Keysight
Extended Power Range and Bias Tees Upgrade Kit

To Upgrade PNA-X N5244A or N5245A Option 400 to Option 419

Upgrade Kit Order Number: N5244AU-926 and N5245AU-926

Keysight Kit Number: N5245-60103

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Installation Note

Safety Notes

The following safety notes are used throughout this document. Familiarize yourself with each of these notes and its meaning before performing any of the procedures in this document.

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.

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.

Keysight Extended Power Range and Bias Tees Upgrade Kit
Upgrade Kit Order Number: N5244AU-926 and N5245AU-926
Installation Note

Description of the Upgrade

This upgrade converts your standard 4-port configurable test set analyzer (N5244A Option 400 or N5245A Option 400) to an extended power range analyzer with bias tees by adding:

— a 60-dB source attenuator and a bias tee in each source port channel

— a 35-dB receiver attenuator in each receiver channel

After installation of this upgrade, your analyzer will be an N5244A Option 419 or N5245A Option 419.

Getting Assistance from Keysight

By internet or phone, get assistance with all your test and measurement needs.

Contacting Keysight

Assistance with test and measurements needs and information on finding a local Keysight office are available on the Web at:
http://www.keysight.com/find/assist

If you do not have access to the Internet, please contact your Keysight field engineer.

> **NOTE**
>
> In any correspondence or telephone conversation, refer to the Keysight product by its model number and full serial number. With this information, the Keysight representative can determine whether your product is still within its warranty period.

If You Have Problems With the Upgrade Kit Contents

Keysight stands behind the quality of the upgrade kit contents. If you have problems with any item in the kit, email Keysight Component Test Division (CTD) Support at support_ctd-soco@keysight.com, or telephone the CTD Hotline at (707) 577-6802 and leave a voice mail message. Please include details of the problem.

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Getting Prepared

<table>
<tr>
<td>**CAUTION**</td>
<td>The PNA contains extremely sensitive components that can be ruined if mishandled. Follow instructions carefully when making cable connections, especially wire harness connections.

The person performing the work accepts responsibility for the full cost of the repair or replacement of damaged components.</td>
</tr>
</table>

To successfully install this upgrade kit, you will need the following:

— A license key - refer to "License Key Redemption" below.

— A PDF copy or a paper copy of the PNA Service Guide - refer to "Downloading the Online PNA Service Guide" below.

— An ESD-safe work area - refer to "Protecting Your Workspace from Electrostatic Discharge" below.

— Correct tools - refer to "Tools Required for the Installation" on page 6.

— Enough time - refer to "About Installing the Upgrade" on page 6.

— Test equipment for the post-upgrade adjustments and full instrument calibration. To view the equipment list, click the Chapter 3 bookmark "Tests and Adjustments" in the PDF Service Guide[1].

License Key Redemption

<table>
<tr>
<td>**NOTE**</td>
<td>The enclosed Option Entitlement Certificate is a receipt, verifying that you have purchased a licensed option for the PNA of your choice. You must now use a Keysight Web page to request a license key for the instrument that will receive the option.</td>
</tr>
</table>

To enable the option product, you must request a license key from: http://www.keysight.com/find/softwarelicense. To complete the request, you will need to gather the following information:

— From the certificate

    — Order number

    — Certificate number

— From your instrument

    — Model number

    — Serial number

    — Host ID

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1. See "Downloading the Online PNA Service Guide" on page 5.

Installation Note N5245-90006

The instrument information is available on the network analyzer – on the analyzer's Help menu, click About Network Analyzer.

If you provide an email address, Keysight will promptly email your license key. Otherwise, you will your receive your license key via postal mail.

Downloading the Online PNA Service Guide

To view the online Service Guide for your PNA model number, use the following steps:

1. Go to www.keysight.com.

2. In the Search box, enter the model number of the analyzer (Ex: N5242A) and click **Search**.

3. Click **Technical Support** > **Manuals**.

4. Click **Service Manual**.

5. Click the service guide title to download the PDF file.

6. When the PDF of the Service Guide is displayed, scroll through the Contents section bookmarks to locate the information needed.

Protecting Your Workspace from Electrostatic Discharge

For information, click on the Chapter 1 bookmark, "Electrostatic Discharge Protection" in the PDF Service Guide[1].

ESD Equipment Required for the Installation

Description	Keysight Part Number
ESD grounding wrist strap	9300-1367
5-ft grounding cord for wrist strap	9300-0980
2 x 4 ft conductive table mat and 15-ft grounding wire	9300-0797
ESD heel strap (for use with conductive floors)	9300-1308

Tools Required for the Installation

Description	Qty	Part Number
T-10 TORX driver - set to 9 in-lbs (1.02 N.m)	1	N/A
T-20 TORX driver - set to 21 in-lbs (2.38 N.m)	1	N/A
5/16-in (8 mm) nutsetter or open end torque wrench- set to 10 in-lbs (1.13 N.m)	1	N/A
5/16-in (8 mm) nutsetter or open end torque wrench - set to 21 in-lbs (2.38 N.m)	1	N/A
9 mm nutsetter or open end torque wrench - set to 21 in-lbs (2.38 N.m)	1	N/A
1/4-in (6 mm) open end wrench	1	N/A

CAUTION　　Use a 5/16-in torque wrench set to 10 in-lbs on all cable connections except the front and rear panel cable connectors. On these, use a 9 mm nutsetter or open end torque wrench set to 21 in-lb.

About Installing the Upgrade

Products affected	N5244A and N5245A Option 400
Installation to be performed by	Keysight service center or personnel qualified by Keysight
Estimated installation time	3 hours
Estimated adjustment time	0.5 hours
Estimated full instrument calibration time	4.5 hours

Items Included in the Upgrade Kit

Check the contents of your kit against the following list. If any part is missing or damaged, contact Keysight Technologies. Refer to "Getting Assistance from Keysight" on page 3.

Table 1   Contents of Upgrade Kit N5245-60103

Ref Desig.	Description	Qty	Part Number
--	Installation note (this document)	1	N5245-90006
A38–A41	0–60 dB source step attenuator	4	33325-60022
A42–A45	Bias tee (includes wire harness, part number 8121-0836)	4	5087-7789
A46–A49	0-35 dB receiver step attenuator	4	33325-60023
--	Attenuator bracket (For A47 port 3 & A48 port 4 rcvr attenuators & all src attenuators.)	6	N5245-00015
--	Attenuator bracket (For A46 port 1 and A49 port 2 receiver attenuators.)	2	N5225-00001
--	Bias tee bracket	4	N5245-00011
--	Machine screw, M3 x 8, pan head	30	0515-0372
--	Machine screw, M3 x 14, pan head	20	0515-2994
--	Machine screw, M3 x 6, pan head	12	0515-0430
--	Cable clamp	3	1400-1334
--	Cable tie wrap, 1 to secure W21 (N5245-20008) to side of deck	5	1400-0249
--	Dust cap for test port	4	1401-0214
W12	A29 port 1 reference coupler to W11	1	N5245-20050
W18	A32 port 2 reference coupler to W17	1	N5245-20049
W21	A29 port 1 reference coupler to A37 reference mixer switch	1	N5245-20008
W25	A30 port 3 reference coupler to front-panel REF 3 SOURCE OUT	1	N5245-20116
W29	A31 port 4 reference coupler to front-panel REF 4 SOURCE OUT	1	N5245-20117
W33	RF cable, A32 port 2 reference coupler to front-panel REF 2 SOURCE OUT	1	N5245-20010
W46	REF 2 RCVR R2 IN to A27 mixer brick (R2)	1	N5245-20115
W81	RF cable, A29 test port 1 reference coupler to A38 test port 1 source attenuator	1	N5245-20029

Table 1   Contents of Upgrade Kit N5245-60103

Ref Desig.	Description	Qty	Part Number
W82	RF cable, A38 test port 1 source attenuator to front-panel Port 1 SOURCE OUT	1	N5245-20077
W83	RF cable, A42 test port 1 bias tee to A33 test port 1 coupler	1	N5245-20076
W84	RF cable, front-panel Port 1 CPLR THRU to A42 test port 1 bias tee	1	N5245-20085
W85	RF cable, A30 test port 3 reference coupler to A39 test port 3 source attenuator	1	N5245-20026
W86	RF cable, A39 test port 3 source attenuator to front-panel Port 3 SOURCE OUT	1	N5245-20027
W87	RF cable, front-panel Port 3 CPLR THRU to A43 test port 3 bias tee	1	N5245-20089
W88	RF cable, A43 test port 3 bias tee to A34 test port 3 coupler	1	N5245-20086
W89	RF cable, A31 test port 4 reference coupler to A40 test port 4 source attenuator	1	N5245-20026
W90	RF cable, A40 test port 4 source attenuator to front-panel Port 4 SOURCE OUT	1	N5245-20028
W91	RF cable, front-panel Port 4 CPLR THRU to A44 test port 4 bias tee	1	N5245-20090
W92	RF cable, A44 test port 4 bias tee to A35 test port 4 coupler	1	N5245-20088
W93	RF cable, A32 test port 2 reference coupler to A41 test port 2 source attenuator	1	N5245-20029
W94	RF cable, A41 test port 2 source attenuator to front-panel Port 2 SOURCE OUT	1	N5245-20031
W95	RF cable, A45 test port 2 bias tee to A36 test port 2 coupler	1	N5245-20030
W96	RF cable, front-panel Port 2 CPLR THRU to A45 test port 2 bias tee	1	N5245-20087
W97	RF cable, front-panel Port 1 RCVR A IN to A46 port 1 receiver attenuator	1	N5245-20054
W98	RF cable, A46 port 1 receiver attenuator to A27 mixer brick (A)	1	N5245-20056
W99	RF cable, front-panel Port 3 RCVR C IN to A47 port 3 receiver attenuator	1	N5245-20073
W100	RF cable, A47 port 3 receiver attenuator to A28 mixer brick (C)	1	N5245-20066
W101	RF cable, front-panel Port 4 RCVR D IN to A48 port 4 receiver attenuator	1	N5245-20074
W102	RF cable, A48 port 4 receiver attenuator to A28 mixer brick (D)	1	N5245-20075
W103	RF cable, front-panel Port 2 RCVR B IN to A49 port 2 receiver attenuator	1	N5245-20055
W104	RF cable, A49 port 2 receiver attenuator to A27 mixer brick (B)	1	N5245-20057

Table 1   Contents of Upgrade Kit N5245-60103

Ref Desig.	Description	Qty	Part Number
--	Ribbon cable, A23 test set motherboard J205 to A46 port 1 receiver attenuator	4	N5245-60026
--	Ribbon cable, A23 test set motherboard J206 to A47 port 3 receiver attenuator		
--	Ribbon cable, A23 test set motherboard J207 to A48 port 4 receiver attenuator		
--	Ribbon cable, A23 test set motherboard J208 to A49 port 2 receiver attenuator		
--	Ribbon cable, A23 test set motherboard J549 to A38 test port 1 source attenuator	4	N5245-60006
--	Ribbon cable, A23 test set motherboard J547 to A39 test port 3 source attenuator		
--	Ribbon cable, A23 test set motherboard J548 to A40 test port 4 source attenuator		
--	Ribbon cable, A23 test set motherboard J546 to A41 test port 2 source attenuator		

NOTE	Extra quantities of items such as protective plastic caps, screws, cable ties, and cable clamps may be included in this upgrade kit. It is normal for some of these items to remain unused after the upgrade is completed.

Installation Procedure for the Upgrade

The network analyzer must be in proper working condition prior to installing this option. Any necessary repairs must be made before proceeding with this installation.

WARNING   This installation requires the removal of the analyzer's protective outer covers. The analyzer must be powered down and disconnected from the mains supply before performing this procedure.

Overview of the Installation Procedure

"Step 1. Obtain a Keyword and Verify the Information."

"Step 2. Remove the Outer Cover."

"Step 3. Remove the Inner Cover."

"Step 4. Remove the Front Panel Assembly."

"Step 5. Remove Some Existing Cables."

"Step 6. Install the Bias Tees."

"Step 7. Install the Step Attenuators."

"Step 8. Install the New Cables."

"Step 9. Reinstall Front Panel Assembly."

"Step 10. Position the Cables and Wires to Prevent Pinching."

"Step 11. Reinstall the Inner Cover."

"Step 12. Reinstall the Outer Cover."

"Step 13. Enable Option 419."

"Step 14. Perform Post-Upgrade Adjustments and Calibration."

"Step 15. Prepare the PNA for the User."

Step 1. Obtain a Keyword and Verify the Information

Follow the instructions on the Option Entitlement Certificate supplied to obtain a license key for installation of this upgrade. Refer to "License Key Redemption" on page 4.

Verify that the model number, serial number, and option number information on the license key match those of the instrument on which this upgrade will be installed.

If the model number, serial number, or option number do not match those on your license key, you will not be able to install the option. If this is the case, contact Keysight for assistance before beginning the installation of this upgrade. Refer to "Contacting Keysight" on page 3.

Once the license key has been received and the information verified, you can proceed with the installation at step 2.

Step 2. Remove the Outer Cover

For instructions, click the Chapter 7 bookmark "Removing the Covers" in the PDF Service Guide1.

Step 3. Remove the Inner Cover

For instructions, click the Chapter 7 bookmark "Removing the Covers" in the PDF Service Guide1.

Step 4. Remove the Front Panel Assembly

For instructions, click the Chapter 7 bookmark "Removing and Replacing the Front Panel Assembly" in the PDF Service Guide1.

Step 5. Remove Some Existing Cables

| NOTE | Be careful not to damage the center pins of the semirigid cables. Some flexing of the cables may be necessary but do not over-bend them. |

| NOTE | Leave the gray flexible cables, the wire harnesses, and the ribbon cables connected where possible. Any that are removed should be labeled for reconnection later. |

1. Place the analyzer bottom-side up on a flat surface

Remove the following cables in the order listed. To see an image showing the location of these cables, click the Chapter 6 bookmark "Bottom RF Cables, Standard 4-Port Configuration, Option 400" in the PDF Service Guide[1]. These cables may be discarded - they will not be reinstalled.

— W40 (N5245-20042) Front-panel Port 2 RCVR B IN to A27 mixer brick (B)

— W31 (N5245-20040) A32 test port 2 reference coupler to front-panel Port 2 SOURCE OUT

— W32 (N5245-20097) Front-panel Port 2 CPLR THRU to A36 test port 2 coupler

1. See "Downloading the Online PNA Service Guide" on page 5.

— W35 (N5245-20108) A32 test port 2 reference coupler to front-panel REF 2 SOURCE OUT

— W46 (N5245-20011) Front-panel REF 2 RCVR R2 IN to A27 mixer brick (R2)

— W39 (N5245-20038) Front-panel Port 4 RCVR D IN to A28 mixer brick (D)

— W27 (N5245-20052) A31 test port 4 reference coupler to front-panel Port 4 SOURCE OUT

— W28 (N5245-20096) Front-panel Port 4 CPLR THRU to A35 test port 4 coupler

— W29 (N5245-20017) A31 port 4 reference coupler to front-panel REF 4 SOURCE OUT

— W38 (N5245-20037) Front-panel Port 3 RCVR C IN to A28 mixer brick (C)

— W24 (N5245-20098) Front-panel Port 3 CPLR THRU to A34 test port 3 coupler

— W23 (N5245-20051) A30 test port 3 reference coupler to front-panel Port 3 SOURCE OUT

— W25 (N5245-20016) A30 port 3 reference coupler to front-panel REF 3 SOURCE OUT

— W37 (N5245-20041) Front-panel Port 1 RCVR A IN to A27 mixer brick (A)

— W19 (N5245-20039) A29 test port 1 reference coupler to front-panel Port 1 SOURCE OUT

— W20 (N5245-20099) Front-panel Port 1 CPLR THRU to A33 test port 1 coupler

— W21 (N5245-20110) A29 port 1 reference coupler to A37 reference mixer switch

Step 6. Install the Bias Tees

Refer to Figure 1 and Figure 2 for this step of the procedure. New parts are listed in Table 1 on page 7. Use a T-10 TORX driver to tighten all screws.

1. Position the bias tee brackets on the PNA test set deck as shown in Figure 1.

Figure 1   Bias Tees Bracket

N5245_006_05
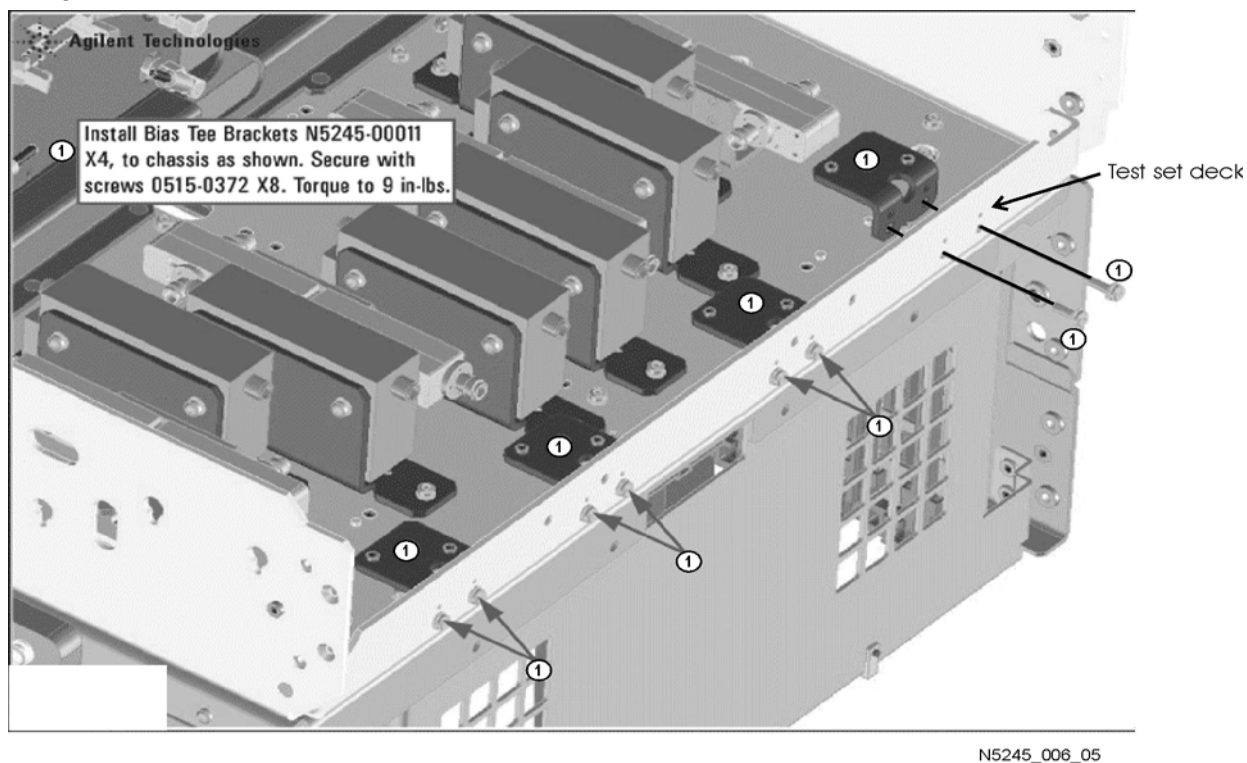
2. Secure the four bias tee brackets by inserting two screws (item ¬, 0515-0372) for each through the test set deck and the bracket as shown in Figure 1.

3. Position the bias tees on the brackets as shown in item Á of Figure 2 on page 14, making sure that the bias tees are oriented so the capacitors face each other for bias tee pair 1 and 3, and bias tee pair 2 and 4.

4. Secure the bias tees to the brackets using two screws (0515-2994) for each as shown in item ® of Figure 2 on page 14. The screw on the side of the bias tee without a capacitor fastens the lug nut on the red wire of the bias tee.

Figure 2   Bias Tees Assemblies

Fasten the bias tee's red wire lug nut using the screw on the side of the bias tee without a capacitor.
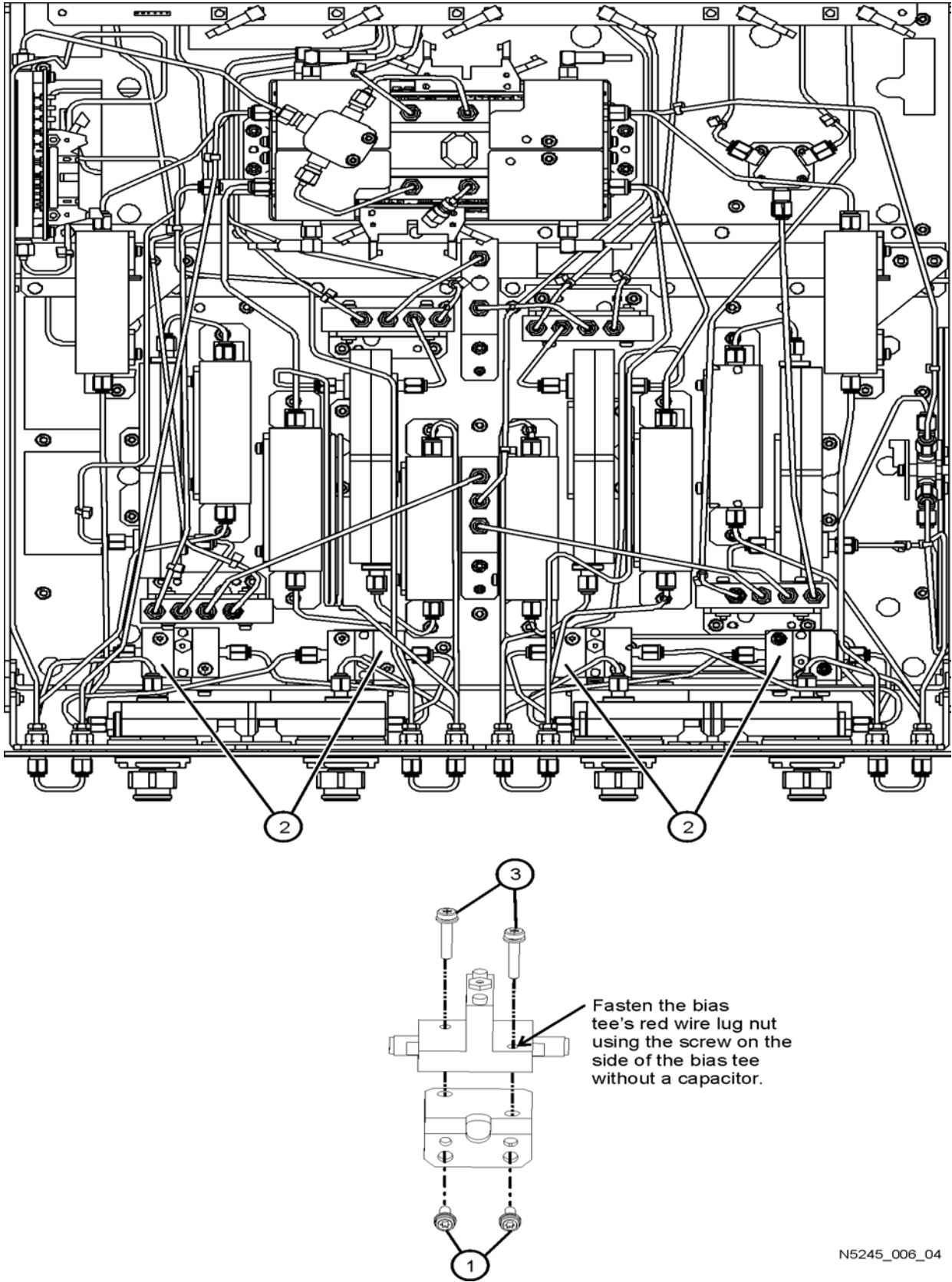
N5245_006_04

Step 7. Install the Step Attenuators

To see the graphic referred to in this step of the procedure, click the Chapter 7 bookmark "Removing and Replacing the A38-A41 Source Attenuators and the A46-49 Receiver Attenuators" in the PDF Service Guide. New parts are listed in Table 1 on page 7. Use a T-10 TORX driver to tighten all screws.

1. Select any two attenuators to be the A46 Test Port 1 Receiver Attenuator and the A49 Test Port 2 Receiver Attenuator.

2. Position the A46 and A49 attenuators on the type of attenuator brackets shown on the lower left of the graphic. Note that the graphic shows the bracket position of A49 and explains that the A46 bracket is positioned on the opposite side of the attenuator.

3. Position each of the six remaining attenuators on the other type of attenuator bracket shown on the lower right in of the graphic.

4. Secure the attenuators to the brackets using two screws (item ⁻, 0515-0372) for each.

5. Secure the A46 and A49 attenuators to the test set deck using three screws (item ®, 0515-0372) for each. Make sure that the attenuators are oriented as shown in the top of the graphic.

6. Secure the six remaining attenuators to the test set deck using two screws (item ®, 0515-2994) for each. Make sure that the attenuators are oriented as shown in the top of the graphic.

Step 8. Install the New Cables

CAUTION	Follow instructions carefully when making cable connections, especially wire harness connections. Incorrect connections can destroy components, resulting in additional customer costs.

CAUTION	Be careful not to damage the center pins of the semirigid cables. Some flexing of the cables may be necessary but do not over-bend them.

| **CAUTION**	Use a 5/16-in torque wrench set to 10 in-lbs on all cable connections except the front and rear panel bulkhead connectors. On these, use a 9 mm nutsetter or open end torque wrench set to 21 in-lb.

Install the Semirigid Cables

To see an image showing the location of these cables, click the Chapter 6 bookmarks "Bottom RF Cables, 4-Port Configuration, Option 419" in the PDF Service Guide1. New parts are listed in Table 1 on page 7.

Install the following new cables in the order listed.

— W96 (N5245-20087) RF cable, front-panel Port 2 CPLR THRU to A45 test port 2 bias tee

— W84 (N5245-20085) RF cable, front-panel Port 1 CPLR THRU to A42 test port 1 bias tee

— W88 (N5245-20086) RF cable, A43 test port 3 bias tee to A34 test port 3 coupler

— W88 (N5245-20086) RF cable, A43 test port 3 bias tee to A34 test port 3 coupler

— W29 (N5245-20117) A31 port 4 reference coupler to front-panel REF 4 SOURCE OUT

— W25 (N5245-20116) A30 port 3 reference coupler to front-panel REF 3 SOURCE OUT
* As shown in Figure 3 on page 16, install clamp part number 1400-1334 to secure W25.

Figure 3   Location of Cable Clamp to Secure W25 (N5245-20116)
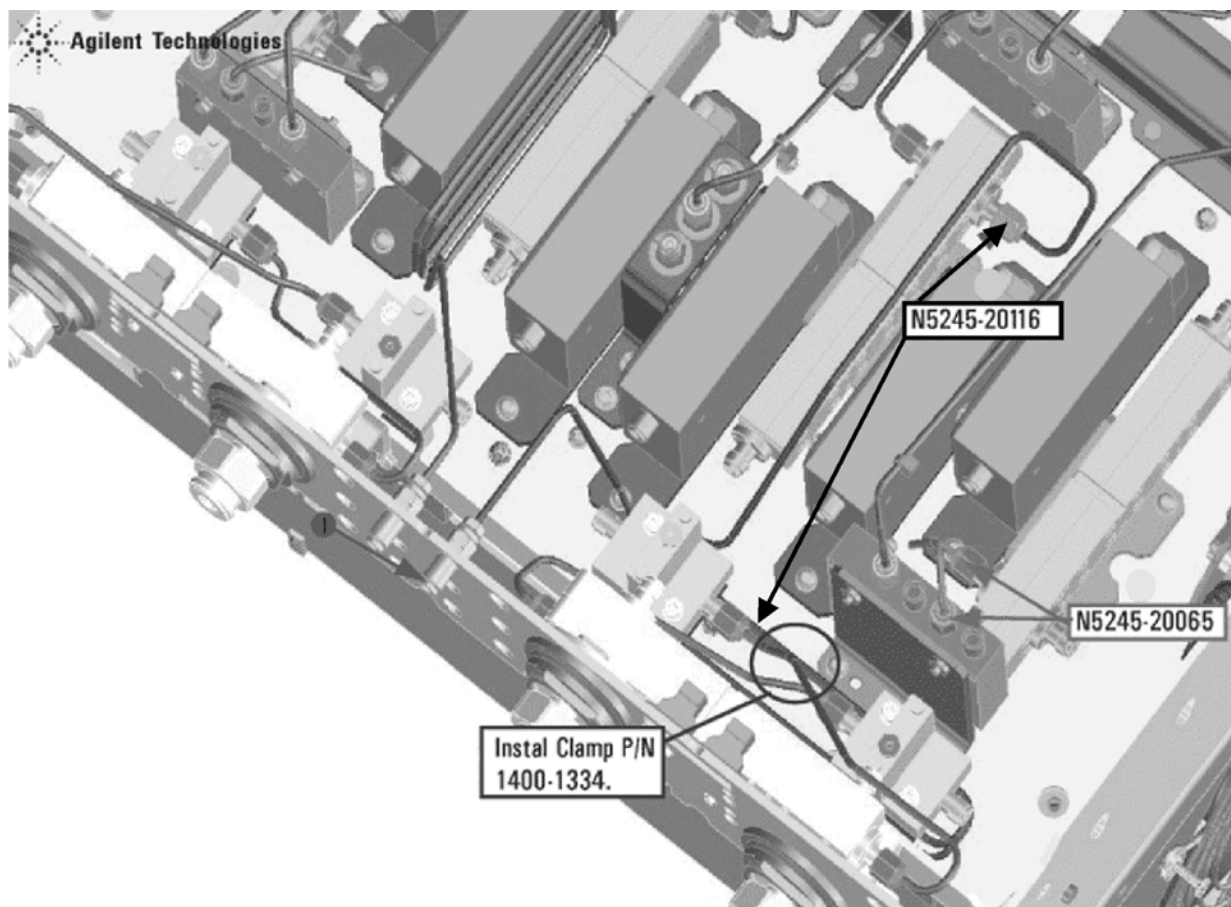
N5245_010_02

— W85 (N5245-20026) RF cable, A30 test port 3 reference coupler to A39 test port 3 source attenuator

— W89 (N5245-20026) RF cable, A31 test port 4 reference coupler to A40 test port 4 source attenuator

— W81 (N5245-20029) RF cable, A29 test port 1 reference coupler to A38 test port 1 source attenuator

— W93 (N5245-20029) RF cable, A32 test port 2 reference coupler to A41 test port 2 source attenuator

— W103 (N5245-20055) RF cable, front–panel Port 2 RCVR B IN to A49 port 2 receiver attenuator

— W95 (N5245-20030) RF cable, A45 test port 2 bias tee to A36 test port 2 coupler

— W94 (N5245-20031) RF cable, A41 test port 2 source attenuator to front–panel Port 2 SOURCE OUT

— W33 (N5245-20010) RF cable, A32 port 2 reference coupler to front–panel REF 2 SOURCE OUT

* As shown in Figure 4, install two clamps (part number 1400-1334) to secure W33 (N5245-20010).

Figure 4   Location of Cable Clamps to Secure W33 (N5245-20010)
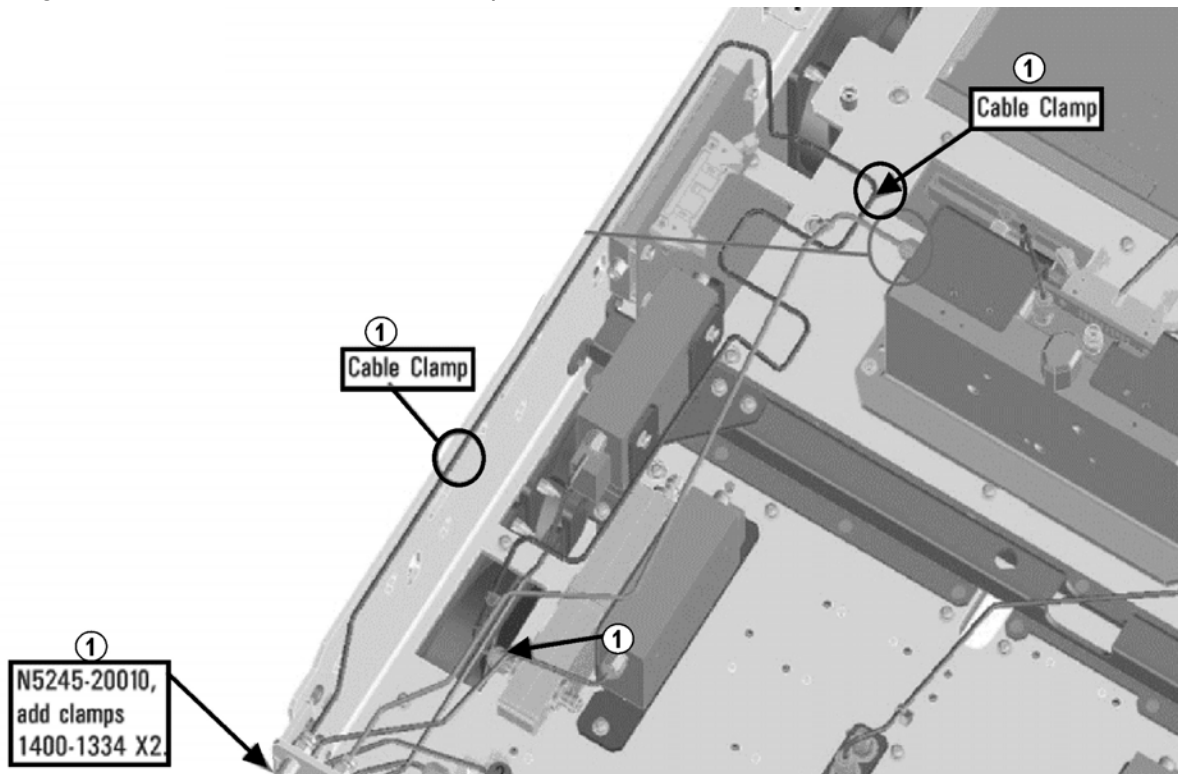
N5245_004_09

— W46 (N5245-20115) REF 2 RCVR R2 IN to A27 mixer brick (R2)

— W101 (N5245-20074) RF cable, front-panel Port 4 RCVR D IN to A48 port 4 receiver attenuator

— W90 (N5245-20028) RF cable, A40 test port 4 source attenuator to front-panel Port 4 SOURCE OUT

— W91 (N5245-20090) RF cable, front-panel Port 4 CPLR THRU to A44 test port 4 bias tee

— W99 (N5245-20073) RF cable, front-panel Port 3 RCVR C IN to A47 port 3 receiver attenuator

— W87 (N5245-20089) RF cable, front-panel Port 3 CPLR THRU to A43 test port 3 bias tee

— W86 (N5245-20027) RF cable, A39 test port 3 source attenuator to front-panel Port 3 SOURCE OUT

— W97 (N5245-20054) RF cable, front-panel Port 1 RCVR A IN to A46 port 1 receiver attenuator

— W82 (N5245-20077) RF cable, A38 test port 1 source attenuator to front-panel Port 1 SOURCE OUT

— W83 (N5245-20076) RF cable, A42 test port 1 bias tee to A33 test port 1 coupler

— W21 (N5245-20008) A29 port 1 reference coupler to A37 reference mixer switch

* As shown in Figure 5, install cable tie part number 1400-0249 to secure W21.

Figure 5   Location of Cable Tie to Secure W21 (N5245-20008)
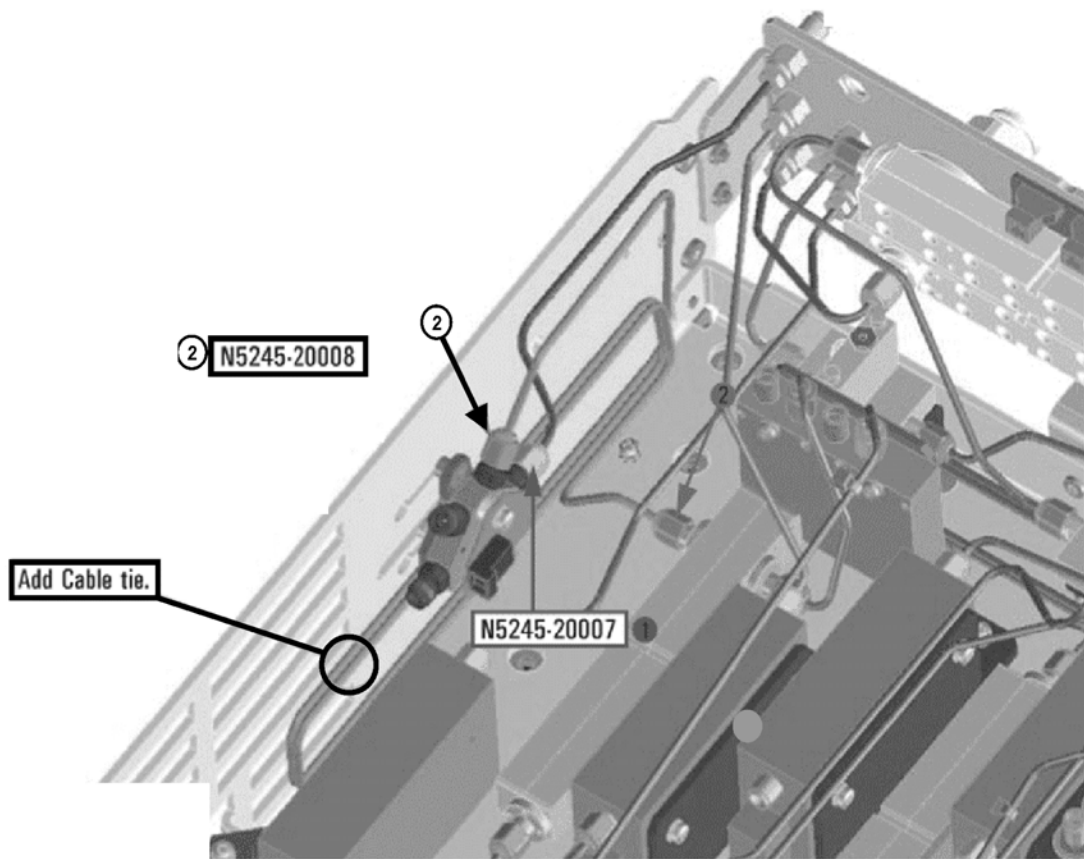
N5245_010_16

— W102 (N5245-20075)RF cable, A48 port 4 receiver attenuator to A28 mixer brick (D)

— W100 (N5245-20066)RF cable, A47 port 3 receiver attenuator to A28 mixer brick (C)

— W104 (N5245-20057)RF cable, A49 port 2 receiver attenuator to A27 mixer brick (B)

— W98 (N5245-20056)RF cable, A46 port 1 receiver attenuator to A27 mixer brick (A)

— W18 (N5245-20049)A32 port 2 reference coupler to W12

— W12 (N5245-20050)A29 port 1 reference coupler to W11

Install the Ribbon Cables and Wire Harnesses

CAUTION   Follow instructions carefully when making cable connections, especially wire harness connections. Incorrect connections can destroy components, resulting in additional customer costs.

To see an image showing the location of these cables, click the Chapter 6 bookmarks "Bottom Ribbon Cables and Wire Harnesses, 4-Port, Option 419" in the PDF Service Guide. New parts are listed in Table 1 on page 7..

1. Connect step attenuator ribbon cables as follows:

— A38 port 1 source step attenuator to A23 test set motherboard J549

— A39 port 3 source step attenuator to A23 test set motherboard J547

— A40 port 4 source step attenuator to A23 test set motherboard J548

— A41 port 2 source step attenuator to A23 test set motherboard J546

— A46 port 1 receiver step attenuator to A23 test set motherboard J205

— A47 port 3 receiver step attenuator to A23 test set motherboard J206

— A48 port 4 receiver step attenuator to A23 test set motherboard J207

— A49 port 2 receiver step attenuator to A23 test set motherboard J208.

2. Connect bias tee cable harnesses (part of bias tee assemblies) as follows:

— A42 port 1 bias tee to A23 test set motherboard J541

— A43 port 3 bias tee to A23 test set motherboard J543

— A44 port 4 bias tee to A23 test set motherboard J544

— A45 port 2 bias tee to A23 test set motherboard J542

Step 9. Reinstall Front Panel Assembly

For instructions on reinstalling the front panel assembly, click the Chapter 7 bookmark "Removing and Replacing the Front Panel Assembly" in the PDF Service Guide1.

Step 10. Position the Cables and Wires to Prevent Pinching

On the top side of the PNA, carefully position the grey flex cables so they can't be pinched between the covers and the rails.

On the bottom side of the PNA, carefully fold or push down the ribbon cables and wires so they can't be pinched between the hardware and the outer cover. Ribbon cables and wires must never be positioned on top of hardware.

Step 11. Reinstall the Inner Cover

For instructions, click the Chapter 7 bookmark "Removing the Covers" in the PDF Service Guide[1].

Step 12. Reinstall the Outer Cover

For instructions, click the Chapter 7 bookmark "Removing the Covers" in the PDF Service Guide[1].

Step 13. Enable Option 419

Procedure Requirements

— The analyzer must be powered up and operating to perform this procedure.

— The Network Analyzer program must be running.

— A keyboard must be connected to the network analyzer.

Option Enable Procedure

1. To start the option enable utility, press UTILITY $\boxed{\text{System}}$, then $\boxed{\text{Service}}$, then $\boxed{\text{Option Enable}}$. An option enable dialog box will appear.

2. Click the arrow in the Select Desired Option box. A list of available options will appear.

3. In the Select Desired Option list, click 419 - Src/Rcvr Atten & Bias Ts 4-Port.

4. Using the keyboard, enter the license key in the box provided. The license key is printed on the the license message you received from Keysight. Enter this key exactly as it is printed on the message.

5. Click Enable.

6. Click Yes in answer to the displayed question in the Restart Analyzer? box.

7. When the installation is complete, click Exit.

Option Verification Procedure

Once the analyzer has restarted and the Network Analyzer program is again running:

1. On the analyzer's Help menu, click About Network Analyzer.

2. Verify that "419" is listed after "Options:" in the display. Click OK.

NOTE	If Option 419 has not been enabled, perform the "Option Enable Procedure" again. If the option is still not enabled, contact Keysight Technologies. Refer to "Getting Assistance from Keysight" on page 3.

Step 14. Perform Post-Upgrade Adjustments and Calibration

Adjustments

The following adjustments must be made due to the hardware changes of the analyzer.

— source adjustment

— receiver adjustment

These adjustments are described in the PNA Service Guide and in the PNA on-line HELP. A list of equipment required to perform these adjustments is also found in the service guide.

To view this service guide information, click the Chapter 3 bookmark "Tests and Adjustments" in the PDF Service Guide[1].

After the specified adjustments have been performed, the analyzer should operate and phase lock over its entire frequency range.

Operator's Check

Perform the Operator's Check to check the basic functionality of the analyzer. For instructions, click the Chapter 3 bookmark "Tests and Adjustments" in the PDF Service Guide[1].

If you experience difficulty with the basic functioning of the analyzer, contact Keysight. Refer to "Contacting Keysight" on page 3.

Calibration

Although the analyzer functions, its performance relative to its specifications has not been verified. It is recommended that a full instrument calibration be performed using the analyzer's internal performance test software. To view information on the performance test software, click the Chapter 3 bookmark "Tests and Adjustments" in the PDF Service Guide[1].

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1. See "Downloading the Online PNA Service Guide" on page 5.

Step 15. Prepare the PNA for the User

1. If necessary, reinstall front jumper cables.

2. If necessary, reinstall the cable guards, pushing them over the front jumper cables until the cushioning material touches the front panel of the PNA.

3. Install the dust caps on the test ports.

4. Clean the analyzer, as needed, using a damp cloth.

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