
Keysight N9040B UXA Signal Analyzer

Frequency Range Upgrade from Microwave to Millimeter
Wave Frequency for instruments without Option B5X

Notices

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Manual Part Number

N9040-90023

Edition

Edition 1, January 2025

Supersedes December 2022

Printed in Malaysia

Published by:

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

Frequency Range Upgrade, Microwave to Millimeter Wave

Products Affected	UXA N9040B
Serial Numbers:	≥ US/MY5605
Options Required:	N9040B-508, or 513, or 526
Restrictions:	Cannot be installed on instruments that currently contain Option B5X.
To Be Performed By:	(X) Keysight Service Center () Personnel Qualified by Keysight () Customer
Estimated Installation Time:	6.0 Hours
Estimated Adjustment Time:	8.5 Hours
Estimated Verification Time:	Varies with installed options

Introduction

This installation note explains how to upgrade the frequency range of a microwave UXA signal analyzer to either 44 GHz or 50 GHz.

The upgrade can only be performed on instrument serial numbers ≥ US/MY5605 to ensure the instrument chassis is a version capable of receiving the millimeter wave hardware, and that the instrument is the Keysight color.

The final frequency range of the instrument will be determined by the upgrade option number the customer orders.

Option Ordered	Description
N9040BU-F08	Upgrade from 8.4 GHz to 44 GHz
N9040BU-F09	Upgrade from 8.4 GHz to 50 GHz
N9040BU-F11	Upgrade from 13.6 GHz to 44 GHz
N9040BU-F12	Upgrade from 13.6 GHz to 50 GHz
N9040BU-F13	Upgrade from 26.5 GHz to 44 GHz
N9040BU-F14	Upgrade from 26.5 GHz to 50 GHz

Upgrading the analyzer to a millimeter frequency requires replacing most assemblies and cables from the input connector through the Front End Control assembly.

All UXA analyzers currently contain Option MPB and LNP switches, and this kit contains replacement high frequency switches and cabling required to extend the frequency range.

The new maximum frequency range will be licensed, and you will need to apply frequency range labels to the instrument and perform the necessary adjustments and performance verification tests.

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Two adapters (connector savers) are included in the kit, and these adapters are to be included with the instrument when it is returned to the customer. One adapter is a 2.4 mm female to female, and the other is a 2.4 mm female to 2.92 mm female.

IMPORTANT **Although the maximum frequency range of the instrument will be upgraded with this kit, the instrument's optional internal preamp frequency will not be updated.**

The option is licensed for one instrument model number/serial number combination. The license file that is downloaded from the web will only install on the designated instrument.

NOTE

A software upgrade to the latest revision, or if the software is already the latest version, a reinstallation of the current software is required. The procedure that follows tells you when to install the software. This assures that after licensing to the new frequency range, any software related changes to the instrument files will be performed by the software installation.

To verify the current version, press **System, Show System** and look for the "Instrument S/W Revision".

The latest revision of the X-Series Signal Analyzers software may be downloaded from http://www.keysight.com/find/xseries_software.

Contents

Quantity	Description	Keysight Part Number
1	Installation Note	This note
1	Option Upgrade Entitlement Certificate	-----
1	EMI O-Ring for input connector	8160-1637
1	J1, 2.4mm input connector	N9030-60011
1	A9, Attenuator A, 10 dB	33326-60019
1	A10, Attenuator B, 60 dB	33325-60027
1	Shield, Magnetic, Attenuator A9	N9020-00043
1	Shield, Magnetic, Attenuator A10	N9020-00044
1	A11 Low band Switch	N9020-60368
1	A12, YTF Preselector	5087-7383
1	A12MP1 Gap Pad	5022-7179
1	Power Supply	0950-5748
1	A13 Front End Assembly, 50 GHz, 255 MHz BW max	N9020-60210
1	Attenuator Bracket	N9040-00027
1	SW3, Switch, Transfer, Low Noise Path	87222-60029
1	SW 6, Switch, Transfer, microwave Preselector Bypass	87222-60031
1	Bracket, Transfer Switch	N9040-00028
1	W2 Cable Assembly, RF input to A9 Attenuator Input (Semi Rigid)	N9040-20114
1	W3, Cable, semi rigid, A16 cal out to Attenuator A9	N9040-20103
1	W4, Cable semi rigid, Attenuator A9 to Attenuator A10	N9040-20102
1	W5, Ribbon Cable, attenuator control	N9040-60065
1	W7, Ribbon Cable, Low band switch control	N9040-60066
1	W8, Cable, semi-rigid, A13J2 Front End to A11J2 Lowband switch	N9040-20108
1	W16, Cable, coax A13J7 Front End to Front End Control A15J902	8121-2027
1	W18, Cable, semi-rigid, A13J1 to A16J702 Reference	N9040-20113
1	W21, Cable, semi-rigid, A14J1 Synthesizer to A13J4 Front End Assy	N9040-20112
1	W30, Cable, coax, A13J13 Front End, to Front End Control J903	8121-2608
1	W51, Cable, semi-rigid, Attenuator A10 to SW 3 port 1	N9040-20104
1	W52, Cable, semi-rigid, SW3 port 4 to A11 Low band J1	N9040-20106

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Quantity	Description	Keysight Part Number
1	W54, Cable, semi-rigid, SW3 Port 3 to A11 Low Band J3	N9040-20107
1	W66, Cable, semi-rigid, SW3 Port 2 to SW6 port 1	N9040-20105
1	W67, Cable, semi-rigid, SW 6 port 4 to A12 YTF input	N9040-20109
1	W68, Cable, semi-rigid, SW 6 port 3 to A12 YTF output	N9040-20110
1	W69, Cable, semi-rigid, SW 6 port 2 to A13A1J9	N9040-20111
1	Connector Body for switch cable	1252-1873
1	Adapter, 2.4 mm (f) to 2.4 mm (f) For use as a connector saver	33311-82005
1	Adapter, 2.92 mm (f) to 2.40 mm (f) For use as a connector saver	1250-3782
26	Screw, M3x0.5 8 mm long	0515-0372
8	Screw-Machine W/Crest-Cup-Con-Washer M2.5X0.45 6 mm-LG	0515-1934
20	Screw-Machine 90-DEG-flat-HD Torx-T10 M3X0.5 6 mm-LG	0515-1946
1	Nameplate, N9040B 44 GHz	N9040-80041
1	Nameplate, N9040B 50 GHz	N9040-80042
1	Rear panel Frequency range upgrade label, 544/ 44 GHz	N9020-80148
1	Rear panel Frequency range upgrade label, 550 / 50 GHz	N9020-80149

Tools Required

- Personal computer with internet access and USB port
- LAN connection to instrument (allows factory to control unit)
- Disk drive re-initialization software
- USB storage device with > 3 GB free memory
- USB mouse and keyboard
- T-10 TORX Driver
- T-20 TORX Driver
- 5/16-inch torque wrench
- 1/4-inch open-end wrench
- Keysight Calibration and Adjustment Software, N7814A (revision E.21.00 or later required)
- Test equipment and computer supported by the Keysight Calibration and Adjustment Software
- UXA Signal Analyzer Service Guide, N9040-90006. Available online.

Frequency Range Upgrade, Microwave to Millimeter Wave

Initial Instrument Functionality Check

Power on the instrument and allow the instrument to boot up, run the alignments 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.

Analyzer Information

1. Press **System, Show System**. Make note of the following information from the Show System screen:

Product Number _____

Serial Number _____

Instrument S/W Revision _____

2. Confirm that the Product listed on the Option Upgrade Entitlement Certificate is appropriate for the Product Number noted above. For example, if the Product listed on the Option Upgrade Entitlement Certificate is N9040BU-F14, the Product Number noted above should be N9040B.

Remove the existing calibration files

This step is required to assure that if a disk recovery is performed, the recovery process will not choose a cal file previously created for the old frequency range. The use of a USB mouse will make this process easier.

1. On the UXA close the show system window.
2. Press **Start, Computer, Calibration E:, and Align Data Storage.**
3. Locate and delete all CurrentPhysics_XXXX.bak or .bkz files
4. There are calibration files on the SD memory card also. Press **Start, Computer, CAL_BACKUP (F:), Alignment Backups.**
5. Locate and delete all N9040B-XXxxxxxx_xxx.... bak or .bkz files

License Installation Procedure over USB

1. Locate the Option Upgrade Entitlement Certificate 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 the signal analyzer 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 as shown in **Figure 2**.

Figure 2 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 folder on the signal analyzer

C:\Program Files\Agilent\licensing

Verify the License Installation and Hardware

1. Cycle power on the signal analyzer and wait until the analyzer boots to the measurement application screen.
2. Press **System, Show System** to display a list of installed options.
3. Verify that the installed options list contains the newly installed N9040B-544 or N9040B-550.

Hardware Removal and Installation

You will be removing almost all front end assemblies, including the Option MPB/LNP switches; from the input connector to the A15 Front End Control Assembly. The only front end assembly that will remain is the A20 YTO.

1. Power down the instrument, wait till the standby light comes on, and remove the power cord.
2. See UXA Service Guide Assembly Replacement Procedure chapter, RF Area Options 508, 513, 526. Follow procedures to remove the Instrument Outer Case and Front Frame Assembly. Carefully disconnect the semi-rigid cable behind the front panel EXT MIXER connector. You need 1/4" and 5/16" wrenches.
3. Disconnect the big ribbon cable from the rear motherboard. Remove the Top Brace (at the rear of the instrument) and Card Cage Brace which covers the front card cage.
4. Remove the RF Bracket. This is the right side cover that needs to be removed to gain access to the YTF, attenuators and cable routing. See the assembly replacement section for Serial Number Prefix \geq 5605.

Front End Assembly Replacement

5. On the front chassis, remove the left screw from the wire cable hold down that routes the small ribbon cable, coax cables, and multi-colored wire harness. This allows all cables to be removed from the cable hold down without completely removing the cable hold down from the chassis.
6. See the UXA Service Guide Assembly Replacement Procedure section for the RF Area - Options 508, 513, 526, A13 Front End Assembly. Follow steps 1 through 5 to remove the existing Front End Assembly and the bypass switches. At step 3, disconnect both ends of cables W8, W16 and W18 and discard these cables.

Since the bypass switches and bracket are removed as one assembly, it is not necessary to disconnect the cables that connect between the switch ports. The switch assembly will be discarded.

When removing the bypass switches, leave the switch control ribbon cable and the multi-color wire harness connected to the Front End Control assembly. Remove these cables from the switch assembly.

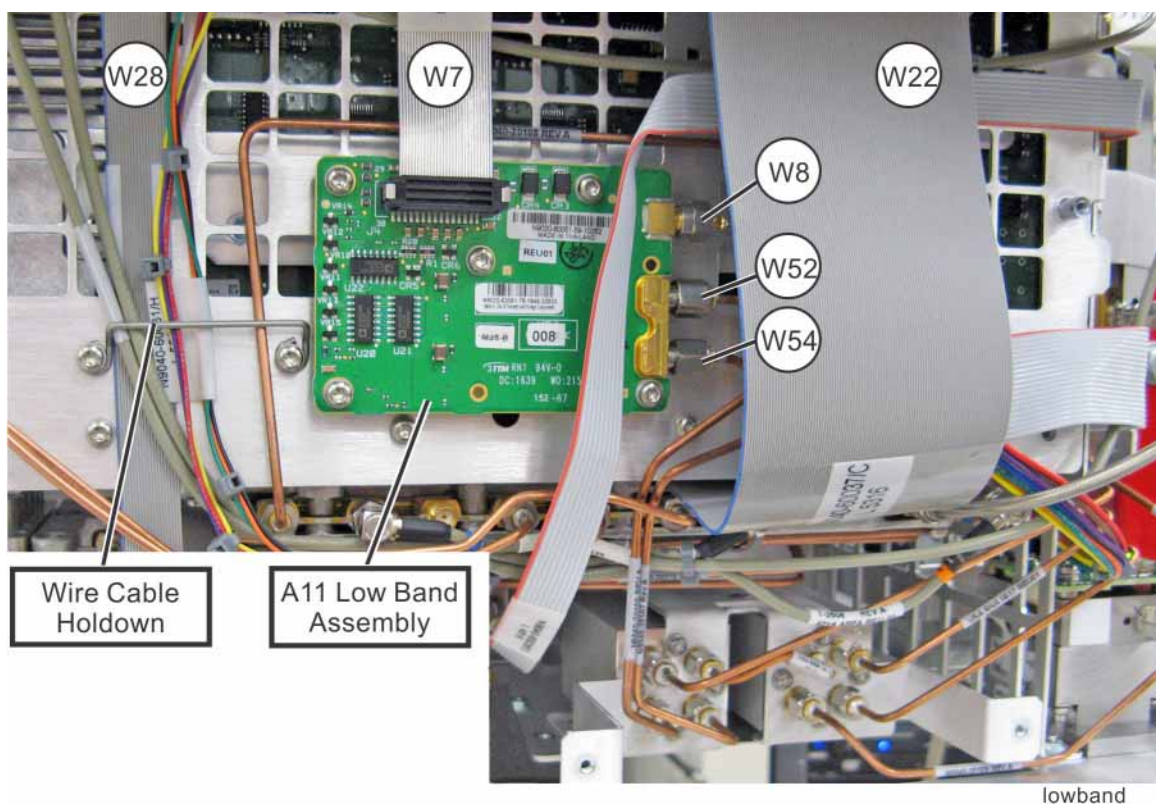
7. Disconnect the big ribbon cable W22 and smaller ribbon cable W28 from the A13 Front End Assembly you just removed. Notice how the big ribbon cable is routed through four tabs in the casting.
8. Locate the replacement A13 Front End Assembly in the kit. It is probably secured to a metal shipping fixture. Remove the metal fixture. Install the big ribbon cable W22 in the board header and route the ribbon cable between the four tabs in the casting. Do not connect the other end of W22 to the Front End Control. Install the W28 ribbon cable into the board header.
9. Install the Front End Assembly onto the chassis using the 6 screws removed earlier.
10. Locate W16, coax cable **8121-2027** in the kit and connect between Front End A13J7 and Front End Controller A15J902.

11. Locate W30, coax cable **8121-2608** in the kit and connect between Front End A13J13 and Front End Controller A15J903.
12. Locate W18, semi-rigid cable **N9040-20113** in the kit and connect between Front End A13J1 and Reference Assembly A16J702.
13. Locate W21, semi-rigid cable **N9040-20112** in the kit and connect between Front End A13J4 and Synthesizer Assembly A14J1.

Low Band Switch Replacement

14. Remove the four screws securing the existing Low Band Switch assembly to the instrument chassis. All cables, including the ribbon cable, that connect to this assembly will be replaced. Notice where the ribbon cable W7 connects to the Front End Control board (A15J700). The Service Guide has a drawing showing removal process for Option 503 through 526 instruments.
15. Locate the replacement A11 Low Band Assembly in the kit. This replacement assembly attaches to the chassis in a different location near the center of the chassis. See **Figure 3**. Secure the assembly to the chassis with five 0515-0372 screws.

Figure 3 Low Band Assembly Installation

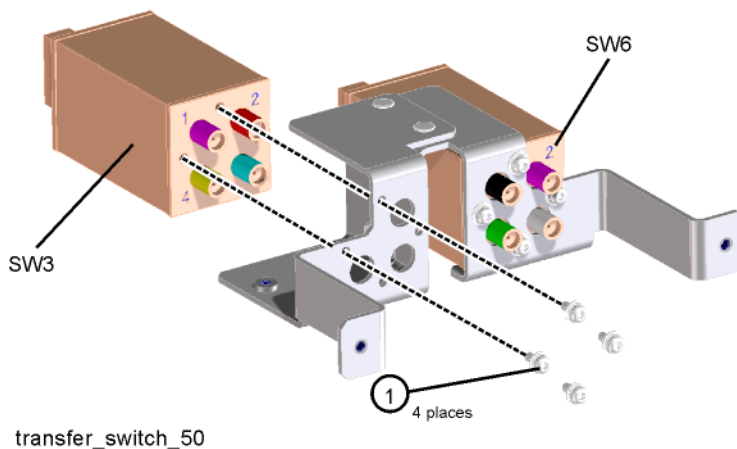


16. Locate W7, Ribbon Cable, Low band switch control **N9040-60066** in the kit and connect this ribbon cable between the Low Band Switch header and A15 Front End Control Board J700.
17. Locate W8, semi-rigid cable **N9040-20108** in the kit. See **Figure 3**. Attach one end to the Lowband Switch J2 (top connector) and the other end to Front End Assembly A13J2.

Install the Replacement Bypass Switches

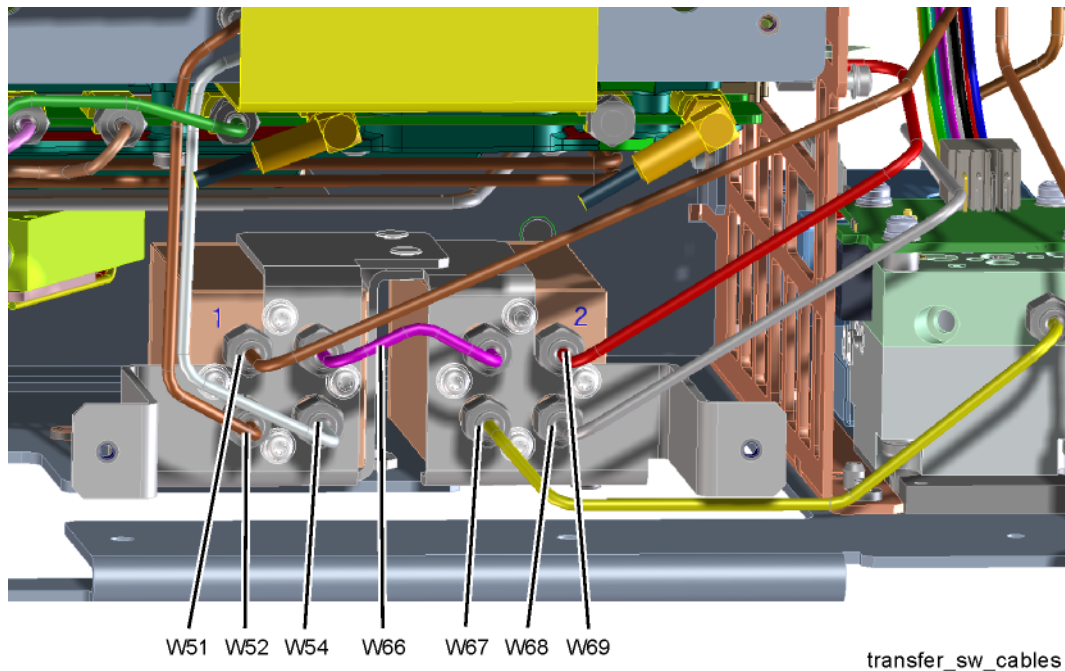
18. See **Figure 4**. Locate the Transfer Switch Bracket, and the two transfer switches, and the 0515-1934 screws in the kit.

Figure 4 Transfer Switch Assembly



19. SW6 is the switch with the wire harness attached. Place SW6 and SW3 into the bracket in the orientation shown with port 1 in the upper left corner. Secure each switch with four 0515-1934 screws. Torque to 6 inch-pounds.
20. Locate W66, semi-rigid cable **N9040-20105** in the kit. Connect this cable between left switch port 2 and right switch port 1. Torque to 10 inch-pounds. See **Figure 5**.
21. Place the switch assembly into the instrument chassis. Do not secure in place yet because the control cables need to be attached.

Figure 5 Transfer Switch Cables



22. Locate the Connector Body, [1252-1873](#) in the kit. Locate the W12 multi-color wire harness in the instrument that is attached to the Front End Control assembly J801. Attach the connector body to the orange, black, green "pigtail" of the wire harness. This connector body is attached to ensure the wire harness cannot short out.
23. Install the yellow, black, green pigtail of the wire harness to the yellow, black, green wire connector on switch 6.
24. Locate the W55 switch control ribbon cable attached to the Front End Controller. Insert this ribbon cable into the header on Switch 3.
25. Secure the switch assembly to the chassis with three screws. Torque to 9 inch-pounds. See Service Guide, Replacement procedures, RF area Option 544, 550, Transfer Switches section.
26. Locate W52, semi-rigid cable [N9040-20106](#) in the kit. Attach one end to switch 3 port 4 and the other end to A11 Low Band Switch J1. See [Figure 3](#) and [Figure 5](#).
27. Locate W54, semi-rigid cable [N9040-20107](#) in the kit. Attach one end to switch 3 port 3 and the other end to A11 Low Band Switch J3. See [Figure 3](#) and [Figure 5](#).
28. Locate W69, semi-rigid cable [N9040-20111](#) in the kit. Attach one end to switch 6 port 2 and the other end to A13J9. See [Figure 5](#).
29. Remove the W3, semi-rigid calibrator cable from A16 Reference board J701. Discard this cable.
30. Remove both attenuators by removing the attenuator brackets with the attenuator still attached. Unplug the ribbon cable from both attenuators. The ribbon cable will be used for the new attenuators. Discard the attenuator/bracket.

- 31.** Remove the Type-N or 3.5 mm input connector assembly with the W2 cable still attached, by removing the two screws that attach the connector bracket to the instrument frame. Discard.
- 32.** Locate the 2.4 mm input connector in the kit and install it on the instrument frame using the screws just removed.

Remove the Microwave A12 YTF Assembly

- 33.** Disconnect all semi rigid cables from the YTF, if not already removed. Discard the cables.
- 34.** Disconnect the W11 wire harness from the YTF header. This wire harness will be reused.
- 35.** Remove the YTF by removing the 4 mounting screws on the instrument chassis.

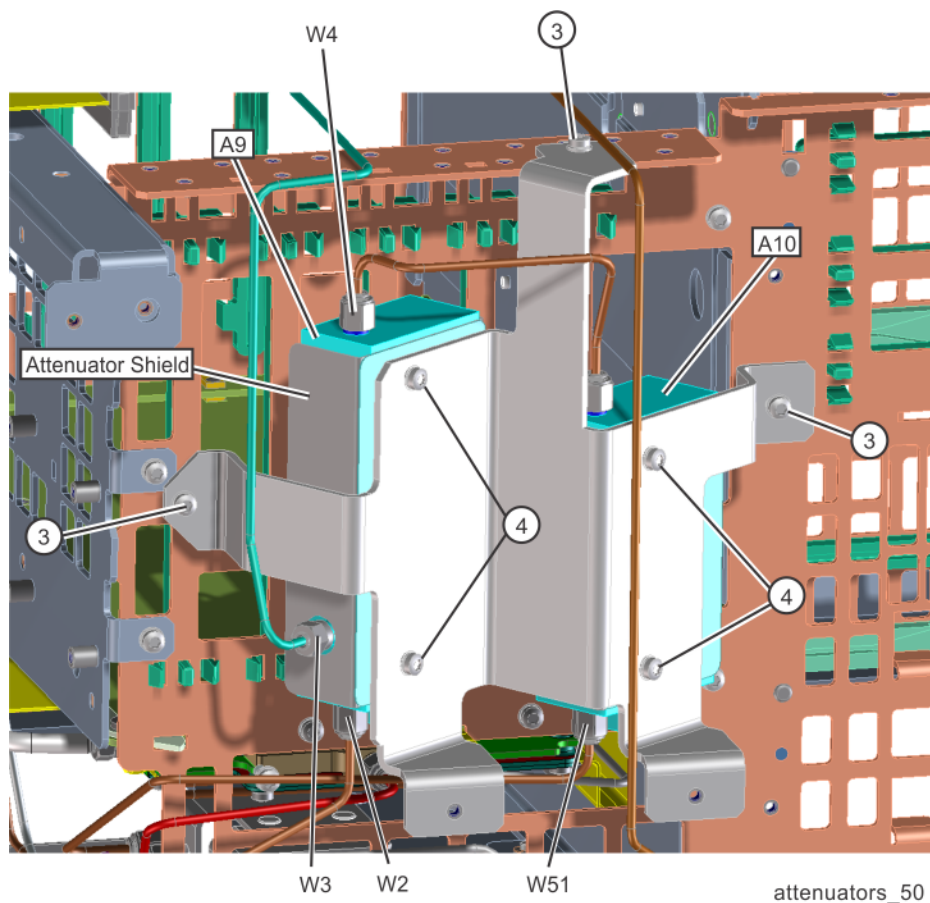
Install the Millimeter Wave A12 YTF Assembly

- 36.** Locate the replacement YTF and gap pad in the kit. Refer to the replacement procedure steps 1 through 3 in Service Guide where any remains of the old gap pad are removed from the chassis, the new gap pad installed on the YTF, and the YTF mounted onto the chassis.
- 37.** Locate the loose end of the W11 wire harness that was removed from the YTF earlier. Connect the W11 Wire Harness to the YTF connector header.
- 38.** Locate W67, semi rigid cable **N9040-20109** in the kit. Attach from switch 6 port 4 to YTF input as shown in **Figure 5**.
- 39.** Locate W68, semi rigid cable **N9040-20110** in the kit. Attach from switch 6 port 3 to YTF output as shown in **Figure 5**.

Assembly the Attenuators Onto Brackets and Install the Attenuators

40. Locate Attenuator bracket, **N9040-00027** in the kit. Locate Attenuator magnetic Shield, **N9020-00044**. Locate A10 Attenuator **33325-60027**, and locate two 0515-0372 screws.
41. Refer to **Figure 6**. With the attenuator positioned with the ribbon cable connector pointing down, place magnetic shield **N9020-00044** over the attenuator, then place attenuator/shield into the attenuator bracket. Align the mounting holes and secure together with two 0515-0372 screws. Torque to 9 inch-pounds.
42. In the retrofit kit locate Attenuator magnetic Shield, **N9020-00043**. Locate A9 Attenuator **33326-60019**, and locate two 0515-0372 screws.
43. Refer to **Figure 6**. With the attenuator positioned with the ribbon cable connector pointing down, place magnetic shield **N9020-00043** over the attenuator, then place attenuator/shield into the attenuator bracket, align the mounting holes and secure together with two 0515-0372 screws. Torque to 9 inch-pounds.
44. Locate W5, Attenuator Control ribbon cable **N9040-60065** in the kit. One end of the cable splits into two connections. Attach the shorter cable end to the A9 attenuator header and the other cable end to the A10 attenuator header. Later this ribbon cable will be attached to the Front End Controller at J800.

Figure 6 Attenuator Mounting



45. Install the attenuator assembly into the instrument as shown in **Figure 6**. Secure with three 0515-0372 screws (3) from the kit. Torque to 9 inch-pounds.
46. Locate W4, semi rigid cable **N9040-20102** in the kit. Attach this cable between the output of Attenuator A and input of Attenuator B.
47. Locate W3, Semi Rigid cable, **N9040-20103** in the kit. Attach from A16 Reference Assembly J701 to A9 Attenuator Calibrator Input.
48. Locate W51 semi-rigid cable **N9040-20104** in the kit. Attach this cable between Attenuator A10 and Switch 3 port 1. Torque to 10 inch-pounds.
49. Locate W2, semi-rigid cable **N9040-20114** in the kit. Attach this cable between Attenuator A9 and the 2.4 mm input connector. Torque to 10 inch-pounds.

Complete the Hardware Installation

50. Locate the EMI O-ring in the kit. Install the O-ring over the 2.4 mm input connector.
51. Replace the Front Brace, RF Bracket, Chassis Base Stiffener, and Front Frame Assembly. Assure the External Mixer semi-rigid cable is connected.
52. Replace the top brace and card cage brace. Reconnect the big ribbon cable to the rear motherboard.
53. Replace the power cord and power on the instrument to assure the instrument boots up. Some auto align failures may occur. Turn on the 4.8 GHz calibrator signal and tune the instrument to 4.8 GHz. Verify the 4.8 GHz signal is present.
54. Shut down the instrument. Once the instrument is completely shut down remove the power cord.
55. Replace the instrument cover, handles, and feet.

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Connect Instrument to LAN and Contact the Division

1. Replace the power cord. Connect the instrument to the LAN. The division will need to log into the instrument and alter some license files.
2. Power-on the instrument and wait until the analyzer has completed its boot-up.
3. Press **System, Show, System**. Make note of the analyzer's IP address
4. E-mail the division at csg.servicedesk@keysight.com

Message Subject: Frequency Range Upgrade

In this e-mail message, provide:

Instrument model number and serial number

The order number from the License Entitlement Certificate

The LAN Address of the instrument

5. The division will e-mail you when the license removal process is complete.

Instrument Software Installation

Upgrade the software to the latest revision, or reinstall the current version (if available and SW version must be \geq A.17.55) when the customer does not want to upgrade. Software installation assures that after licensing to the new frequency range, any software related changes to the instrument files will be performed by the software installation.

To verify the current version, press **System, Show System** and look for the "Instrument S/W Revision".

The latest revision of the X-Series Signal Analyzers software may be downloaded from:

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

Re-label the Instrument with New Frequency Range

1. Locate the correct rear panel frequency range upgrade label that indicates the new frequency range of the analyzer. The rear panel labels are printed with the option number and frequency range. Example: "550 50 GHz".
2. Remove the bar code portion of the label and discard this bar code portion. Apply this label under the existing serial number label.
3. Locate the correct front panel nameplate that indicates the new frequency range of the analyzer.
4. Remove the existing frequency range nameplate. Be careful and avoid scratching the frame.
5. Install the new frequency range name plate.

Utilities, Adjustments, and Performance Verification Tests

Utilities Required

None

Adjustments Required

Adjustment Name
Perform all possible adjustments

Performance Testing Required

Verification Test Name
Perform all Performance Verification tests

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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Edition 1, January 2025

N9040-90023

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