Keysight N9010B EXA Signal Analyzer

Option EXM, External Mixing Upgrade Kit

KEYSIGHT TECHNOLOGIES

Installation Note

Option EXM, External Mixing Upgrade Kit

Products Affected:	N9010B EXA
Serial Numbers:	All
To Be Performed By:	(X) Keysight Service Center
	(X) Personnel Qualified by Keysight
	( ) Customer
Estimated Installation Time: Estimated Adjustment Time: Estimated Verification Time:	1.5 Hours 1.0 Hours[a] 1.0 Hours[a]

a. To ensure that these newly installed options are functioning properly, the procedure that follows includes the requirement of performing certain adjustments and performance verification tests. However, the completion of these tests does not guarantee that the instrument meets all advertised specifications.

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

While Keysight does recommend that a full calibration be performed after the installation of this upgrade, the end user must ultimately determine whether they want this service 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.

Introduction

This kit includes parts to upgrade an EXA signal analyzer with frequency range Option 532 or 544 to add Option EXM, External Mixing.

In addition to installing the hardware to support Option EXM, a license for the following option will also be installed:

— N9010B-EXM, External Mixing

Option EXM, External Mixing Upgrade Kit

Installation Kit Parts List

Quantity	Description	Keysight Part Number
1	Adapter- Coaxial Straight Female-SMA to Female-SMA, 50W	1250-1666
1	Washer, Lock, Internal Tooth, ¼ inch	2190-0067
1	Nut-Hex-Double-Chamfer 1/4-36-THD.125-IN-THK, Stainless Steel	2950-0223
1	50 Ohm Termination, SMA male	1810-0118
1	Opt EXM Cable Kit with Wire Markers (includes cable W26, listed below)	N9010-60009
1	Cable Assembly, External Mixing, Front Panel (W27)	N9020-20166
1	Cable Assembly, mmW Front End to W27 (W28) (for use in millimeter wave analyzers)	N9020-20296
1	Cable Assembly, Coaxial 275 mm LG (W26) (for use in millimeter wave analyzers)	8121-2025 [a] with ends labeled '903' and '13'
1	Label, Warning	N9030-80018
5	Cable Ties	1400-0249
12	Screw, M3 x 0.5, (6 mm long), flathead	0515-1946
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 Cable Kit with Wire Markers, p/n N9010-60009.

Tools Required

— T-10 TORX Driver

— T-20 TORX Driver

— 5/16-inch torque wrench

— ¼-inch open-end wrench

— Diagonal cutters

— Keysight Calibration and Adjustment Software, N7814A (revision E.16.00 or later)

— Test equipment and computer supported by the X- Series Performance Tests and Adjustment Software

— EXA Signal Analyzer Service Guide. This manual is available online at the following URL:

  www.keysight.com/find/N9010B_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

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 frequency range options listed below in the Show System. Put a check mark or "X" after the frequency range option listed below that appears in the Show System menu.

   N9010A-503_____
   N9010A-507_____
   N9010A-513_____
   N9010A-526_____
   N9010A-532_____
   N9010A-544_____

4. If the analyzer is equipped with any of the following frequency range options (refer to the data in step 3 above):

   N9010A-503
   N9010A-507
   N9010A-513
   N9010A-526

   do not proceed with the installation of this upgrade kit.

   An RF or microwave EXA is not compatible with Option EXM.

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	Make sure any adapters on the front panel are removed.
NOTE	If the analyzer has Option PRC, Portable Configuration, refer to the "Option PRC." section on page 9 to remove the outer case.

Standard Instrument

1. Disconnect the instrument from ac power.

2. Refer to Figure 1, "Instrument Outer Case Removal,". Using the T-20 driver, remove the 4 screws (1) (two on each side) that attach the handle strap (2) on each side of the instrument.

3. Remove the four key locks from the instrument four bottom feet.

4. Remove the four instrument bottom feet.

5. Using the T-20 driver, remove the four screws (including washers) (3) that hold the rear feet (4) in place.

6. Pull the instrument cover (5) off towards the rear of the instrument.
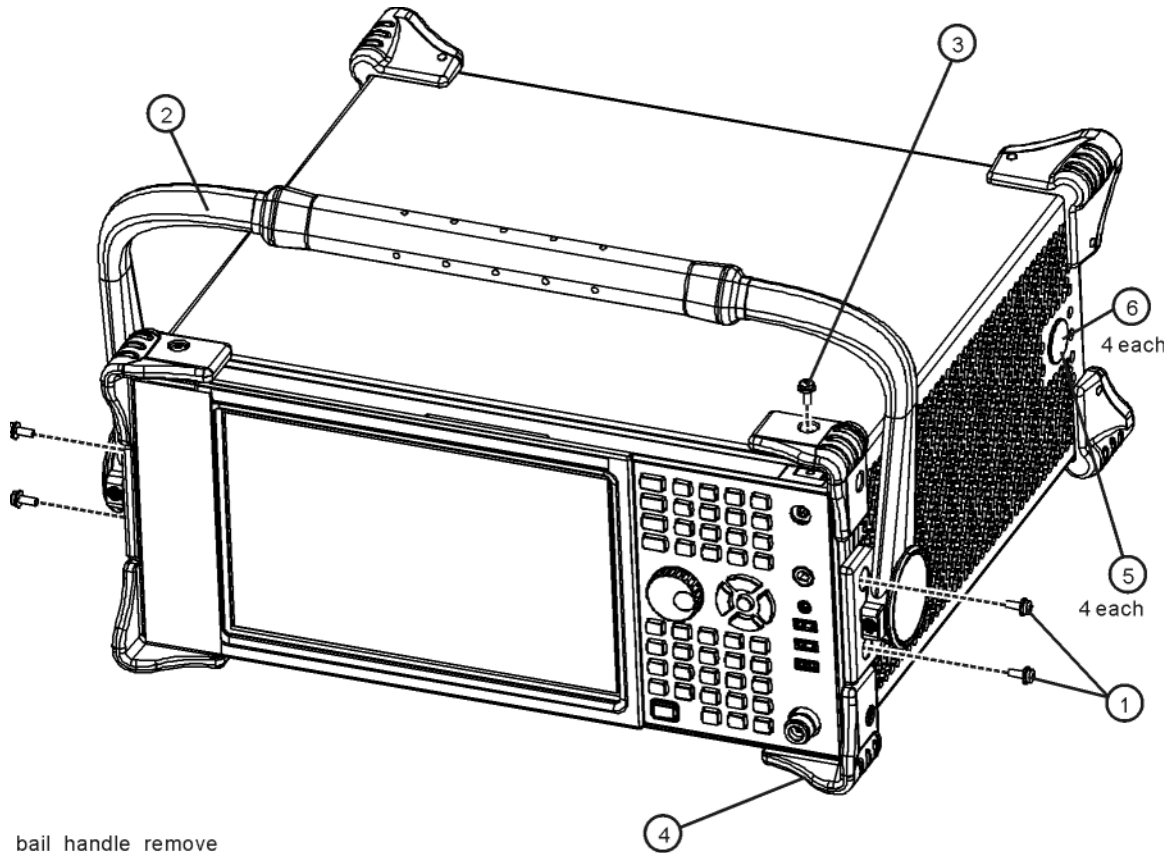
Figure 1　　　　　　　　　Instrument Outer Case Removal

outer_case
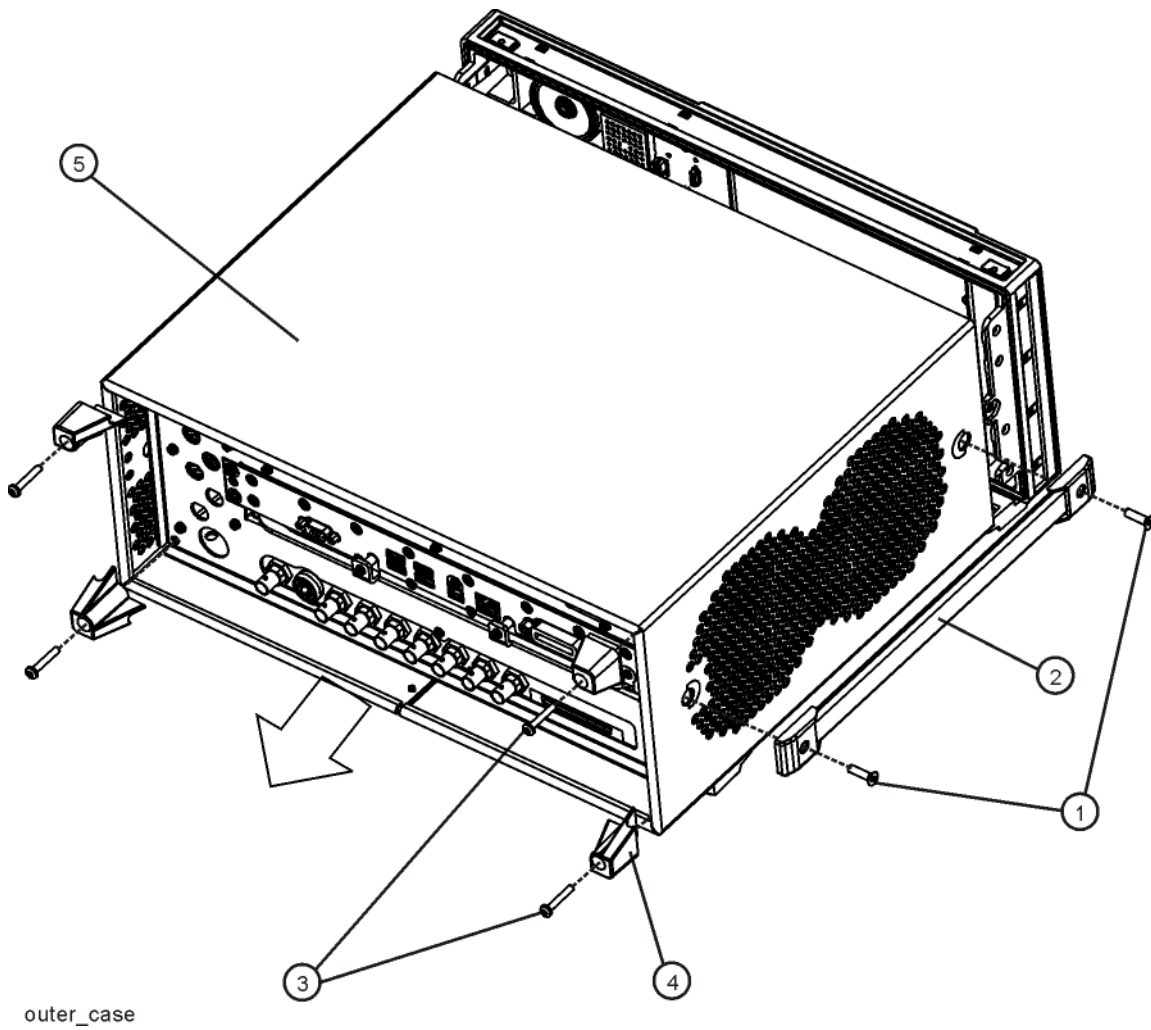
Option PRC

1. Disconnect the instrument from ac power.

2. Refer to Figure 2, "Bail Handle Removal,". Using the T-20 driver, remove the four screws (two on each side) (1) that hold the bail handle (2) to the front frame.
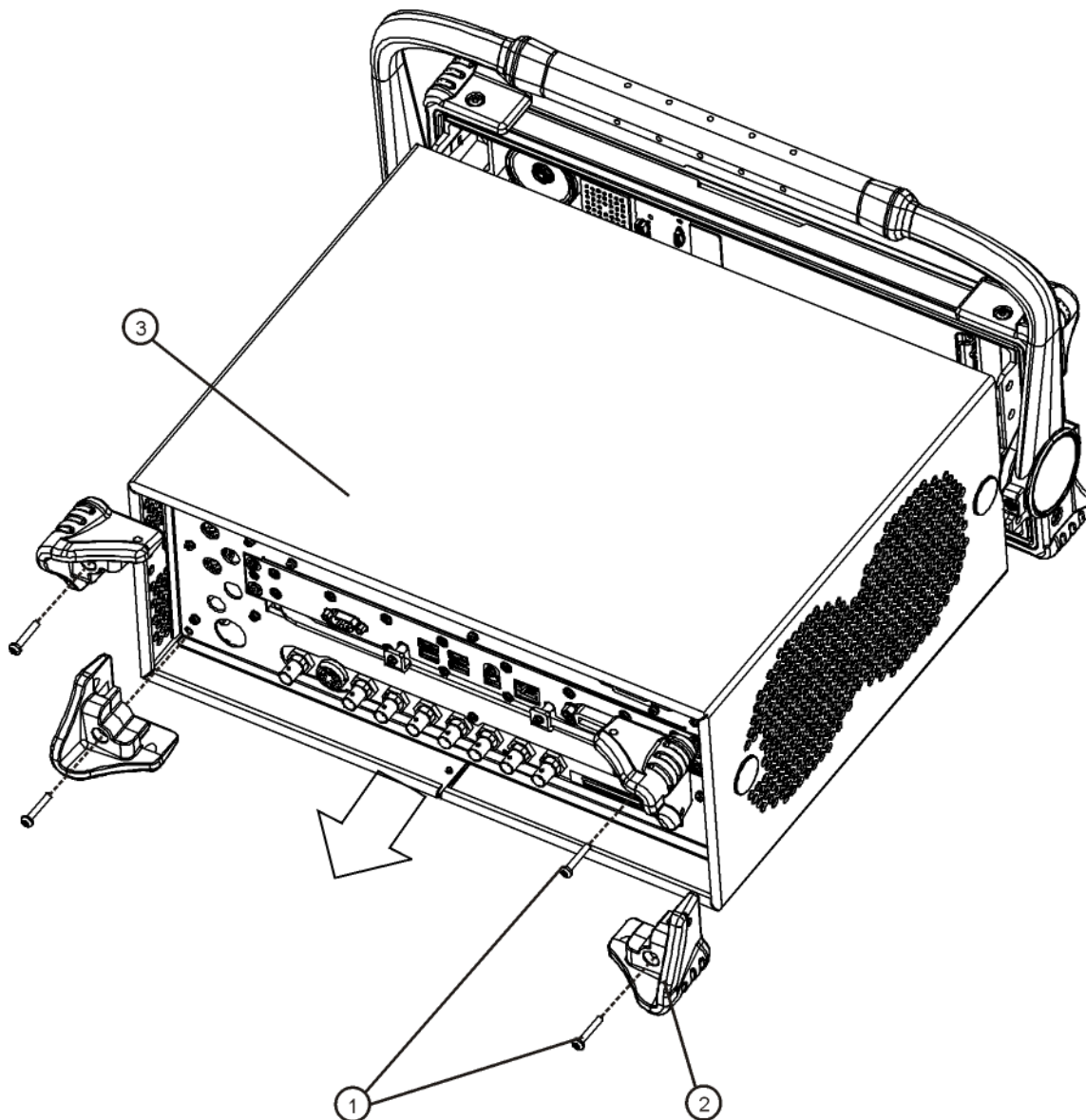
Figure 2   Bail Handle Removal

bail_handle_remove

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 3, "Option PRC Outer Case Removal,". Using the T-20 driver, remove the four screws (including washers) (1) that hold the rear bumpers (2) (two on each side) in place.

**Figure 3**   Option PRC Outer Case Removal

rear_bumper_remove

5. Pull the instrument cover (3) off towards the rear of the instrument.

Top Brace Removal

Refer to Figure 4, "Top Brace Removal,". To remove the top brace **(1)**, use the T‑10 driver to remove the eight screws **(3)** (0515-0372) attaching the top brace to the chassis. Remove and discard the twelve screws **(4)** (0515-1946) attaching the top brace to the boards.

Figure 4 **Top Brace Removal**

top_brace_remove
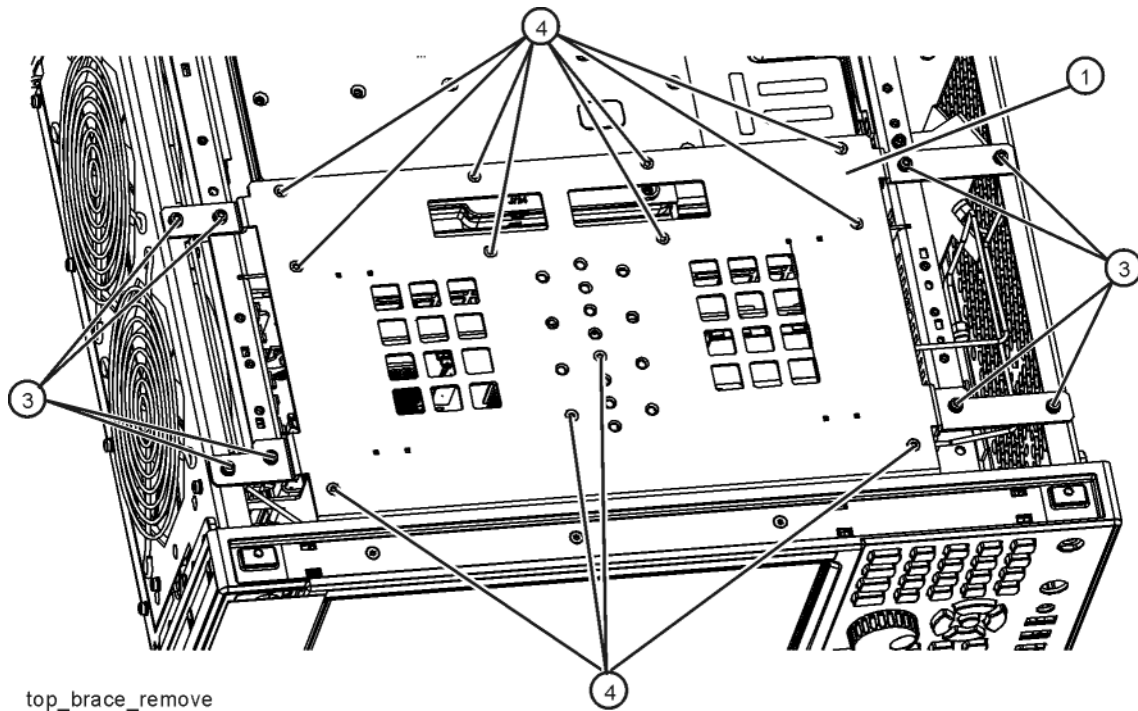
Front Frame Assembly Removal

NOTE	Make sure any connectors on the front panel are removed.

1. Refer to Figure 5, "Front Frame Removal,". Using the T-10 driver, remove the eight screws (1) (0515-1035), four on each side, to detach the Front Frame Assembly from the chassis.

2. Refer to Figure 6, "Front Panel Cable,". Pull the Front Frame Assembly carefully away from the chassis. Remove the ribbon cable W1 from the motherboard. The cable has locking tabs on each side, pinch and pull to release.
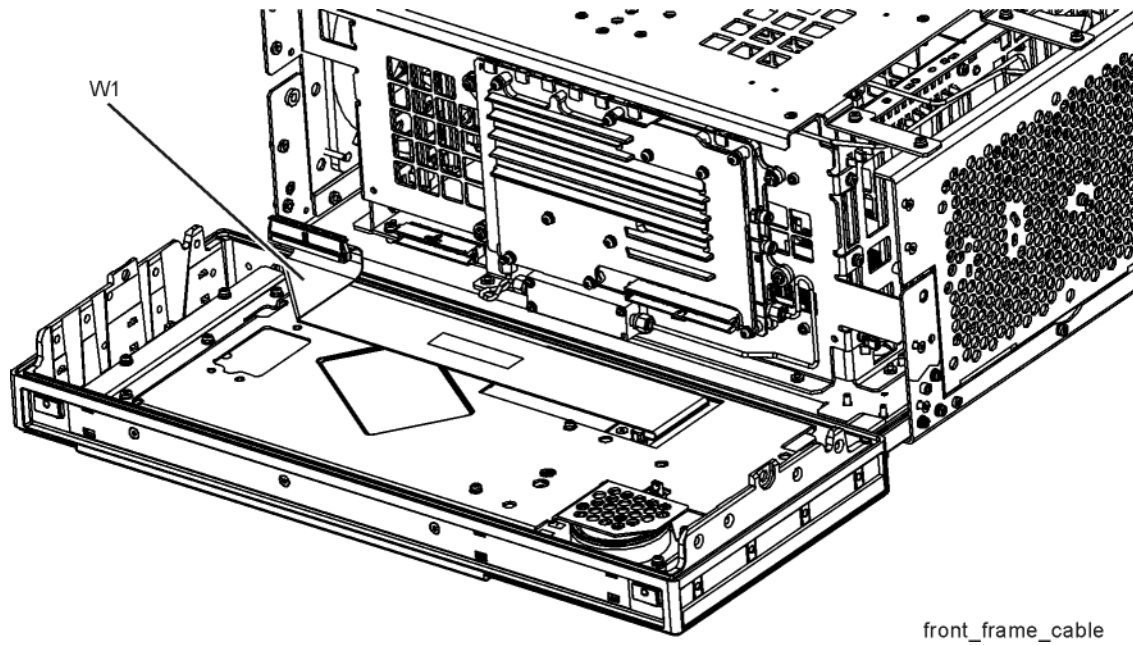
NOTE	W1 may have locking springs on each side. Depress the spring on each side of the connector to remove from the motherboard.

Figure 5   Front Frame Removal
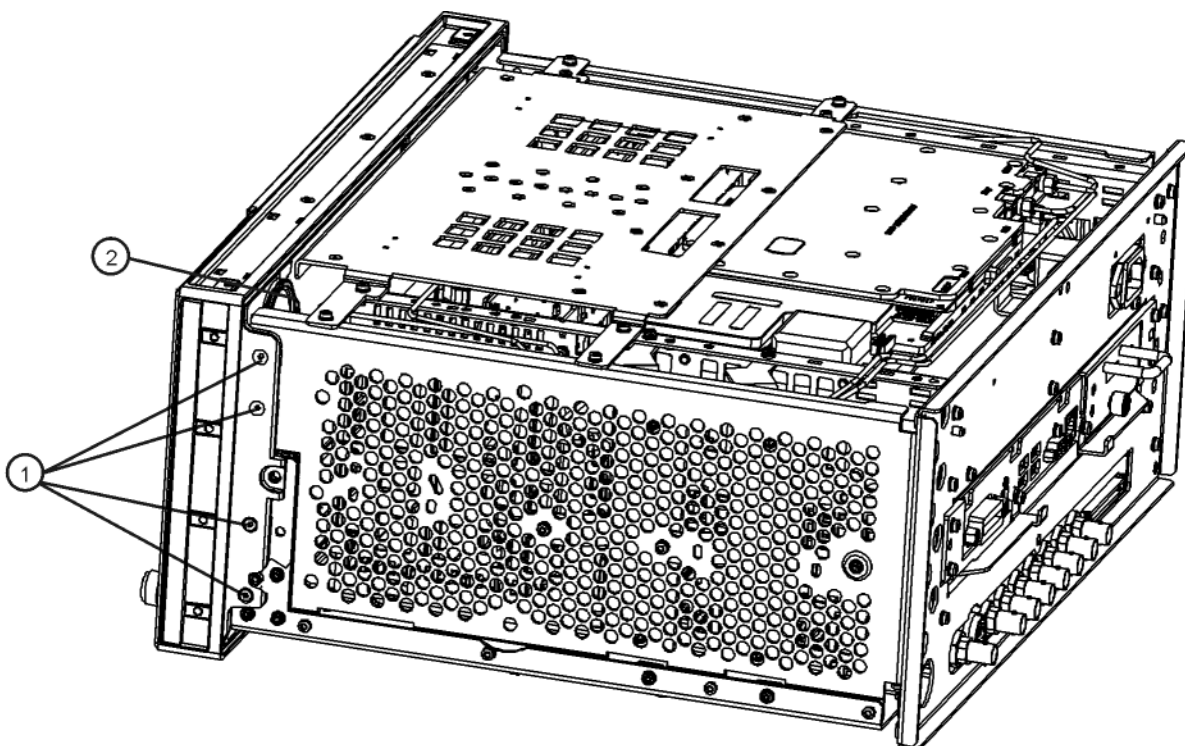
front_frame_new

Figure 6   Front Panel Cable

W1

front_frame_cable

Add Cables to A13 Front End and A15 Front End Controller

| NOTE | This procedure only applies to millimeter wave EXAs (frequency range options 532 and 544). |

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"

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 7, "Orientation of W28 in a Millimeter Wave EXA,". Note that W26 is routed below W28. Torque the cable nut to 10 inch-pounds.

Figure 7   Orientation of W28 in a Millimeter Wave EXA
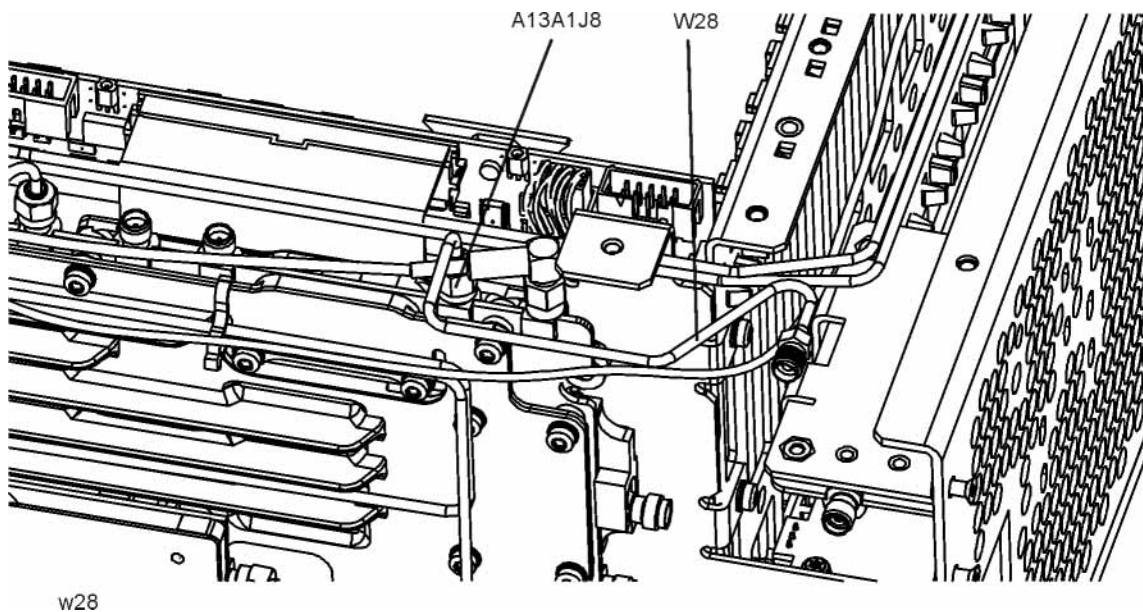
## Add EXT MIXER Connector and Cable to Front Frame Assembly

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 8, "Attaching SMA Female Connector,". Secure the connector using the ¼" lock washer and ¼" hex nut from the rear. Torque to 21 inch-pounds.

Figure 8   Attaching SMA Female Connector
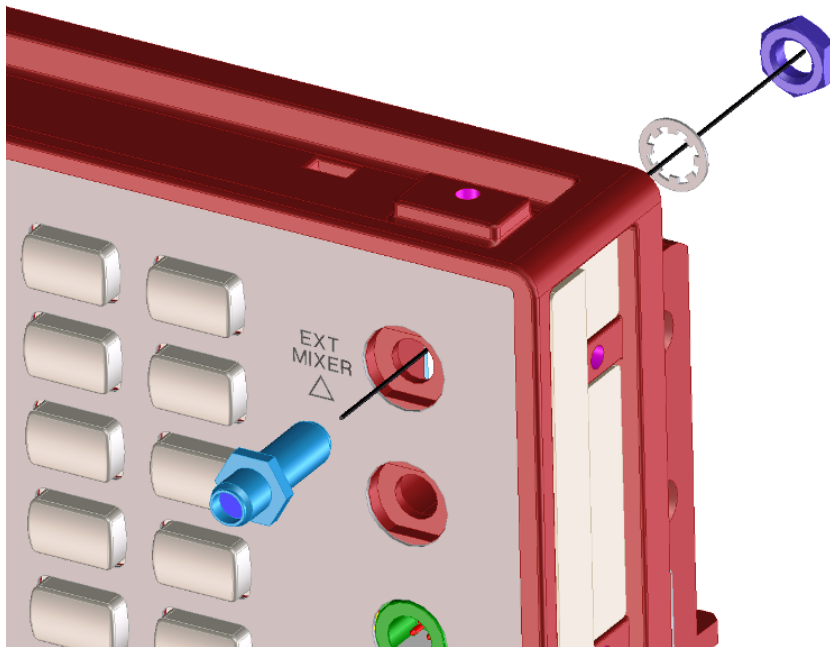
4. Locate the External Mixing, Front Panel semi-rigid coax assembly in the kit, part number N9020-20166. This is W27. Note that this cable is symmetrical; either end can be connected to the front-panel connector.

5. Connect one end of W27 to the SMA female connector as shown in Figure 9, "Connecting W27 to Ext Mixer Connector,".

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 10, "Proper Orientation of W27,". Torque the cable nut on the Ext Mixer connector to 10 inch-pounds.

Figure 9   Connecting W27 to Ext Mixer Connector

w27_position1

**Figure 10**   Proper Orientation of W27

w27_position2
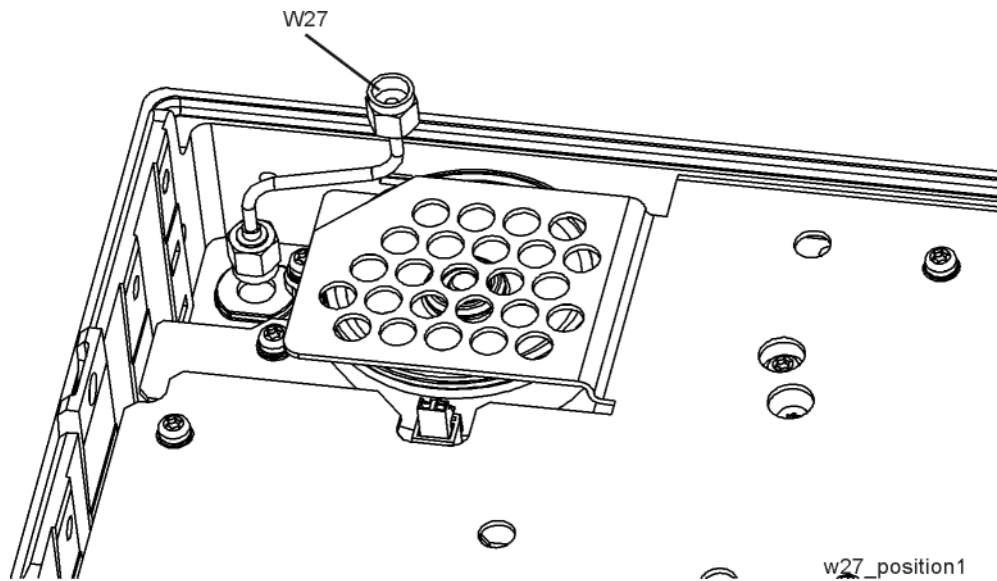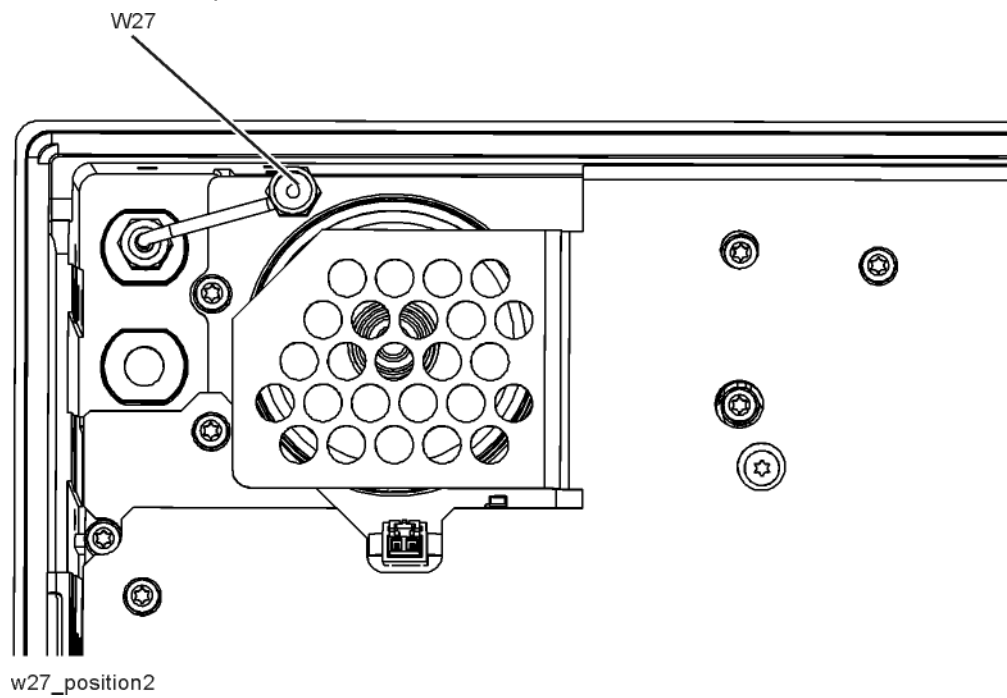
Front Frame Replacement

1. Refer to Figure 11, "Front Panel Cable,". Reattach the ribbon cable W1. Ensure the locking tabs are engaged.

2. Refer to Figure 12, "Front Frame Replacement,". Carefully position the Front Frame Assembly onto the chassis. Ensure no cables are crushed. Replace the eight screws (1)(0515-1035), four on each side of the chassis. Torque to 9 inch pounds.

Figure 11   Front Panel Cable
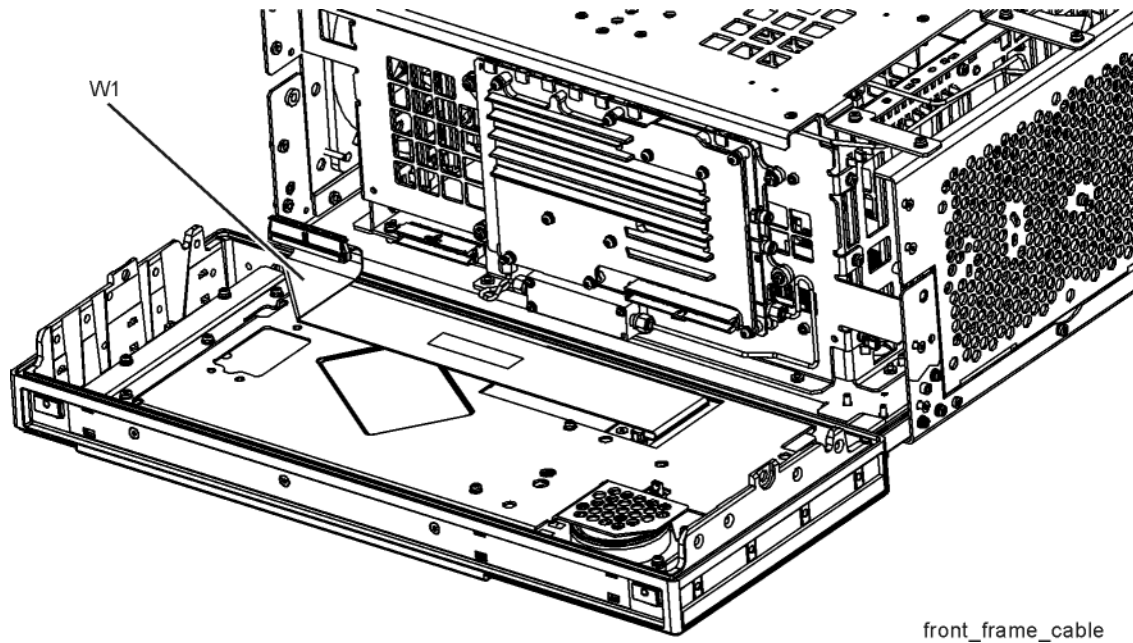
front_frame_cable

Figure 12   Front Frame Replacement
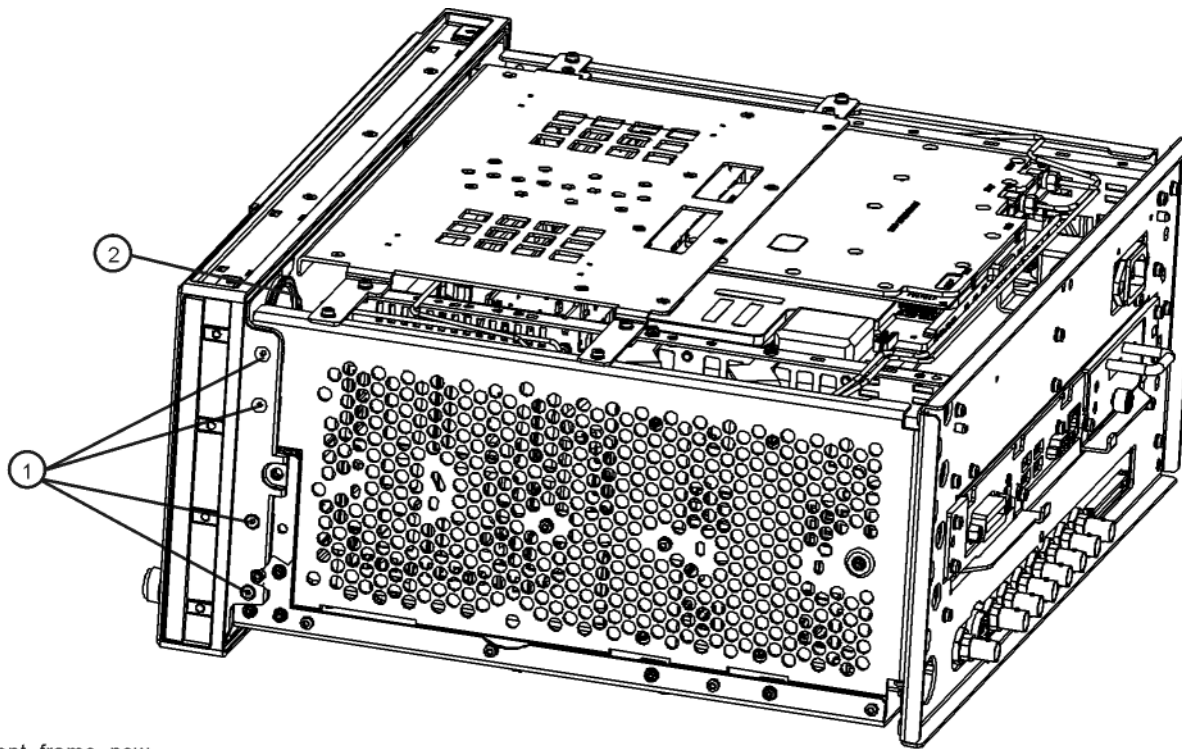
front_frame_new

3. Refer to Figure 13, "W27 and W28 Before Alignment,". When the front panel is installed, cables W27 and W28 typically do not align. This is OK since the cables are flexible.

4. Refer to Figure 14, "W27 and W28 Properly Aligned,". Align and connect cables W27 and W28. Hand-tighten the nut.
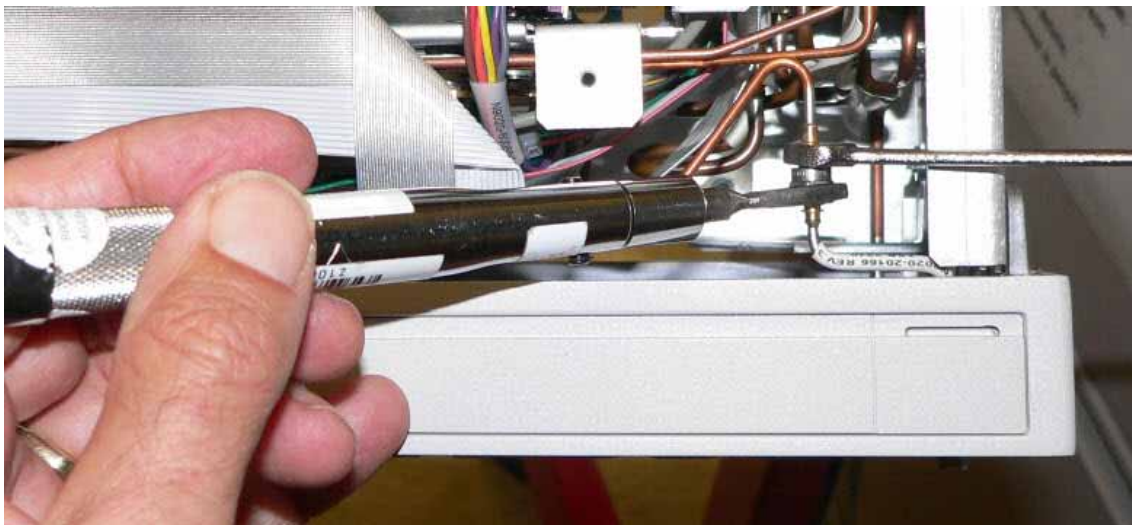
Figure 13   W27 and W28 Before Alignment

Figure 14   W27 and W28 Properly Aligned
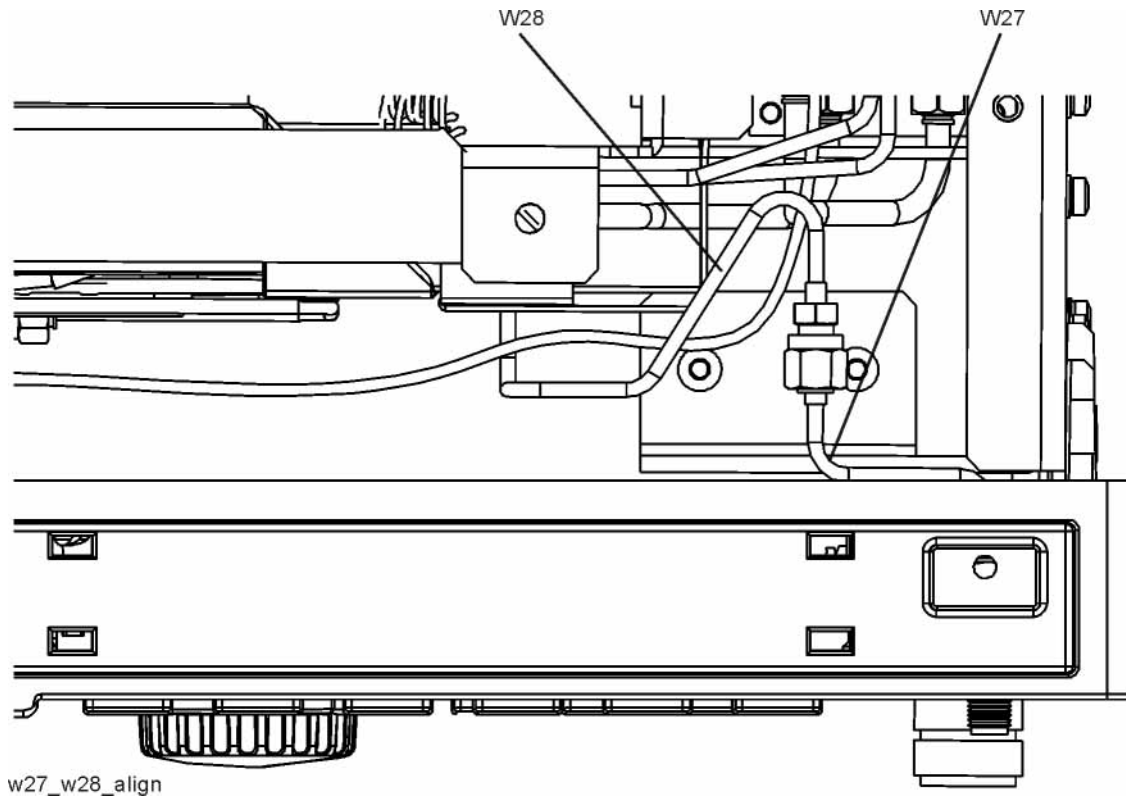
5. Refer to Figure 15, "Torque Cable W27 onto W28,". Use a ¼" open-end wrench to prevent the SMA female connector on W28 from twisting. Use a 5/16" torque wrench to torque the nut on W27 to 10 inch-pounds.

Figure 15   Torque Cable W27 onto W28

Top Brace Replacement

1. Refer to Figure 16, "Top Brace Replacement,". To replace the top brace, place the brace in the correct position and attach to the chassis using the eight screws (3) (0515-0372). Attach the top brace to the boards using the twelve screws (4) (0515-1946) included in the kit.

2. Torque all screws to 9 inch-pounds.

Figure 16   Top Brace Replacement

top_brace_remove
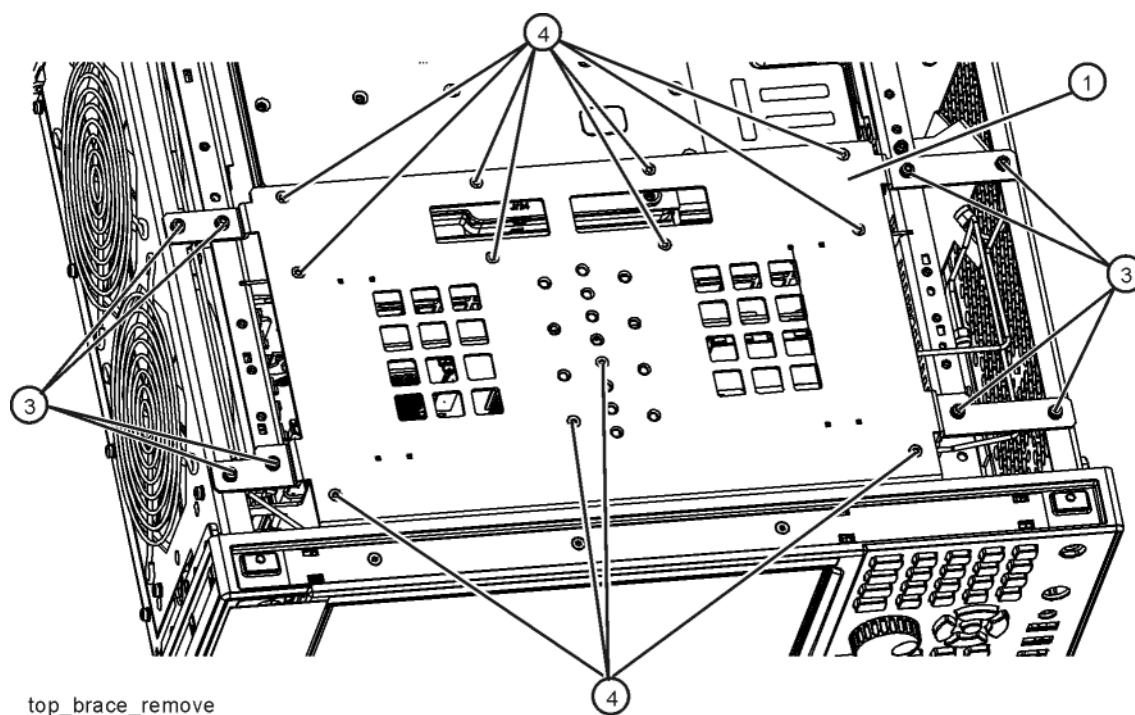
3. In the upgrade kit, locate the Warning Label, N9030-80018.

4. Refer to Figure 17, "Add Warning Label to Top Brace,". Attach the Warning Label to the top brace as shown.

5. Locate the 50 Ohm SMA termination in the kit, part number 1810-0118. Attach the SMA termination to the front panel EXT MIXER connector.

Figure 17   Add Warning Label to Top Brace

EXM_warning_label
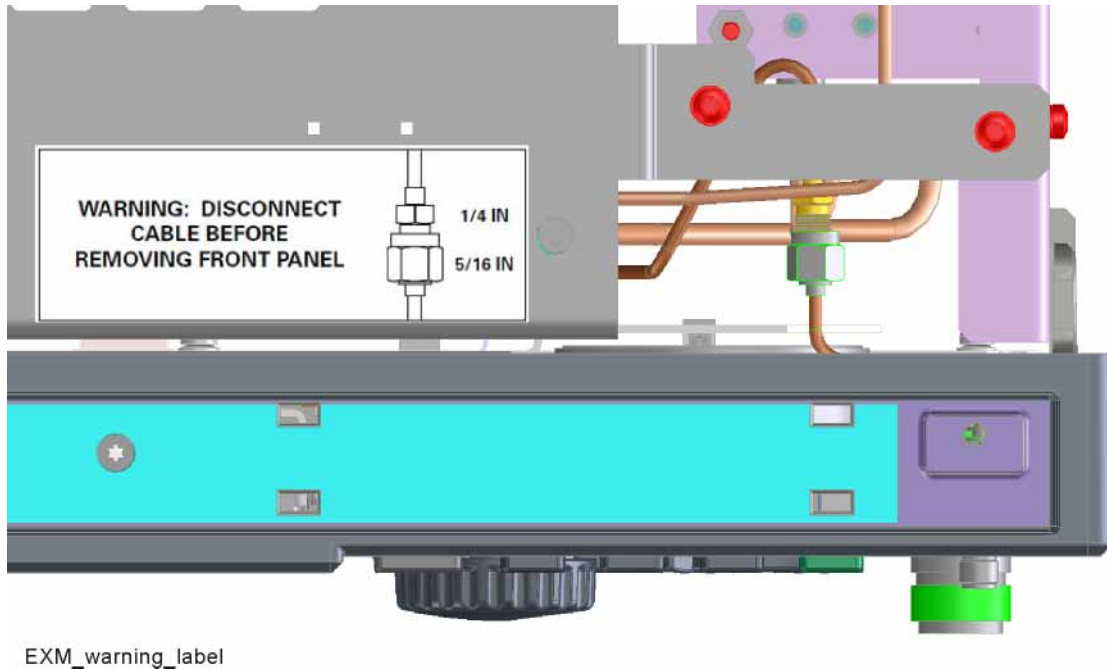
Final Installation for Standard Instruments
(Benchtop Configuration, Figure 1, "Instrument Outer Case Removal,")

1. Refer to Figure 1, "Instrument Outer Case Removal,". 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.

Final Installation for Portable Instruments (Option PRC, Figure 2, "Bail Handle Removal," and Figure 3, "Option PRC Outer Case Removal,")

1. Refer to Figure 3, "Option PRC Outer Case Removal,". 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 3, "Option PRC Outer Case Removal,". 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 2, "Bail Handle Removal,". Replace the four hole plugs (5) to both sides of the instrument.

4. Refer to Figure 2, "Bail Handle Removal,". Replace the bail handle (2) (using the four screws (1)) to the Front Frame Assembly. Torque to 21 inch pounds.

Update Instrument Software

Go to the following website and determine whether or not the analyzer has the latest instrument software already installed (the currently-installed software was noted in the Analyzer Information procedure at the beginning of the installation procedure):

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 Option
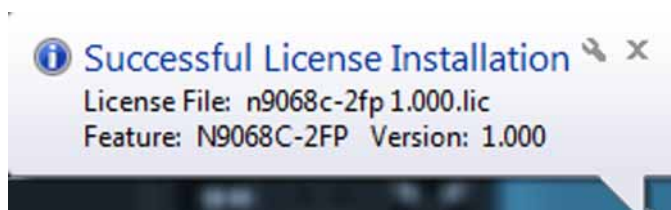
Installation Procedure over USB

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 18, "USB Storage Device Configuration Menu,". This menu may be configured according to your preferences.

Figure 18   USB Storage Device Configuration Menu

7. The 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 19, "Successful License Installation,".

Figure 19   Successful License Installation

Alternate Installation Procedure

The License File can be manually installed over USB or LAN by placing the license file in the following analyzer folder: C:\Program Files\Agilent\licensing.

Verify the License Installation

1. Before the licenses will be recognized, the XSA application must be restarted. Press **System**, **Exit Program**. An Exit Analyzer dialog box will appear; press **OK** 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 option listed:

   – N9010B-EXMExternal Mixing

Verify Optional Functionality

1. Press **Mode/Meas, Spectrum Analyzer, Swept SA, OK**.

2. Press **Input/Output**. Press **Select Input**.

3. Verify that "**External Mixer**" appears below the "**RF**" key.

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. Information on how to obtain this software can be found at:

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

Utilities Required

None

Adjustments Required

The following adjustments are the minimum set required to ensure that the newly installed hardware is functioning properly

— LO Output Adjustment

— IF Input Adjustment

Performance Testing Required

The following performance verification tests are the minimum set required to ensure that this newly installed option is functioning properly.

— LO Output Power Accuracy

— IF Input Gain Accuracy

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

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