# Keysight Extended Power Range and Bias Tees Upgrade Kit

To Upgrade PNA-X N5241A, N5242A or N5249A Option 200 to Option 219

Upgrade Kit Order Numbers: N5241AU-921, N5242AU- 921 and N5249AU- 921

Keysight Kit Number: N5242-60101

KEYSIGHT TECHNOLOGIES

Installation Note

NOTICE: This document contains references to Agilent Technologies. Agilent's former Test and Measurement business has become Keysight Technologies. For more information, go to **www.keysight.com.**

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## 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** | **Warning denotes a hazard. It calls attention to a procedure which, if not correctly performed or adhered to, could result in injury or loss of life. Do not proceed beyond a warning note until the indicated conditions are fully understood and met.** |

| | |
|---|---|
| **CAUTION** | Caution denotes a hazard. It calls attention to a procedure that, if not correctly performed or adhered to, could result in damage to or destruction of the instrument. Do not proceed beyond a caution sign until the indicated conditions are fully understood and met. |

## Description of the Upgrade

**IMPORTANT** In June 2013, the N5241A/AS and N5242A/AS analyzers underwent significant hardware changes. Some components that have 2.4 mm connectors (bias tees, couplers, and some semi-rigid cables) were replaced with components that have 3.5 mm connectors.

**If your analyzer's serial number prefix is MY/SG/US5310 and below**:
Your analyzer was originally shipped with 2.4 mm components. Bias tees with 2.4 mm connectors are no longer available, so the bias tees and connecting cables included in this kit have 3.5 mm connectors. Since they are interconnected, the 2.4 mm couplers and connecting cables in your analyzer must be replaced with the new 3.5 mm items included in this kit.

**If your analyzer's serial number prefix is MY/SG/US5321 and above**:
Your analyzer was shipped with 3.5 mm components, so it is not necessary to replace the couplers and connecting cables. These items are included in this kit, but will not be used for your upgrade. Set them aside for possible use in the future.

Be very careful to use the appropriate hardware in your analyzer. Using the wrong hardware can ruin analyzer components, resulting in additional customer costs.

This upgrade converts your standard 2-port configurable test set analyzer (Option 200) to an extended power range analyzer with bias tees by adding:

- a 60-dB source attenuator in each source port channel
- a bias tee in each source port channel
- a 35-dB receiver attenuator in each receiver channel
- cables
- test port couplers
- bulkhead connectors

After installation of this upgrade, your analyzer will be an Option 219.

## 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.

## Getting Prepared

**CAUTION** 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.

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 7.
- Test equipment for the post-upgrade adjustments. To view the equipment list, click the Chapter 3 bookmark "Tests and Adjustments" in the PDF Service Guide[1].

### License Key Redemption

**NOTE** 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.

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

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

- ❏ Serial number
- ❏ Host ID

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].

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

**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 | N/A |
| T-20 TORX driver (set to 21 in-lbs) | 1 | N/A |
| 5/16-in torque wrench (set to 10 in-lbs) | 1 | N/A |
| 5/16-in torque wrench (set to 21 in-lbs) | 1 | N/A |
| 1-in torque wrench (set to 72 in-lbs) | 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 bulkhead connectors. Torque these connections to 21 in-lb.

### About Installing the Upgrade

| | |
|---|---|
| Products affected | N5241A, N5242A and N5249A Option 200 |
| Installation to be performed by | Keysight service center or personnel qualified by Keysight |
| Estimated installation time | 1.5 hours |
| Estimated adjustment time | 0.5 hours |
| Estimated full instrument calibration time | 2.0 hours |

## Items Included in the Upgrade Kit[1]

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 N5242-60101**

| Ref Desig. | Description | Qty | Part Number |
|---|---|---|---|
| | Installation note | 1 | N5242-90002 |
| A29, A32 | Test port couplers | 2 | 5087-7813<br>Was 5087-7710 |
| A34, A37 | 0–60 dB source step attenuator | 2 | 33321-60077 |
| A38, A41 | Bias tee (includes wire harness) | 2 | 5067-4865 |
| A42, A45 | 0-35 dB receiver step attenuator | 2 | 33321-60078 |
| | Attenuator bracket | 2 | N5242-00007 |
| | Machine screw, M3 x 8, pan head (to attach attenuator to attenuator bracket) | 8 | 0515-0372 |
| | Machine screw, M3 x 14, pan head (to attach bias tee to attenuator bracket) | 4 | 0515-2994 |
| | Machine screw, M3 x 6, pan head (to attach attenuator bracket to analyzer) | 6 | 0515-0430 |
| | Bulkhead connector assembly for test set front plate | 10 | 1250-3805 |
| | Bumper for test port coupler | 2 | 0403-0285 |
| | Cable tie, as requried | 5 | 1400-0249 |
| | Cable clamp, as requried | 5 | 1400-1334 |
| W25 | RF cable, A28 test port 2 bridge to front-panel REF 2 SOURCE OUT | 1 | N5222-20038 |
| W37 | RF cable, A33 reference mixer switch to A23 mixer brick (R1) | 1 | N5222-20003 |

1. In addition to the upgrade kit, the shipment includes an Option Entitlement Certificate. Refer to "License Key Redemption" on page 4 for important information about this certificate.

**Table 1 Contents of Upgrade Kit N5242-60101**

| Ref Desig. | Description | Qty | Part Number |
|---|---|---|---|
| W40 | RF cable, REF 2 RCVR R2 IN to A23 mixer brick (R2) | 1 | N5222-20039 |
| W71 | RF cable, A25 test port 1 bridge to A34 test port 1 source attenuator | 1 | N5222-20002 |
| W72 | RF cable, A34 test port 1 source attenuator to Port 1 SOURCE OUT | 1 | N5222-20028 |
| W73 | RF cable, Port 1 CPLR THRU to A38 test port 1 bias tee | 1 | N5222-20029 |
| W83 | RF cable, A28 test port 2 bridge to A37 test port 2 source attenuator | 1 | N5222-20001 |
| W84 | RF cable, A37 test port 2 source attenuator to Port 2 SOURCE OUT | 1 | N5222-20036 |
| W85 | RF cable, Port 2 CPLR THRU to A41 test port 2 bias tee | 1 | N5222-20035 |
| W87 | RF cable, Port 1 RCVR A IN to A42 port 1 receiver attenuator | 1 | N5222-20031 |
| W88 | RF cable, A42 port 1 receiver attenuator to A23 mixer brick (A) | 1 | N5222-20004 |
| W93 | RF cable, Port 2 RCVR B IN to A45 port 2 receiver attenuator | 1 | N5222-20037 |
| W94 | RF cable, A45 port 2 receiver attenuator to A23 mixer brick (B) | 1 | N5222-20010 |
| W115 | RF cable, Port 1 CPLR ARM to A29 test port 1 coupler | 1 | N5222-20070 |
| W117 | RF cable, Port 2 CPLR ARM to A32 test port 2 coupler | 1 | N5222-20071 |
| W119 | RF cable, A38 test port 1 bias tee to A29 test port 1 coupler | 1 | N5222-20072 |
| W120 | RF cable, A41 test port 2 bias tee to A32 test port 2 coupler | 1 | N5222-20065 |
| | Ribbon cable, A19 test set motherboard J205 to A42 port 1 receiver attenuator | 2 | 8121-0982 |
| | Ribbon cable, A19 test set motherboard J208 to A45 port 2 receiver attenuator | | |
| | Ribbon cable, A19 test set motherboard J201 to A34 test port 1 source attenuator | 2 | N5242-60008 |
| | Ribbon cable, A19 test set motherboard J204 to A37 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 Front Panel Assembly.

Step 4. Remove the Existing Cables.

Step 5. Remove the A29 and A32 Test Port Couplers (For Analyzers with Serial Numbers Prefixed MY/SG/US5310 and Below).

Step 6. Assemble the New (3.5 mm) A29 and A32 Test Port Couplers (For Analyzers with Serial Numbers Prefixed MY/SG/US5310 and Below).

Step 7. Install the New (3.5 mm) A29 and A32 Test Port Couplers onto the Front Plate (For Analyzers with Serial Numbers Prefixed MY/SG/US5310 and Below).

Step 8. Install the Bulkhead Connectors in the Test Set Front Plate (For Analyzers with Serial Numbers Prefixed MY/SG/US5310 and Below).

Step 9. Assemble the Step Attenuators and Bias Tees.

Step 10. Install the Step Attenuators and Bias Tees into the Analyzer.

Step 11. Install the New Cables.

Step 12. Reinstall the Front Panel Assembly and Front Panel Jumpers.

Step 13. Position the Cables and Wires to Prevent Pinching.

Step 14. Reinstall the Outer Cover.

Step 15. Enable Option 219.

Step 16. Perform Post-Upgrade Adjustments and Calibration.

Step 17. 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.

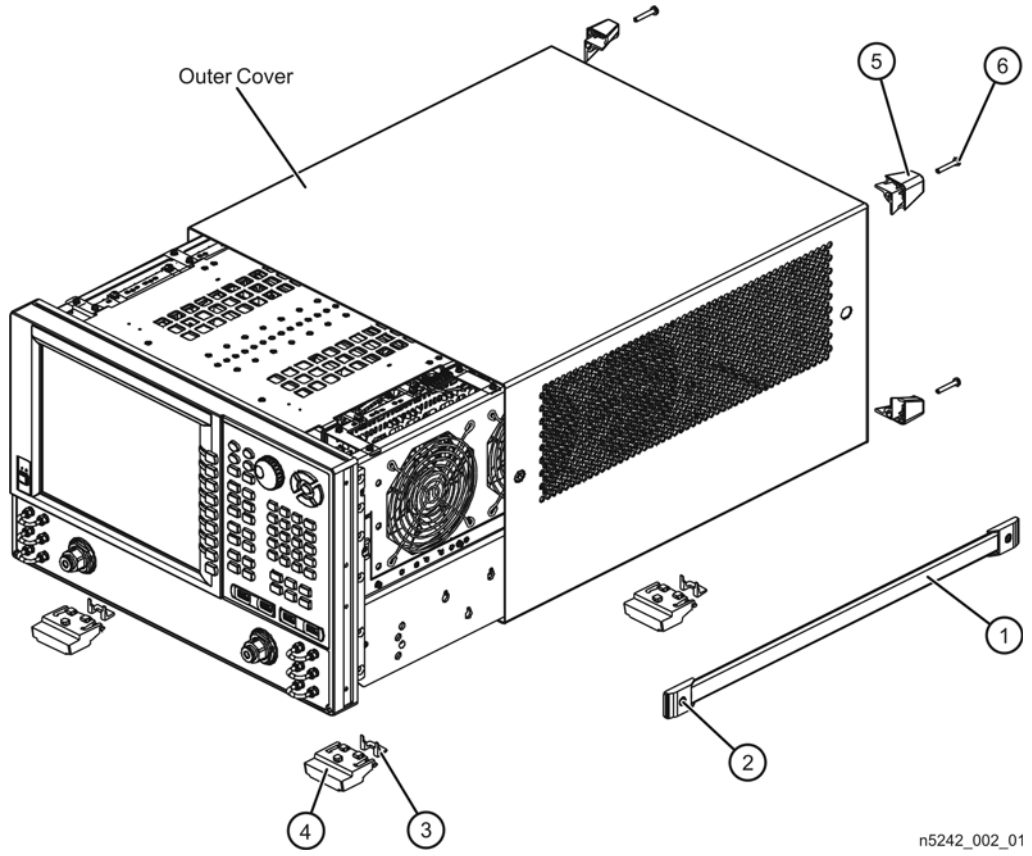
## Step 2. Remove the Outer Cover

**CAUTION** This procedure is best performed with the analyzer resting on its front handles in the vertical position. *Do not place the analyzer on its front panel without the handles*. This will damage the front panel assemblies.

Refer to Figure 1 for this step of the procedure.

1. Disconnect the power cord (if it has not already been disconnected).
2. Remove the strap handles (item ①) by loosening the screws (item ②), with a T-20 TORX driver, on both ends until the handle is free of the analyzer.
3. Remove the foot locks (item ③) from the four bottom feet (item ④) and then remove the four bottom feet from the outer cover.
4. Remove the four rear panel feet (item ⑤) by removing the center screws (item ⑥) with a T-20 TORX driver,.
5. Slide the outer cover toward the rear of the analyzer and remove it.

**Figure 1 Outer Cover Removal**



## Step 3. Remove the Front Panel Assembly

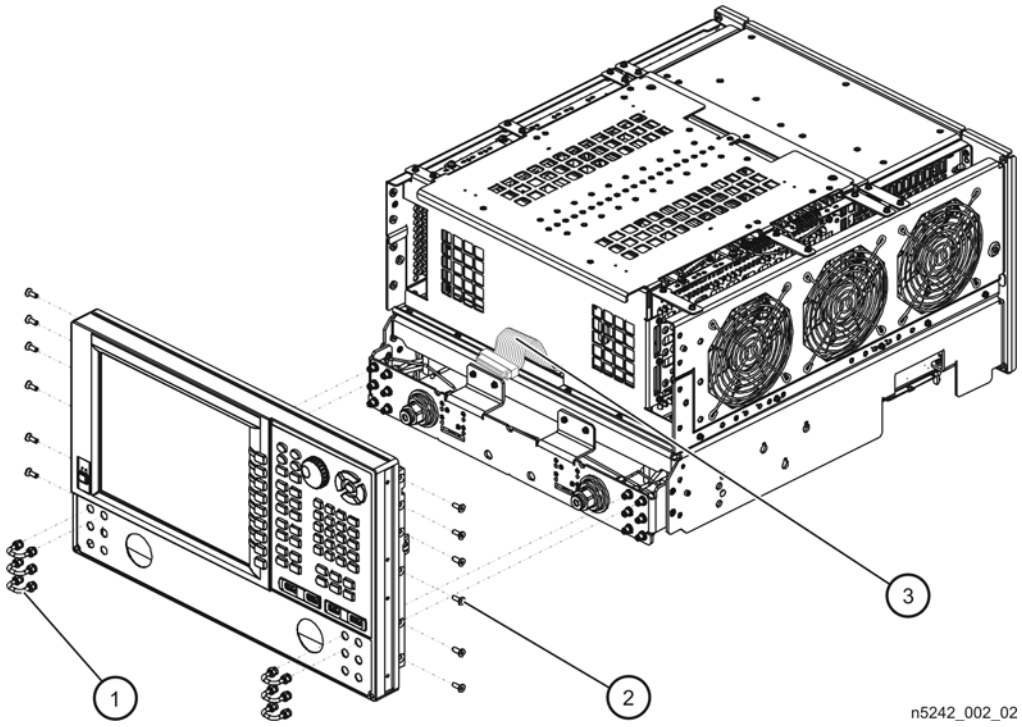
Refer to Figure 2 for this step of the procedure.

1. With a 5/16-in wrench, remove all front panel jumpers (item ①).
2. With a T-10 TORX driver, remove the screws (item ②) from the sides of the frame.

**CAUTION** Before removing the front panel from the analyzer, lift and support the front of the analyzer chassis.

3. Slide the front panel over the test port connectors.
4. Disconnect the front panel interface ribbon cable (item ③). The front panel is now free from the analyzer.

**Figure 2 Front Panel Assembly Removal**



## Step 4. Remove the Existing Cables

**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.

Refer to Figure 3 for this step of the procedure.

1. Place the analyzer bottom-side up on a flat surface.
2. Remove the following cables in the order listed.

   *For all analyzer serial numbers:*

   - W31 Front-panel Port 1 RCVR A IN to A23 mixer brick (A)
   - W34 Front-panel Port 2 RCVR B IN to A23 mixer brick (B)

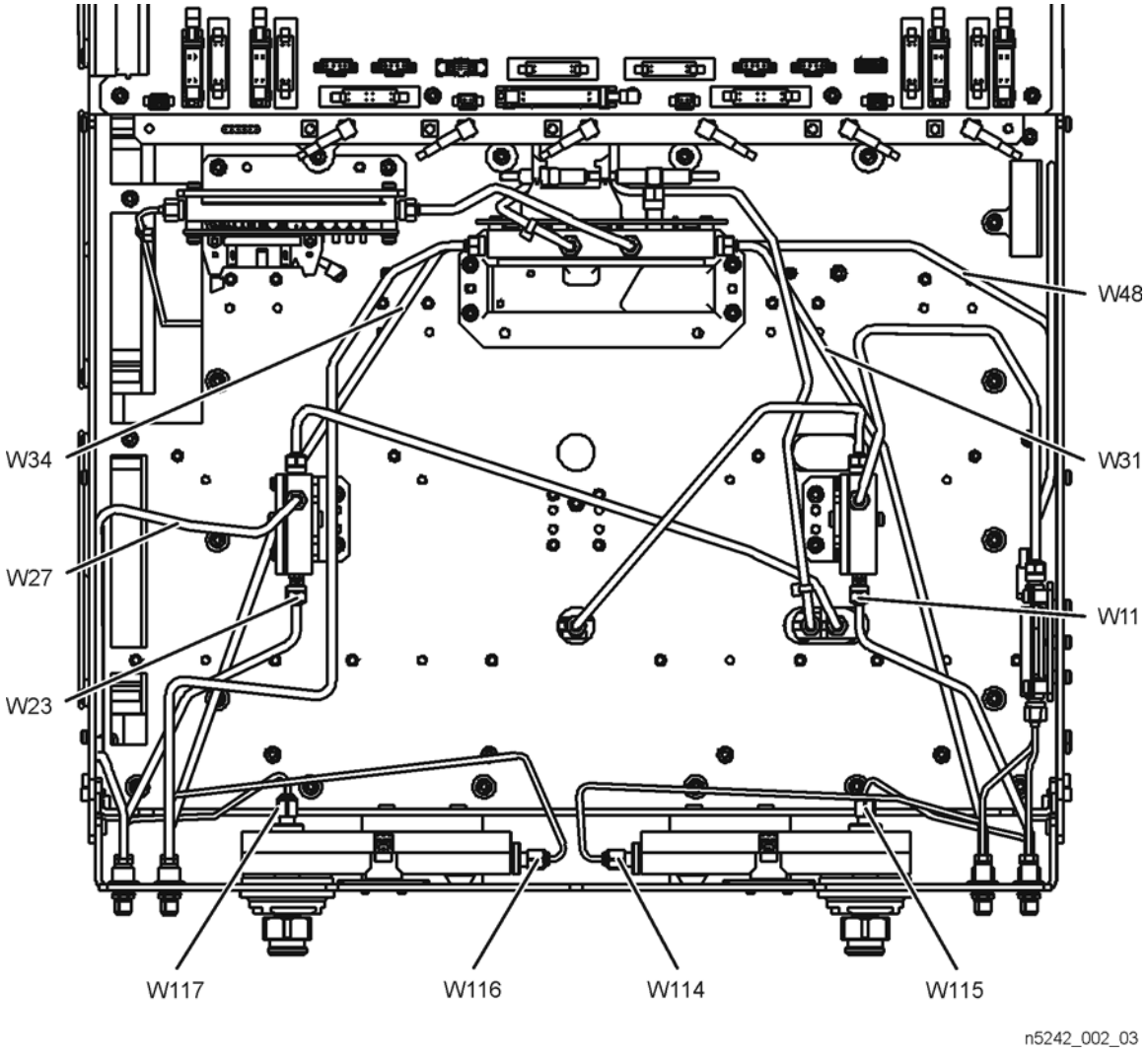
   *For analyzers with serial numbers prefixed MY/SG/US5310 and below:*

   - W114 Port 1 CPLR THRU to A29 test port 1 coupler
   - W116 Port 2 CPLR ARM to A32 test port 2 coupler
   - W117 Front-panel Port 2 CPLR ARM to A32 test port 2 coupler
   - W115 Front-panel Port 1 CPLR ARM to A29 test port 1 coupler

   *For all analyzer serial numbers:*

   - W11 A25 port 1 bridge to front-panel Port 1 SOURCE OUT
   - W23 A28 port 2 bridge to front-panel Port 2 SOURCE OUT
   - W48 A33 reference mixer switch to A23 mixer brick (R1)
   - W27 A28 port 2 bridge to front-panel REF 2 SOURCE OUT

**Figure 3 Existing Cable Removal**




## Steps 5 - 8: For Analyzers with Serial Numbers Prefixed MY/SG/US5310 and Below

If your analyzer serial number is prefixed MY/SG/US5321 and above, go to "Step 9. Assemble the Step Attenuators and Bias Tees" on page 18.

## Step 5. Remove the A29 and A32 Test Port Couplers (For Analyzers with Serial Numbers Prefixed MY/SG/US5310 and Below)

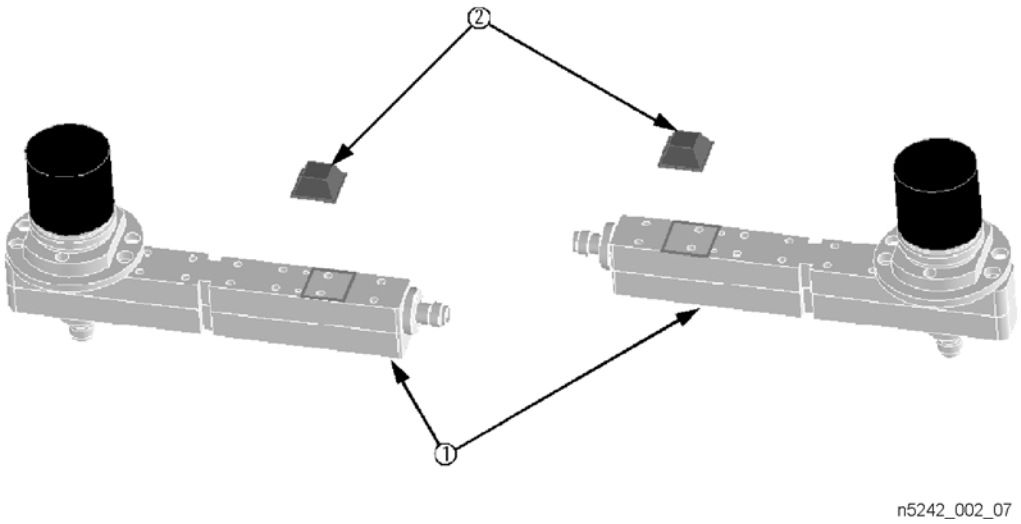
For instructions, click the Chapter 7 bookmark "Removing and Replacing the A29–A32 Test Port Couplers" in the PDF Service Guide. Refer to "Downloading the Online PNA Service Guide" on page 5.

Discard the test port couplers you just removed from the PNA. These old couplers have 2.4 mm connectors and must be replaced with the new couplers (3.5 mm connectors) included in the kit.

## Step 6. Assemble the New (3.5 mm) A29 and A32 Test Port Couplers (For Analyzers with Serial Numbers Prefixed MY/SG/US5310 and Below)

1. Locate the two new test port couplers (5087-7813). These components have 3.5 mm connectors.
2. As shown in Figure 4, adhere a bumper (0403-0285) onto each coupler by aligning the bumper edge with the two threaded holes.

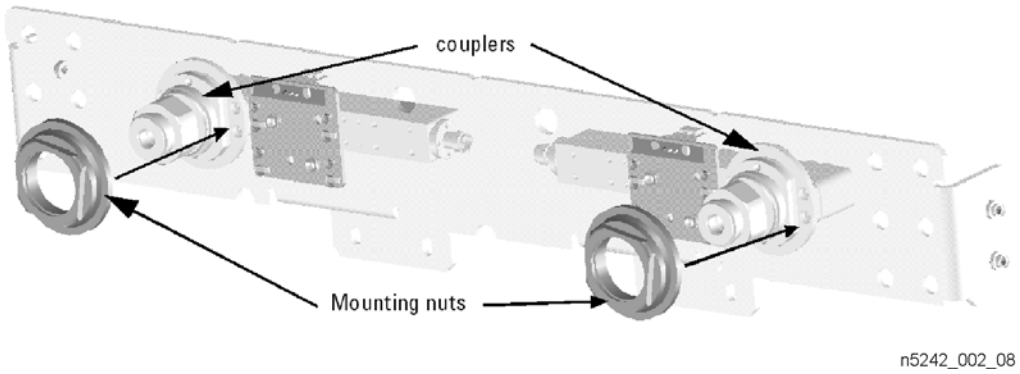
**Figure 4 A29 and A32 Test Port Couplers Assembly**



## Step 7. Install the New (3.5 mm) A29 and A32 Test Port Couplers onto the Front Plate (For Analyzers with Serial Numbers Prefixed MY/SG/US5310 and Below)

1. As shown in Figure 5, install the two new test port couplers onto the front plate.
2. Reinstall the two mounting nuts, but hand tighten only. They will be fully tightened later.

**Figure 5 A29 and A32 Test Port Couplers Installation onto Front Plate**



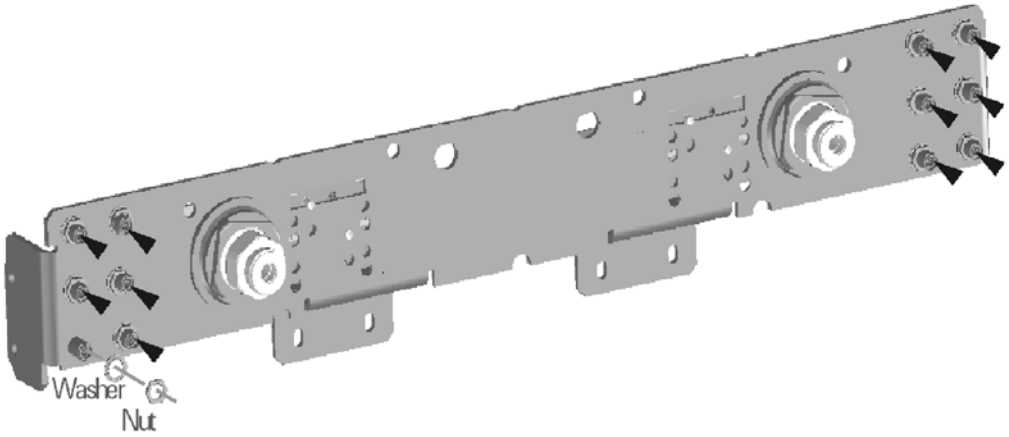
## Step 8. Install the Bulkhead Connectors in the Test Set Front Plate (For Analyzers with Serial Numbers Prefixed MY/SG/US5310 and Below)

If your analyzer's serial number is MY/SG/US5321 and above, ignore this step.

Refer to Figure 6 for this procedure. Some bulkhead connectors may already be installed on your analyzer's front plate. New parts are listed in Table 1 on page 7.

1. From the back side of the test set front plate, insert a bulkhead connector into a hole in the plate.
2. Install 1x washer and 1x nut. Hand tighten nut and ensure bulkhead connector hexagon nut, on the back side of test set front plate, is aligned to the test set subpanel hexagon indent.
3. Repeat previous two steps for the remaining bulkhead connectors.
4. Torque nuts, on the front side of test set front plate, to 21 in-lbs.
5. Torque mounting nuts for the test port couplers, on the front side of test set front plate, to 72 in-lbs.

**Figure 6 Bulkhead Connectors Installation**



## Step 9. Assemble the Step Attenuators and Bias Tees

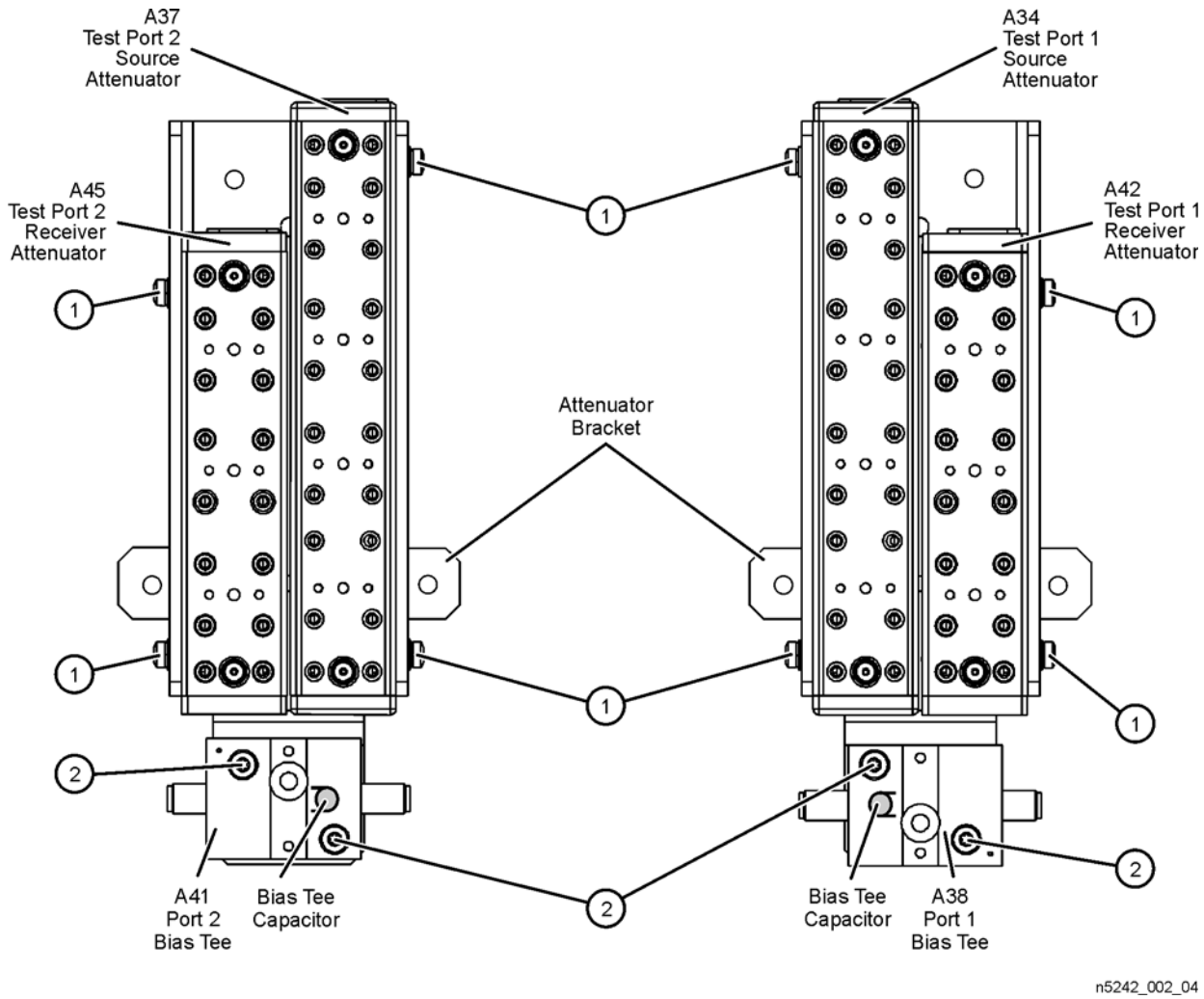
Refer to Figure 8 for this procedure. New parts are listed in Table 1 on page 7.

1. Position the source and receiver attenuators on the attenuator brackets as shown.
2. Secure each attenuator to its attenuator bracket using two screws (item ① - 0515-0372) for each. Make sure that the attenuators are oriented as shown.
3. As shown, position the bias tees on the attenuator brackets so that the port 1 and port 2 bias tees capacitors face each other.

**CAUTION** Installing these bias tees backwards will cause damage to the analyzer source modules.

4. Secure each bias tee to the attenuator brackets using two screws (item ② - 0515-2994) for each. Make sure that the attenuators are oriented as shown.

**Figure 7 Step Attenuators and Bias Tees Assembly**

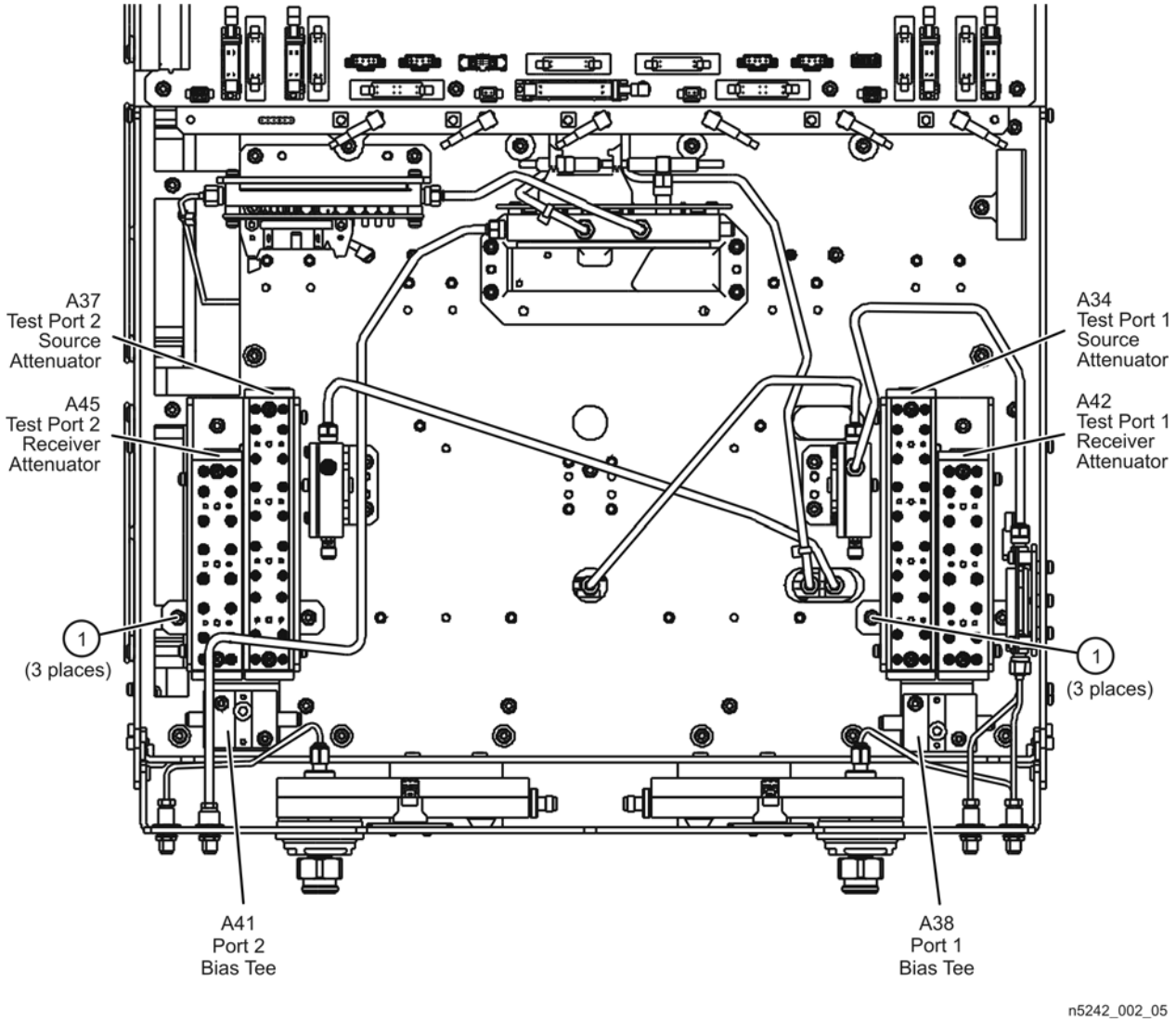


## Step 10. Install the Step Attenuators and Bias Tees into the Analyzer

Refer to Figure 8 for this procedure. New parts are listed in Table 1 on page 7.

1. Position the attenuator brackets (with the attenuators and bias tees attached) in the analyzer as shown.
2. Secure the attenuator brackets to the analyzer test set deck using three screws (item ① - 0515-0430) each.

**Figure 8 Step Attenuators and Bias Tees Installation**



## Step 11. 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. |

| | |
|---|---|
| **NOTE** | Some of these cables may have different dimensions from those shown in the graphics. |

Install the following cables in the order listed. To see images showing the location of these cables, click the Chapter 6 bookmark "Bottom RF Cables, 2-Port, Option 219..." in the PDF Service Guide[1]. New parts are listed in Table 1 on page 7.

1. Install the following cables in the order listed. Use a 5/16-in torque wrench set to 10 in-lbs to tighten all cable connectors.

*For analyzers with serial numbers prefixed MY/SG/US5310 and below:*

- W117 (N5222-20071) Port 2 CPLR ARM to A32 test port 2 coupler
- W120 (N5222-20065) A41 test port 2 bias tee to A32 test port 2 coupler

*For all analyzer serial numbers:*

- W85 (N5222-20035) Front-panel Port 2 CPLR THRU to A41 test port 2 bias tee
- W93 (N5222-20037) Front-panel Port 2 RCVR B IN to A45 port 2 receiver attenuator
- W84 (N5222-20036) A37 test port 2 source attenuator to front-panel Port 2 SOURCE OUT
- W83 (N5222-20001) A28 test port 2 bridge to A37 test port 2 source attenuator
- W25 (N5222-20038) A28 port 2 bridge to front-panel REF 2 SOURCE OUT

  Secure W25 to the side of the deck with 1x cable tie wrap, part number 1400-0249 (included in the kit).
- W94 (N5222-20010) A45 port 2 receiver attenuator to A23 mixer brick (B)
- W40 (N5222-20039) REF 2 RCVR R2 IN to A23 mixer brick (R2)
- W115 (N5222-20070) Port 1 CPLR ARM to A29 test port 1 coupler
- W119 (N5222-20072) A38 test port 1 bias tee to A29 test port 1 coupler

*For all analyzer serial numbers:*

- W73 (N5222-20029) Front-panel Port 1 CPLR THRU to A38 test port 1 bias tee
- W87 (N5222-20031) Front-panel Port 1 RCVR A IN A42 port 1 receiver attenuator
- W72 (N5222-20028) A34 test port 1 source attenuator to front-panel Port 1 SOURCE OUT
- W37 (N5222-20003) A33 reference mixer switch to A23 mixer brick (R1)
- W71 (N5222-20002) A25 test port 1 bridge to A34 test port 1 source attenuator
- W88 (N5222-20004) A42 port 1 receiver attenuator to A23 mixer brick (A)

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

2. Using a 5/16-in torque wrench set to 21 in-lbs, tighten the hex nuts (item ①) on all front panel cable connectors.
3. Connect a ribbon cable to each of the step attenuator connectors:
   a. Item ② connects between the A42 port 1 receiver attenuator and A19 test set motherboard connector J205.
   b. Item ③ connects between the A34 test port 1 source attenuator and A19 test set motherboard connector J201.
   c. Item ④ connects between the A45 port 2 receiver attenuator and A19 test set motherboard connector J208.
   d. Item ⑤ connects between the A37 test port 2 source attenuator and A19 test set motherboard connector J204.
4. Connect the bias tee cables:
   a. Item ⑥ connects between the A38 test port 1 bias tee and A19 test set motherboard connector J541.
   b. Item ⑦ connects between the A41 test port 2 bias tee and A19 test set motherboard connector J542.

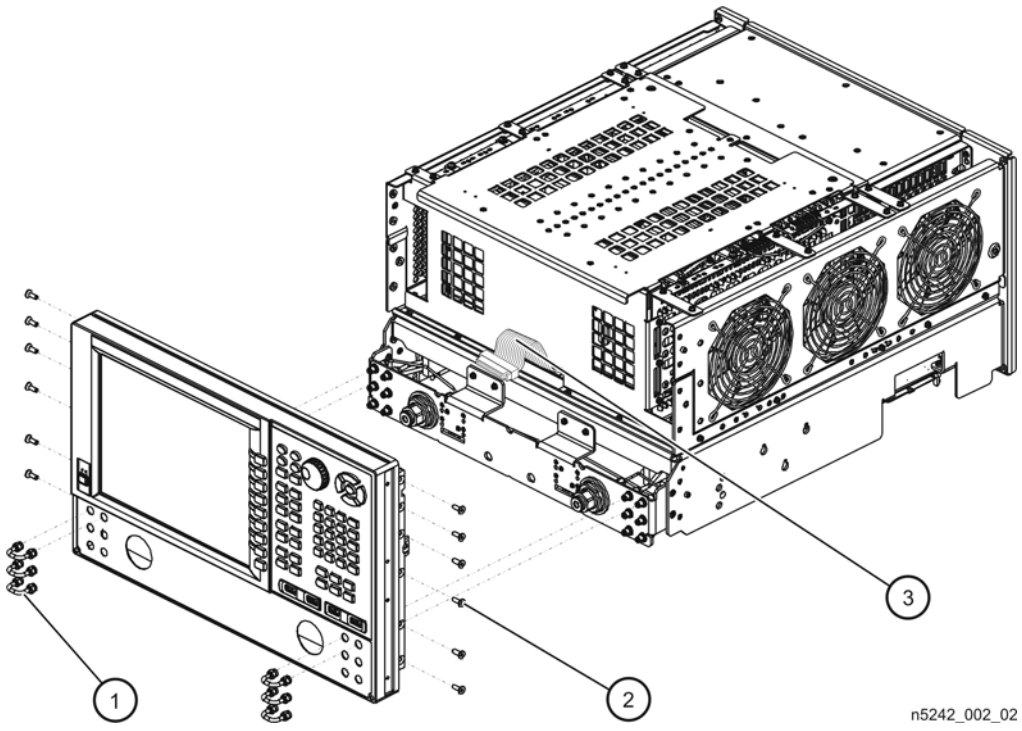
## Step 12. Reinstall the Front Panel Assembly and Front Panel Jumpers

**CAUTION** Before installing the front panel assembly onto the analyzer, lift and support the front of the analyzer chassis.

Refer to Figure 9 for this procedure. New parts are listed in Table 1 on page 7.

1. Make sure all of the hex nuts on the front-panel cable connectors have been tightened using a 5/16-in torque wrench set to 21-in lbs.
2. Reconnect the ribbon cable (item ③) to the A1 front panel interface board.
3. Slide the front panel over the front-panel connectors.
4. With a T-10 TORX driver, reinstall the 12 screws (item ②) in the sides of the frame.
5. Reinstall the semirigid jumpers (item ①) on the front panel, and tighten each of the connectors to 10-in lbs.

**Figure 9 Front Panel Assembly Reinstallation**




## Step 13. 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.

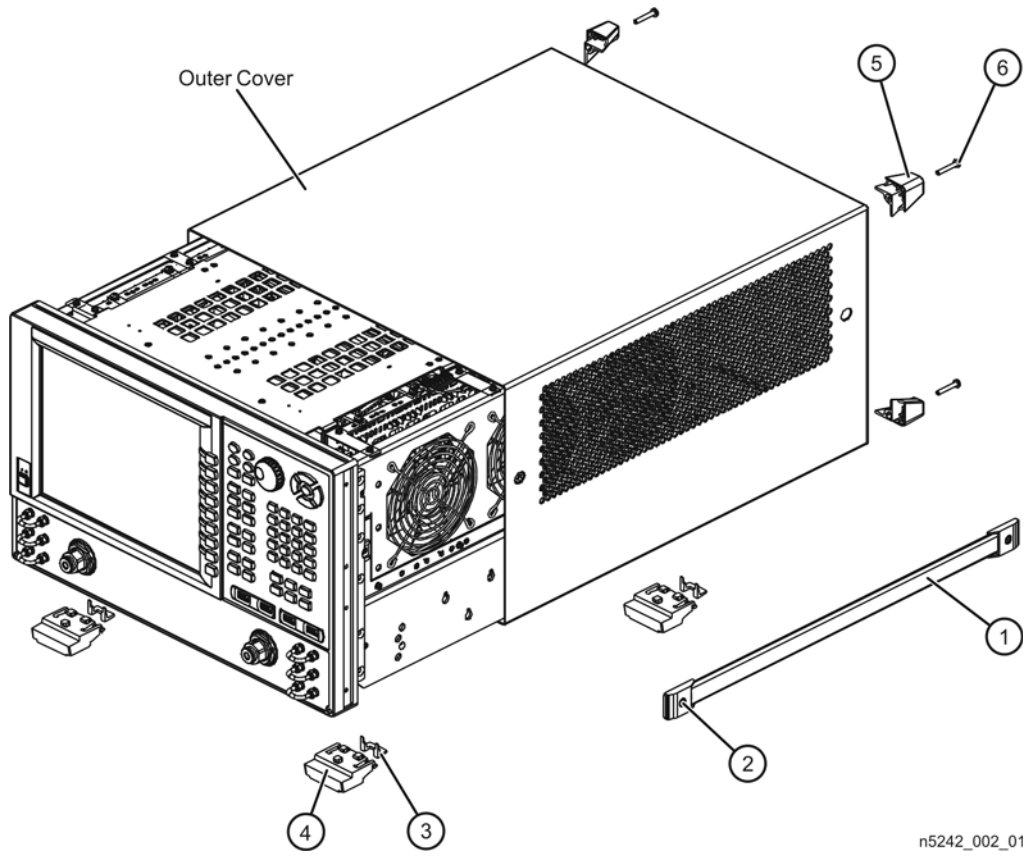
## Step 14. Reinstall the Outer Cover

**CAUTION** This procedure is best performed with the analyzer resting on its front handles in the vertical position. *Do not place the analyzer on its front panel without the handles*. This will damage the front panel assemblies.

Refer to Figure 10 for this procedure.

1. Slide the outer cover over the analyzer frame.
2. Install the four rear panel feet (item ⑤) by installing the center screws (item ⑥) with a T-20 TORX driver,.
3. Install the four bottom feet (item ④) onto the bottom of the outer cover then install the foot locks (item ③).
4. Install the strap handles (item ①) by tightening the screws (item ②) on both ends of the strap handle with a T-20 TORX driver.

**Figure 10 Outer Cover Reinstallation**



## Step 15. Enable Option 219

### Procedure Requirements

- The analyzer must be powered up and operating to perform this procedure.
- The Network Analyzer program must be running.
- A keyboard and mouse must be connected to the network analyzer.

### Option Enable Procedure

1. To start the option enable utility, press UTILITY System, then Service, then 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 **219 - Src/Rcvr Atten & Bias Ts 2-Port**. Click **Enable**.
4. Using the keyboard, enter the license key in the box provided. The license key is printed on 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 "219" is listed after "Options:" in the display. Click **OK**.

**NOTE** If Option 219 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 16. 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
- receiver characterization
- IF gain

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].

## Step 17. Prepare the PNA for the User

1. If necessary, reinstall front jumper cables.
2. Install 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.

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

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