Installation Note

Agilent Technologies
E4401B ESA Spectrum Analyzer and
E7401A EMC Analyzer
High Stability Frequency Reference Option 1D5
Performance Kit Upgrade E4401-60151

Agilent Technologies

Part Number E4401-90104
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Introduction

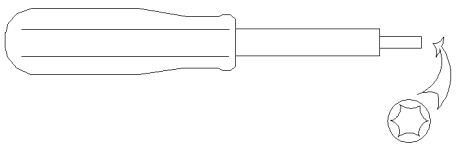
Products Affected:	E4401B E7401A
Serial Numbers:	US00000000/US99999999 MY00000000/MY99999999
To Be Performed By:	(X) Agilent Technologies Service Center (X) Personnel Qualified by Agilent (X) Customer
Estimated Installation Time:	2.0 Hours

Performance Kit Upgrade Kit Parts List

Qty	Description	Part Number
5	Screw - M3 X 8 mm (TORX Pan Head with Crest Washer)	0515-0372
1	Precision Frequency Reference Cable, Flexible Coax, *A8A1 to A8J4*	8120-5024
1	Cover Shield	E4401-00055
1	A8A1 1.5 GHz Precision Frequency Reference Assembly	E4401-60036
1	Power Harness, *A8A1 to A8J2*	E4401-60043
1	Installation Note	This note

Tools Required

Figure 1 TORX Tool



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T-10 TORX screwdriver

T-20 TORX screwdriver

Torque Settings

To avoid potential RFI leakage, tighten screws to the following torque limits:

Item	Torque
M3 T-10 TORX screws	101 N/cm (9 in.-lbs)
M5 T-20 TORX screws	236 N/cm (21 in-lbs)

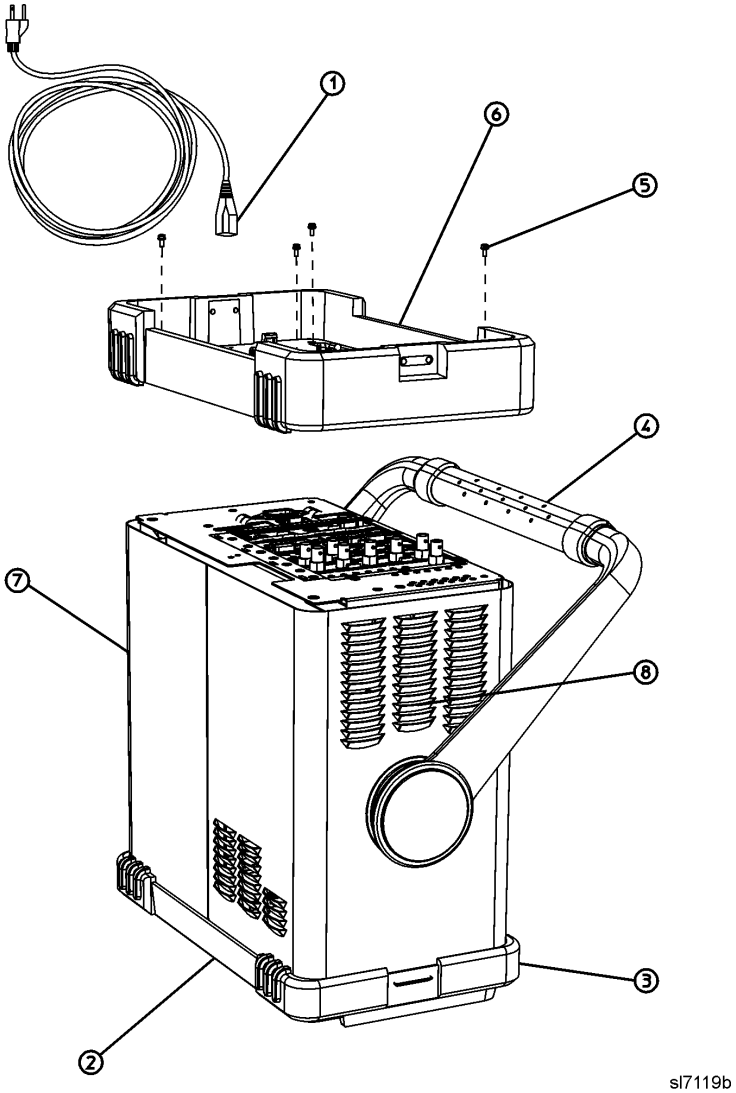
Procedure

WARNING **Dangerous voltages may be present when opening covers or removing parts. Disconnect the product from all voltage sources while it is being opened.**

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.

Instrument Outer Case Removal

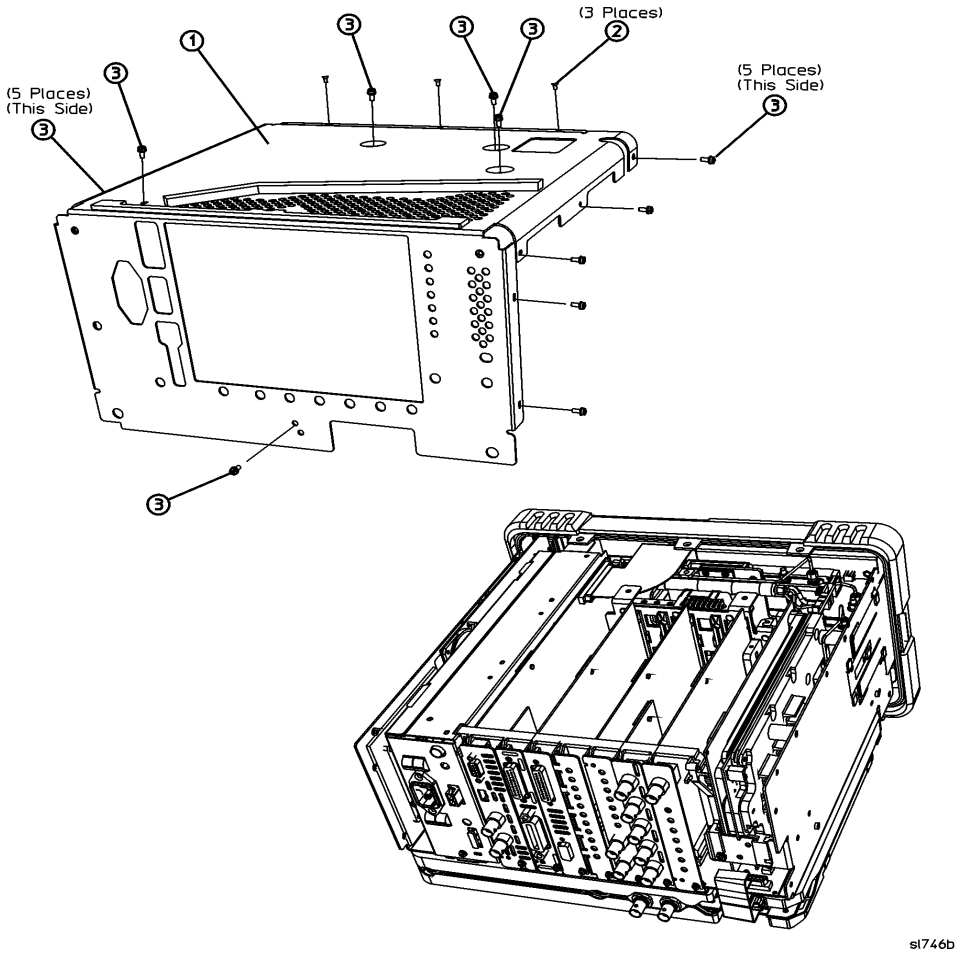
Figure 2 **Outer Case, Rear Frame Removal**



1. Referring to Figure 2 disconnect the spectrum analyzer from ac power **(1)**.
2. Remove any adapters or cables **(2)** connected to the front frame.
3. Carefully place the analyzer on the work surface with the front frame **(3)** facing down.
4. Position the handle **(4)** as shown.
5. Remove the four screws **(5)** that hold the rear frame and outer case in place.
6. Remove the rear frame **(6)**.
7. Pull the outer cover **(7)** off towards the rear of the instrument.

Chassis Cover Removal

Figure 3 Chassis Cover Removal



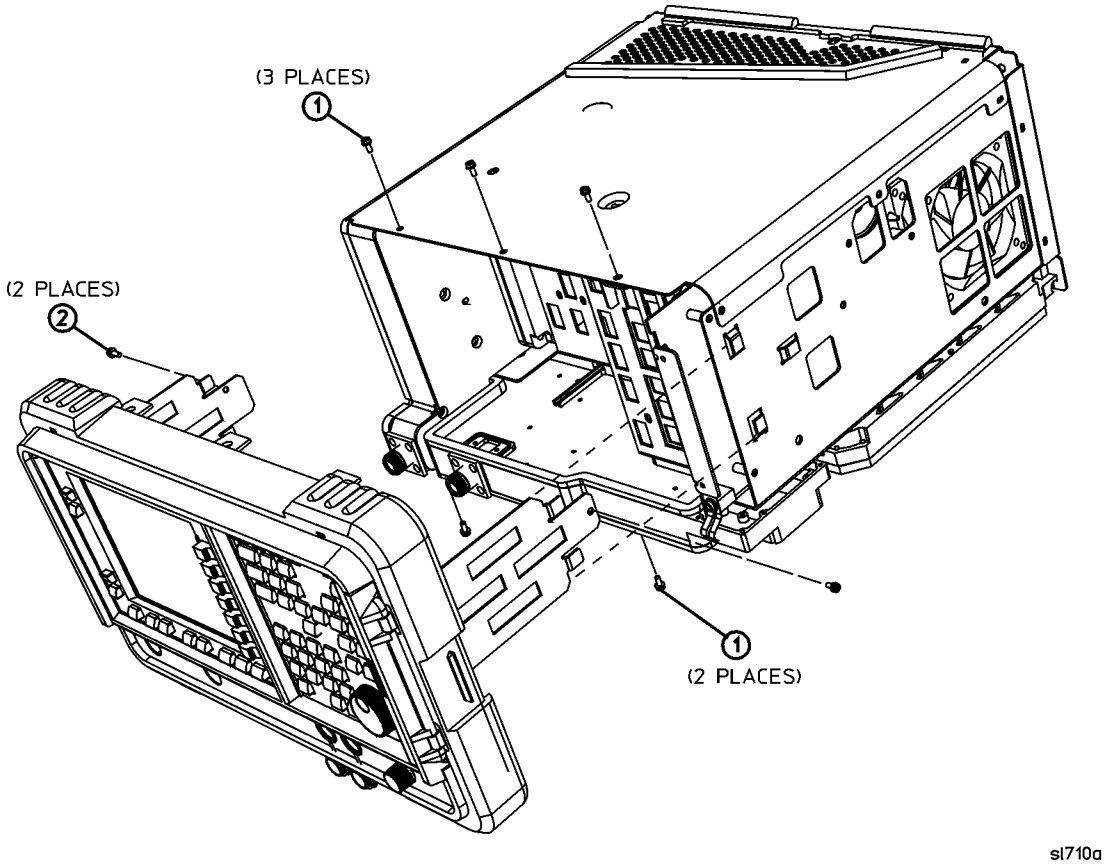
1. Lay the instrument flat as shown in Figure 3.
2. Remove the 17 screws **(2)** and **(3)** attaching the chassis cover **(1)** to the chassis. Note that the number of screws attaching the chassis cover may vary with option mixes.
3. The chassis cover can now be removed from the chassis.

A1 Front Frame Assembly Removal

CAUTION Use ESD precautions when performing this replacement procedure.

Extension

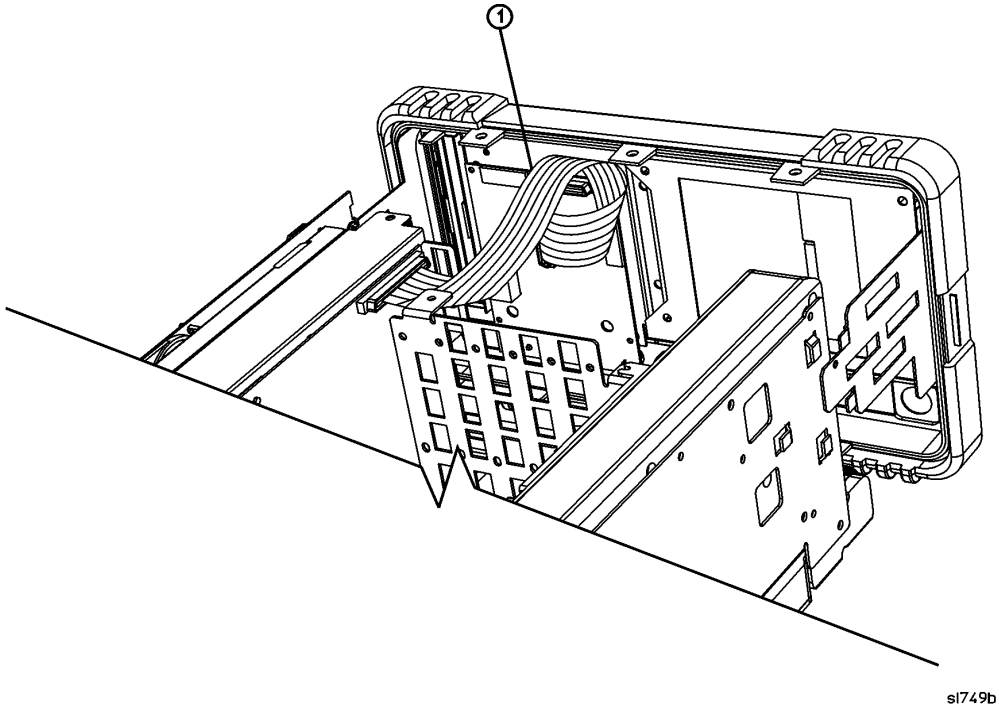
Figure 4 A1 Front Frame Assembly Removal



1. Refer to Figure 4. With the instrument on its face, remove the five screws **(1)**, two on the bottom side and three on the top of the instrument, that secure the front frame to the RF assembly and chassis cover.
2. Place the instrument with the top side facing up and remove the remaining two screws **(2)** that secure the front frame subpanel to the chassis.
3. Slide the front frame forward until it catches on the tabs on the sides of the chassis.

Removal

Figure 5 Front Frame Ribbon Cable



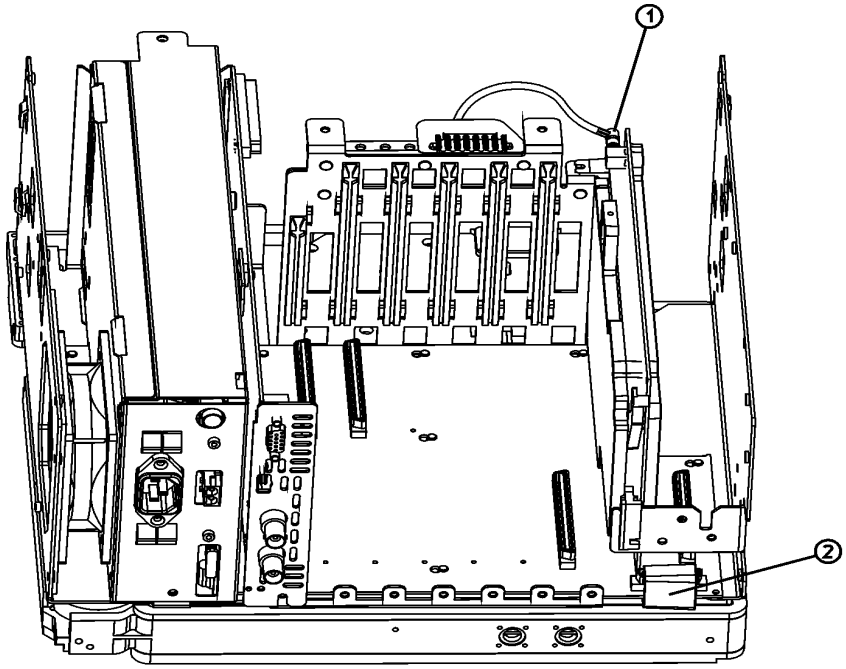
1. Refer to Figure 5. Disconnect the ribbon cable **(1)** from the A1A1 front panel interface board. Analyzers with Option B7B (E4401B only) will have a second ribbon cable connected to A1A1. Disconnect the second ribbon cable if present.
2. Carefully pull the sides of the front frame subpanel away from the chassis and over the tabs on the chassis.
3. Slide the front frame forward to disengage from the chassis assembly.

A8 1.5 GHz RF Assembly Removal

CAUTION Use ESD precautions when performing this replacement procedure.

NOTE The RF assembly is not field serviceable. Please do not remove the shields (other than the input connector cover).

Figure 6 **A8 1.5 GHz RF Assembly Cables**



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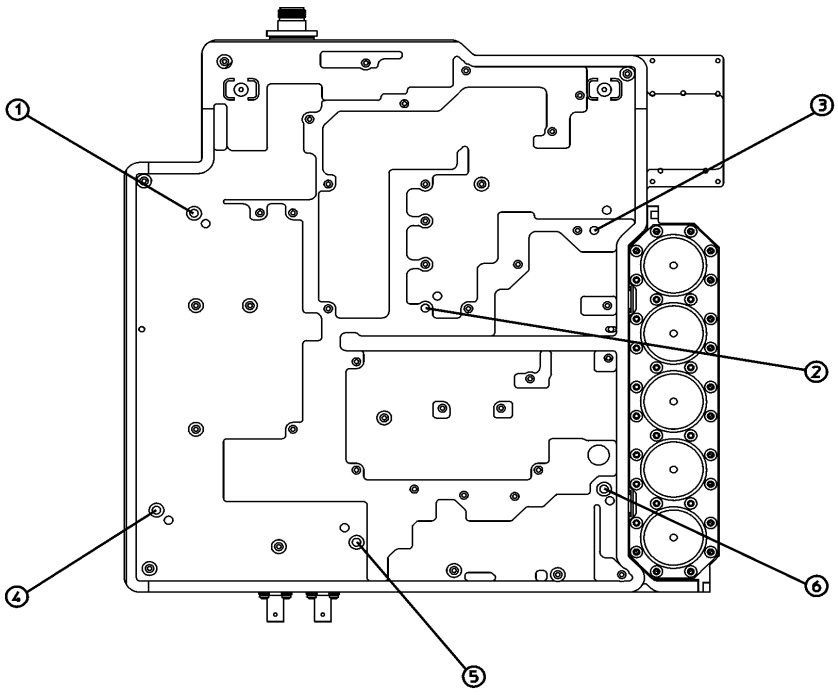
1. Refer to Figure 6. Disconnect the W2 coaxial cable **(1)** from the A3 IF assembly.
2. Disconnect the W4 RF ribbon cable **(2)** from the motherboard at the rear of the instrument.

Figure 7 **A8 1.5 GHz RF Assembly Removal**



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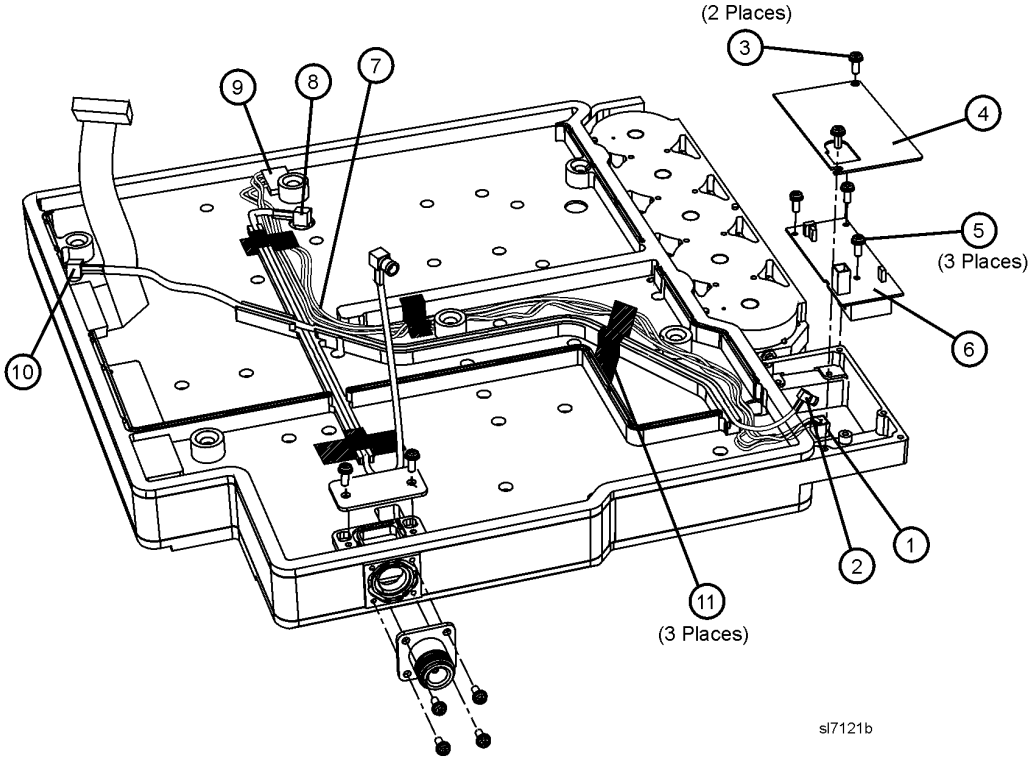
3. Refer to Figure 7. Turn the instrument upside down and remove the six screws labeled **(1 - 6)** that hold the RF assembly to the chassis.
4. Lift the RF assembly from the spectrum analyzer.

A8A1 OCXO Precision Frequency Reference (Option 1D5) Installation

CAUTION Use ESD precautions when performing this installation procedure.

Figure 8 Precision Frequency Reference



1. Referring to Figure 8, install the 1D5 assembly **(6)** (E4401-60036) and secure with the three screws **(5)**.
2. Install the cover **(4)** (E4401-00055) and two screws **(3)**.
3. Install power cable harness assembly **(7)** (E4401-60043) by running the harness under the coaxial cable connected to the RF board J1 **(8)** and following the cable path indicated in Figure 8.
4. Connect the control cable **(1)** to the precision frequency reference assembly and to RF Board J2 **(9)**.
5. Connect the SMB cable **(2)** to the precision frequency reference assembly and to RF Board J4 **(10)**.
6. Secure cable harness with tape **(11)** as shown.
7. Dress the cables to avoid pinching during reassembly.

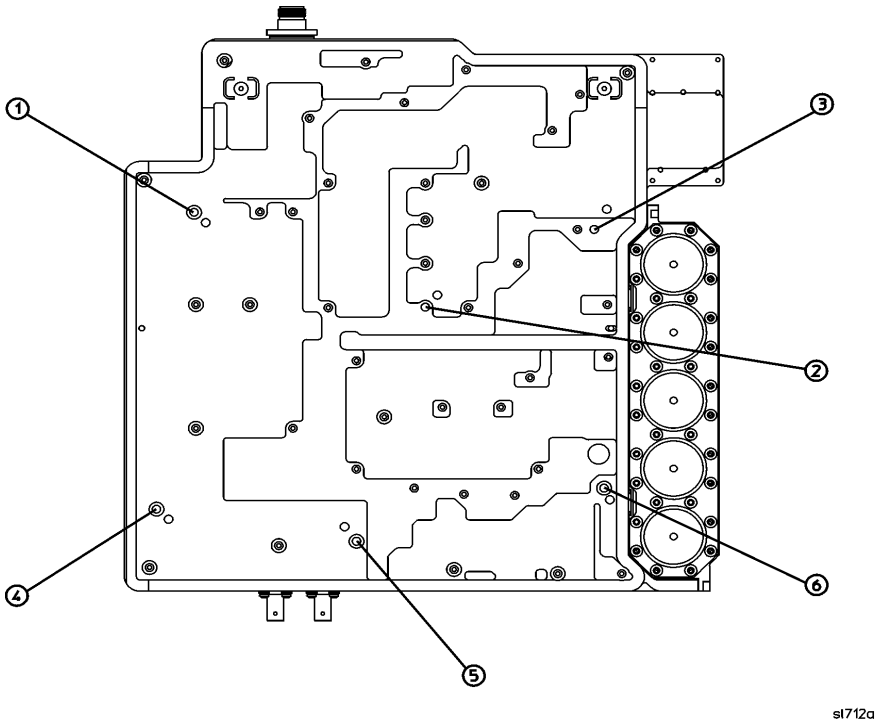
A8 1.5 GHz RF Assembly Replacement

CAUTION Use ESD precautions when performing this replacement procedure.

NOTE The RF assembly is not field serviceable. Please do not remove the shields (other than the input connector cover).

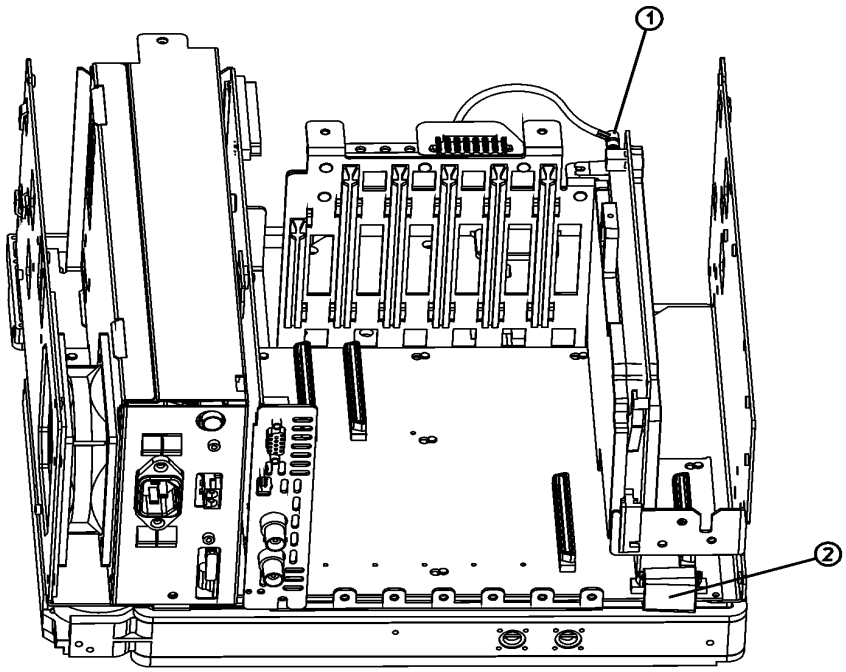
1. Place the instrument chassis upside down on the work surface.
2. Position the RF assembly on the chassis, taking care not to pinch any of the cables.

Figure 9 A8 1.5 GHz RF Assembly Removal



3. Refer to Figure 9. Replace the six screws labeled **(1 - 6)** that secure the RF assembly to the chassis. The correct screw holes are marked 1 through 6 on the assembly. Tighten them to 9 inch-pounds.
4. Refer to Figure 10. Connect the W4 ribbon cable **(2)** to the RF assembly and W2 coaxial cable **(1)** to the A3 IF assembly.

Figure 10 **A8 1.5 GHz RF Assembly Cables**



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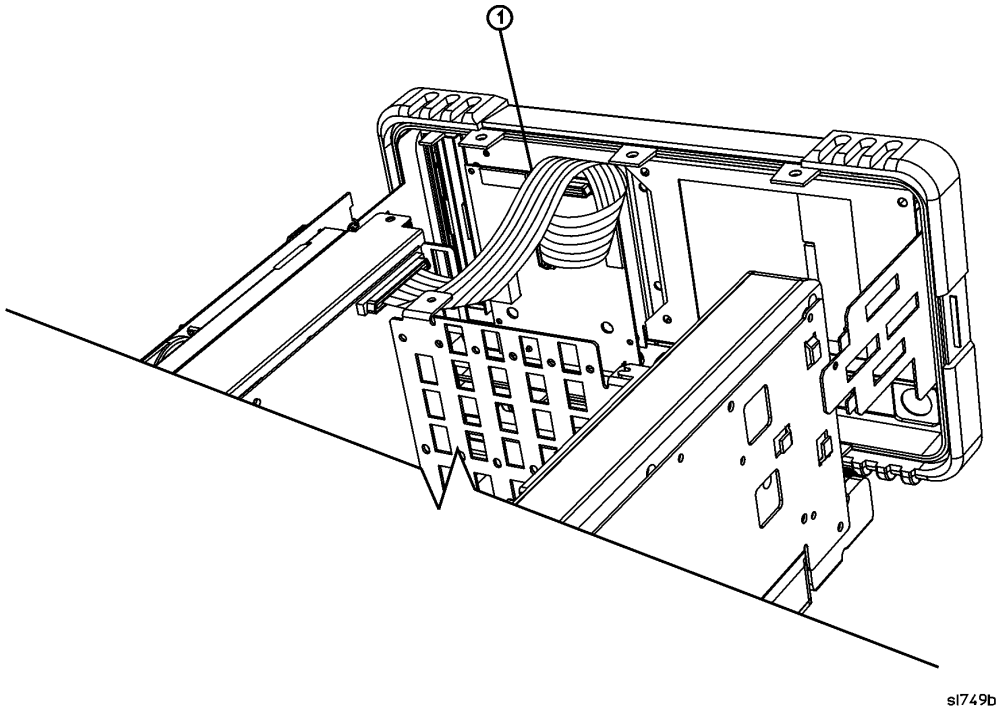
A1 Front Frame Assembly Replacement

CAUTION Use ESD precautions when performing this replacement procedure.

Figure 11 Front Frame Ribbon Cable

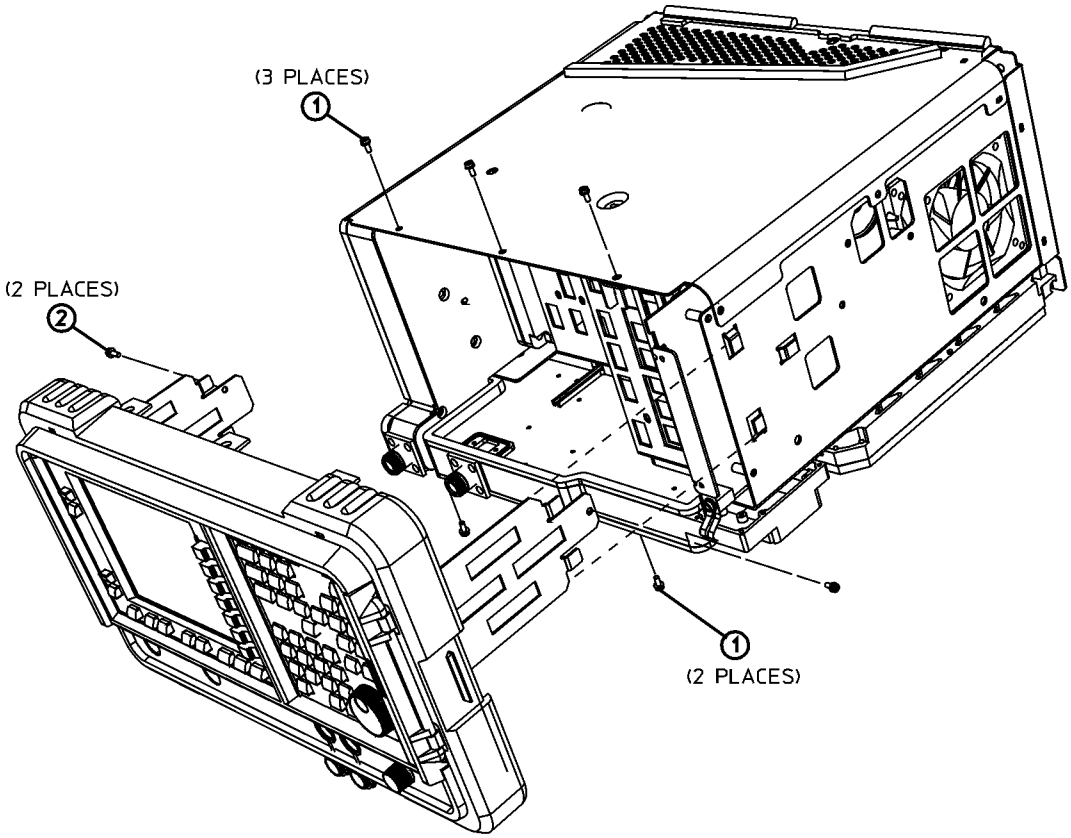


1. Align the A1 front frame subpanel rails with the chassis as shown in Figure 11.
2. Connect the ribbon cable **(1)** to the front frame assembly. Analyzers with Option B7B (E4401B only) will have a second ribbon cable connected to A1A1. Connect the second ribbon cable if present.
3. Carefully slide the front frame toward the chassis, assuring the ribbon cable is not pinched between assemblies, and the RF input connector lines up correctly with the opening in the front frame.

NOTE Make sure the water seal is still in place around the input connector (and around the A2 tracking generator connector if the instrument is an Option 1DN or 1DQ) before reinstalling the front frame assembly.

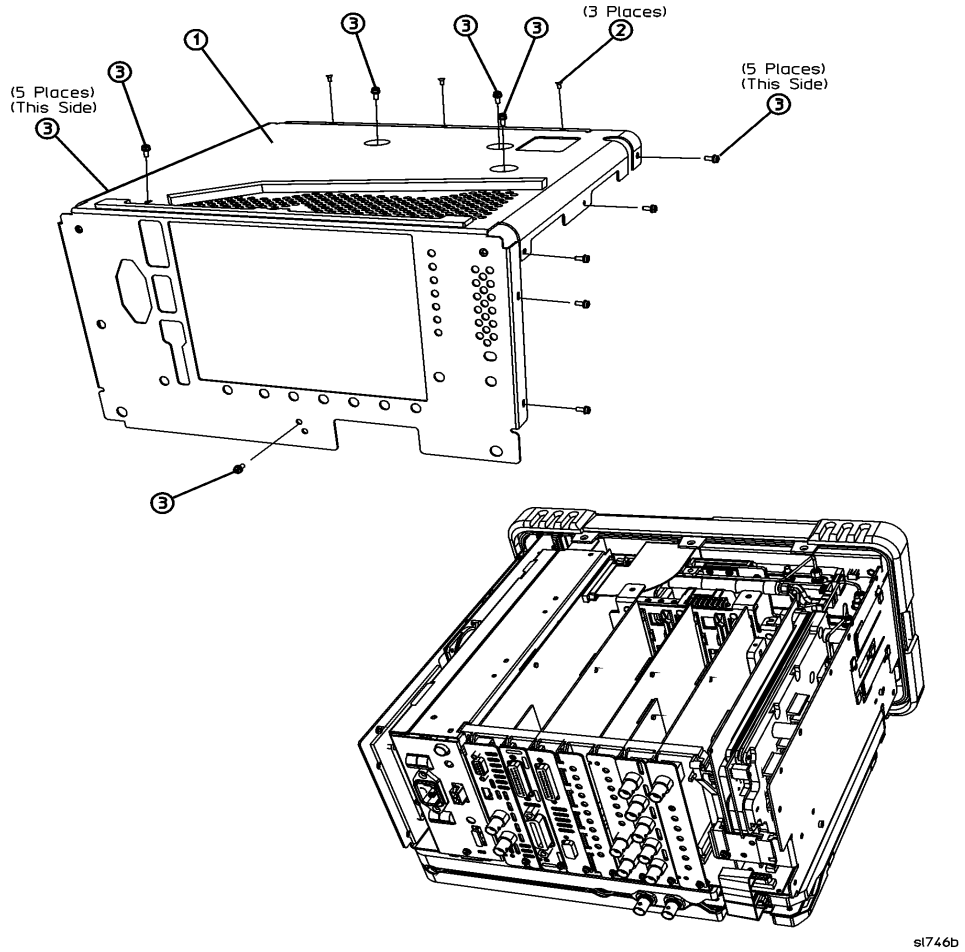
4. Refer to Figure 12. Replace the screws **(2)** that secure the front frame slide to the chassis. Tighten them to 9 inch-pounds.
5. Replace the screws **(1)** that secure the front frame to the chassis. Tighten them to 9 inch-pounds.

Figure 12 **A1 Front Frame Assembly Replacement**



Chassis Cover Replacement

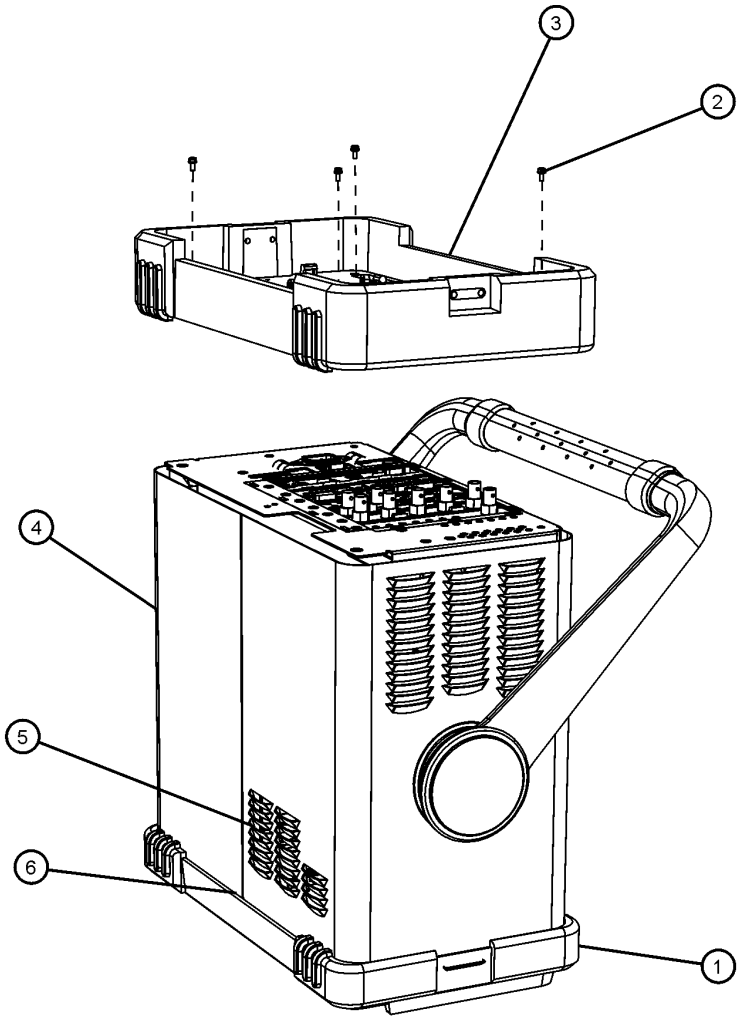
Figure 13 Chassis Cover Replacement



1. Position the chassis cover **(1)** over the instrument as shown in Figure 13, then lower onto the instrument.
2. Replace the 17 screws **(2)** as **(3)** shown and tighten them to 9 inch-pounds.

Instrument Outer Case

Figure 14 Outer Case, Rear Frame Replacement



1. Referring to Figure 14, Carefully place the spectrum analyzer on the work surface with the front frame **(1)** facing down.
2. Replace the instrument outer case **(4)**, matching the grill **(5)** on the bottom of the case to the bottom of the analyzer.
3. Fit the leading edge of the case completely into the slot **(6)** on the back of the front frame assembly.
4. Replace the rear frame assembly **(3)** using the four screws **(2)** to fasten the rear frame to the instrument. Tighten them to 21 inch-pounds.

Post Maintenance Adjustments And Performance Verification Tests

Adjust the Precision Frequency Reference

1. Use the Adjustment Software (not supplied) to perform the following adjustment. Obtain the software by ordering the Service Documentation Option (0BW).
   - "10 MHz Reference Frequency Adjustment."

Functional Testing

1. Press **System**, **More**, **Show System** to verify existence of Option 1D5.
2. To test the functionality and performance of this option, execute the following performance verification tests located in the calibration guide for the analyzer being upgraded.
   - "10 MHz High-Stability Frequency Reference Output Accuracy"
   - "Residual FM"
3. If you have problems performing any of these tests, get in touch with the nearest Agilent Technologies sales and service office listed in the *Getting Started* guide for the analyzer being upgraded.

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Manufacturing Part Number

E4401-90104

Customer Order Number

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