ul>				
🏭 SystemDrive (C:) 👝 UserData (D:)				

Figure 95 Selecting license file from the folder

3 Navigate to the folder where the N109310CA SFF-8431 licenses are saved.



4 Select the license and click **Open**. The license files are installed and an entry is displayed in the Keysight License Manager.

Figure 96 Licenses displayed in Keysight License Manager version 5.0 or earlier

5 Close the Keysight License Manager.

#### Connecting N1010A FlexDCA to N109X Oscilloscope and N107X

Perform the following steps to connect your N109X oscilloscope with N107X clock data recovery using FlexDCA:

- 1 Launch FlexDCA.
- 2 When FlexDCA starts, the **Extended Module Configuration** window is displayed automatically. If the **Extended Module Configuration** window does not appear, from the FlexDCA interface's main menu, click **Setup>Configure Extended Modules...**.
- 3 Configure Slot 7 to be the N109X module.
- 4 Configure Slot 8 to be the N107X module.
- 5 Remove any other N109X/N107X that is configured for Slot 5 and Slot 6.



- 6 Click Close to exit the Extended Module Configuration window.
- 7 Once the connection is established, you may proceed to launch the N109310CA SFF-8431 Compliance Test Application on your PC.

## Starting the N109310CA SFF-8431 Compliance Test Application

After you install the N109310CA SFF-8431 Compliance Test Application on the 86100D or N1000A Oscilloscope, follow the steps below to start the N109310CA SFF-8431 Compliance Test Application:

- 1 On the 86100D or N1000A Oscilloscope, launch the Keysight FlexDCA application.
- 2 From the FlexDCA's main menu, click Apps>Automated Test Apps>N109310CA SFF-8431.
- 3 The N109310CA SFF-8431 Compliance Test Application banner appears. Afterwards, the default view of the N109310CA SFF-8431 Compliance Test Application appears.

F	ile Vi	ew Tools He	lp													
		·	Ŷ	Connect	Run	Automate	Results	HTML Report		-						
	Gene	ral						-		^						
L	Comments															
L																
L	Test	Filter														
L	0	Host Transmitt	er Output													
L		Module Receive	er Output													
L	🕒 Host Transmitter Output - Cu															
L	Host Receiver Limiting Module Test Signal     Host Receiver Linear Module Test Signal															
SE																
H		Host Receiver	Stress Gene	rator Sign												
	Module Transmitter Input Signal															
ľ	Deskew Utilities															
L																
L																
										]						
	Exter	rnal Instrumen	its													
L	Name	Name: N4877A/N1076/7A														
	Address: Connect															
	IDN:	Get								J,						

Figure 97 Default window of the N109310CA SFF-8431 Compliance Test Application

#### Connecting to the Network Analyzer

Refer to "Connecting to External Instruments" on page 21 for connecting to the network analyzer you are using.

Configuring the Network Analyzer on the N109310CA SFF-8431 Application

After you establish a connection with a network analyzer, you must configure certain settings to run the S-parameter and Impedance Tests on the N109310CA SFF-8431 Compliance Test Application.

- 1 In the N109310CA SFF-8431 Compliance Test Application, click the **Configure** tab.
- 2 With the **Mode:** option set to **Compliance** (for compliance testing), select **Source for S-parameter values** on the left pane.
- 3 In the corresponding Settings For: pane, select the type of network analyzer that is connected.

s	et Up Select Tests Configure Co	onnect Run	Autor	mate	Results	∣нт	ML Report						
	Mode: 🔘 Compliance 🌔 Debug							•					
	<ul> <li>All Tests</li> </ul>							Settings For: Source for S-parameter Values					
	Signalling Rate (10E+09)	Signalling Rate (10E+09) Lane (Lane 1) Channels for N1045/46/55A (Channels 1A/1B`				Select a value:							
		(Channels 1A,	/1B	ENA		$\mathbf{\vee}$							
	Channel Attenuation (0) CDR Loop Bandwidth (4E+06	3	- 41	Not	Selected		upports the	e use of the Performance					
	CDR State (On)	<b>'</b> )	- 11	ENA			work Analy	zer families. Please					
	Trigger Divide Ratio (4)		- 11				hat you are	using.					
	Number of Patterns for Eye (	6)	- 11	VNA	1								
	Number of Waveforms for Sc		- 11	N10	55A		erface (Arsl						
	Number of Patterns for Jitter (4)					line Utility: arsl -a <ip address="" o<br="">"<command/>"</ip>							
0	Pattern for Rise Time (PRBS9	))	- 11	Scor		COITI	inanu>						
0	Pattern for UJ (PRBS9) Source for TJ and J2 (PRBS31) Precision Timebase State (On)				IRemoteAte Methods GetConfig 'Src4S P'								
Z													
- H	Receiver Filter (Gaussian)												
G	Receiver Filter BW (12E+09)		- 11	SetC	Config 'Sr	c4S_	_P' ' <value:< th=""><th></th></value:<>						
5	Source for S-parameter Value	es (ENA)	- 11										
RE	Source for Termination Misma	Ente	Parameters <value> = One of the following:</value>										
	Remove Cable S-parameters	(Off)	•		lue> = 0 ot Select		of the follow	/ing:					
	86108A/B JSA State (On)		- 11		ot Select NA	ea							
	SIRC Functionality (Off)		. 11		NA								
	SIRC Channel Response (4th	order Bessel	)		1055A								
	SIRC Channel BW (50E+09) Measurement Time, Jitter on	Long Pattorn	- 16										
	Channel Bandwidth Setting (I		5 (0		Run-tim	ie Pa	rameter Di	scovery					
	ToleranceRate (100 ppm)	BARB 1)	- 11	Get/	AllOptions	sForl	Member 'Co	onfigValues' 'Src4S_P'					
	Channels for N1094A/B (Cha	nnels 7A/7B)	- II										
	Variable Equalization Level (0	))						e see the N5452A Remot					
	Loop Bandwidth Tuning (Off)						lkit docume						
	Optimize for Rj and Linearity	(On)	•		w.keysig	nt.co	om/find/rpi)	).					
	<		>										

Figure 98

Configuring S-parameter value source

- 4 Select Source for Termination Mismatch Values on the left pane.
- 5 Select ENA if you are using an ENA. For VNA, select Enter Manually.

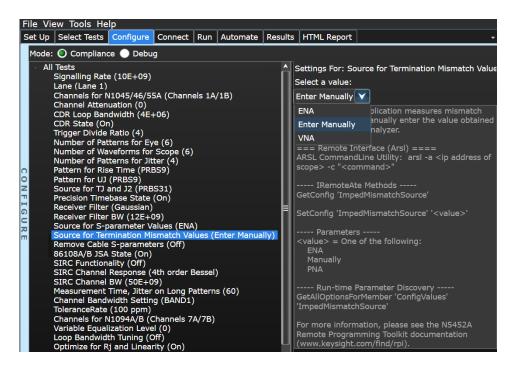


Figure 99 Configuring Termination Mismatch value source

The setup of the N109310CA SFF-8431 Compliance Test Application on the 86100D or N1000A Oscilloscope is now complete. You may begin to select, setup, and run compliance tests. Refer to *Keysight N109310CA SFF-8431 Compliance Test Application Online Help* to understand the functionality of the application to run tests.

#### Installing WDP Measurement Script

This step is required before you can perform the following TWDP (Transmitter Waveform Dispersion Penalty) test, which is selected under the "Host Transmitter Output – Cu" tests in the application: Output TWDPc – Host Cu

This step is also required for the following WDP (Waveform Dispersion Penalty) test, which is selected under the "Host Receiver Stress Generator Signal" tests in the application:

WDP of ISI Gen - Host Stress Gen

1 On your PC's web browser, go to the following site:

#### https://ta.snia.org/higherlogic/ws/public/documents

- 2 On this site, locate and open the **SFF-8431.PDF** file.
- 3 In the document, go to APPENDIX G MATLAB CODE FOR TWDP.
- 4 Copy the script and place it in a text editor.
- Comment out line 40 and add a new line after line 40. The two lines should look like the following:
   %% TXDataFile = 'prbs9\_950.txt';

## TXDataFile = 'C:\Temp\XmitBits.csv';

- 6 Compile the WDP script file in a 32-bit MATLAB (Version 2009a & above) to create an executable to run on the 86100D or PC.
- 7 Name the executable file SFF8431xWDP.exe, and save the file in the following folder:

C:\Documents and Settings\All Users\Application Data\Keysight\FlexDCA\Apps\N109310CA SFF-8431\App\ExternalAppScripts\SFF8431xWDP.exe 4 Installing N109310CA on the 86100D or N1000A Oscilloscope