# Keysight Technologies N9020B MXA Signal Analyzer

Option EXM, External Mixing Upgrade Kit

KEYSIGHT TECHNOLOGIES

Installation Note

# Notices



The information contained in this document is subject to change without notice.

Keysight Technologies makes no warranty of any kind with regard to this material, including but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Keysight Technologies shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

**Manual Part Number**
N9020-90263

**Edition**
Edition 1, September 2018
Supersedes August 2018

Printed in USA/Malaysia

Published by:
Keysight Technologies, Inc.
1400 Fountaingrove Parkway
Santa Rosa, CA 95403

# Option EXM, External Mixing Upgrade Kit

| | |
|---|---|
| Products Affected: | N9020B MXA Signal Analyzer |
| Serial Numbers: | All |
| To Be Performed By: | (X) Keysight Service Center |
| | (X) Personnel Qualified by Keysight |
| | ( ) Customer |
| Estimated Installation Time: | 2.0 Hours |
| Estimated Adjustment Time: | 4.0 Hours |
| Estimated Verification Time: | 4.0 Hours |

## Introduction

This installation note explains how to install the hardware and provides guidelines for adjustment and verification for Option EXM, External Mixing Upgrade for N9020B MXA signal analyzers.

This kit includes the necessary license, cables and connectors required for External Mixing.

Depending upon what other options are already installed, the A15 Front End Controller board currently installed in the MXA may also need to be replaced with the Enhanced Front End Controller (EFEC) board included in this kit. To allow the necessary adjustments the EFEC requires, a license for Option CR3, 2nd IF Output is also included.

Software and test equipment is required for making adjustments and for performance verification testing. Information on how to obtain this software can be found at:
www.keysight.com/find/calibrationsoftware

**NOTE**

The instrument must be readjusted and the performance tested to assure the instrument meets specifications following the hardware installation. The X-Series Performance Verification and Adjustment Software must be used and have revision A.16.00 or later (for RF/microwave analyzers) or A.21.00 or later (for millimeter wave analyzers). All adjustments are automated. This software is included in the N7814A, Keysight X-Series Signal Analyzer Calibration Application software.

## Installation Kit Parts List

| Quantity | Description | Keysight Part Number |
|---|---|---|
| 1 | A15 Front End Controller w/ IF MUX | N9020-60172 |
| 1 | Adapter-Coaxial Straight Female-SMA to Female-SMA, 50 Ω | 1250-1666 |
| 1 | Washer, Lock, Internal Tooth, ¼-inch | 2190-0067 |
| 1 | Nut-Hex-Double-Chamfer ¼-36-THD .125-IN-THK Stainless Steel | 2950-0223 |
| 1 | 50 Ω Termination, SMA male | 1810-0118 |
| 12 | Screw, M3 x 0.5, (6 mm long), flathead | 0515-1946 |
| 1 | Cable Assembly, External Mixing, Front Panel (W27) | N9020-20166 |
| 1 | Cable Assembly, μW Front End to W27 (W28)<br>(for RF/microwave analyzers) | N9020-20241 |
| 1 | Cable Assembly, mmw Front End to W27 (W28)<br>(for millimeter wave analyzers) | N9020-20296 |
| 1 | Opt EXM/HL6 Cable Kit with Wire Markers<br>(includes W26, W36, W37, and W39, listed below) | N9020-60212 |
| 1 | Cable Assembly, Coaxial 350 mm LG (W26)<br>(for RF/microwave analyzers) | 8121-2027[a] with ends labeled '903' and '13' |
| 1 | Cable Assembly, Coaxial 275 mm LG (W26)<br>(for millimeter wave analyzers) | 8121-2025[a] with ends labeled '903' and '13' |
| 1 | Cable Assembly, Coaxial 240 mm LG (W36) | 8121-1862[a] with ends labeled '902' and '7' |
| 1 | Cable Assembly, Coaxial 530 mm LG (W37) | 8121-1401[a] with ends labeled '900' and '100' |
| 1 | Cable Assembly, Coaxial 525 mm LG (W39) | 8121-2028[a] with one end labeled '1100' |
| 1 | Label, Warning | N9030-80018 |
| 5 | Cable Ties | 1400-0249 |
| 1 | Entitlement Certificate | 5964-5178 |
| 1 | Entitlement Certificate Envelope | 5967-7169 |
| 1 | Installation Note | This note |

a. This cable is included in the Opt EXM/HL6 Cable Kit with Wire Markers, p/n N9020-60212.

## Tools Required

- T-10 TORX Driver
- T-20 TORX Driver
- 5/16-inch torque wrench
- ¼-inch open-end wrench
- 9/16-inch nut driver
- Scissors or knife
- Diagonal cutters
- Keysight Calibration and Adjustment Software, N7814A (revision E.16.00 or later for RF/microwave analyzers, or E.21.00 or later for millimeter wave analyzers)
- Test equipment and computer supported by the X- Series Performance Tests and Adjustment Software
- MXA Signal Analyzer Service Guide. This manual is available online at the following URL:

  www.keysight.com/find/N9020B_service_guide
- Microsoft Windows based personal computer with internet access and USB port
- USB storage device with > 2 GB free memory

## Initial Instrument Functionality Check

Power on the instrument and allow the instrument to boot up. Run an alignment and display the measurement screen. (The instrument will probably display a spectrum analyzer screen and you will see the instrument sweeping.)

There should be no alignment failures. If there are failures, investigate and fix the problem before continuing.

**WARNING** Before you disassemble the instrument, turn the power switch to Standby. After the instrument has completely shut down, unplug the instrument. Failure to unplug the instrument can result in personal injury.

**CAUTION** Electrostatic discharge (ESD) can damage or destroy electronic components. All work on electronic assemblies should be performed at a static-safe workstation. Refer to the documentation that pertains to your instrument for information about static-safe workstations and ordering static-safe accessories.

## Installation Procedure

### Analyzer Information

1. Connect a power cord to the analyzer and turn on the analyzer.
2. After the analyzer has completed turning on, press **System**, **Show System**. Make note of the following information from the Show System screen:

   Product Number: _____
   Serial Number: _____
   Instrument S/W Revision: _____

3. Check for the presence of one of the following options listed below in the Show System. Put a check mark or "X" after the option listed below that appears in the Show System menu.

   N9020B-B40_____
   N9020B-CR3_____
   N9020B-CRP_____
   N9020B-DP2_____
   N9020B-MPB_____
   N9020B-BBA_____
   N9020B-503_____
   N9020B-508_____
   N9020B-513_____
   N9020B-526_____
   N9020B-532_____
   N9020B-544_____
   N9020B-550_____

4. On the analyzer, press **System**, **Show Hardware**. Note the Part #, Matl Rev, Rev, OF Rev, and Hw Id of the Front End Controller and Front End in the table below.

| Assembly Name | Part # | Matl Rev | Rev | OF Rev | Hw Id |
|---|---|---|---|---|---|
| Front End Controller | | | | | |

5. Refer to the data in step 2 above. If the Product Number is not N9020B, **do not proceed** with the installation of this kit. This kit is to be installed only on N9020B signal analyzers.
6. Refer to the data in step 3 above. If option N9020B-BBA is present, there will be additional steps required to remove and replace the front panel assembly.
7. Refer to the data in step 3 above. If option N9020A-B40, N9020A-MPB and/or N9020A-DP2 is already present, the EFEC is already installed and you do not need to perform the Replace Front End Controller procedure.
8. Refer to the data in step 3 and step 4 above. If the analyzer has N9020B-CR3 and/or N9020B-CRP installed, verify that it also has a Front End Controller with Hw Id of 75. If the Front End Controller has a Hw Id of 75, you do not need to perform the Replace Front End Controller procedure.

## Update Instrument Software

Updating the instrument software and installing the necessary licenses before installing the new hardware will help ensure that the hardware installation was successful.

Go to the following website and determine whether or not the analyzer has the latest instrument software already installed:

http://www.keysight.com/find/xseries_software

If the analyzer does not have the latest instrument software already installed, download and install the latest version.

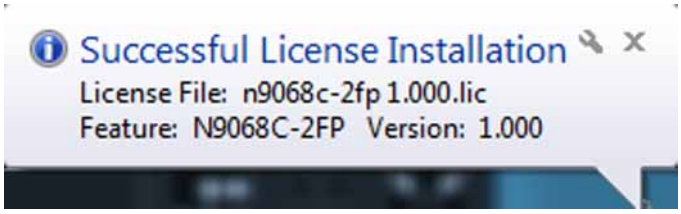
## Licensing the New Options

1. Locate the Option Upgrade Entitlement Certificate (5964-5178) from the kit.
2. Redeem the Option Upgrade Entitlement Certificate by following the instructions on the Certificate.
3. After redeeming your Option Upgrade Entitlement Certificate you will receive an email with an attached License File.
4. Locate a USB storage device. Perform a virus scan on this device before use.
5. Save the License File to the root directory of the USB Storage Device.
6. Connect the USB Storage Device to one of the analyzer's USB ports. Connect a mouse to another USB port. Windows will detect the new hardware and may display the configuration menu shown in Figure 1. This menu may be configured according to your preferences.

**Figure 1** USB Storage Device Configuration Menu

7. The signal analyzer will automatically consume the License File. (This may take a few minutes) When the License File is consumed the Keysight License Manager will display a “Successful License Installation” message similar to the one shown in Figure 2. Since the license file contains multiple licenses, multiple “Successful License Installation” messages will appear. Wait until all licenses have been consumed before removing the USB Storage Device.

**Figure 2** Successful License Installation




Verify the License Installation

1. Before the licenses will be recognized, the XSA application must be restarted. Press **File**, **Exit**. An Exit Analyzer dialog box will appear; press Enter to confirm the exit.
2. Double-click on the LaunchXSA icon on the Windows desktop. Wait for the XSA application to finish starting (the analyzer should be sweeping).
3. Press **System**, **Show System** on the analyzer to display a list of all displayed options. You should see the following options listed:
   - N9020B-EXM External Mixing
   - N9020B-CR3 Connector Rear, 2nd IF Output

## Analyzer Disassembly

**CAUTION** If the instrument is placed on its face during any of the following procedures, be sure to use a soft surface or soft cloth to avoid damage to the front panel, keys, or input connector.

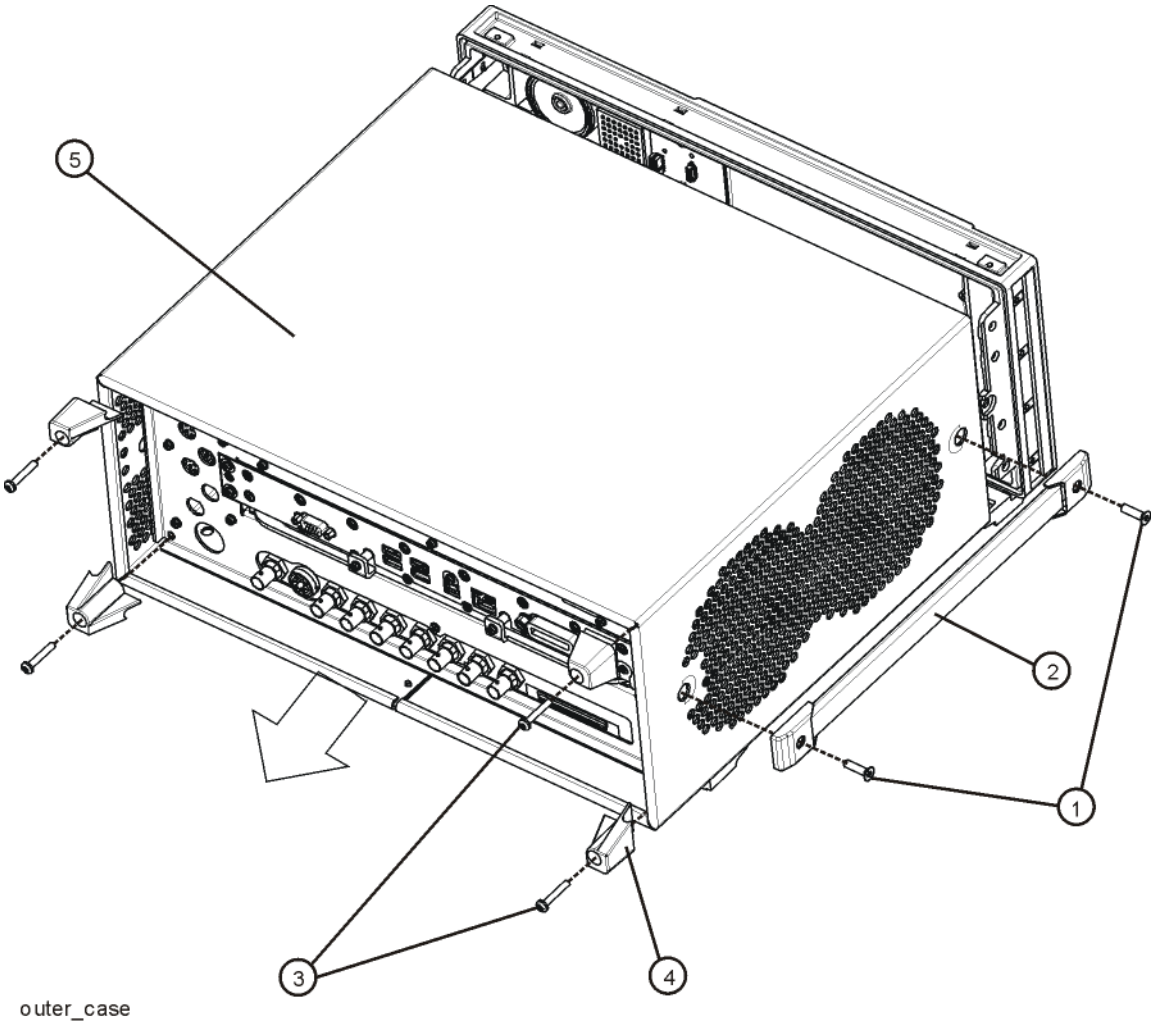
**NOTE** If the analyzer has Option PRC, Portable Configuration, refer to the "Portable Instrument (Option PRC)" section on page 12 to remove the outer case.

**NOTE** Make sure any adapters on the front panel are removed.

## Standard Instrument (Benchtop Configuration)

1. Disconnect the instrument from ac power.
2. Refer to Figure 3. Using the T-20 driver, remove the four screws (two on each side) (1) that attach the handle strap (2) on each side of the instrument.
3. Using the T-20 driver, remove the four screws (including washers) (3) that hold the rear feet (4) in place.
4. Pull the instrument cover (5) off towards the rear of the instrument.

**Figure 3** Standard Instrument Outer Case Removal



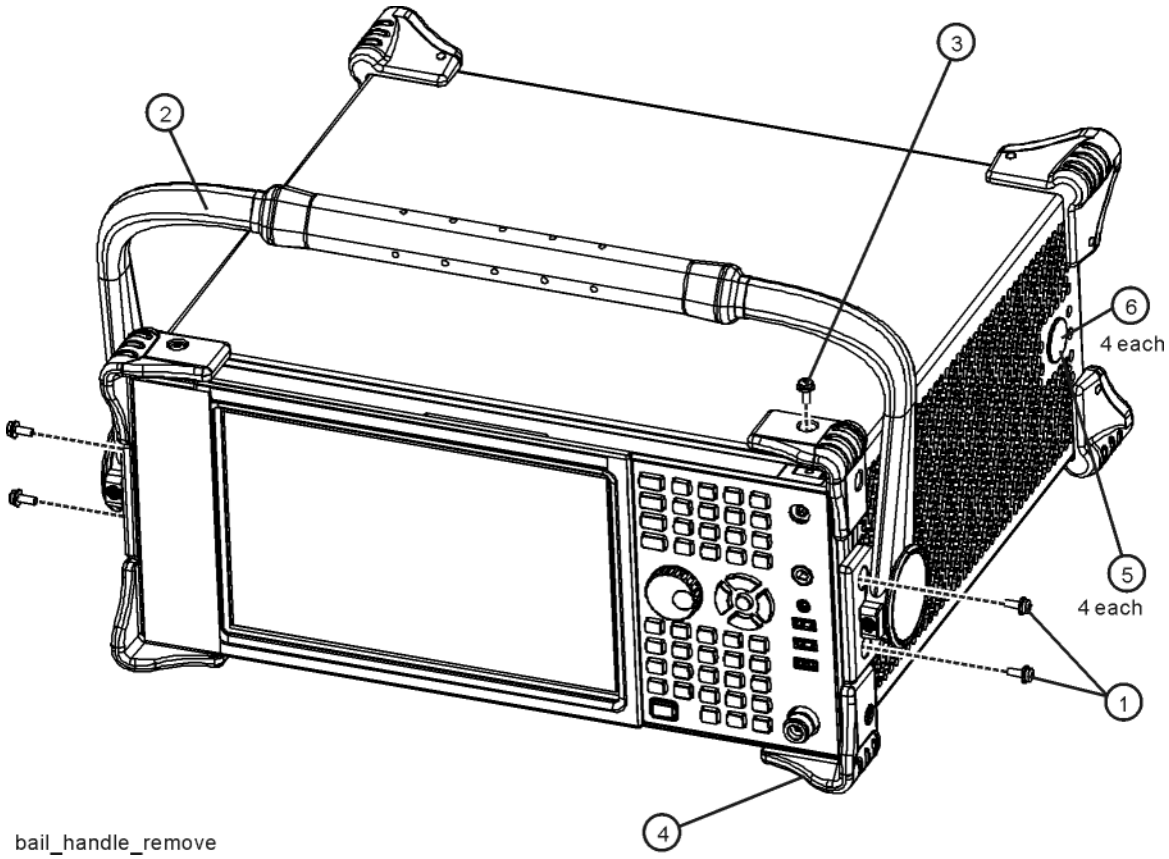

5. Proceed to the Front Frame Assembly Removal section to remove the front frame.

## Portable Instrument (Option PRC)

**NOTE** Make sure any adapters on the front panel are removed.

1. Disconnect the instrument from ac power.
2. Refer to Figure 4. Using the T-20 driver, remove the four screws (two on each side) (1) that hold the bail handle (2) to the front frame.

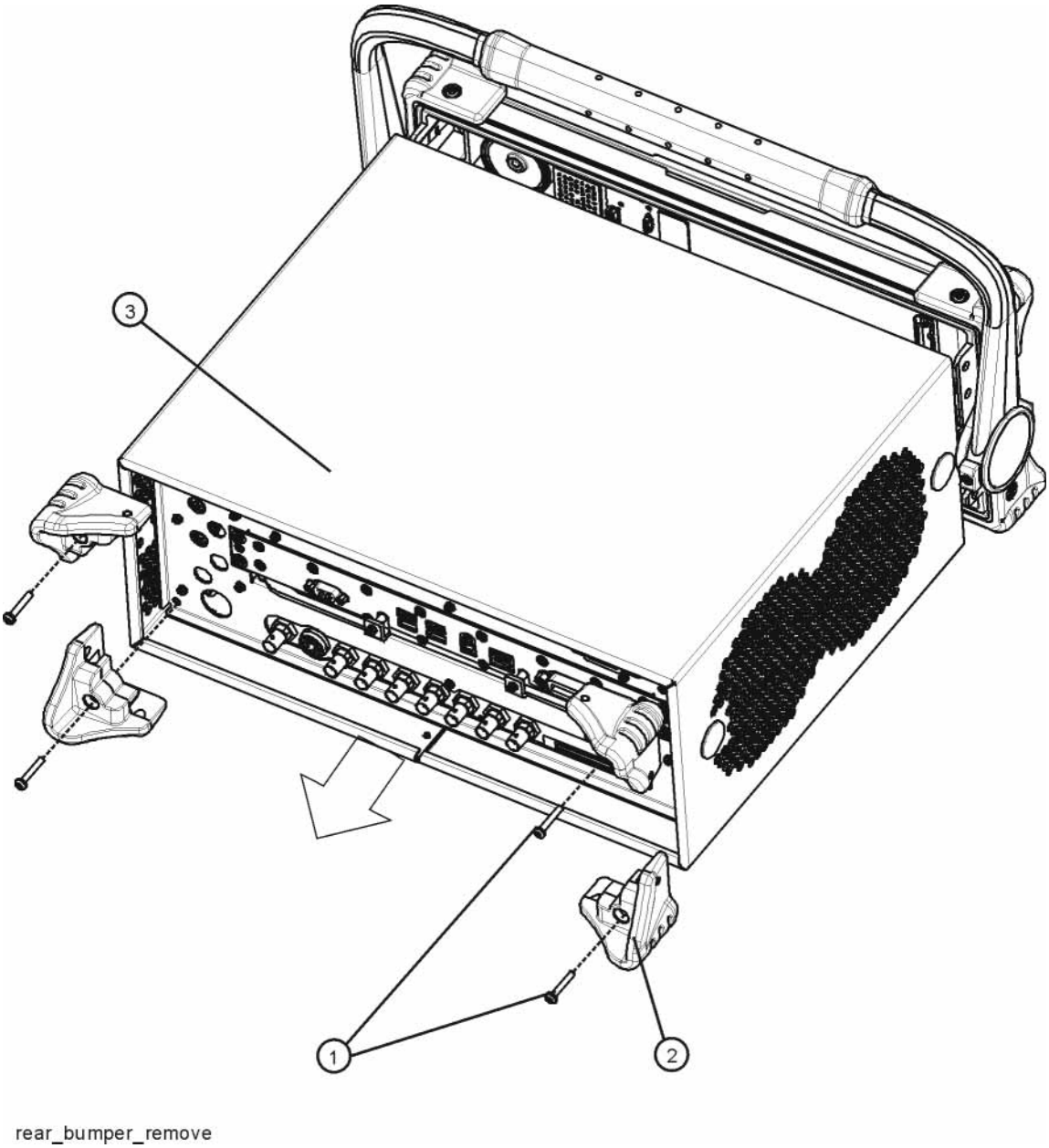
**Figure 4** Bail Handle Removal




3. Using the T-20 driver, remove the four screws (two on each side) (6) that hold the strap handle plugs (5) in place.

4. Refer to Figure 5. Using the T-20 driver, remove the four screws including washers (1) that hold the rear bumpers (2) in place.
5. Pull the instrument cover (3) off towards the rear of the instrument.

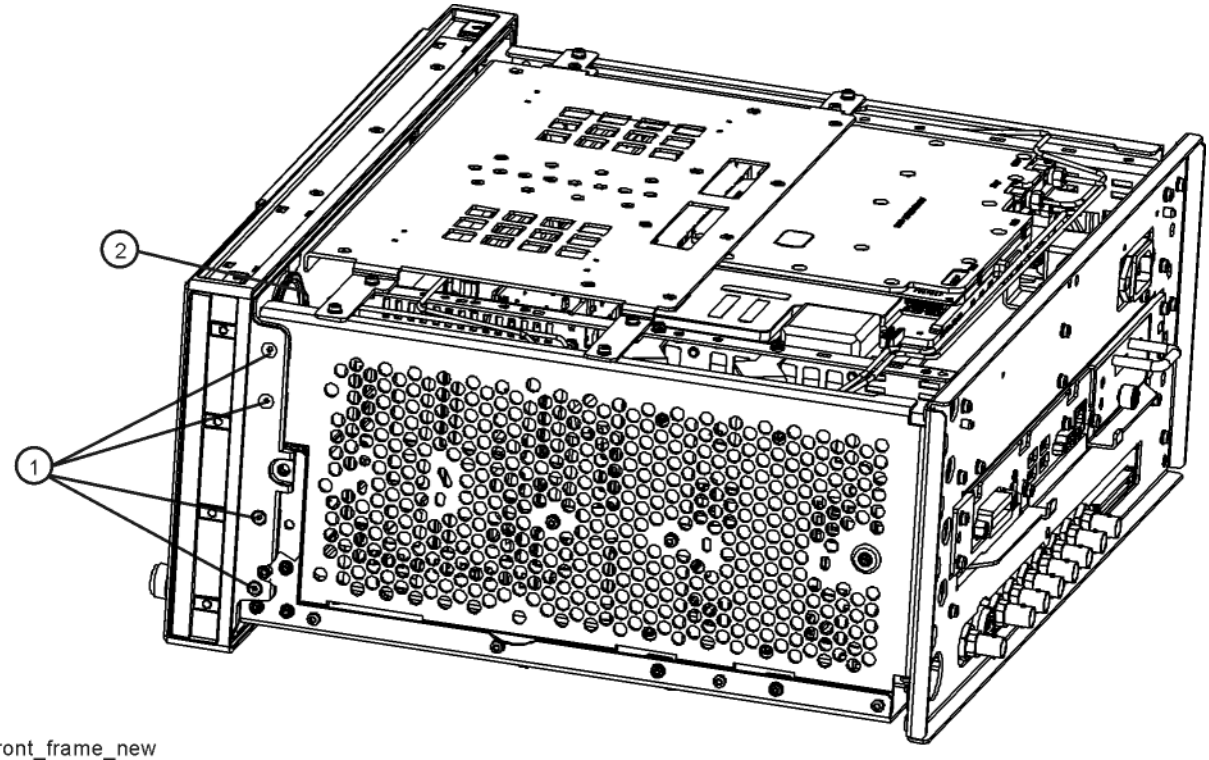
**Figure 5** Option PRC Instrument Outer Case Removal



## Front Frame Assembly Removal

1. Refer to Figure 6. Using the T-10 driver, remove the eight screws (1), four on each side, to detach the front frame from the chassis.

**Figure 6** Front Frame Removal



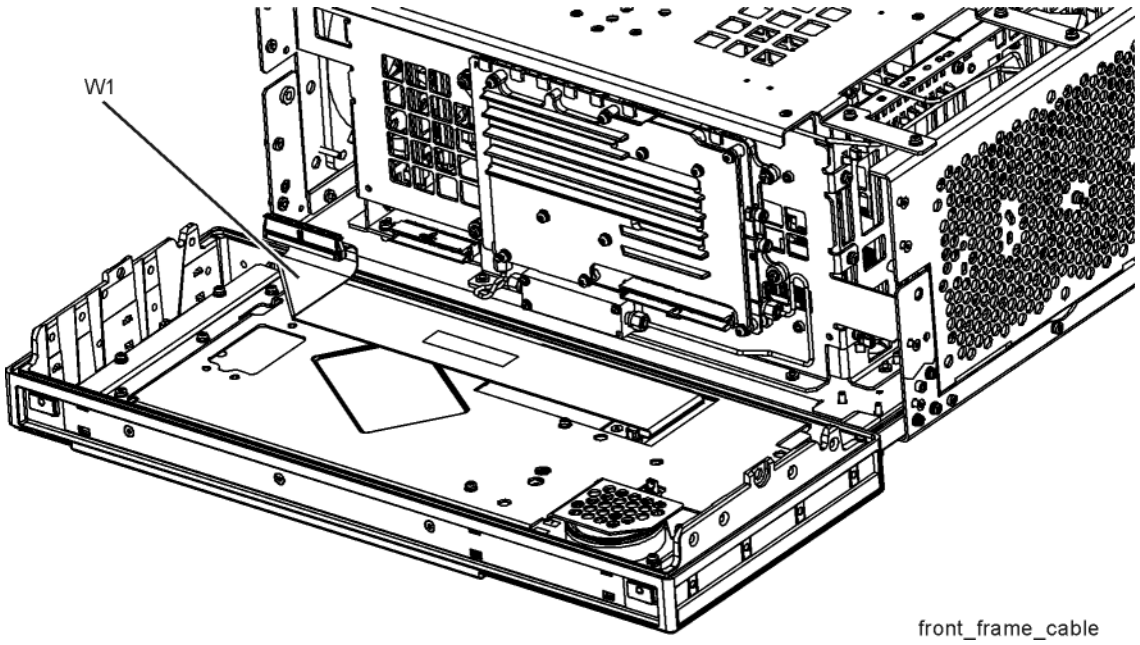

front_frame_new

2. Refer to Figure 7. Pull the front frame carefully away from the chassis. Remove the ribbon cable W1 from the A8 Motherboard.

NOTE

W1 may have locking springs on each side. Depress the spring on each side of the connector to remove from the motherboard.

**Figure 7** Front Panel Cable



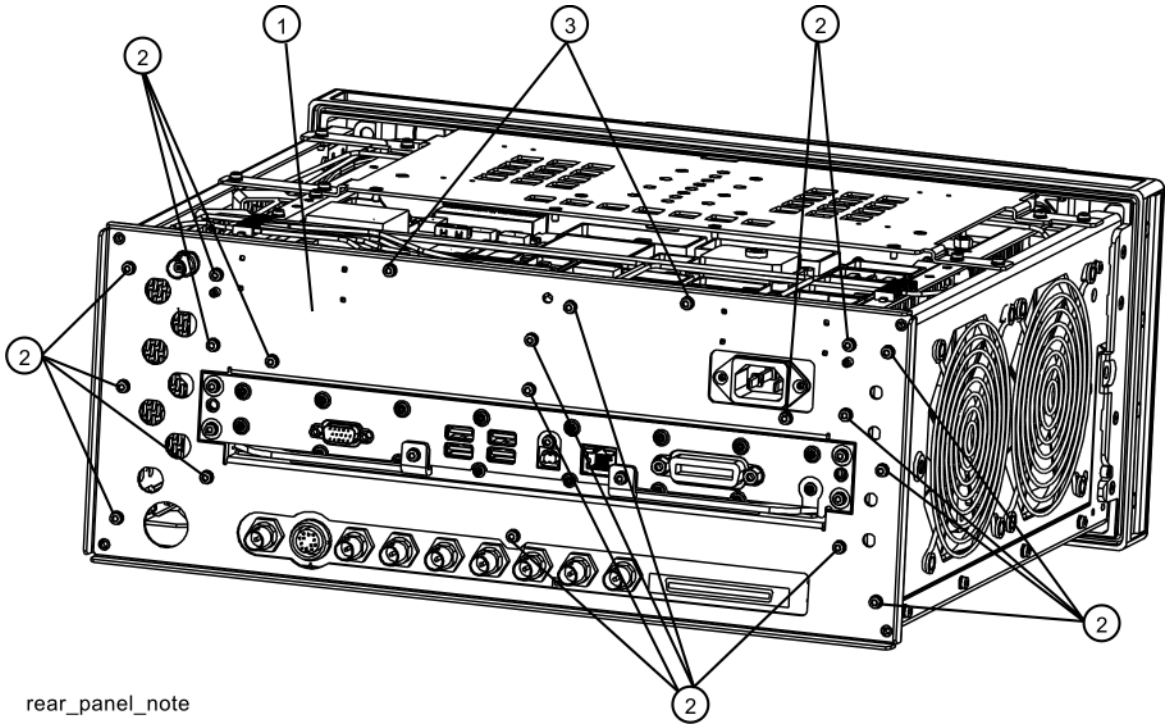

3. If the instrument has Option BBA (BBIQ inputs), there will be an additional cable (W24) that will need to be removed. W24 connects to the A18 BBIQ Interface Board. Pull the Front Frame Assembly carefully away from the chassis. Remove the ribbon cable W1 from the motherboard.

## Rear Panel Removal

**NOTE** Refer to Analyzer Information at the beginning of the "Installation Procedure". Do not remove the rear panel if the Front End Controller has a Hw Id of 75.

1. Refer to Figure 8. Using the T-10 driver, remove the screws (2) attaching the rear panel (1) to the chassis.
2. Use a 9/16-inch socket wrench to remove the nut securing the EXT REF IN connector from the rear panel.

**Figure 8** Rear Panel Removal

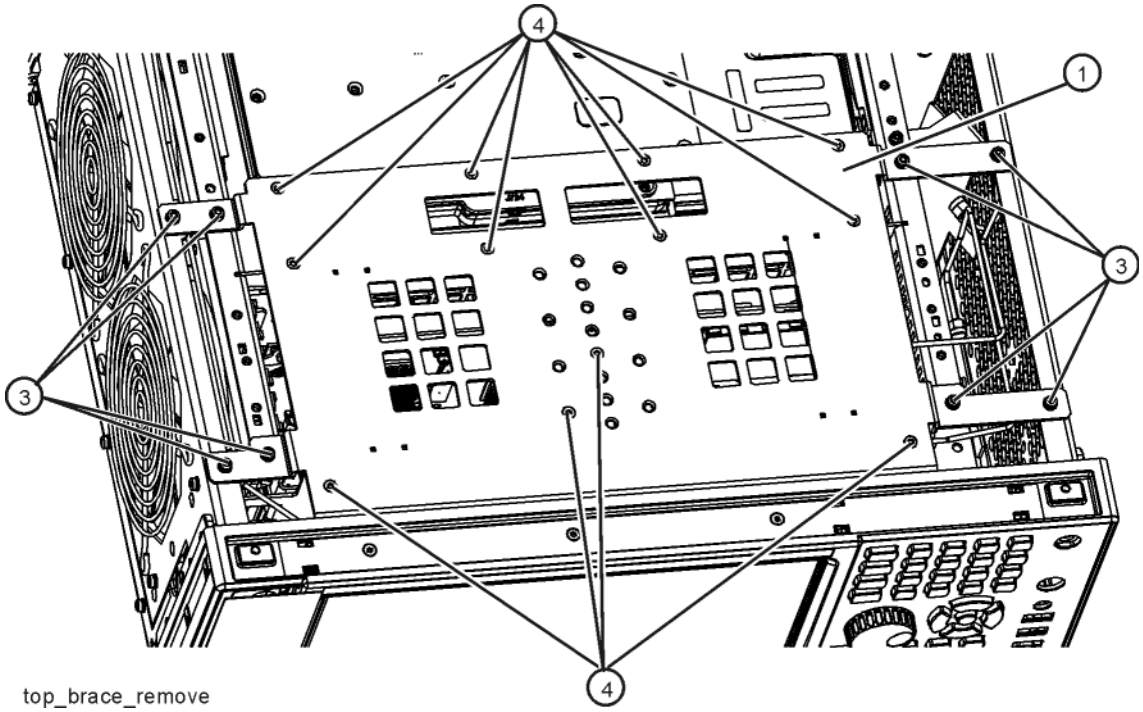



3. Instruments with Option CR3 or CRP will have an additional cable W39 that is attached to the rear panel. Remove W39 using either a 5/16" nut driver or a 5/16" open-end wrench.
4. The rear panel can now be removed.

## Top Brace Removal

1. Refer to Figure 9. To remove the top brace (1), use the T-10 driver to remove the eight panhead screws (3) (0515-0372), four on each side, attaching the braces to the chassis. Also remove and discard the twelve flathead screws (4) (0515-1946) attaching the top brace to the boards.

Figure 9 Top Brace Removal



## Replace Front End Control Assembly

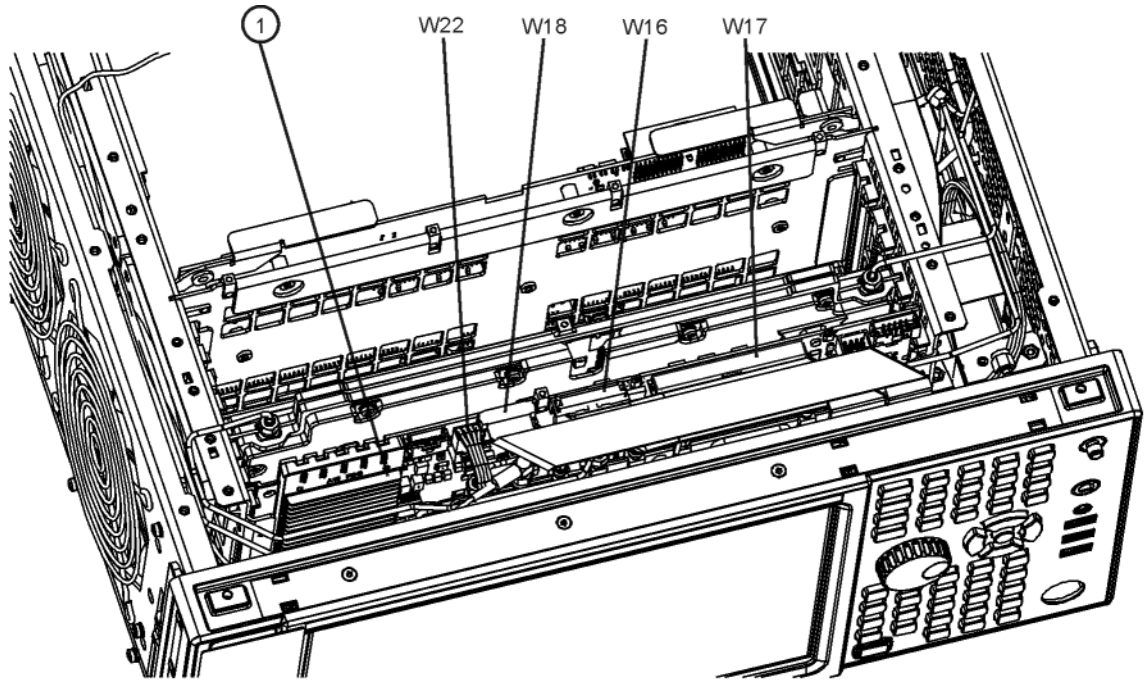
**NOTE** Refer to Analyzer Information at the beginning of the "Installation Procedure". Only perform this procedure if the Front End Controller does not have a Hw Id of 75.

1. Refer to Figure 10. Remove the ribbon cables W16, W17, and W18 and the wire harness W22 from the Front End Control assembly (1).

**NOTE** W22 will not be present in instruments with Option 503.

2. The Front End Control assembly can now be unplugged from the motherboard by leveraging up on the ejector and lifting the board up on the other side.

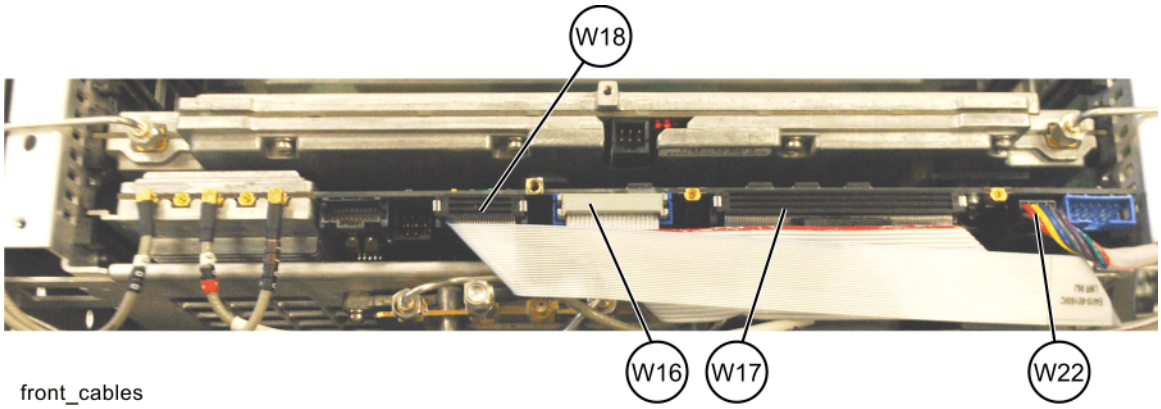
**Figure 10** Front End Control Assembly Removal




front_cables_efec

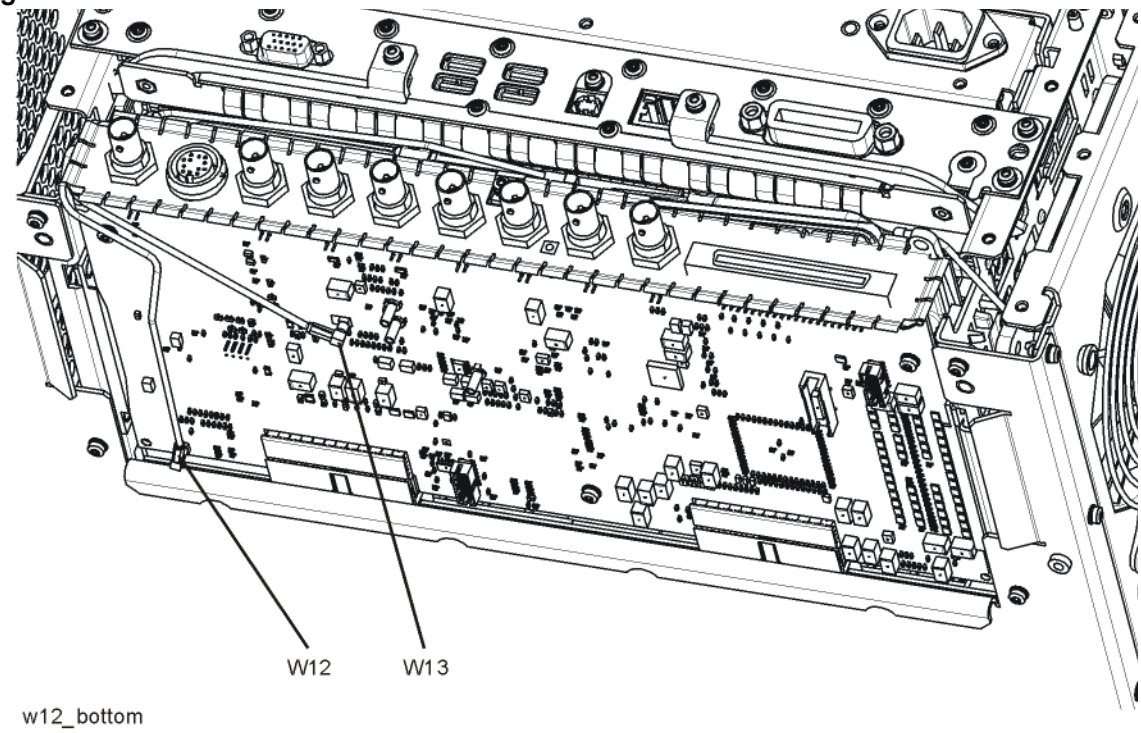
3. Refer to Figure 11. Install the Enhanced Front End Control assembly included in this kit into slot 6 in the chassis securing with the ejector.
4. Refer to Figure 10. Reattach the ribbon cables W16, W17, and W18 to the Front End Control assembly (1).
5. If the analyzer does not have Option 503, reconnect W22 wire harness to the Front End Control assembly (1).

**Figure 11** Enhanced Front End Control Assembly Installation



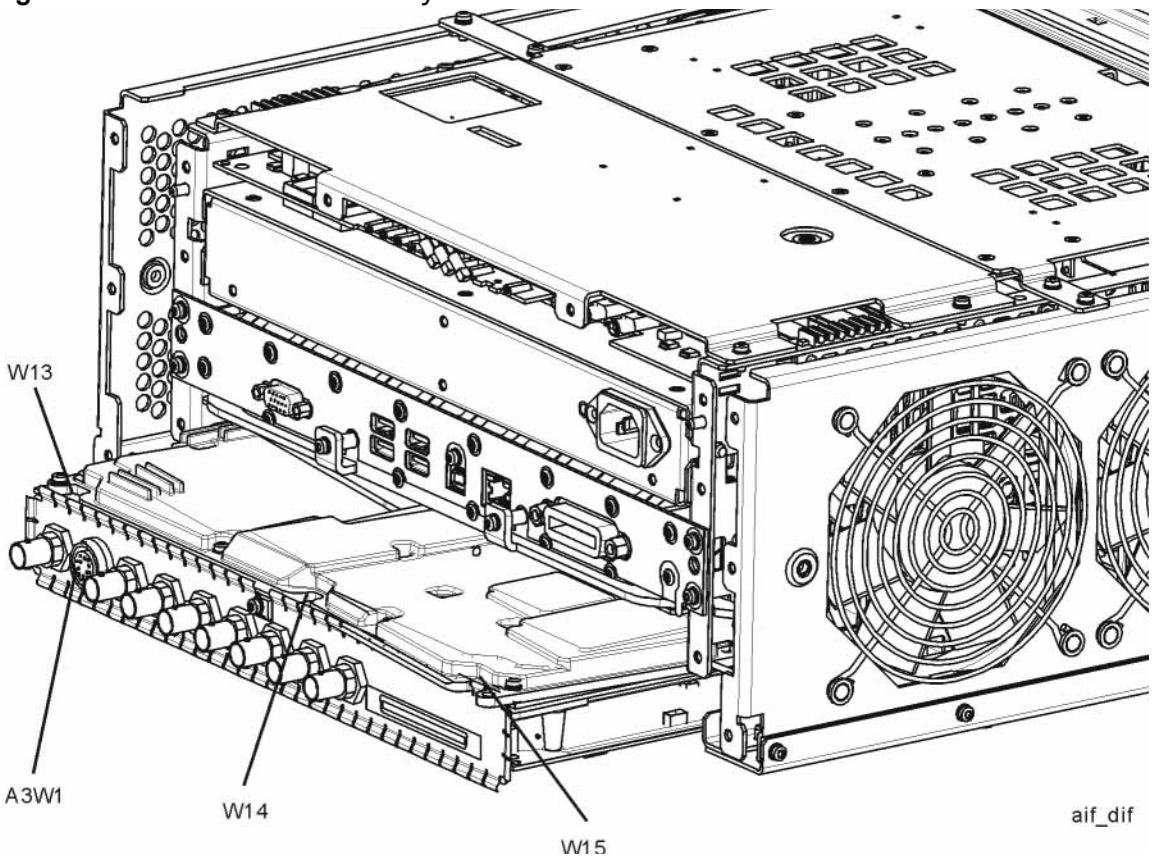
6. Refer to Figure 12. Disconnect cables W12 and W13 from the bottom of the DIF assembly.

**Figure 12** Disconnect W12 and W13



7. Refer to Figure 13. Pull the AIF/DIF assembly part way out of the chassis. Disconnect cable W15 from the analyzer.
8. Completely remove W15 from the analyzer.

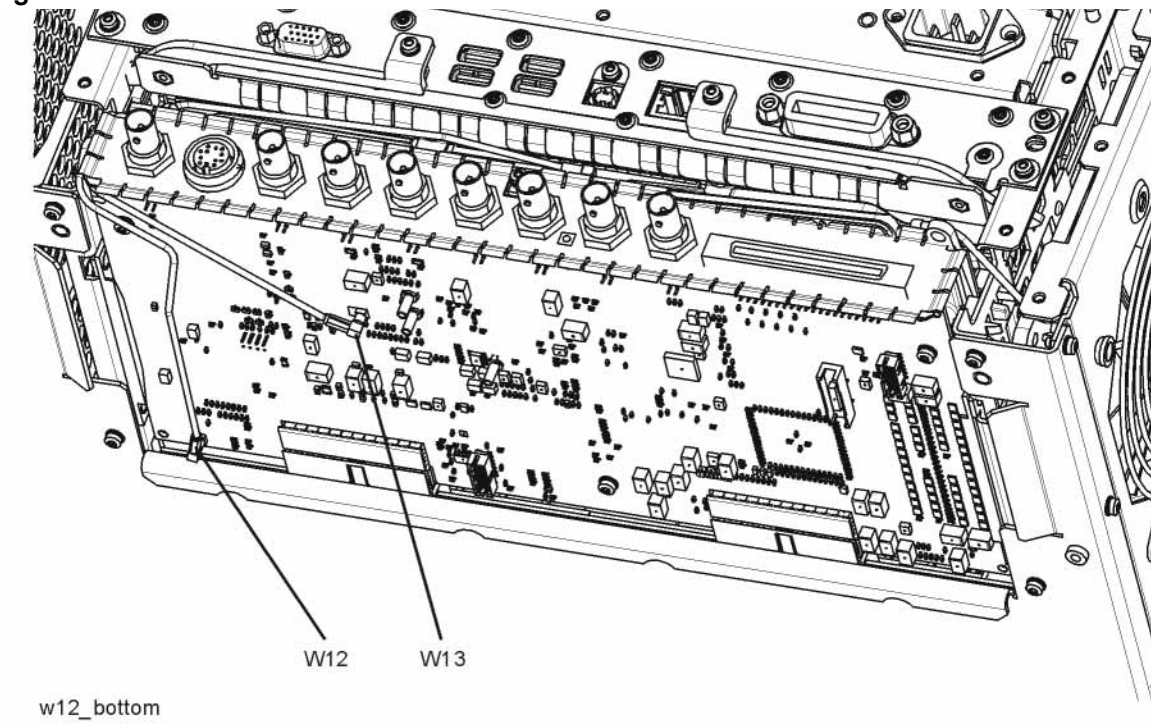
**Figure 13** AIF/DIF Assembly Partial Removal




9. Locate W36 in the Opt EXM/HL6 Cable Kit. This cable will have part number 8121-1862 and will be labeled “902” on one end and “7” on the other. Connect the end labeled “902” to A15J902 on the A15 EFEC Assembly. Connect the other end to A13J7 on the A13 Front End Assembly. Torque the connector on A13J7 to 10 inch-pounds.
10. Locate W37 in the Opt EXM/HL6 Cable Kit. This cable will have part number 8121-1401 and will be labeled “900” on one end and “100” on the other. Connect the end labeled “900” to A15J900 on the A15 EFEC Assembly. Route the cable along the left side of the instrument above the fans. Route the cable down behind the rear of the second (rearmost) fan. Connect the cable to A2J100 on the A2 EAIF Assembly
11. Slide the AIF/DIF assembly into the slot at the rear of the instrument and push on the assembly to mate the connectors to the motherboard assembly.

**12.** Refer to Figure 14. Reconnect W12 to A3J14. Reconnect W13 to A3J15.

**Figure 14** Reconnect W12 and W13



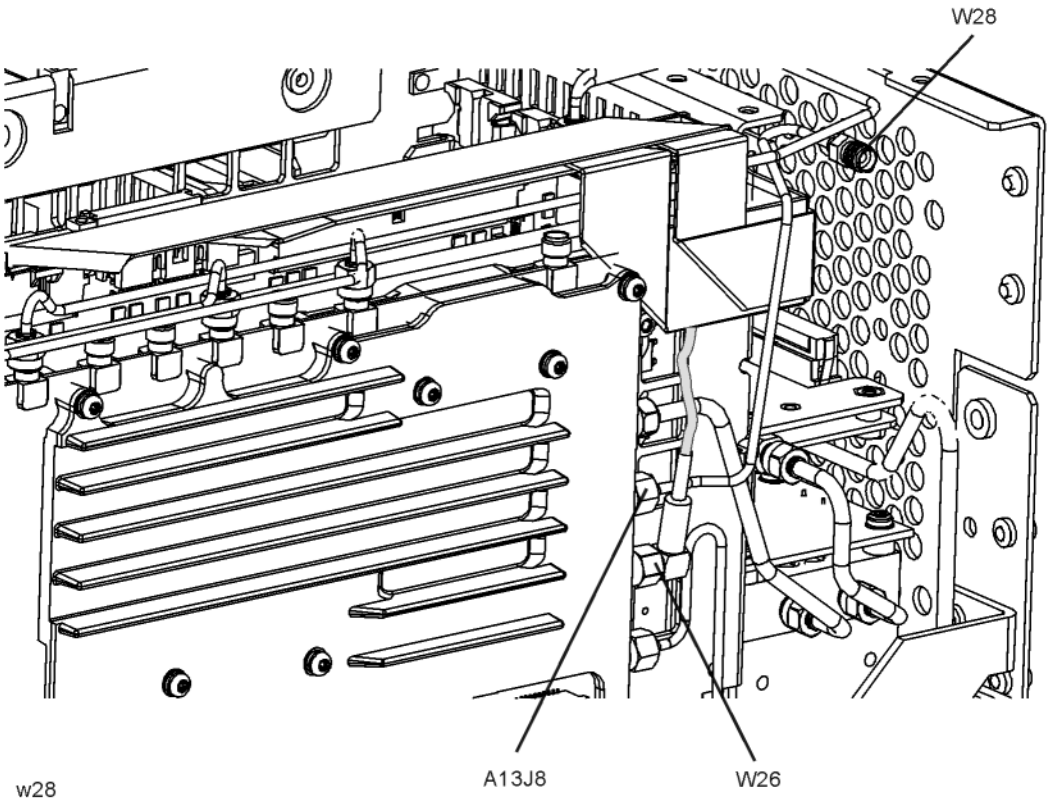

**13.** Locate W39 in the Opt EXM/HL6 Cable Kit. This cable will have part number 8121-2028 and will be labeled “1100” one end and no label on the other. Connect the end labeled “1100” to A15J1100 on the A15 EFEC Assembly. Route the cable along the left side of the chassis above the fans toward the rear panel. The other end of the connector will be secured to the rear panel later.

## Add Cables to A13 Front End and A15 Front End Controller (RF/Microwave Analyzers)

**NOTE** This procedure only applies to RF/microwave MXAs (frequency range options 503, 508, 513, and 526)

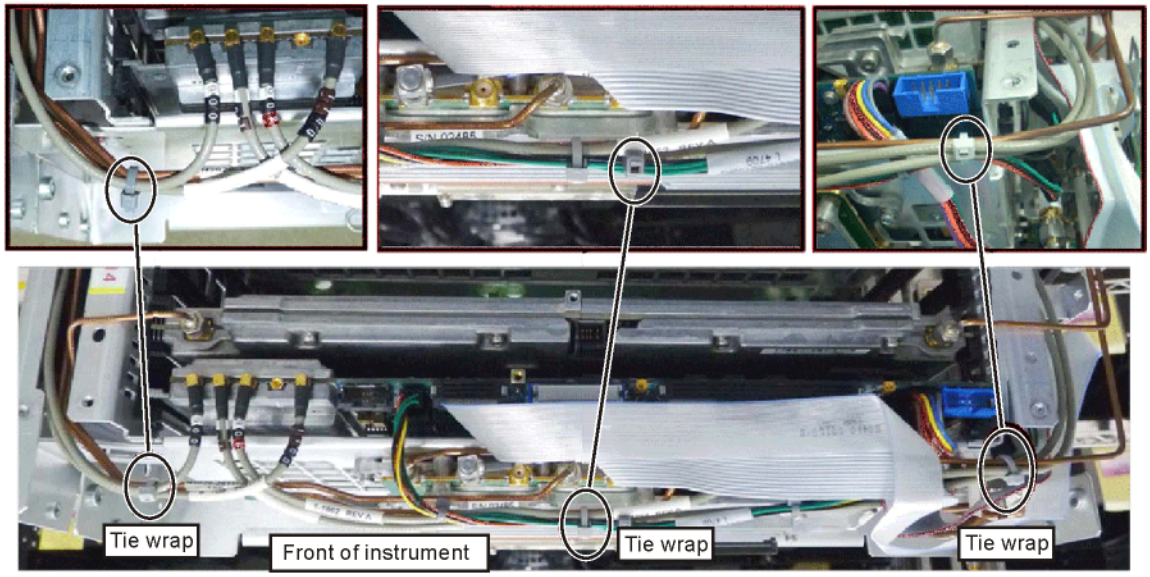
1. Locate the flexible coax assembly in the Opt EXM/HL6 Cable Kit with Markers that is labeled “8120-2027”. The ends should be labeled “903” and “13”. This is W26. Note that there are two cables labeled "903" and "13", but only 8121-2027 should be used on RF/microwave MXAs.
2. Connect the end of W26 that is labeled “903” to A15J903.
3. Refer to Figure 15. Connect the end of W26 that is labeled “13” to A13A1J13. Torque the cable nut to 10 inch-pounds. J13 is one of the connectors along the right side of A13, near the A12 BYFA (if present).
4. Remove the SMA termination on A13A1J8. A13A1J8 is just above A13A1J13.
5. Locate semi-rigid coax cable, part number N9020-20241, in the upgrade kit. This is W28. Connect the end with the SMA male connector A13J8, with the SMA female connector pointing towards where the front panel would be. The long, straight section of W28 should be parallel to the casting of the A13 Front End and parallel to the side chassis. Torque the cable nut to 10 inch-pounds.

**Figure 15** Orientation of W28 in an RF/Microwave MXA



6. Refer to Figure 16. Dress the coaxial cables and semi-rigid cables neatly and tie together using cable ties (1400-0249) at the locations indicated.

**Figure 16** Adding Cable Ties near A13 and A15 Assemblies



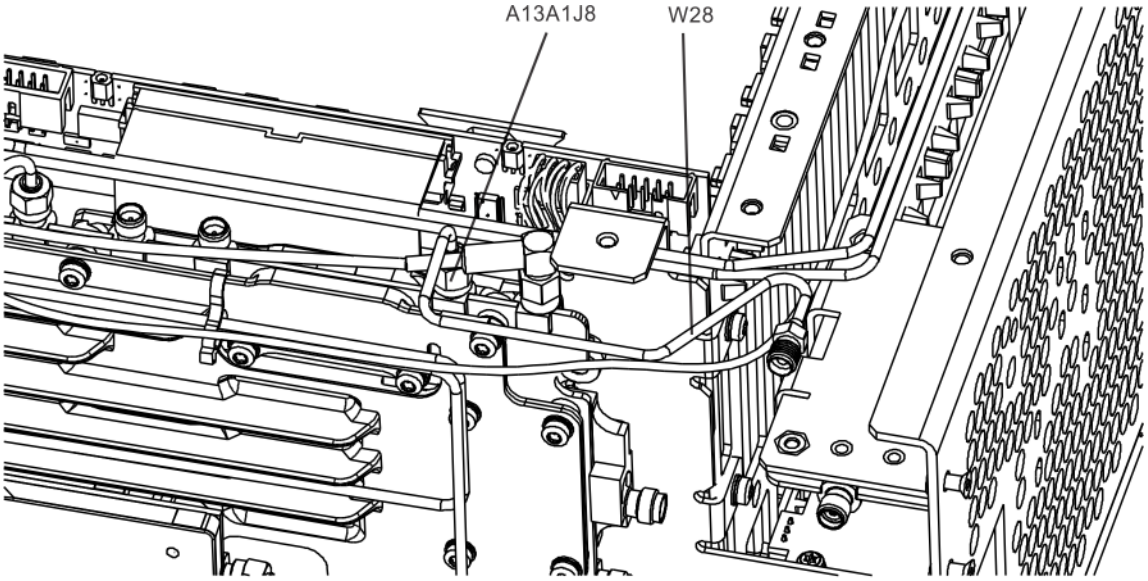

tiewrap

## Add Cables to A13 Front End and A15 Front End Controller (Millimeter Wave Analyzers)

**NOTE** This procedure only applies to millimeter wave MXAs (frequency range options 532, 544, and 550)

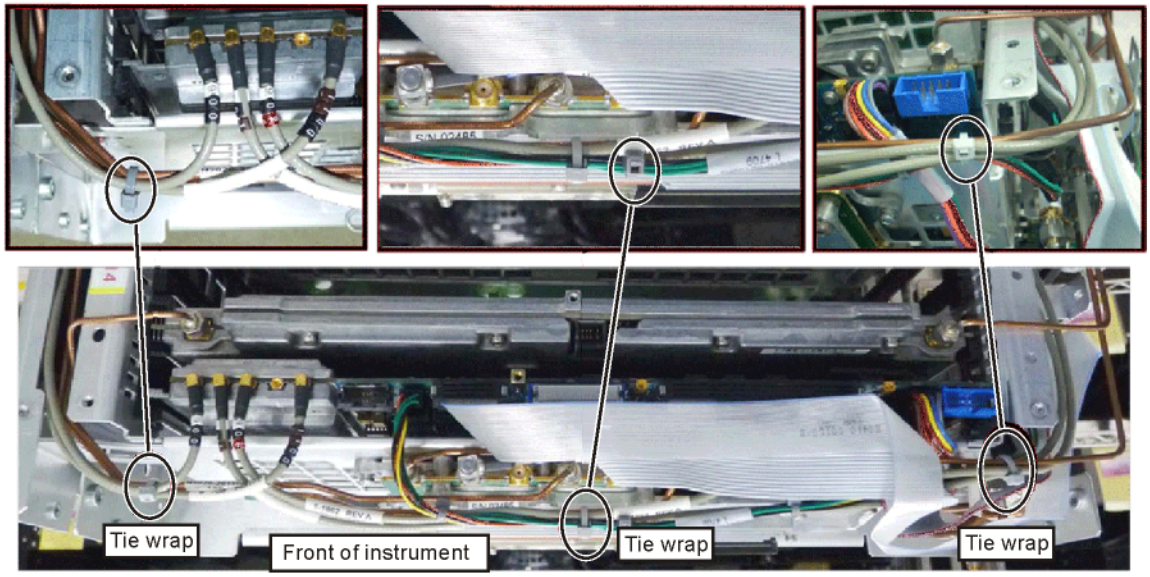
1. Locate the flexible coax assembly in the Opt EXM Cable Kit with Markers. This is cable W26 and should be labeled "8121-2025" and have the ends labeled “903” and “13”. Note that there are two cables labeled "903" and "13", but only 8121-2025 should be used on millimeter wave MXAs.
2. Connect the end of W26 that is labeled “903” to A15J903.
3. Connect the end of W26 that is labeled “13” to A13A1J13. J13 is one of the connectors along the top side of A13. Torque the cable nut to 10 inch-pounds.
4. Remove the SMA termination on A13A1J8. A13A1J8 is to the left of A13A1J13.
5. Locate semi-rigid coax cable, part number N9020-20296, in the upgrade kit. This is W28. Connect the end with the SMA male connector A13A1J8, with the SMA female connector pointing towards where the front panel would be. The long, straight section of W28 should be parallel to the casting of the A13 Front End and level. Refer to Figure 17. Note that W26 is routed below W28. Torque the cable nut to 10 inch-pounds.

**Figure 17** Orientation of W28 in a Millimeter Wave MXA



6. Refer to Figure 18. Dress the coaxial cables and semi-rigid cables neatly and tie together using cable ties (1400-0249) at the locations indicated.

**Figure 18** Adding Cable Ties near A13 and A15 Assemblies

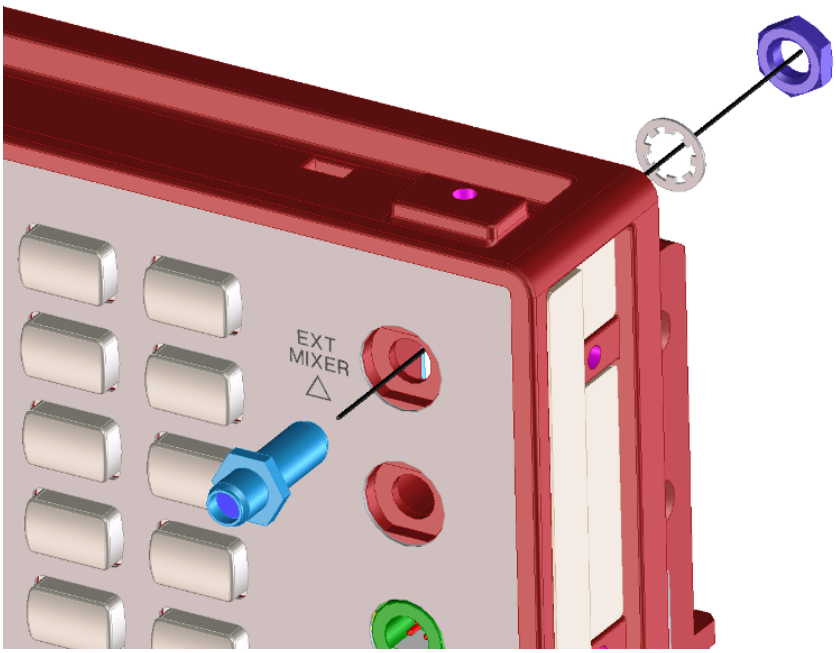



tiewrap

## Add EXT MIXER Connector and Cable to Front Frame Assembly

1. Locate the SMA female to SMA female connector (1250-1666), ¼" lock washer (2190-0067), and ¼" hex nut (2950-0223) in the kit. If the SMA connector includes hardware, discard that hardware and use the 2190-0067 lock washer and 2950-0223 hex nut included in this kit.
2. Remove the hole-plug in the top-most hole in the upper right corner of the front frame assembly.
3. Insert the SMA female to SMA female connector in the hole in the front frame assembly from the front of the assembly. The hex feature on the connector should engage with the recess in the front frame assembly. Refer to Figure 19. Secure the connector using the ¼" lock washer and ¼" hex nut from the rear. Torque to 21 inch-pounds.

**Figure 19** Attaching SMA Female Connector




4. Locate the External Mixing, Front Panel semi-rigid coax assembly in the kit, part number N9020-20166. This is W27. Note that this cable is symmetrical; either end can be connected to the front-panel connector.
5. Connect one end of W27 to the SMA female connector as shown in Figure 20.
6. Orient W27 so that the cable slopes upward from the Ext Mixer connector at a 15 degree angle. The top of the connector should be approximately level with the top of the shield over the Front Panel Interface board. Refer to Figure 21. Torque the cable nut on the Ext Mixer connector to 10 inch-pounds.

**Figure 20** Connecting W27 to Ext Mixer Connector

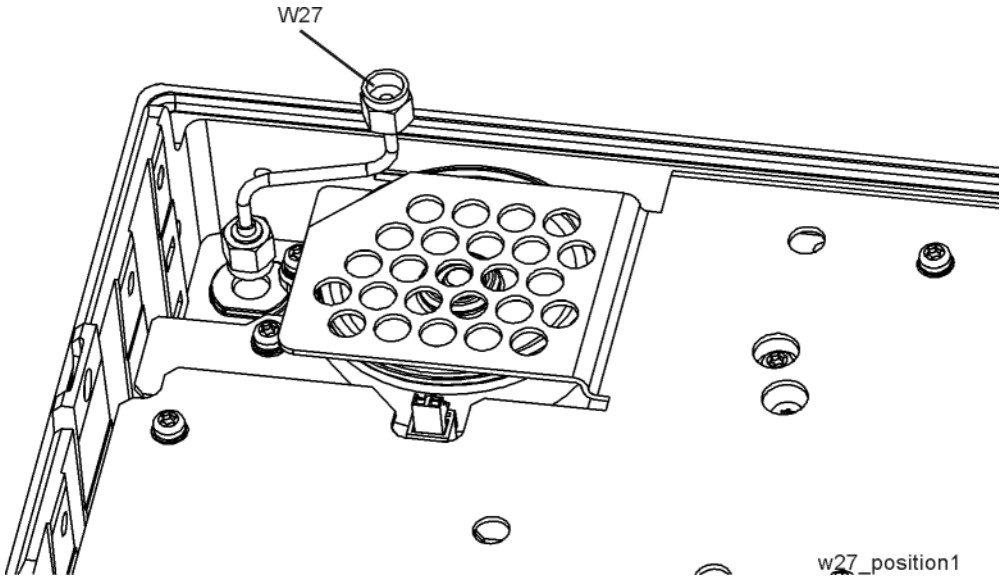
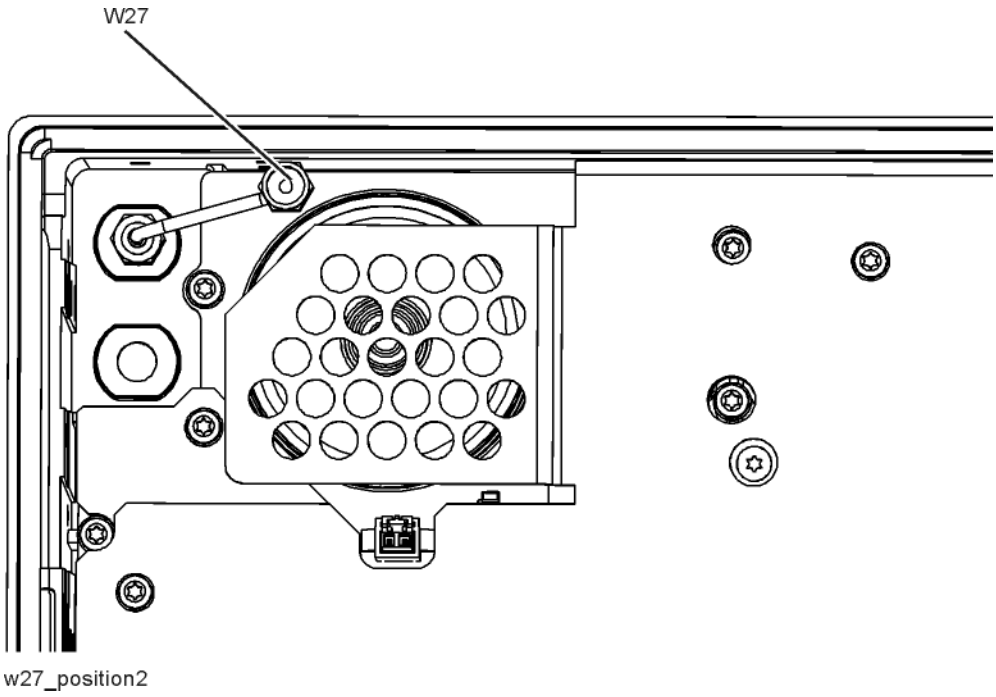


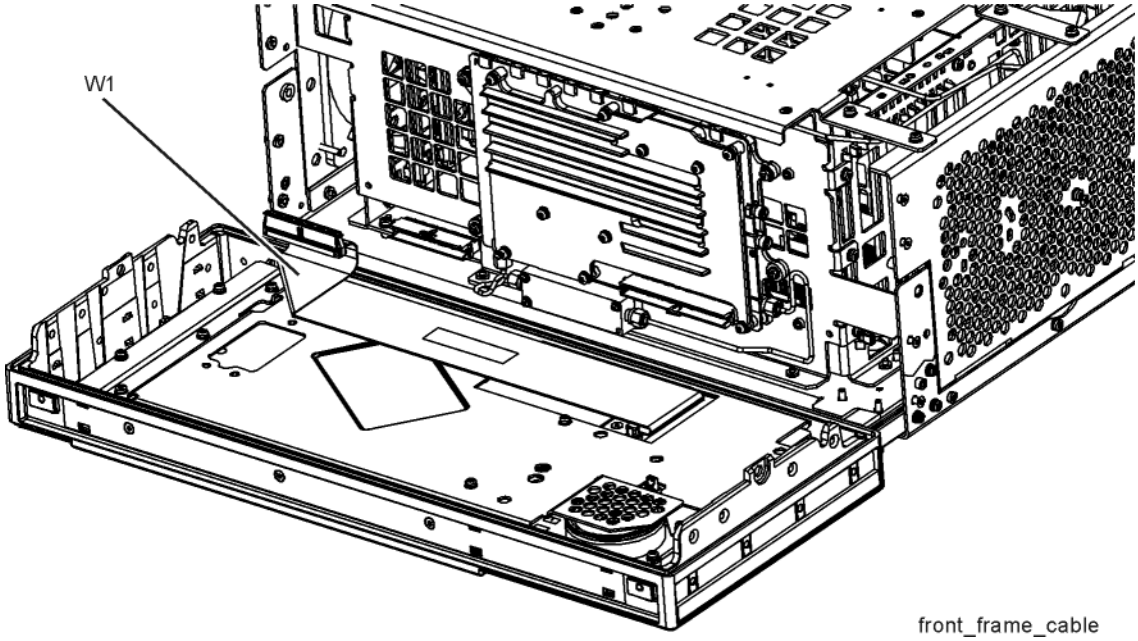

**Figure 21** Proper Orientation of W27



## Front Frame Replacement

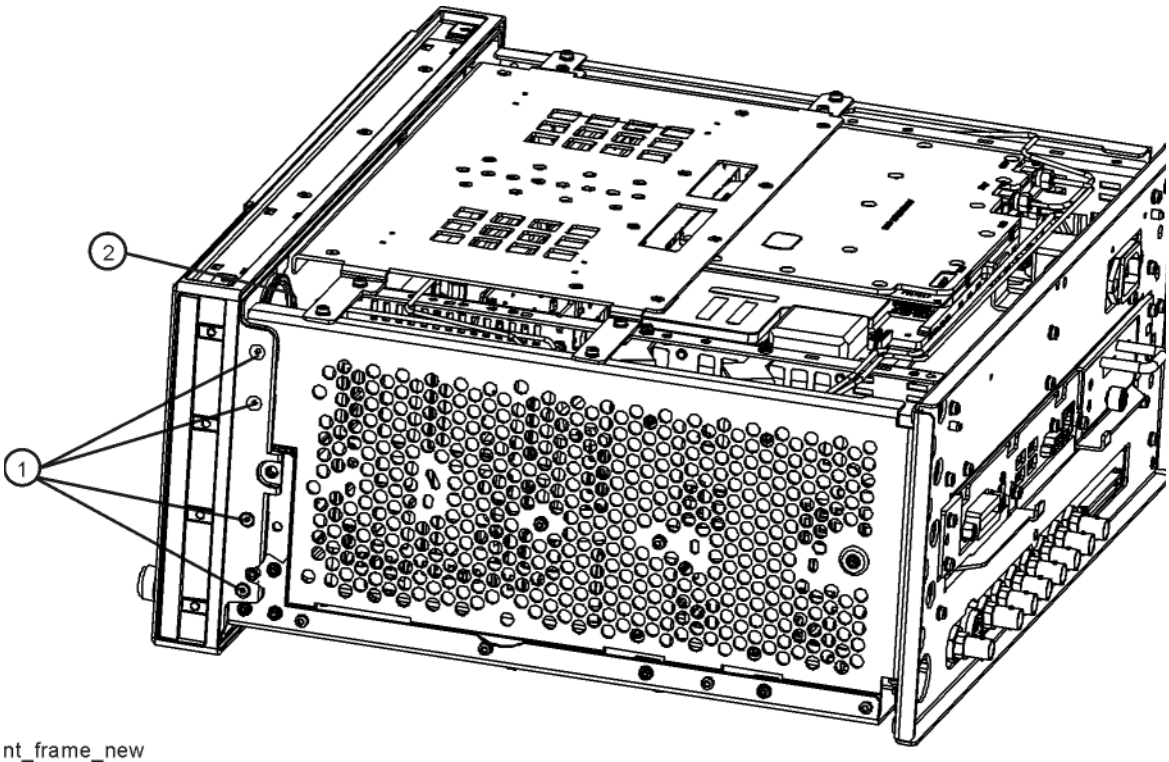
1. Refer to Figure 22. Reattach the ribbon cable W1. Ensure the locking tabs are engaged.
2. Reattach the ribbon cable W24 for instruments with Option BBA.

**Figure 22** Front Panel Cable



3. Refer to Figure 23. Carefully position the Front Frame Assembly onto the chassis. Ensure no cables are crushed. Replace the eight screws (1), four on each side of the chassis. Torque to 9 inch-pounds.

**Figure 23** Front Frame Replacement




nt_frame_new

4. Refer to Figure 24. When the front panel is installed, cables W27 and W28 typically do not align. This is OK since the cables are flexible.
5. Refer to Figure 25. Align and connect cables W27 and W28. Hand-tighten the nut.

**Figure 24** W27 and W28 Before Alignment

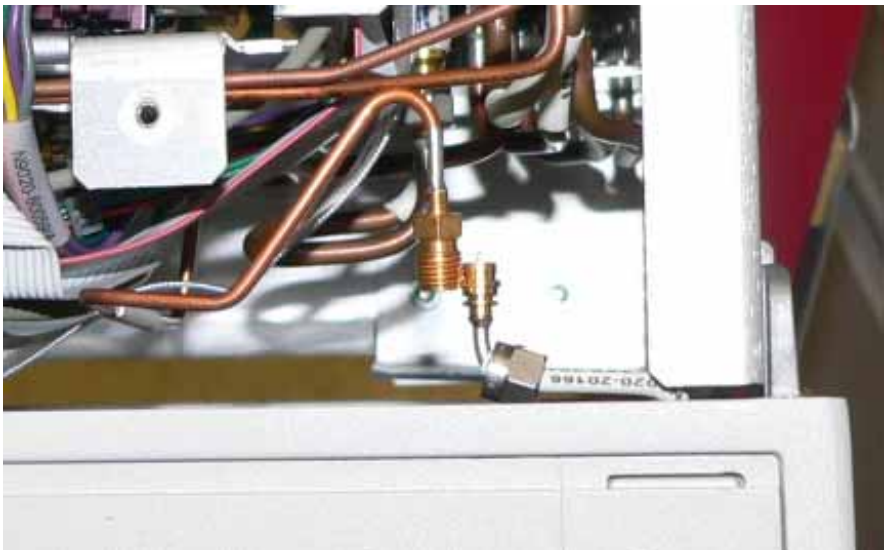
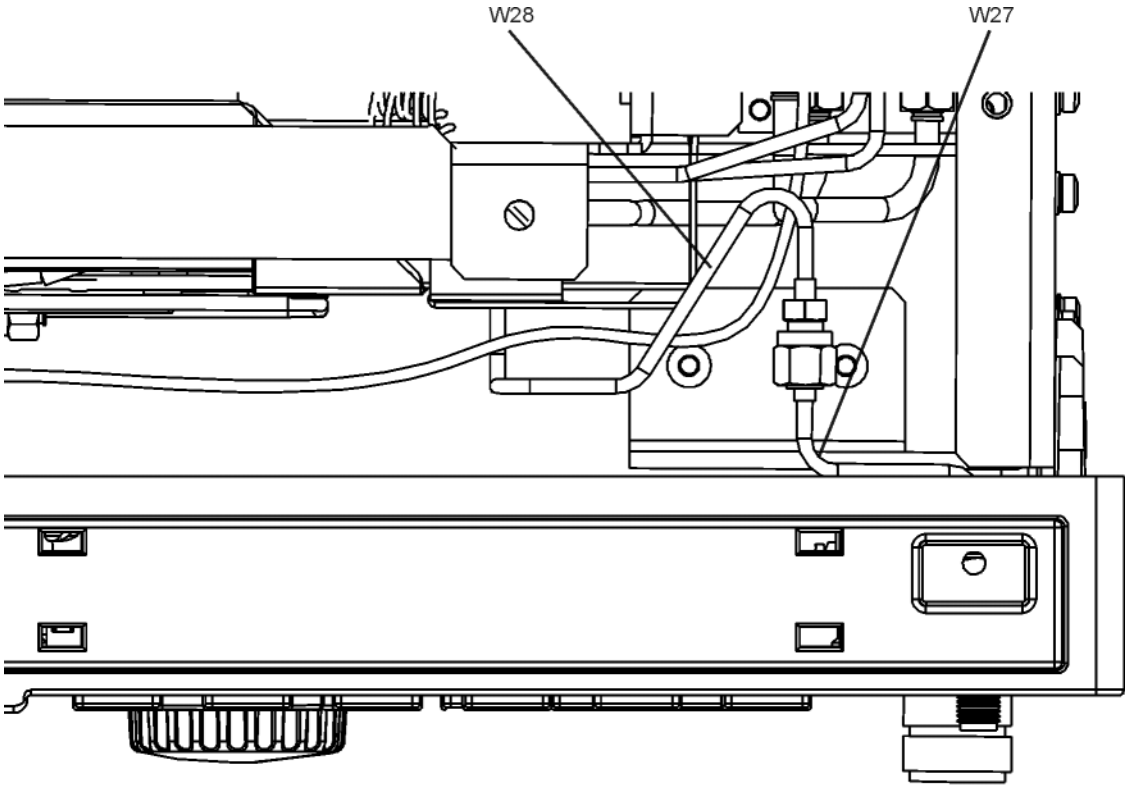


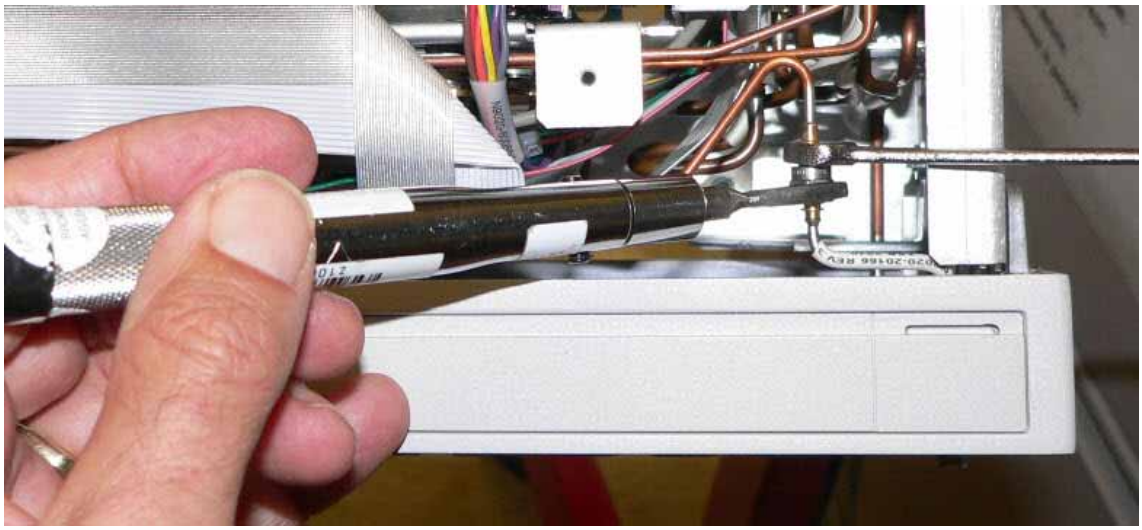
**Figure 25** W27 and W28 Properly Aligned




w27_w28_align

6. Refer to Figure 26. Use a ¼” open-end wrench to prevent the SMA female connector on W28 from twisting. Use a 5/16” torque wrench to torque the nut on W27 to 10 inch-pounds.

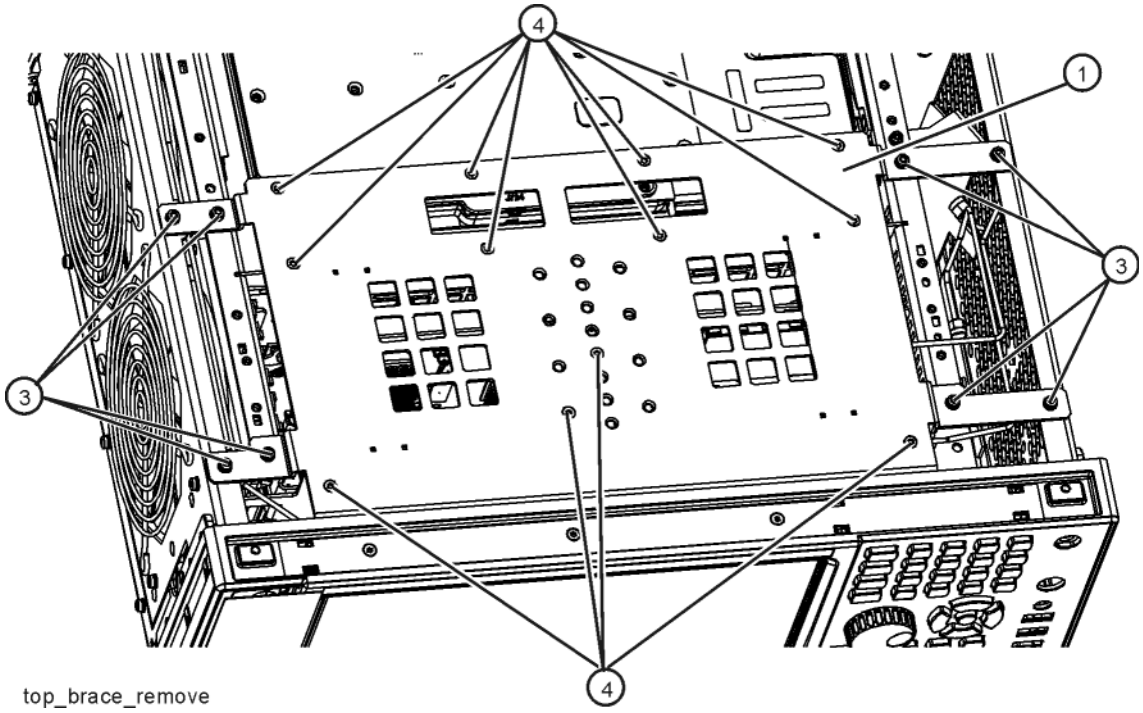
**Figure 26** Torque Cable W28 onto W27



## Reassembly

1. Refer to Figure 27. To replace the top brace (1), place it in the correct position and attach using the screws supplied in the kit. Torque to 9 inch-pounds.

**Figure 27** Top Brace Replacement

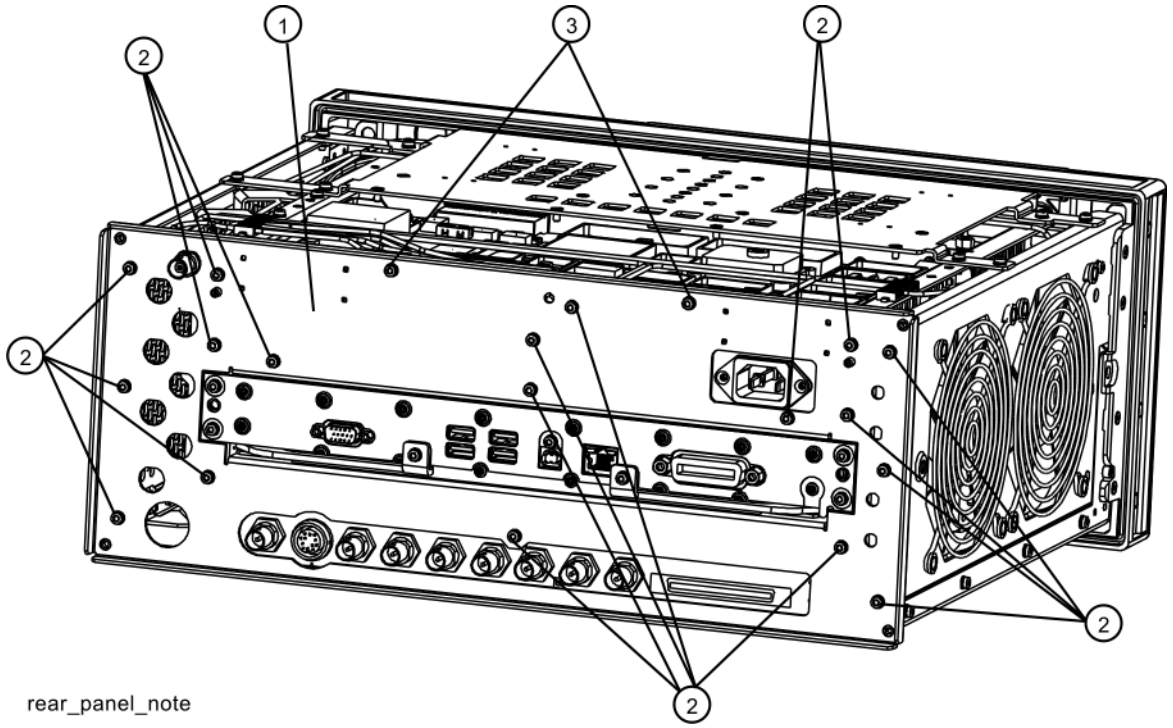



**NOTE** Refer to Analyzer Information at the beginning of the "Installation Procedure". Do not perform steps 2 through 5 if the Front End Controller originally installed has Hw Id of 75.

2. Remove the hole plug from the AUX IF OUT hole.
3. Attach the W23 External Reference cable to the rear panel and secure with a lock washer (2190-0102) and nut (0590-2332). Torque to 21 inch-pounds using a 9/16" nut driver.
4. Attach the W39 Aux IF Out cable to the rear panel and secure with the lock washer and nut that came with the cable. Torque to 9 inch-pounds with a 5/16" nut driver.

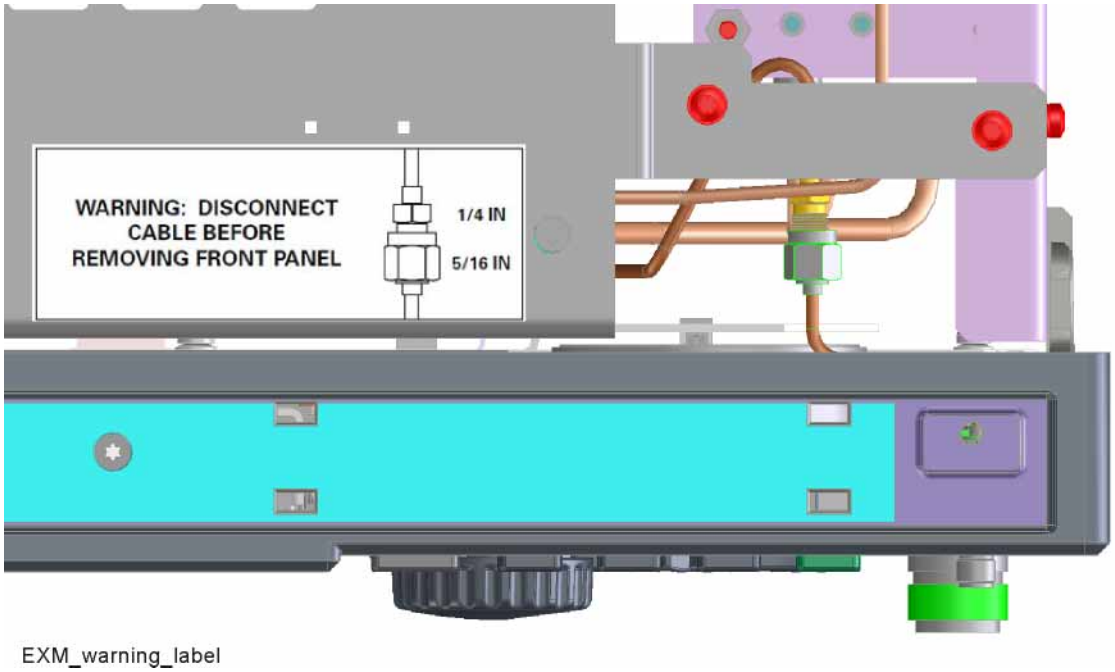
5. Refer to Figure 28. Place the rear panel (1) into position in the chassis. Replace the screws (2) to attach the rear panel to the chassis. Torque to 9 inch-pounds.

**Figure 28** Rear Panel Replacement



6. In the upgrade kit, locate the Warning Label, N9030-80018.
7. Refer to Figure 29. Attach the Warning Label to the top brace as shown.

**Figure 29** Add Warning Label to Top Brace



## Final Installation for Standard Instruments (Benchtop Configuration)

1. Refer to Figure 3. Carefully slide the instrument cover back onto the instrument from the rear of the analyzer, making sure not to damage any internal cables. The seam on the cover should be on the bottom of the instrument. Be sure the cover seats into the gasket groove in the Front Frame Assembly.
2. Replace the four rear feet (4) to the rear of the instrument using the four screws (3). Torque to 21 inch-pounds.
3. Replace the strap handles (2) on both sides of the instrument using the four screws (1). Torque to 21 inch-pounds.
4. Replace the four instrument bottom feet.
5. Replace the four key locks to the bottom feet.
6. Locate the 50 Ω termination (1810-0118) in the kit. Connect the 50 Ω termination to the EXT MIXER connector.

## Final Installation for Portable Instruments (Option PRC)

1. Refer to Figure 5. Carefully slide the instrument cover back onto the instrument from the rear of the analyzer, making sure not to damage any internal cables. The seam on the cover should be on the bottom of the instrument. Be sure the cover seats into the gasket groove in the Front Frame Assembly.
2. Refer to Figure 5. Replace the four rear bumpers (2) to the rear of the instrument using the four screws (1). Torque to 21 inch-pounds.
3. Refer to Figure 4. Replace the four hole plugs (5) to both sides of the instrument.
4. Refer to Figure 4. Replace the bail handle (2) (using the four screws (1)) to the Front Frame Assembly. Torque to 21 inch-pounds.
5. Locate the 50 Ω termination (1810-0118) in the kit. Connect the 50 Ω termination to the EXT MIXER connector.

## Verify Hardware Installation

1. Verify the spectrum analyzer application loads and sweeps as expected.
2. Press **System**, **Show Hardware** on the analyzer and verify that the Front End Controller assembly identifies itself as:
   - Front End Controller (Hw Id = 75)

## Verify Optional Functionality

1. Press **Input/Output**, **Select Input**.
2. Verify that there is a selection labeled "**External Mixer**".
3. Press **Output**.
4. Verify that there is a selection labeled "**Aux IF Out**".
5. Press **Aux IF Out** and verify that there is a selection labeled "**Second IF**".

## Perform Preselector Characterization (Only applies to analyzers with Option 508, 513, or 526)

1. Press **System**, **Alignments**, **More**, **Advanced**.
2. Press **Characterize Preselector**, **Enter**. The characterization will take several minutes.
3. Wait until the analyzer resumes sweeping.

## Utilities, Adjustments, and Performance Verification Tests

Calibration Software and specified test equipment is required to perform the adjustments, and can be used to automate the performance verification testing.

Obtain Keysight X-Series Signal Analyzer Calibration Application SW, N7814A TME Calibration Application, version E.16.00 or later for RF/microwave analyzers, or E.21.00 or later for millimeter wave analyzers. Information on how to obtain this software can be found at:

http://www.keysight.com/find/calibrationsoftware

The following tests are required to assure the installation was performed correctly. The instrument may not have been in spec before the upgrade was begun. Performing only these tests does not guarantee that the analyzer meets all specifications.

### Utilities Required

None

### Adjustments Required

– Perform all adjustments

### Performance Testing Required

– Perform all performance tests

### A full calibration is required to assure the instrument meets all specifications

The end user must ultimately determine whether they want a full calibration to be performed after the installation of this upgrade or not. If a full calibration is required, arrangements regarding the level of calibration must be made between the end user and the calibration provider.

For assistance, contact your nearest Keysight Technologies Sales and Service Office. To find your local Keysight office access the following URL, or if in the United States, call the following telephone number:

http://www.keysight.com/find/assist

1-800-829-4444 (8 am - 8 pm ET, Monday - Friday)



Edition 1, September 2018

N9020-90263

www.keysight.com