

Installation Note

Option 015 Configurable Test Set Upgrade Kit

For PNA Series RF Network Analyzers (E8356A, E8357A, and E8358A)

Network Analyzer Model Number	Applicable Upgrade Kit Model Number
E8356A	E8356AU Option 015
E8357A	E8357AU Option 015
E8358A	E8358AU Option 015



Agilent Technologies

Agilent Part Number: E8356-90021

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About the Upgrade Kit

Products Affected:	E8356A and all Options E8357A and all Options E8358A and all Options
Installation to Be Performed By:	Agilent Service Center, Personnel Qualified by Agilent, or Customer
Estimated Installation Time:	2 hours
Estimated Verification Time:	5 minutes

If you need assistance, contact the nearest Agilent sales and service office. Refer to [Table 2 on page 17](#) for a list of offices.

Description of Option 015

An Option 015 analyzer can be configured to measure high-power devices and devices for high dynamic range.

For a high-power measurement, external amplifiers and high power attenuators or isolators can be added to complete the test setup. In this configuration, test port output power up to 1 Watt (+30 dBm) can be applied to the device under test (DUT). Additionally, there is an external reference input that allows the external amplifier's frequency response and drift to be ratioed out. There are also internal step attenuators between the coupler and the receivers to prevent receiver overload.

For high dynamic range measurements, front panel jumpers are moved to reverse the signal path through one of the couplers. This allows for a 15 dB improvement in transmitted signal sensitivity in one direction only. These jumpers are installed on both ports allowing the user to choose a high dynamic range measurement in either the forward or reverse direction.

Items Included in the Upgrade Kit

Table 1 lists the parts included in this upgrade kit, Agilent part number E8356-60102. Check the contents of your kit against this list.

Table 1 Contents of Option 015 Upgrade Kit (E8356-60102)

Ref Des	Description	Qty	Part Number
	Installation note (this document)	1	E8356-90021
	SMA feed-through connectors, female SMA to female SMA	4	1250-1251
A27,A28	35 dB step attenuator	2	33325-60008
	Machine screw, M3.0 x 8 (for attaching step attenuators and cable clamps)	6	0515-0372
	Ribbon cable, 35 dB step attenuator control	2	8121-0119
	Cable clamp	2	E8356-00021
W51	RF cable, A25 70 dB step attenuator to front panel Source Out	1	E8356-20067
W52	RF cable, A26 70 dB step attenuator to front panel Source Out	1	E8356-20068
W53	RF cable, front panel Coupler In to A23 test port 1 coupler	1	E8356-20069
W54	RF cable, front panel Coupler In to A24 test port 2 coupler	1	E8356-20070
W10	RF cable jumper, front panel	2	E8356-20072
W60	RF cable, A28 35 dB step attenuator to A21 channel B receiver	1	E8356-20075
W58	RF cable, front panel B In to A28 35 dB step attenuator	1	E8356-20076
W59	RF cable, A27 35 dB step attenuator to A18 channel A receiver	1	E8356-20077
W57	RF cable, front panel A In to A27 35 dB step attenuator	1	E8356-20078
W55	RF cable, A22 switch splitter to front panel R1 Out	1	E8356-20094
W56	RF cable, A22 switch splitter to front panel R2 Out	1	E8356-20095
	Lower front panel overlay	1	E8356-80003

Installation Procedure for the Upgrade Kit

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.**

Electrostatic Discharge Protection

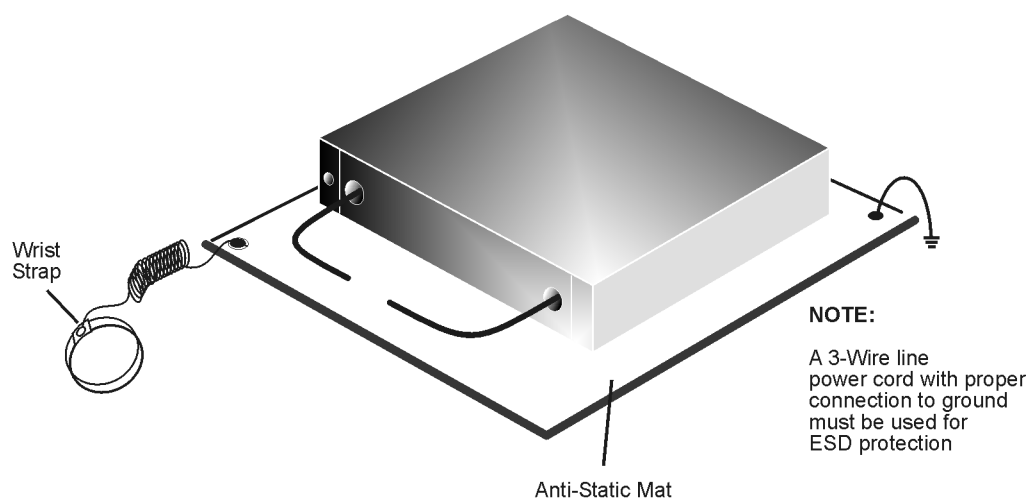
Protection against electrostatic discharge (ESD) is essential while removing or connecting cables or assemblies within the network analyzer.

Static electricity can build up on your body and can easily damage sensitive internal circuit elements when discharged. Static discharges too small to be felt can cause permanent damage. To prevent damage to the instrument:

- *always* wear a grounded wrist strap having a 1 M Ω resistor in series with it when handling components and assemblies.
- *always* use a grounded, conductive table mat while working on the instrument.
- *always* wear a heel strap when working in an area with a conductive floor. If you are uncertain about the conductivity of your floor, wear a heel strap.

Figure 1 shows a typical ESD protection setup using a grounded mat and wrist strap. Refer to “Tools and Equipment Required for the Installation” on page 6 for part numbers.

Figure 1 **ESD Protection Setup**



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Overview of the Installation Procedure

The following steps comprise the installation of the Option 015 upgrade kit.

1. Remove the outer cover.
2. Remove the front panel assembly.
3. Remove the standard instrument cables (to prepare for installation of the step attenuators).
4. Install the Option 015 cables and step attenuators.
5. Replace the lower front panel overlay.
6. Reinstall the front panel assembly.
7. Reinstall the outer cover.
8. Enable Option 015.
9. Verify that Option 015 is enabled.

Tools and Equipment 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
ESD grounding wrist strap	1	9300-1367
5 ft grounding cord for wrist strap	1	9300-0980
2 x 4 ft conductive table mat and 15 ft grounding wire	1	9300-0797
ESD heel strap (for use with conductive floors)	1	9300-1308

CAUTION Use a 5/16 in torque wrench (set to 10 in-lbs) on all SMA cable connections.

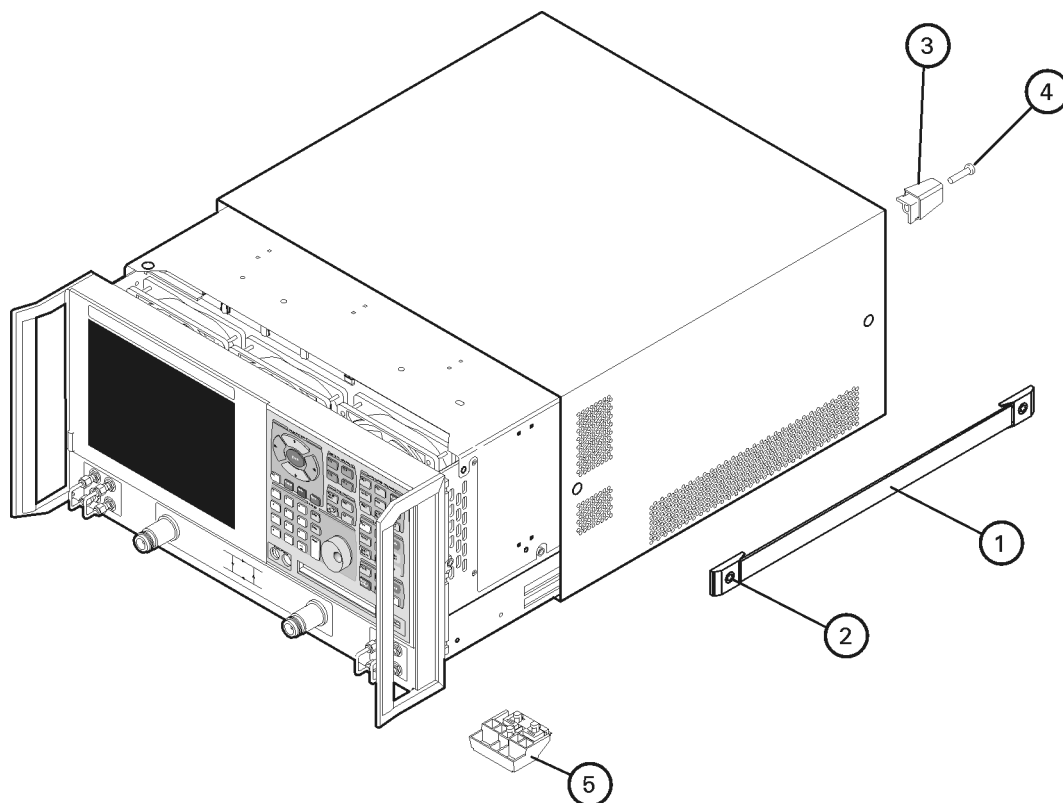
Step 1. Remove the Outer Cover

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 2](#) for this procedure.

1. Disconnect the power cord (if it has not already been disconnected).
2. With a T-20 TORX driver, remove the strap handles (item ①) by loosening the screws (item ②) on both ends until the handle is free of the analyzer.
3. With a T-20 TORX driver, remove the four rear panel feet (item ③) by removing the center screws (item ④).
4. Slide the four bottom feet (item ⑤) off the cover.
5. Slide the cover off of the frame.

Figure 2 Outer Cover Removal



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Step 2. Remove the Front Panel Assembly

CAUTION Use a 5/16 in torque wrench (set to 10 in-lbs) on all SMA cable connections.

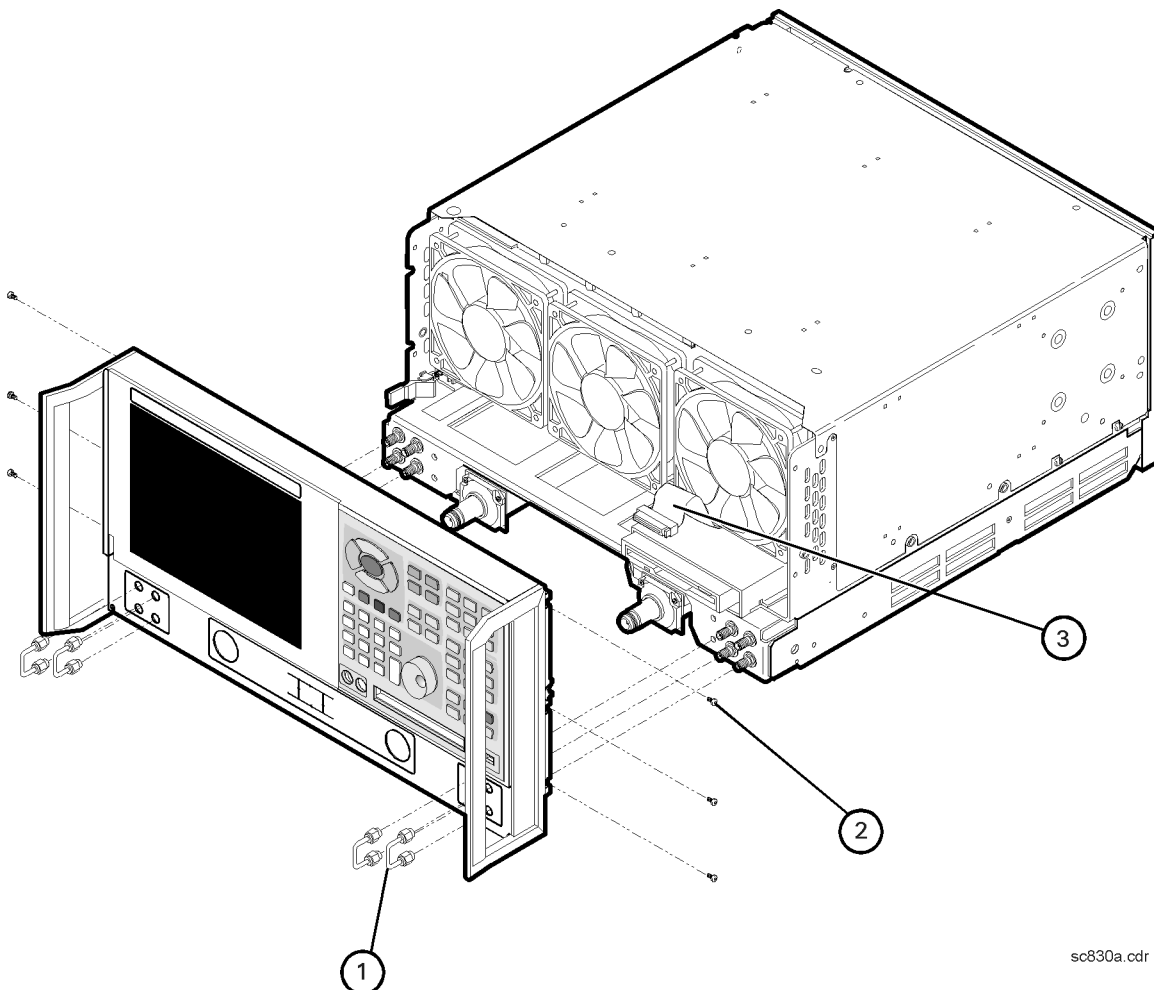
Refer to [Figure 3](#) for this procedure.

1. Remove all the semirigid jumpers (item ①) from the front panel and set aside for reinstallation later.
2. With a T-10 TORX driver, remove the six 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 3 Front Panel Assembly Removal



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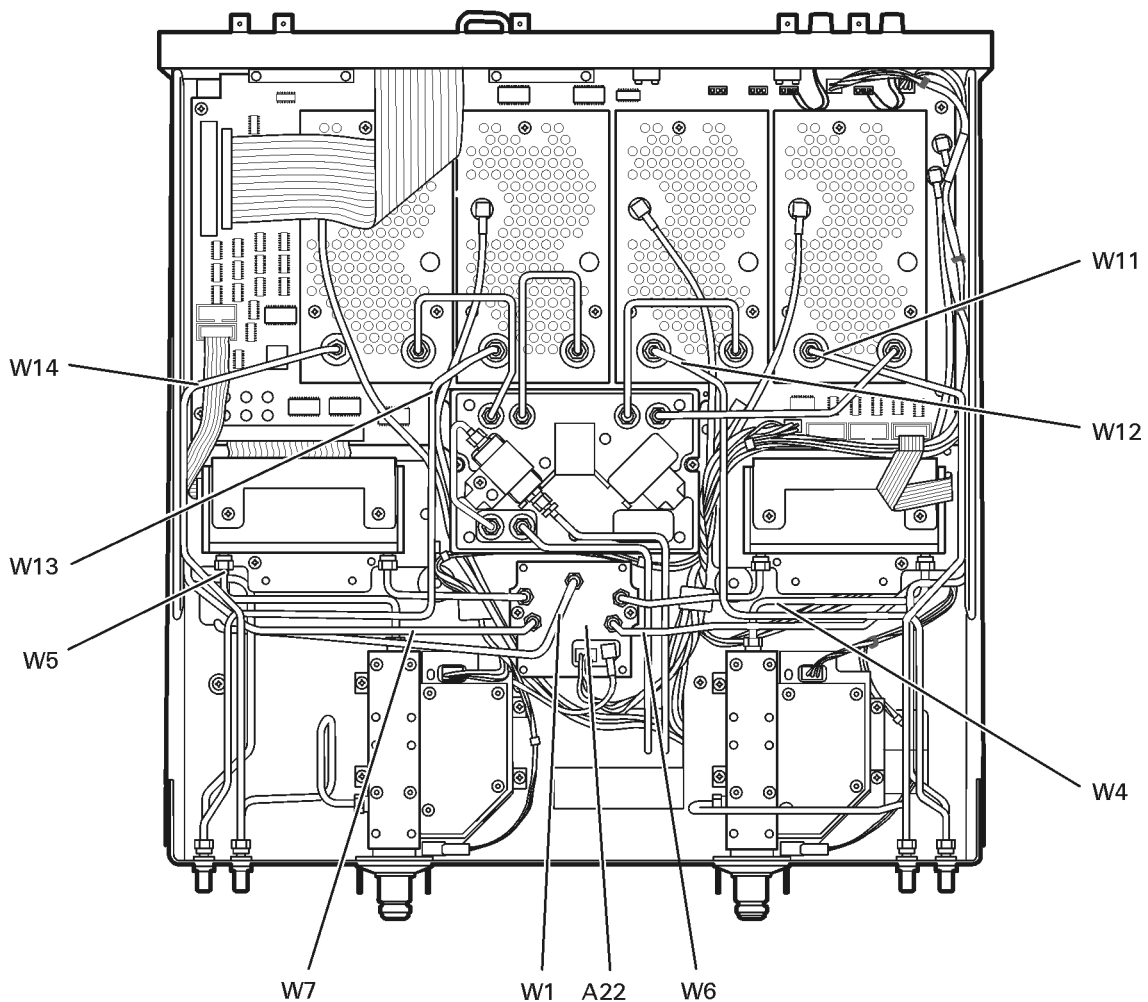
Step 3. Remove the Standard Cables

CAUTION Use a 5/16 in torque wrench (set to 10 in-lbs) on all SMA cable connections.

Refer to [Figure 4](#) for this procedure.

1. Remove and discard the following cables: W4, W5, W6, W7, W11, and W14.
2. Remove and set aside (for reinstallation later) the following cables: W12 and W13.
3. Disconnect W1 from the A22 Switch Splitter.

Figure 4 Standard Cable Removal



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Step 4. Install the Option 015 Cables and Step Attenuators

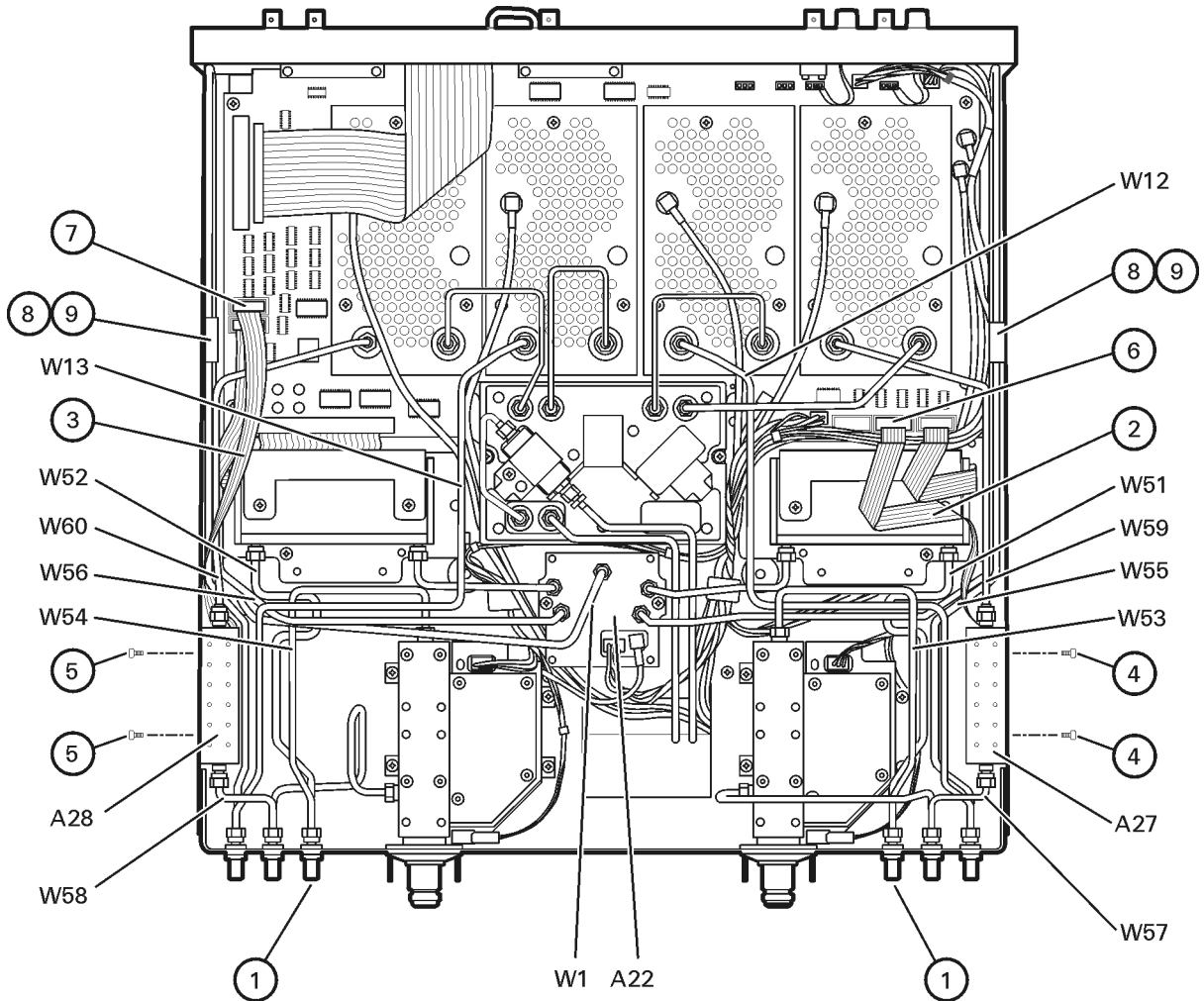
CAUTION Use a 5/16 in torque wrench (set to 10 in-lbs) on all SMA cable connections.

NOTE The new parts referenced in this procedure are listed in [Table 1 on page 4](#).

Refer to [Figure 5](#) for this procedure.

1. Install four additional SMA feed-through connectors (item ①) in the front of the chassis in the holes provided.
2. Install W55 and W56.
3. Install W51 and W52.
4. Reinstall the W12 and W13 cables set aside in step 3.
5. Install W53 and W54.
6. Connect the ribbon cables (items ② and ③) to the A27 and A28 step attenuators.
7. *Loosely* connect W57 to the A27 step attenuator. Be sure to connect the cable to the attenuator port on the opposite end of the attenuator from the ribbon cable connector.
8. Place the A27 step attenuator assembly, with W57 *loosely* attached, into position in the analyzer, and *loosely* connect the other end of W57 to the front panel SMA feed-through connector.
9. Secure the A27 step attenuator using two of the machine screws (item ④) supplied.
10. Tighten the connections at both ends of W57.
11. *Loosely* connect W58 to the A28 step attenuator. Be sure to connect the cable to the attenuator port on the opposite end of the attenuator from the ribbon cable connector.
12. Place the A28 step attenuator assembly, with W58 *loosely* attached, into position in the analyzer, and *loosely* connect the other end of W58 to the front panel SMA feed-through connector.
13. Secure the A28 step attenuator using two of the machine screws (item ⑤) supplied.
14. Tighten the connections at both ends of W58.
15. Connect the attenuator ribbon cables (items ② and ③) to their corresponding sockets (items ⑥ and ⑦) on the A16 test set motherboard.
16. Install W59 and W60.
17. Install two cable clamps (item ⑧) using the two remaining machine screws (item ⑨) supplied.
18. Reconnect W1 to the A22 switch splitter.

Figure 5 Option 015 Cable and Step Attenuator Installation



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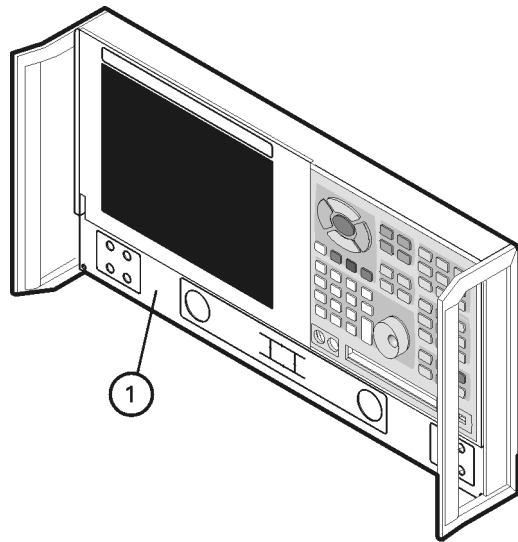
Step 5. Replace the Lower Front Panel Overlay

NOTE The new parts referenced in this procedure are listed in [Table 1 on page 4](#).

Refer to [Figure 6](#) for this procedure.

1. Remove the standard lower front panel overlay (item ①) from the front panel assembly:
 - a. From the back side of the front panel, use a blunt object in one of the unused cutouts in the frame, to push the overlay and separate it from the front panel.
 - b. From the front side of the front panel, pull the overlay completely off and discard it.
 - c. Remove any adhesive remaining on the front panel.
2. Remove the protective backing from the new Option 015 front panel overlay.
3. Starting from either the left or right side, *loosely* place the overlay in the recess on the lower front panel, ensuring that it fits tightly against the recess edges.
4. Once the overlay is in place, press it firmly onto the frame to secure it.

Figure 6 Lower Front Panel Overlay Replacement



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Step 6. Reinstall the Front Panel Assembly

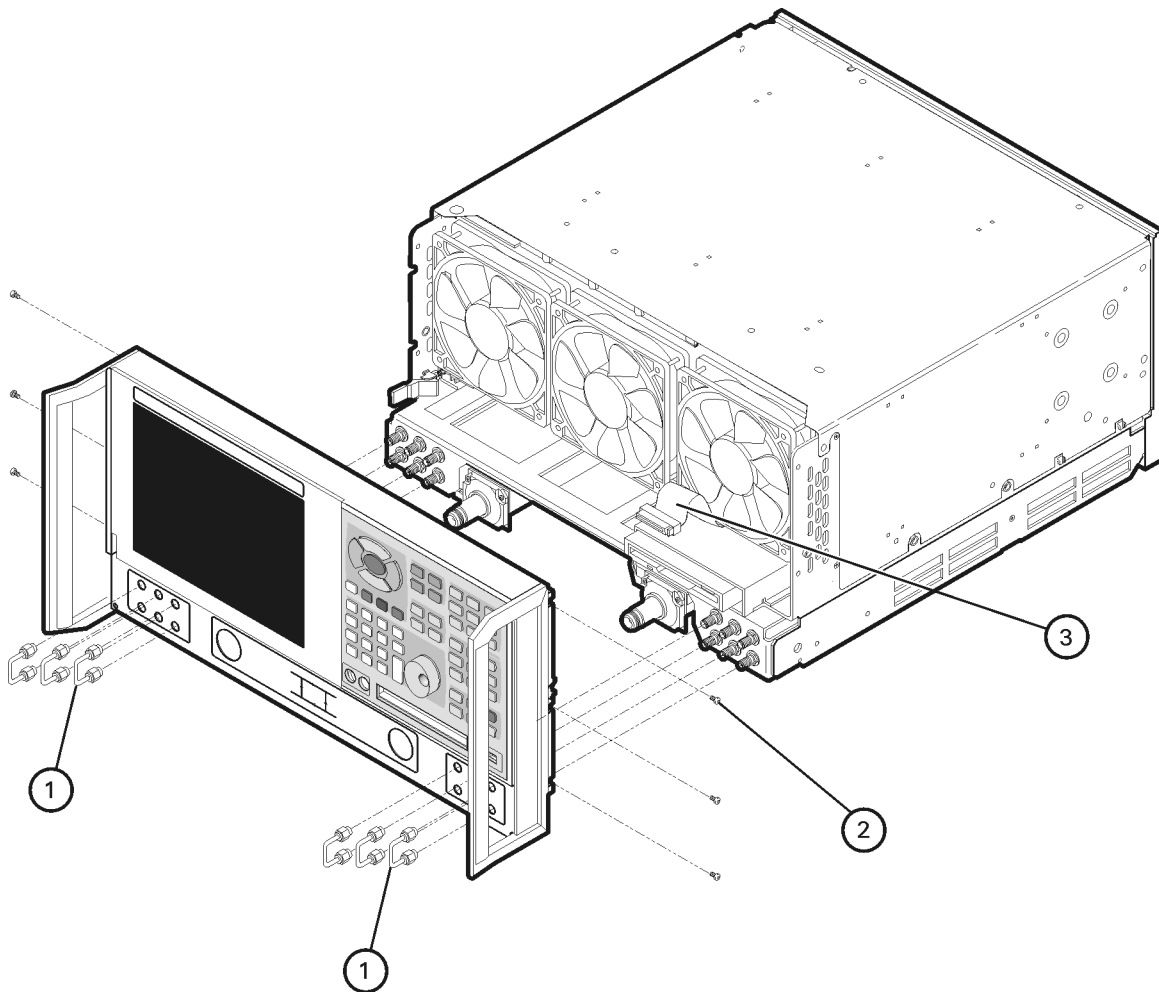
CAUTION Use a 5/16 in torque wrench (set to 10 in-lbs) on all SMA cable connections.

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

Refer to [Figure 7](#) for this procedure.

1. Connect the front panel interface ribbon cable (item ③).
2. Slide the front panel over the test port connectors being careful to align the power switch and floppy disk drive to their corresponding front panel cutouts.
3. With a T-10 TORX driver, install the six screws (item ②) in the sides of the frame.
4. Install the semirigid jumpers (item ①) on the front panel; four jumpers removed in step 2 and two new jumpers supplied in this kit.

Figure 7 Front Panel Assembly Reinstallation



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Step 7. Reinstall the Outer Cover

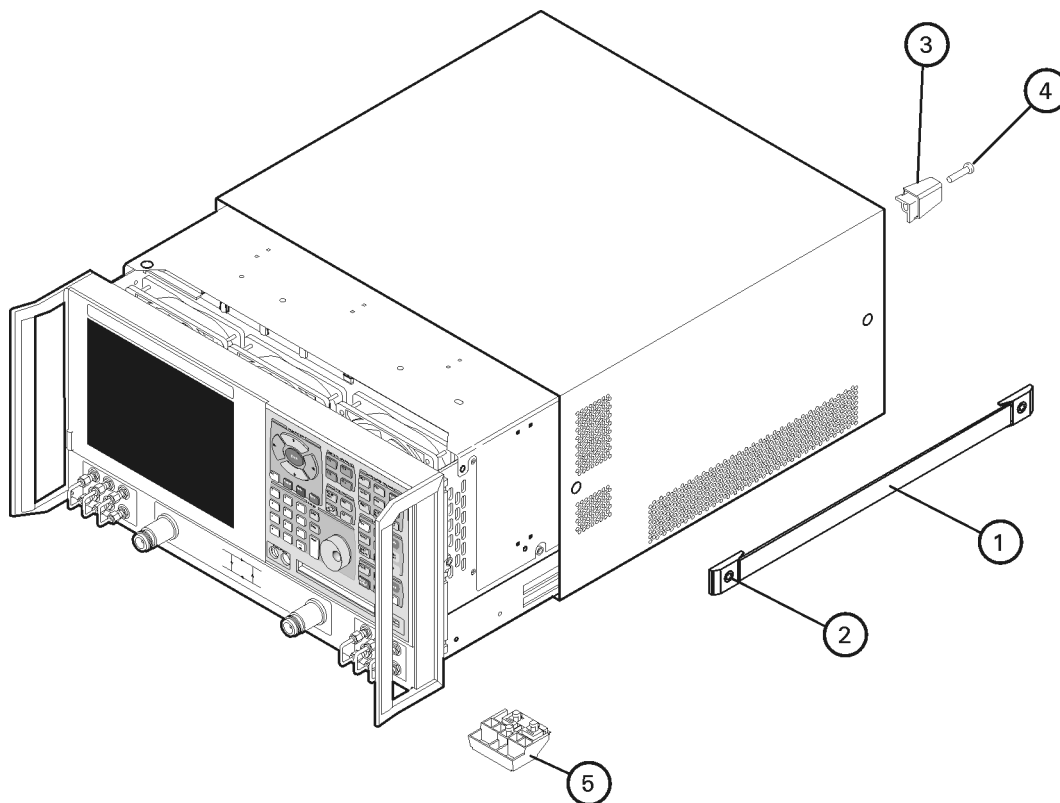
CAUTION This procedure is best performed with the analyzer resting on its front handles in the vertical position. *Do not place the analyzer on its front panel without the handles.* This will damage the front panel assemblies.

Refer to [Figure 8](#) for this procedure.

1. Slide the cover over the analyzer frame.
2. Slide the four bottom feet (item ⑤) into position on the cover.
3. With a T-20 TORX driver, install the four rear panel feet (item ③) by installing the center screws (item ④).

NOTE With a T-20 TORX driver, install the strap handles (item ①) by installing the screws (item ②) on both ends of the handle. [Table 2 on page 17](#)

Figure 8 Outer Cover Reinstallation



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Step 8. Enable Option 015

Procedure Requirements

- The analyzer must be powered up and operating to perform this procedure.
- The Network Analyzer program must be running.
- A mouse is recommended for this procedure but is not required.

Mouse Procedure

1. On the analyzer's **System** menu, point to **Service**, and then click **Option Enable**.
2. In the **Select Desired Option** list, click **015 - Configurable Test Set**.
3. Click **Install**.
4. Click **Yes** in answer to the displayed question in the **Restart Analyzer?** box.
5. When the installation is complete, click **Exit**.

Front Panel Keys Procedure

1. In the **COMMAND** block, press **Menu/Dialog**.
2. In the **NAVIGATION** block, press the Right Tab and Arrows to move over to the **System** menu and down to the **Service** selection. Press the Right Tab to display the extended menu and the Arrows to select **Option Enable**. Press **Click**.
3. Tab to the **Select Desired Option** list, and press Arrows to select **015 - Configurable Test Set**.
4. Tab to **Install**, and then press **Click**.
5. Click **Yes** in answer to the displayed question in the **Restart Analyzer?** box.
6. When the installation is complete, in the **COMMAND BLOCK**, press **OK** (or Tab to **OK**, and then press **Click**).

Step 9. Verify that Option 015 is Enabled

Procedure Requirements

- The analyzer must be powered up and operating to perform this procedure.
- The Network Analyzer program must be running.
- A mouse is recommended for this procedure but is not required.

Mouse Procedure

1. On the analyzer's **Help** menu, click **About Network Analyzer**.
2. Verify that "015" is listed after "Options:" in the display. Click **OK**.

NOTE If Option 015 has not been enabled, perform step 8 again. If the option is still not enabled, contact the nearest Agilent sales or service office listed in [Table 2 on page 17](#).

Front Panel Keys Procedure

1. In the **COMMAND** block, press **Menu/Dialog**.
2. In the **NAVIGATION** block, press the Right Tab and Arrows to move over to the **Help** menu, and down to the **About Network Analyzer** selection. Press **Click**.
3. Verify that "015" is listed after "Options:" in the display. In the **COMMAND BLOCK**, press **OK** (or Tab to **OK**, and then press **Click**).

NOTE If Option 015 has not been enabled, perform step 8 again. If the option is still not enabled, contact the nearest Agilent sales or service office listed in [Table 2 on page 17](#).

Getting Assistance from Agilent

To get assistance from Agilent, contact the nearest sales or service office listed below.

Table 2 Agilent Sales and Service Offices

UNITED STATES		
<p>Instrument Support Center Agilent Technologies (800) 403-0801</p>		
EUROPEAN FIELD OPERATIONS		
<p>Headquarters Agilent Technologies S.A. 150, Route du Nant-d'Avril 1217 Meyrin 2/ Geneva Switzerland (41 22) 780.8111</p>	<p>France Agilent Technologies France 1 Avenue Du Canada Zone D'Activite De Courtaboeuf F-91947 Les Ulis Cedex France (33 1) 69 82 60 60</p>	<p>Germany Agilent Technologies GmbH Agilent Technologies Strasse 61352 Bad Homburg v.d.H Germany (49 6172) 16-0</p>
<p>Great Britain Agilent Technologies Ltd. Eskdale Road, Winnersh Triangle Wokingham, Berkshire RG41 5DZ England (44 118) 9696622</p>		
INTERCON FIELD OPERATIONS		
<p>Headquarters Agilent Technologies 3495 Deer Creek Rd. Palo Alto, CA 94304-1316 USA (415) 857-5027</p>	<p>Australia Agilent Technologies Australia Ltd. 31-41 Joseph Street Blackburn, Victoria 3130 (61 3) 895-2895</p>	<p>Canada Agilent Technologies (Canada) Ltd. 17500 South Service Road Trans-Canada Highway Kirkland, Quebec H9J 2X8 Canada (514) 697-4232</p>
<p>Japan Agilent Technologies Japan, Ltd. Measurement Assistance Center 9-1, Takakura-Cho, Hachioji-Shi, Tokyo 192-8510, Japan TEL (81) -426-56-7832 FAX (81) -426-56-7840</p>	<p>Singapore Agilent Technologies Singapore (Pte.) Ltd. 150 Beach Road #29-00 Gateway West Singapore 0718 (65) 291-9088</p>	<p>Taiwan Agilent Technologies Taiwan 8th Floor, H-P Building 337 Fu Hsing North Road Taipei, Taiwan (886 2) 712-0404</p>
<p>China China Agilent Technologies 38 Bei San Huan X1 Road Shuang Yu Shu Hai Dian District Beijing, China (86 1) 256-6888</p>		