

# Installation Note

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**Agilent Technologies ESA E4402/3/4/5/7/8B  
Spectrum Analyzers  
and E7402/3/4/5A EMC Analyzers  
3.0 GHz 50  $\Omega$  Tracking Generator Retrofit Kit  
(Option 1DN)**



**Agilent Technologies**

Part Number E4403-90021

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# Tracking Generator Retrofit Kit

Products Affected: .....	E4402B Spectrum Analyzer E4403B Spectrum Analyzer E4404B Spectrum Analyzer E4405B Spectrum Analyzer E4407B Spectrum Analyzer E4408B Spectrum Analyzer E7402A EMC Analyzer E7403A EMC Analyzer E7404A EMC Analyzer E7405A EMC Analyzer
Serial Numbers: .....	US00000000/US99999999
To Be Performed By: .....	(x) Agilent Service Center (x) Personnel Qualified by Agilent Technologies (x) Customer
Estimated Installation Time: .....	1 Hour
Estimated Verification Time: .....	2 Hours

## Introduction

This kit contains the parts and instructions to install a 3.0 GHz 50 Ω tracking generator (Option 1DN) in an Agilent ESA Spectrum Analyzer. See the table above for models that apply.

**NOTE** Some ESA models that can be retrofitted with the tracking generator option have frequency ranges that exceed that of the 3.0 GHz tracking generator.

## Installation Kit Parts List

**Table 1** 50 Ω Tracking Generator Kit (Option 1DN) Contents

Item	Quantity	Description	Part Number
1	1	Board Assembly, Tracking Generator 50 Ω	E4403-60013
2	1	Adapter, Type-N (m) to BNC (f)	1250-0780
3	1	Adapter, Type-N (m) to SMA (f)	1250-1250
4	1	Cable, Type-N (m) to SMA (m)	8120-5148
5	1	Cable, SMB (f) to SMB (f)	8120-5024
6	5	Screw, M3 x 8 mm (crest washer - pan head - TORX)	0515-0372
7	1	Type-N EMC Seal	E4403-20046
8	1	Installation Note (this document)	---

**NOTE**

Item numbers 2, 3, and 4 are supplied for calibration and normal use purposes following installation of the tracking generator. These adapters and cable are not used in the actual installation.

## Tools Required

- T-8 TORX screwdriver
- T-10 TORX screwdriver
- T-15 TORX screwdriver
- Flat-blade screwdriver
- Spectrum analyzer, microwave
- 50  $\Omega$  termination, 2 required
- Power meter
- Power sensor
- Digital voltmeter
- BNC (f) to dual banana plug
- Cable, BNC 91 cm (36 in.)
- Adapter, Type-N tee, (m)(f)(f)
- Adapter, Type-N (m) to BNC (f)
- Cable, Type-N, 62 cm (24 in.)
- Cable, BNC, 23 cm (9 in.)
- Torque driver (Torque driver requirements are shown in [Table 2.](#))
- Torque wrench (5/16-inch) (Torque driver requirements are shown in [Table 2.](#))

# Installation Procedure

**WARNING**                    **Before you disassemble the instrument, turn the power switch OFF and 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.**

To avoid potential RFI leakage and prevent connector damage, tighten screws and RF coax cable connectors to the following values:

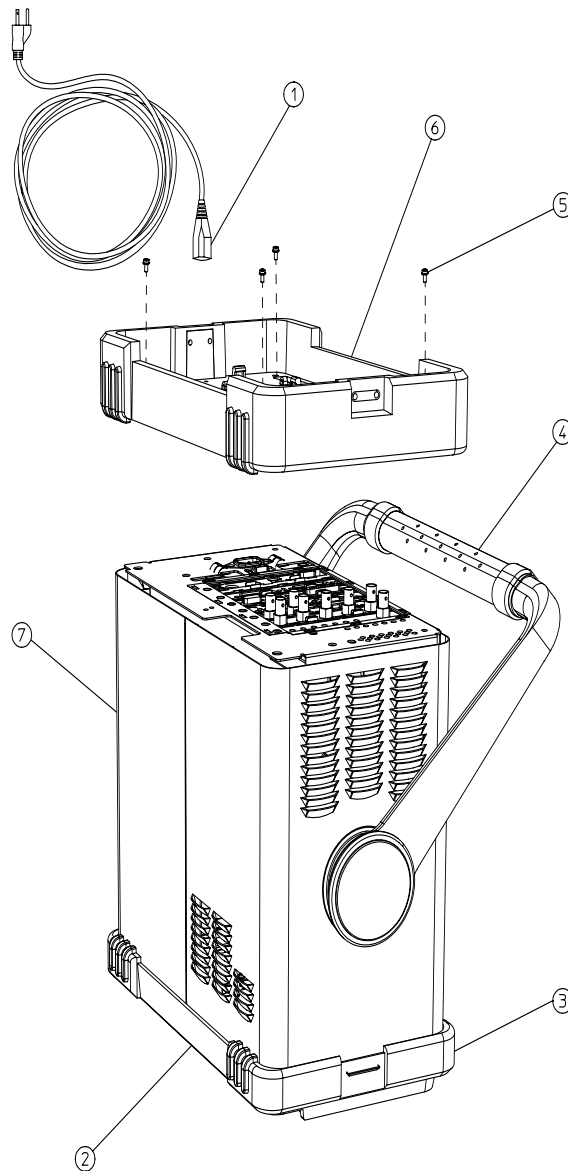
**Table 2                    Torque Settings**

<b>Item</b>	<b>Torque N-cm</b>	<b>Torque in-lb.</b>
SMA connectors	95	8.5
3-mm, T-10 TORX screws	101	9.0
3.5-mm, T-10 TORX screws	157	14
4-mm, T-15 TORX screws	236	21
Pozidrive screws	157	14

## Remove Rear Frame and Outer Cover

1. Disconnect the ac power cord from the spectrum analyzer.
2. Refer to [Figure 1](#). Carefully put the analyzer on the work surface with the front frame, (2) and (3), facing down.
3. Position the handle (4) as shown in the figure.
4. Remove the four screws (5) that hold the rear frame (6) and outer cover (7) in place.
5. Lift the instrument rear frame (6) and outer cover (7) up and off of the instrument and set them aside.

**Figure 1. Remove Rear Frame and Outer Cover**

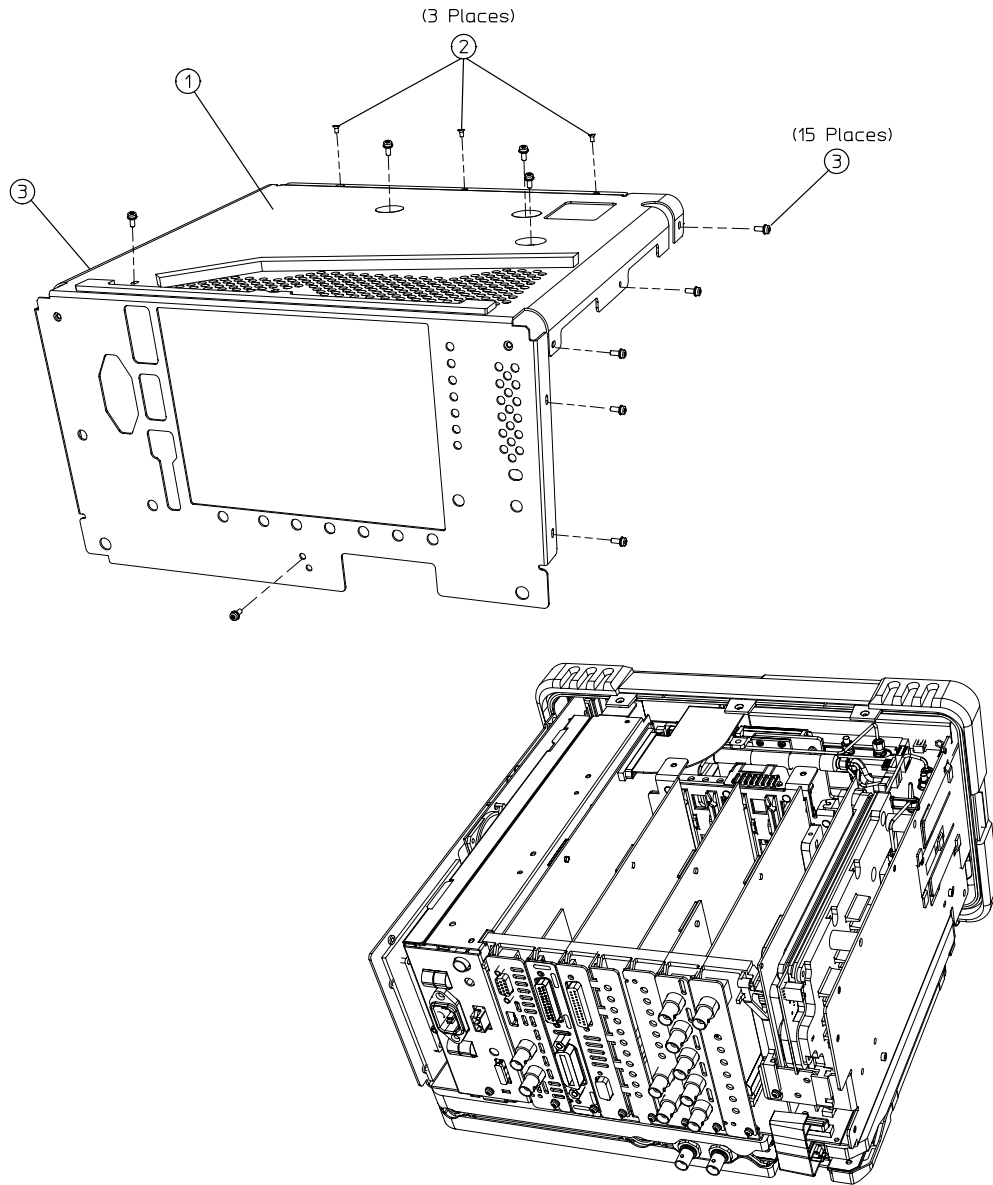


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## Remove Chassis Cover

6. Refer to [Figure 2](#). Remove the screws (2 and 3) attaching the chassis cover (1) to the chassis.
7. Remove the chassis cover from the chassis.

**Figure 2. Remove Chassis Cover**



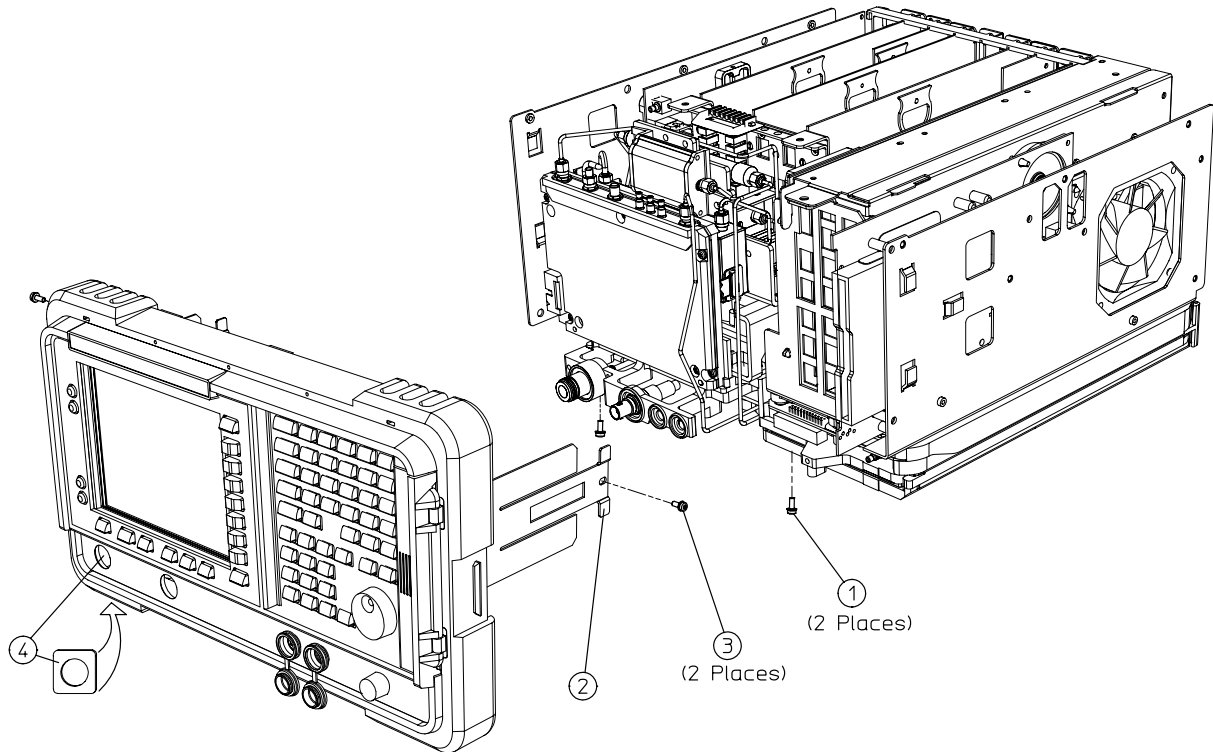
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## Remove Front Frame and Install Tracking Generator

8. Refer to [Figure 3](#). Remove the two screws on the bottom side (1) of the instrument that secure the front frame to the RF assembly.
9. Place the instrument with the top side facing up. Remove the two screws (3) that secure the front frame subpanel to the chassis sides.

**Figure 3. Remove Front Frame**

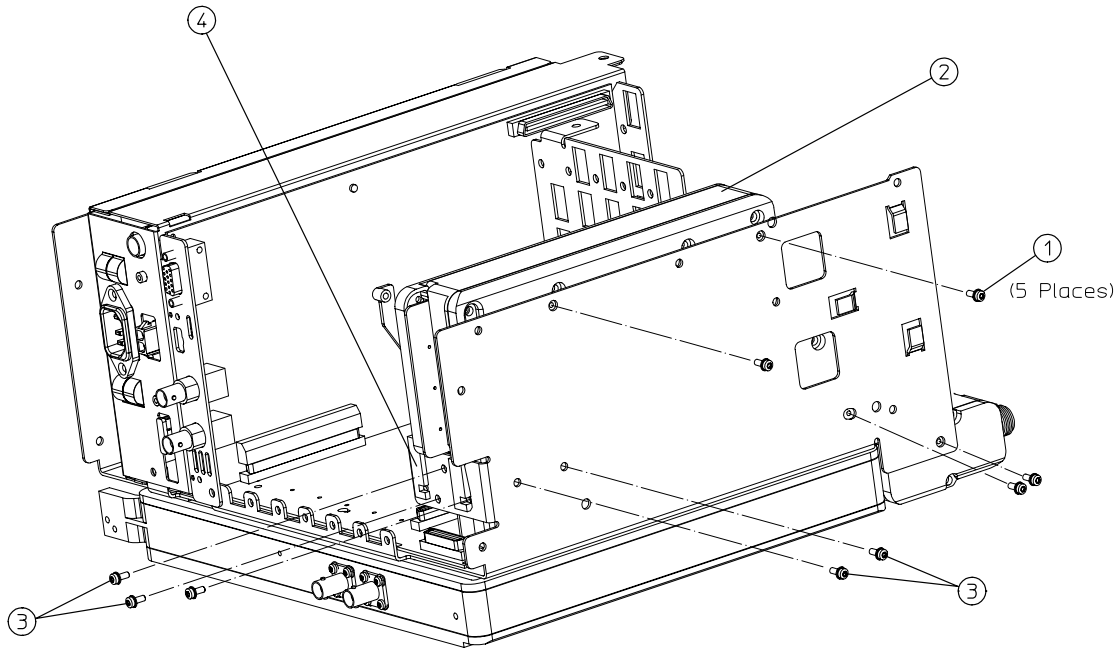


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10. Slide the front frame forward until it latches. Disengage the latches on each side of the instrument by sliding the front frame back toward the instrument a small amount and then gently pulling out on the latch tabs (2).
11. Slide the front frame forward just far enough to reach the ribbon connector attached to J2 on the front panel keyboard printed circuit board. Disconnect the ribbon cable from J2.
12. Remove the front frame and position it with the display face down. With a flat-blade screwdriver, carefully press the side tabs of the hole plug in the tracking generator RF OUT connector hole (from the inside of the front panel) and push the plug out of the hole. Discard the hole plug and set the front panel assembly aside.
13. Install the Type-N EMC Seal (included with this kit) onto the inside front panel RF OUT connector hole (4), unless this seal is already installed on your instrument front panel. Remove the adhesive backing from the seal and press it into the front frame pocket. The foiled edges must make contact with the top and bottom of the frame pocket.
14. Refer to [Figure 4](#). Remove the L bracket by removing four screws (3). This bracket is located in back of the aluminum protrusion at (4). Discard the bracket.

15. Carefully plug the tracking generator assembly (2) into the motherboard.
16. Insert and attach the five screws (1) that secure the tracking generator to the chassis. These screws are supplied in this kit. Torque these screws to 101 N-cm (9 in-lb.).
17. Turn the instrument so that the front is facing toward you. If your instrument is model E4402B, E4403B, or E7402A, continue with this procedure at [step 18](#). If your instrument is any other model number, continue at [step 22](#).

**Figure 4. Remove the L Bracket and Install the Tracking Generator**

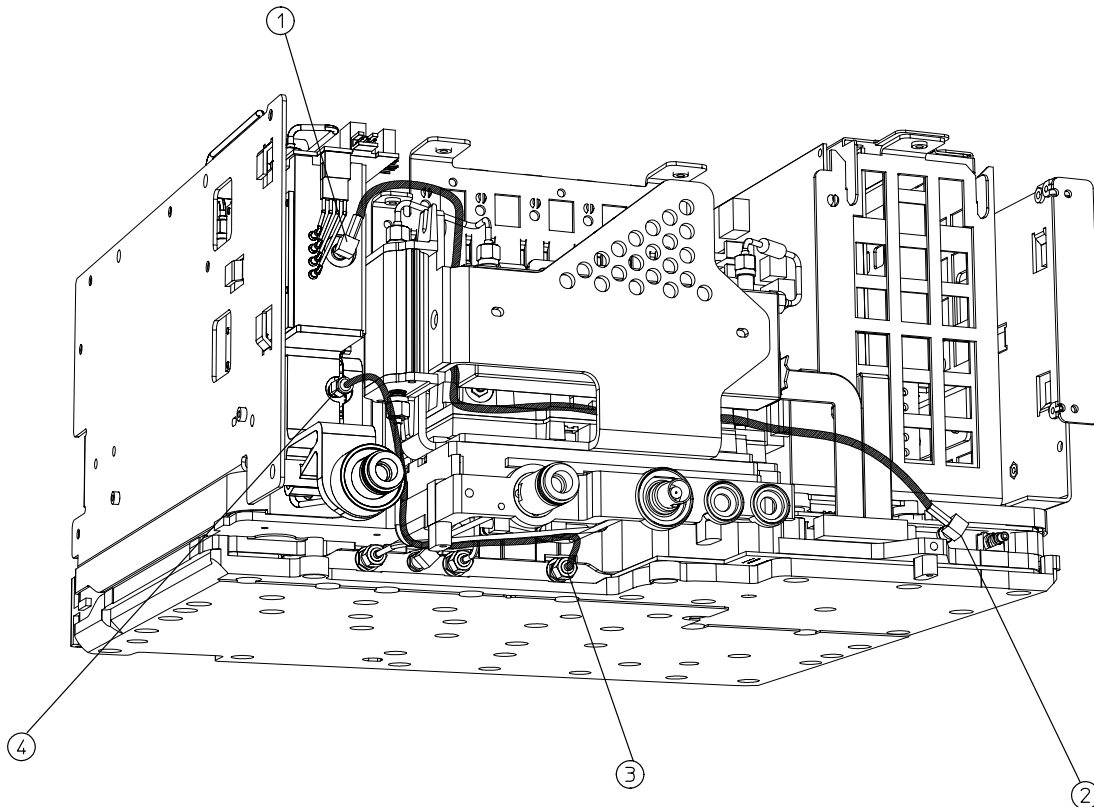


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## Install Tracking Generator Cables (Agilent E4402B, E4403B, and E7402A)

18. Refer to [Figure 5](#). This figure applies to Agilent models E4402B, E4403B, and E7402A only. Remove the 50Ω SMA termination from the connector at (3). Refer to [Figure 6](#). Connect the termination to tracking generator connector J3 (6) as shown in [Figure 6](#). Torque this connection to 95 N-cm (8.5 in-lb.).
19. Refer to [Figure 5](#). The tracking generator is supplied with an SMA semi-rigid cable already attached to the tracking generator at the connector at (4). Route the free end of this cable as shown and connect the end to the SMA female connector at (3). Torque this connection to 95 N-cm (8.5 in-lb.).
20. Locate the SMB cable in this kit (part number 8120-5024). Connect one end of the SMB cable to the connector at (2). Route the cable as indicated and connect the other end to the connector at (1).
21. Continue this procedure with “Replace Front Frame” at [step 25](#).

**Figure 5. Install the Tracking Generator Cables (E4402B, E4403B, and E7402A)**

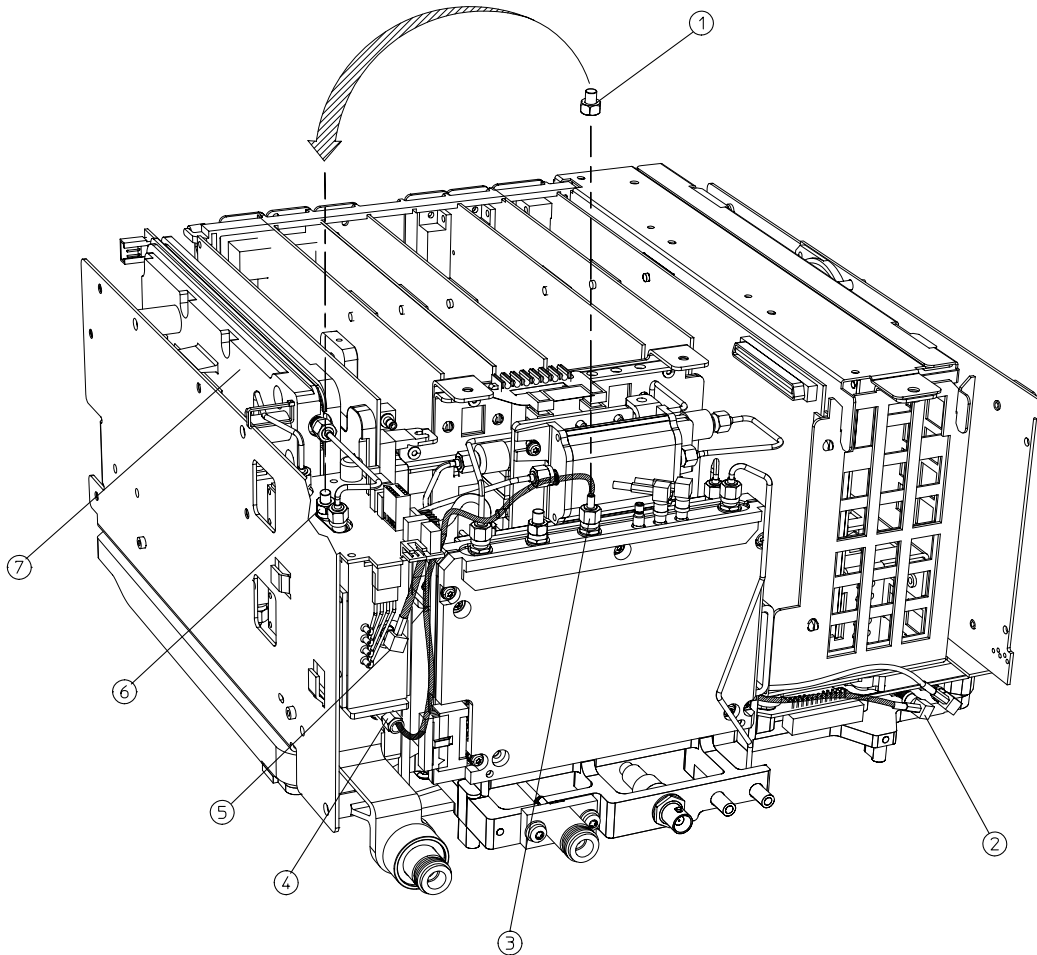


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## Install Tracking Generator Cables (Agilent E4404/5/7/8B and E7403/4/5A)

22. Refer to [Figure 6](#). This figure applies only to models E4404/5/7/8B and E7403/4/5A. Remove the 50 $\Omega$  SMA termination (1) from the connector at (3). Connect the termination to tracking generator connector J3 (6). Torque this connection to 95 N-cm (8.5 in-lb.).
23. The tracking generator (7) is supplied with an SMA semi-rigid cable already attached to it at the connector at (4). Route the free end of this cable as shown and connect the end to the SMA female connector at (3). Torque this connection to 95 N-cm (8.5 in-lb.).
24. Locate the SMB cable in this kit (part number 8120-5024). Connect one end of the SMB cable to the connector at (2). Route the cable in back of the microwave RF assembly and connect the other end to the connector at (5). (For reference, the connector at (3) is part of the microwave RF assembly.)

**Figure 6. Install the Tracking Generator Cables (E4404/5/7/8B and E7403/4/5A)**



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## Replace Front Frame

25. Carefully slide the front frame onto the chassis and attach the ribbon cable to connector J2 on the front panel keyboard printed circuit board. Make sure that the ribbon cable is not pinched between assemblies, and that the Input connector and RF Out connector line up correctly with their respective openings in the front frame.
26. Refer to [Figure 3](#). Replace the four screws that secure the front frame to the chassis at locations (1) and (3). Torque these screws to 101 N-cm (9 in-lb.).

## Replace Chassis Cover

27. Refer to [Figure 2](#). Carefully position the chassis cover on the instrument as shown.
28. Replace the 15 pan head screws (3) and three flathead screws (2) as shown. Torque these screws to 101 N-cm (9 in-lb.).

## Replace Outer Cover and Rear Frame

29. Refer to [Figure 1](#). Carefully place the spectrum analyzer on the work surface with the front frame facing down.
30. Replace the instrument outer cover by matching the grill on the side of the case to the fan on the A5 power supply assembly.
31. Fit the leading edge of the case completely into the slot on the back of the front frame assembly.
32. The rear EMI contact grid that clips onto the rear frame can come loose. When replacing the rear frame, make sure the gasket is in the correct position.
33. Replace the rear frame assembly (6) using the four screws (5) to fasten the rear frame to the instrument. Torque these screws to 236 N-cm (21 in-lb.).

## Verify Analyzer Performance

Perform the following performance verification tests found in the calibration guide for the instrument being upgraded.

1. Tracking Generator L.O. Feedthrough Amplitude
2. Tracking Generator Absolute Amplitude and Venier Accuracy
3. Tracking Generator Level Flatness
4. Tracking Generator Harmonic Spurious Outputs
5. Tracking Generator Non-Harmonic Spurious Outputs