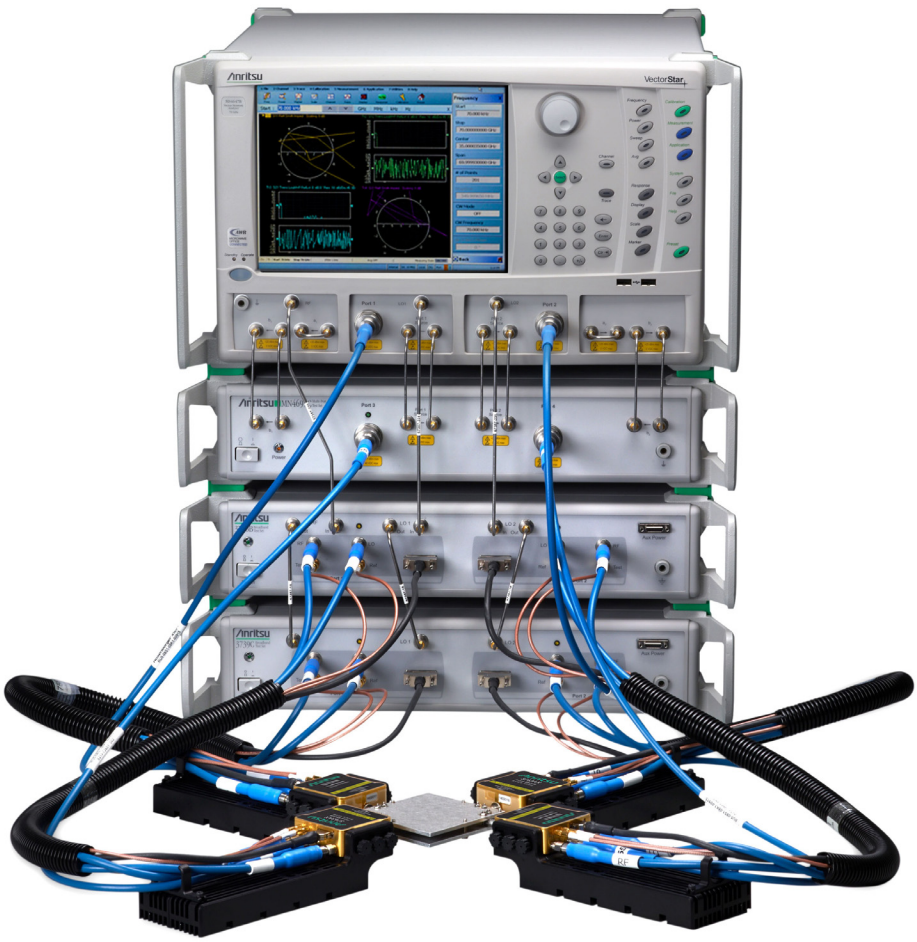
Quick Start Guide

VectorStar™ ME7838E4/E4X Multiport Broadband/Banded mmWave System

High Performance Modular Broadband/Banded mmWave Vector Network Analyzer (VNA) Multiport Measurement System

ME7838E4/E4X, 70 kHz to 110 GHz



Anritsu

Anritsu Company
490 Jarvis Drive
Morgan Hill, CA 95037-2809
USA
http://www.anritsu.com

Part Number: 10410-00771
Revision: C
Published: September 2021
Copyright 2021 Anritsu Company, USA. All Rights Reserved.

High Performance Modular Broadband/Banded mmWave Vector Network Analyzer (VNA) Measurement System, 70 kHz to 110 GHz

This guide provides quick setup instructions for the ME7838E4/E4X Multiport Broadband/Banded mmWave VNA System assembly. For additional safety and compliance information, and for more details about the assembly, configuration, setup, and initial testing of the equipment, refer to the *VectorStar™ ME7838x4/x4X Series Multiport Broadband Vector Network Analyzers Installation Guide – 10410-00734.*

This and all other documentation that supports the ME7838E4/E4X is available on the ME7838A product web page:

http://www.anritsu.com/test-measurement/products/me7838a4

On this web page, you can select various tabs for more information about your instrument. Included is a "Library" tab which contains links to all the latest technical documentation related to this instrument.

1. ME7838E4/E4X Main Components

ME7838E4/E4X Broadband Systems

The ME783A4 Multiport Broadband system consists of the following components:

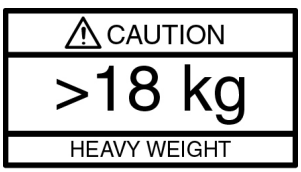
- MS4647B VNA with Option 007 (Receiver Offset) and Option 08x (Modular Broadband Connection Capability)
- MN4697C Multiport Test Set
- 3736B Broadband Test Set
- 3739C Broadband Test Set
- Four 3743E/EX mmWave Modules
- Front and rear panel cables

ME7838E4/E4X Banded Systems

The ME7838E4/E4X Multiport Banded system consists of the following components:

- MS464xB VNA with Option 08x
- MN469xC Multiport Test Set
- 3736B Broadband Test Set
- 3739C Broadband Test Set
- Four 3744E-EE, 3744E-EW, or four OML/VDI mmWave Modules
- Front and rear panel cables

Caution



A MS464xB VNA unit is heavy. To avoid personal injury, it must be lifted and maneuvered by at least two people during installation.

If mounting on a workbench surface, first position the 3739C Broadband Test Set with access to its front and rear panels. Stack the remaining test sets on top of one another, then finally the VNA.

If mounting into rack or console, make sure the Test Sets have been installed, and that the rack/console is carefully positioned on a flat and level surface. If equipped, make sure any casters are locked. Use two people to lift the VNA unit and two to guide it into its shelf rails.

The test loops on the front and rear panels of the VNA are delicate. Be careful not to bump or bend the test loops.

2. Rear Panel Connections Between Components (MS464xB VNA)

In this section, connect the cables between the VNA and the Test Sets as shown in Figure 1 or Figure 2, and Table 1.

Cable Connections (Systems with Option 031 Dual Source Architecture)

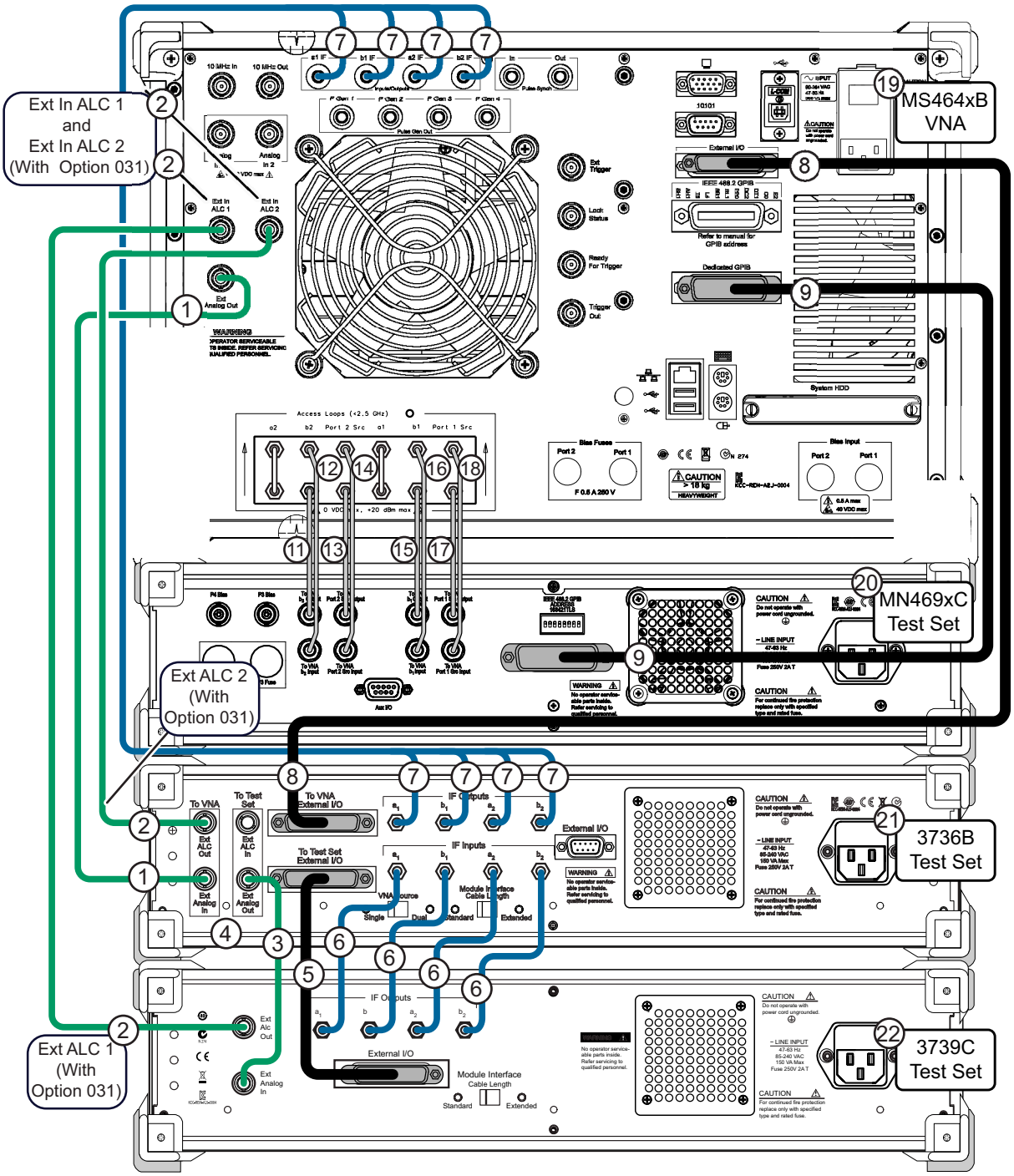


Figure 1 ME7838E4/E4X Multiport BB/mmW VNA System – Rear Panel Cables (With Option 031)

Cable Connections (Systems without Option 031)

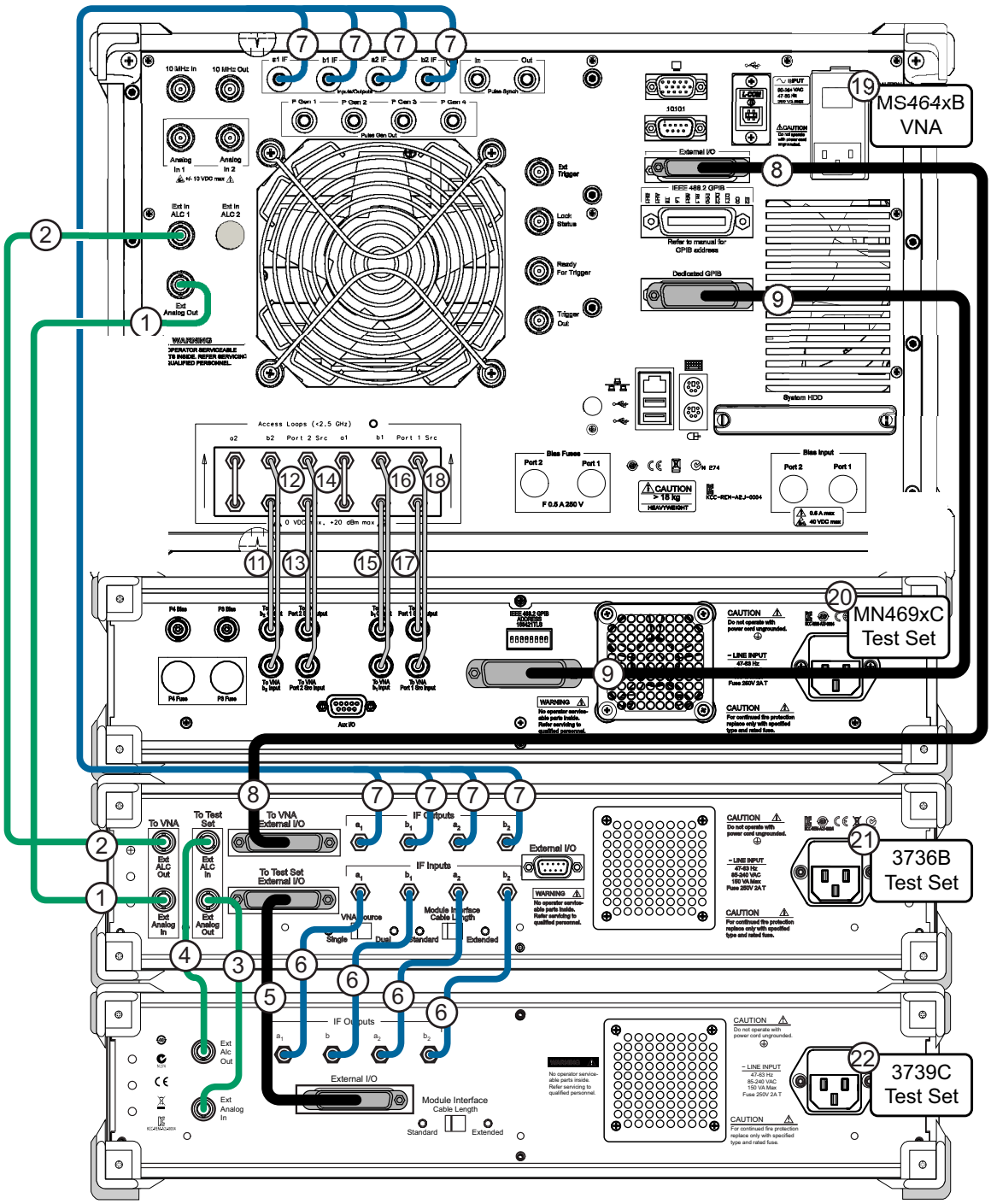


Figure 2 ME7838E4/E4X Multiport BB/mmW VNA System – Rear Panel Cables (No Option 031)

Table 1. ME7838E4/E4X Multiport Rear Panel Cable Connections (MS464xB) (1 of 2)

Index	Part Number	Cable Description	Connection From	Connection To
1	3-806-225	BNC (male-male), 24 in	MS464xB port labeled: **Ext Analog Out**	3736B port labeled: **EXT ANALOG IN**
2	3-806-225	BNC (male-male), 24 in	VNA port labeled: **Ext In ALC 1** ***(No Option 031)*** (Figure 2)	3736B port labeled: **EXT ALC OUT**
	3-806-225	BNC (male-male), 24 in	VNA port labeled: **Ext In ALC 1** ***(With Option 031)*** (Figure 1)	3739C port labeled: **EXT ALC OUT**
	3-806-225	BNC (male-male), 24 in	VNA port labeled: **Ext In ALC 2** ***(With Option 031)*** (Figure 1)	3736B port labeled: **EXT ALC OUT**
3	3-806-225	BNC (male-male), 24 in	3736B port labeled: **(To Test Set) EXT ANALOG OUT**	3739C port labeled: **EXT ANALOG IN**
4	3-806-225	BNC (male-male), 24 in	3736B port labeled: **(To Test Set) EXT ALC IN** (Figure 2) ***(Not used with Option 031)***	3739C port labeled: **EXT ALC OUT**
5	3-73598-1[a] (5 cable bundle)	DB-25	3736B port labeled: **TO TEST SET EXTERNAL I/O**	3739C port labeled: **EXTERNAL I/O**
6		SMA male-male flexible: 3-72243-1 3-72243-2 3-72243-3 3-72243-4	3736B ports labeled: **(IF INPUTS)** **a1** **b1** **a2** **b2**	3739C ports labeled: **(IF OUTPUTS)** **a1** **b1** **a2** **b2**
7	3-80734[a] (5 cable bundle)	SMA male-male flexible: 3-72243-21 3-72243-22 3-72243-23 3-72243-24	MS464xB ports labeled: **(Inputs/Outputs)** **a1 IF** **b1 IF** **a2 IF** **b2 IF**	3736B ports labeled: **(IF OUTPUTS)** **a1 IF** **b1 IF** **a2 IF** **b2 IF**
8		DB-25	MS464xB port labeled: **External I/O**	3736B port labeled: **TO VNA EXTERNAL I/O**
9	2100-1-R	GPIB, 1 m	MS464xB port labeled: **Dedicated GPIB**	MN469xC port labeled: **IEEE 488.2 GPIB**
11	3-62112-81[a]	SMA male-male semi-rigid	MS464xB port labeled: **b2 loop out**	MN469xC port labeled: **TO VNA b2 OUTPUT**
12	3-62112-80[a]	SMA male-male semi-rigid	MS464xB port labeled: **b2 loop in**	MN469xC port labeled: **TO VNA b2 INPUT**
13	3-62112-81[a]	SMA male-male semi-rigid	MS464xB port labeled: **P2 source loop out**	MN469xC port labeled: **TO VNA Port 2 Src OUTPUT**

Table 1. ME7838E4/E4X Multiport Rear Panel Cable Connections (MS464xB) (2 of 2)

Index	Part Number	Cable Description	Connection From	Connection To
14	3-62112-80[a]	SMA male-male semi-rigid	MS464xB port labeled: **P2 source loop in**	MN469xC port labeled: **TO VNA Port 2 Src INPUT**
15	3-62112-81[a]	SMA male-male semi-rigid	MS464xB port labeled: **b1 loop out**	MN469xC port labeled: **TO VNA b1 OUTPUT**
16	3-62112-80[a]	SMA male-male semi-rigid	MS464xB port labeled: **b1 loop in**	MN469xC port labeled: **TO VNA b1 INPUT**
17	3-62112-81[a]	SMA male-male semi-rigid	MS464xB port labeled: **P1 source loop out**	MN469xC port labeled: **TO VNA Port 1 Src OUTPUT**
18	3-62112-80[a]	SMA male-male semi-rigid	MS464xB port labeled: **P1 source loop in**	MN469xC port labeled: **TO VNA Port 1 Src INPUT**
19	MS464xB VNA			
20	MN469xC Test Set			
21	3736B Test Set			
22	3739C Test Set			

a. Tighten each cable in this group using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in).

3. Semi-rigid Cable Connections Between System Components

Make the semi-rigid cable connections as shown in Figure 3 or Figure 4, and in Table 2.

If your system has Option 031 Dual Source Architecture (MS464xB only), use Figure 3. If your system does not have Option 031, use Figure 4.

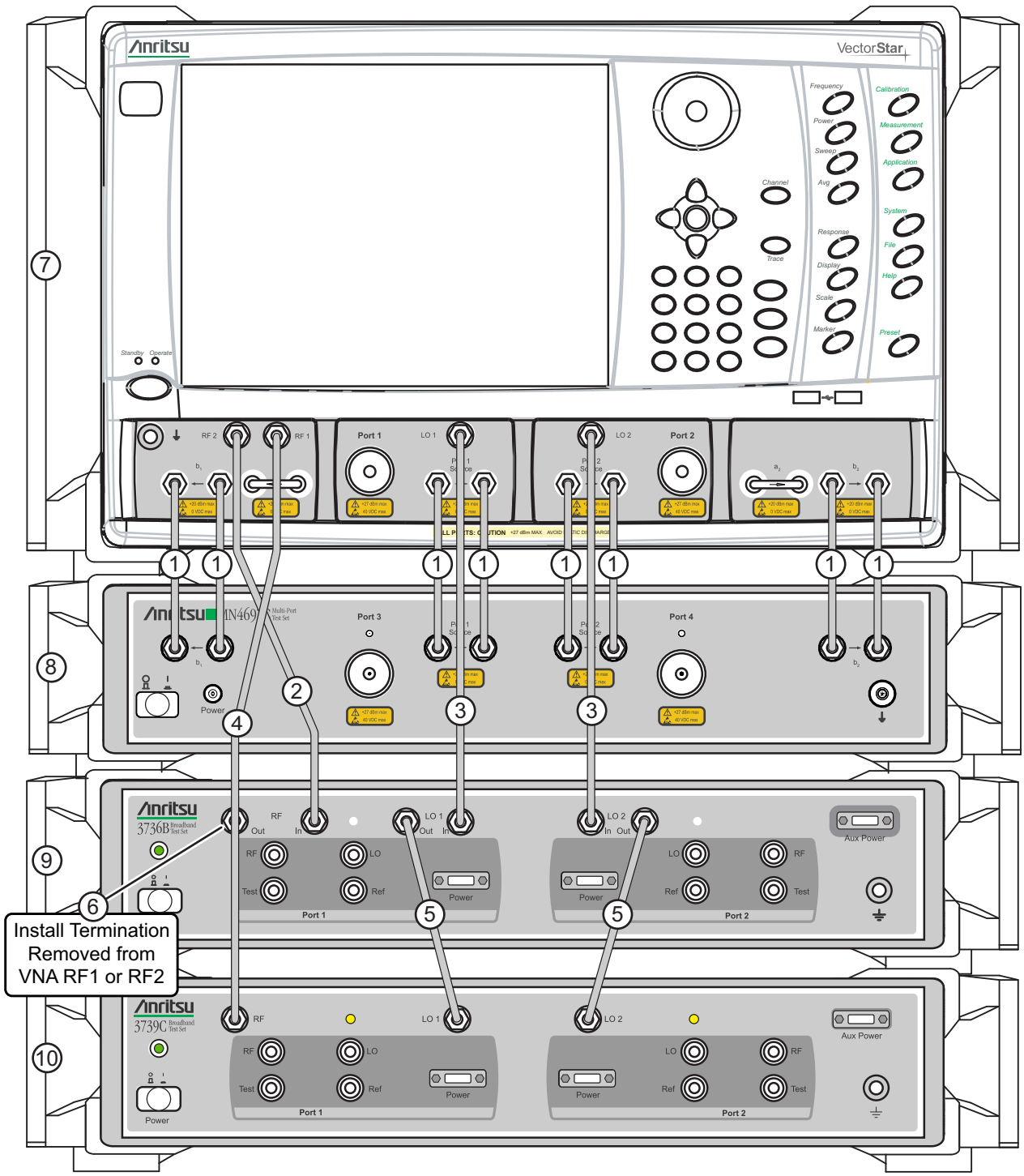


Figure 3 ME7838E4/E4X Multiport Semi-rigid Cable Connections (with Option 031 Dual Source Architecture)

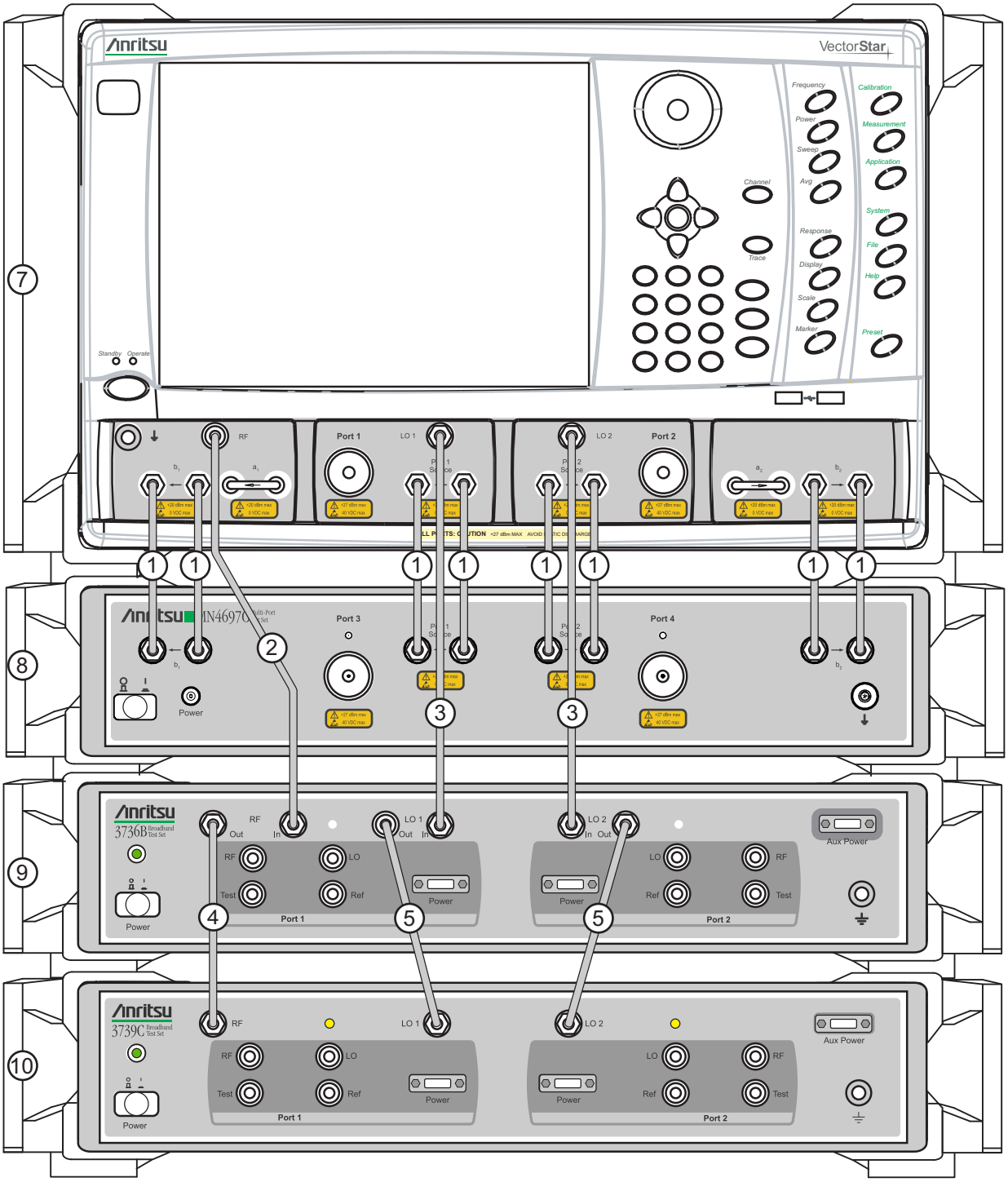


Figure 4 ME78383E4/E4X Multiport semi-rigid Cable Connections (No Option 031)

Table 2. ME7838E4/E4X Multiport Semi-rigid Cable Interconnect Part Numbers and Locations (1 of 2)

Index	Part Numbers	Description/Torque	Connection From	Connection To
1	3-62109-42 V (m-m) (MN4697C) 3-67357-38 K (m-m) (MN4694C)	**Front Panel RF Cable** (4 each) V or K male-male semi-rigid Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in).	VNA port labeled: **b1** (In)	MN469xC port labeled: **b1** (In)
			VNA port labeled: **b1** (Out)	MN469xC port labeled: **b1** (Out)
			VNA port labeled: **Port 1 Source** (In)	MN469xC port labeled: **Port 1 Source** (In)
			VNA port labeled: **Port 1 Source** (Out)	MN469xC port labeled: **Port 1 Source** (Out)
			VNA port labeled: **Port 2 Source** (In)	MN469xC port labeled: **Port 2 Source** (In)
			VNA port labeled: **Port 2 Source** (Out)	MN469xC port labeled: **Port 2 Source** (Out)
			VNA port labeled: **b2** (In)	MN469xC port labeled: **b2** (In)
			VNA port labeled: **b2** (Out)	MN469xC port labeled: **b2** (Out)
2	3-67357-230	**Front Panel RF Cable** K male-male semi-rigid Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in).	VNA port labeled: **RF 2** (Figure 3) ***(With Option 031)***	3736B Test Set port labeled: **RF In**
			VNA port labeled: **RF** (Figure 4) ***(No Option 031)***	3736B Test Set port labeled: **RF In**
3	3-67357-231	**Front Panel LO Cable** (2 each) K male-male semi-rigid Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in).	VNA port labeled: **LO 1**	3736B Test Set port labeled: **LO 1 In**
			VNA port labeled: **LO 2**	3736B Test Set port labeled: **LO 2 In**
4	3-67357-232 ***(With Option 031)***	**Front Panel RF Cable** K male-male semi-rigid Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in).	VNA port labeled: **RF 1** (Figure 3) ***(With Option 031)***	3739C Test Set port labeled: **RF**
	3-67357-18 ***(No Option 031)***		3736B Test Set port labeled: **RF Out** (Figure 4) ***(No Option 031)***	3739C Test Set port labeled: **RF**
5	3-67357-19	**Front Panel LO Cable** (2 each) K male-male semi-rigid Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in).	3736B Test Set port labeled: **LO 1 Out**	3739C Test Set port labeled: **LO 1**
			3736B Test Set port labeled: **LO 2 Out**	3739C Test Set port labeled: **LO 2**
6	V210	**Termination** ***(With Option 031)*** Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in).	Remove from VNA port labeled: **RF 1 or RF 2** ***(With Option 031)***	Add to 3736B Test Set port labeled: **RF Out**

Table 2. ME7838E4/E4X Multiport Semi-rigid Cable Interconnect Part Numbers and Locations (2 of 2)

Index	Part Numbers	Description/Torque	Connection From	Connection To
7	MS464xB VNA	Option 051, 061, or 062, and 08x (Banded)		
	MS4647B VNA	Option 051, 061, or 062, and 08x (Broadband)		
8	MN469xC Test Set	(Banded)		
	MN4697C Test Set	(Broadband)		
9	3736B Test Set			
10	3739C Test Set			

4. Front Panel Cable Connections

Make the cable connections as shown in Figure 5 and in Table 3.

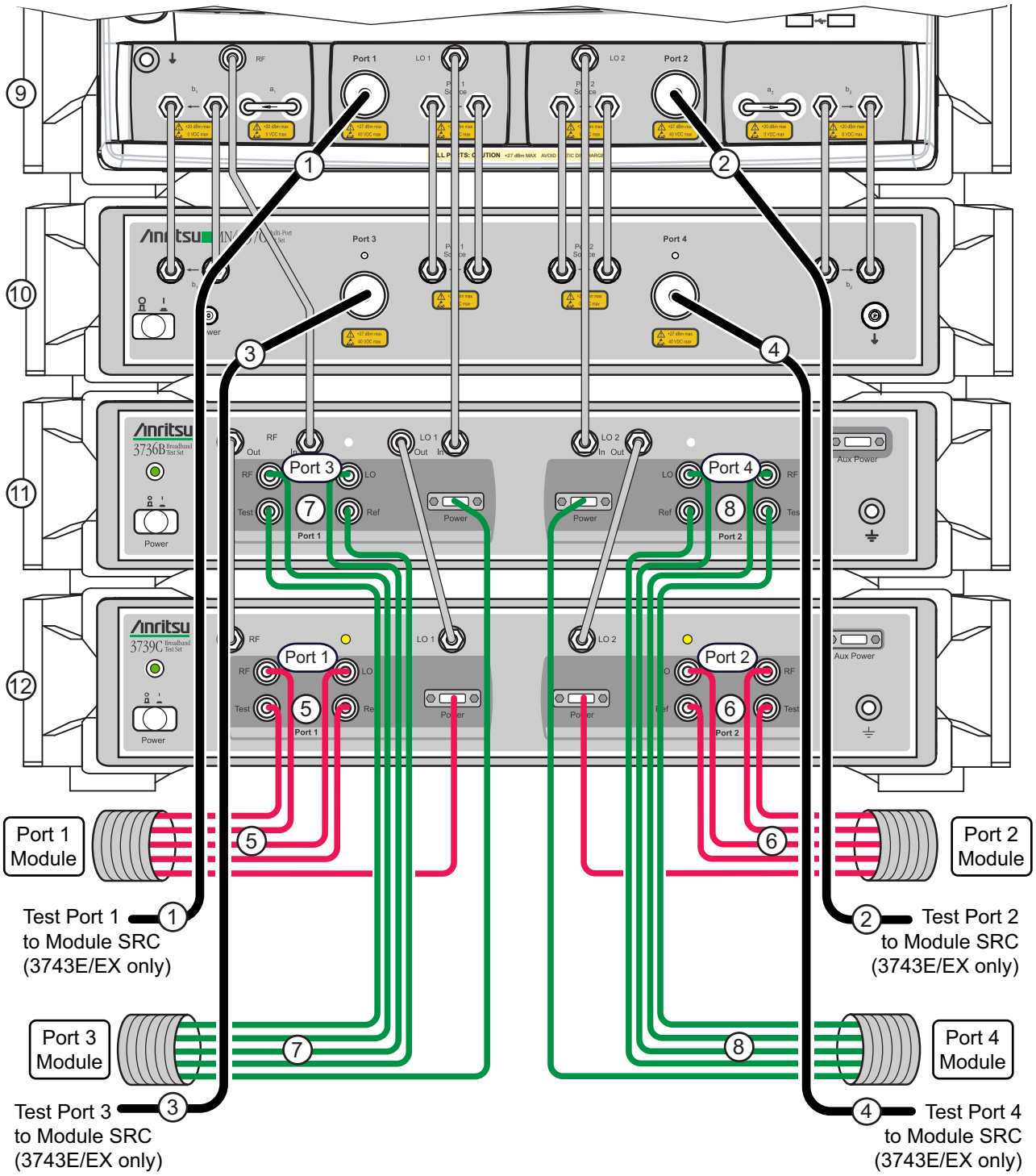


Figure 5 Front Panel to mmWave Module Connections

Note	The cables for Test Port 1 through Test Port 4 to Module SRC are not used with mmWave modules 3744E-EE, 3744E-EW, or 3744E-Rx.

Table 3. ME7838E4/E4X Cable Interconnect Part Numbers and Locations (1 of 2)

Index	Part Number	Description	Connection From	Connection To
1 2 3 4	806-209-R[a,b]	**Coaxial Cable** (4 each) V male-female flexible, 36 in Used with 3743E/EX Broadband Modules only Tighten at Test Set using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in).	MN469xC port labeled: **Port 1** **Port 2** **Port 3** **Port 4**	3743E/EX port labeled: (Port 1 Module) **SRC** (Port 2 Module) **SRC** (Port 3 Module) **SRC** (Port 4 Module) **SRC**
5 6 7 8	3-75685-1[a]	**mmWave Module Interface Cables** (for 3743E/EX, 3744E-EE, 3744E-EW modules) Group of 5 cables for each port Tighten at Test Set using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in).	3739C Test Set: Port 1, Port 2 **RF, LO, Test, Ref, Power/Signal**	mmWave Modules: Port 1, Port 2 Modules **RF, LO, Test, Ref, Power/Signal**
			3736B Test Set Port1, Port 2 (Port 3, Port 4) **RF, LO, Test, Ref, Power/Signal**	mmWave Modules Port 3, Port 4 Modules **RF, LO, Test, Ref, Power/Signal**
5 6 7 8	3-75685-2[a]	**OML Module Interface Cables** Group of 4 cables for each port Tighten at Test Set using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in).	3739C Test Set Port 1, Port 2 **RF, LO, Test, Ref**	OML Modules Port 1, Port 2 Modules **RF, LO, Test IF, Ref IF**
			3736B Test Set Port1, Port 2 (Port 3, Port 4) **RF, LO, Test, Ref**	OML Modules Port 3, Port 4 Modules **RF, LO, Test IF, Ref IF**
		VDI Module Interface Cables Group of 4 cables for each port Tighten at Test Set using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in).	3739C Test Set Port 1, Port 2 **RF, LO, Test, Ref**	VDI Modules Port 1, Port 2 Modules **RF Input, LO Input, Meas. IF, Ref IF**
			3736B Test Set Port1, Port 2 (Port 3, Port 4) **RF, LO, Test, Ref**	VDI Modules Port 3, Port 4 Modules **RF Input, LO Input, Meas. IF, Ref IF**
5 6 7 8	3-75685-3[a]	**mmWave Module Interface Cables (for 3744E-Rx modules)** Group of 3 cables for each port Tighten at Test Set using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in).	3739C Test Set Port 1, Port 2 **LO, Test, Power/Signal**	Rx Modules Port 1, Port 2 Modules **LO, Test, Power/Signal**
			3736B Test Set Port1, Port 2 (Port 3, Port 4) **LO, Test, Power/Signal**	Rx Modules Port 3, Port 4 Modules **LO, Test, Power/Signal**
9	MS464xB VNA – Option 051, 061, or 062, and 08x (Banded)			
	MS4647B VNA – Option 051, 061, or 062, and 08x (Broadband)			
10	MN469xC Test Set (Banded)			
	MN4697C Test Set (Broadband)			

Table 3. ME7838E4/E4X Cable Interconnect Part Numbers and Locations (2 of 2)

Index	Part Number	Description	Connection From	Connection To
11	3736B Test Set			
12	3739C Test Set			

a. Do not yet connect the cable ends to the mmWave modules. Module connection instructions follow this section.

b. The 806-209-R Coaxial Cable is not included or required when using the 3744E-EE, 3744E-EW mmWave modules, or the 3744E-Rx Receiver Module.

5. Front Panel to mmWave Module Connections

Connect the 3736B and 3739C Broadband Test Set test port cables to the 3743E/EX, 3744E-EE, or 3744E-EW Modules as shown below, observing the correct torque limits for each connector. See Figure 6 and Table 4. Route the cable assemblies through the module cable restraint.

Note	It is easier to first connect the cables to the module and then mount the module in its bracket. Observe torque instructions where indicated. Each module is characterized for a specific VNA Serial Number and VNA Test Port as designated on the module port assignment label. Ensure the module matches the correct VNA and Test Set port. For more detailed information on the modules including DUT Waveguide (WG) connection alignment and custom bracket mounting, refer to ***10410-00311-VectorStar™ Broadband/Banded mmWave Modules Reference Manual***.

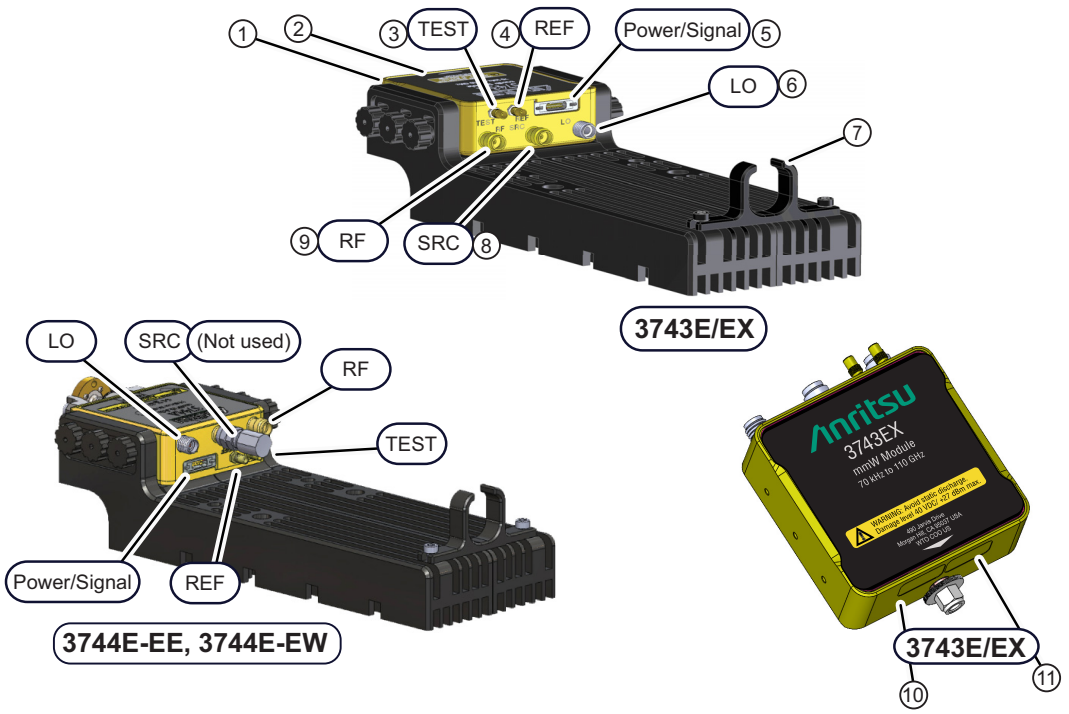


Figure 6 mmWave Module Connections

Table 4. mmWave Module Connections (1 of 2)

Index	Cable P/N	Description
1	N/A	mmWave Module in bracket
2	N/A	**W1** – 1 mm Connector (*3743E/EX modules*) • Tighten using a torque end wrench and a plain end wrench • 6 mm Torque End Wrench set to 0.45 N·m (4 lbf·in). Recommended is Anritsu 01-504. • 6 mm / 7 mm Open End Wrench. Recommended is Anritsu 01-505. **WR-10 or WR-12 Adapter** – 1 mm connector (*3744E-EE, 3744E-EW modules*) • Use Waveguide Adapter Toolkits (3-74394-2, 3-74394-3, or 3-74394-4). • Tighten using a torque end wrench and a plain end wrench. • 6 mm Torque End Wrench set to 0.45 N·m (4 lbf·in). Recommended is Anritsu 01-504. • 6 mm / 7 mm Open End Wrench. Recommended is Anritsu 01-505.

Table 4. mmWave Module Connections (2 of 2)

Index	Cable P/N	Description
3	3-75685-1[a] or 3-75685-3[b,c]	**TEST** – SSMC Connector (*3743E/EX, 3744E-EE, and 3744E-EW modules*) • Tighten using a 4 mm (5/32 in) torque end wrench set to less than 0.17 N·m (1.5 lbf·in). • Recommended is Anritsu 01-529-R torque wrench.
4		**REF** – SSMC Connector (*3743E/EX, 3744E-EE, and 3744E-EW modules*) • Tighten using a 4 mm (5/32 in) torque end wrench set to less than 0.17 N·m (1.5 lbf·in). • Recommended is Anritsu 01-529-R torque wrench.
5		**Power/Signal** Bi-Lobe™ Connector (*3743E/EX, 3744E-EE, 3744E-EW, 3744E-Rx*)
6		**LO** – K Connector (*3743E/EX, 3744E-EE, and 3744E-EW modules*) • Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in). • Recommended is Anritsu 01-201.
7		Module Power and I/O Cable Restraint
8	806-209-R[d]	**SRC** – V Connector (*3743E/EX module only*) • Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in). • Recommended is Anritsu 01-201.
9	3-75685-1[a]	**RF –** V Connector (*3743E/EX, 3744E-EE, and 3744E-EW modules*) • Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in). • Recommended is Anritsu 01-201.
10	N/A	Factory Calibrated Port Assignment Label
11	N/A	Module Serial Number Label

a. 3743E/EX, 3744E-EE, and 3744E-EW modules use cable assembly 3-75685-1.

b. The REF cable is not used in the 3-75685-3 cable assembly.

c. 3744E-Rx module uses cable assembly 3-75685-3.

d. The 806-209-R Coaxial Cable is used only with the 3743E/EX modules.

Inverting a Module

If necessary, a module can be turned over in the bracket to change the elevation of the W1 connector. To turn the module over:

1. Remove the six knurled-head thumbscrews from the module.

2. Turn the module over.

3. Install the cable assembly, then install the module into the bracket.

4. Install the six thumbscrews.

mmWave Module Operating Environment

The following notes should be observed when operating the 3743E/EX and 3744E-xx mmWave Modules:

- Thermal heat sinking similar to the supplied mounting brackets of the mmWave Module should be considered in custom mounting applications.
- Each 3743E/EX Module consumes a maximum of 12 watts.
- Each 3744E-EE and 3744E-EW Module consumes a maximum of 12 watts.
- Each 3744E-Rx Module consumes a maximum of 7 watts.
- The primary heat sink paths for the module is the two side mounting surfaces of the mounting bracket.
- With the attached cable mounting brackets, the case temperature rise is approximately 15 °C to 20 °C above ambient.

6. Front Panel to OML/VDI Module Connections

Connect the front panel cables between the 3736B and 3739C Test Sets, and the OML or VDI frequency extension modules as shown in Figure 7, Figure 8, and Figure 9, and as described in Table 5, Table 6, and Table 7.

Caution	To avoid connector damage, observe torque requirements where indicated.

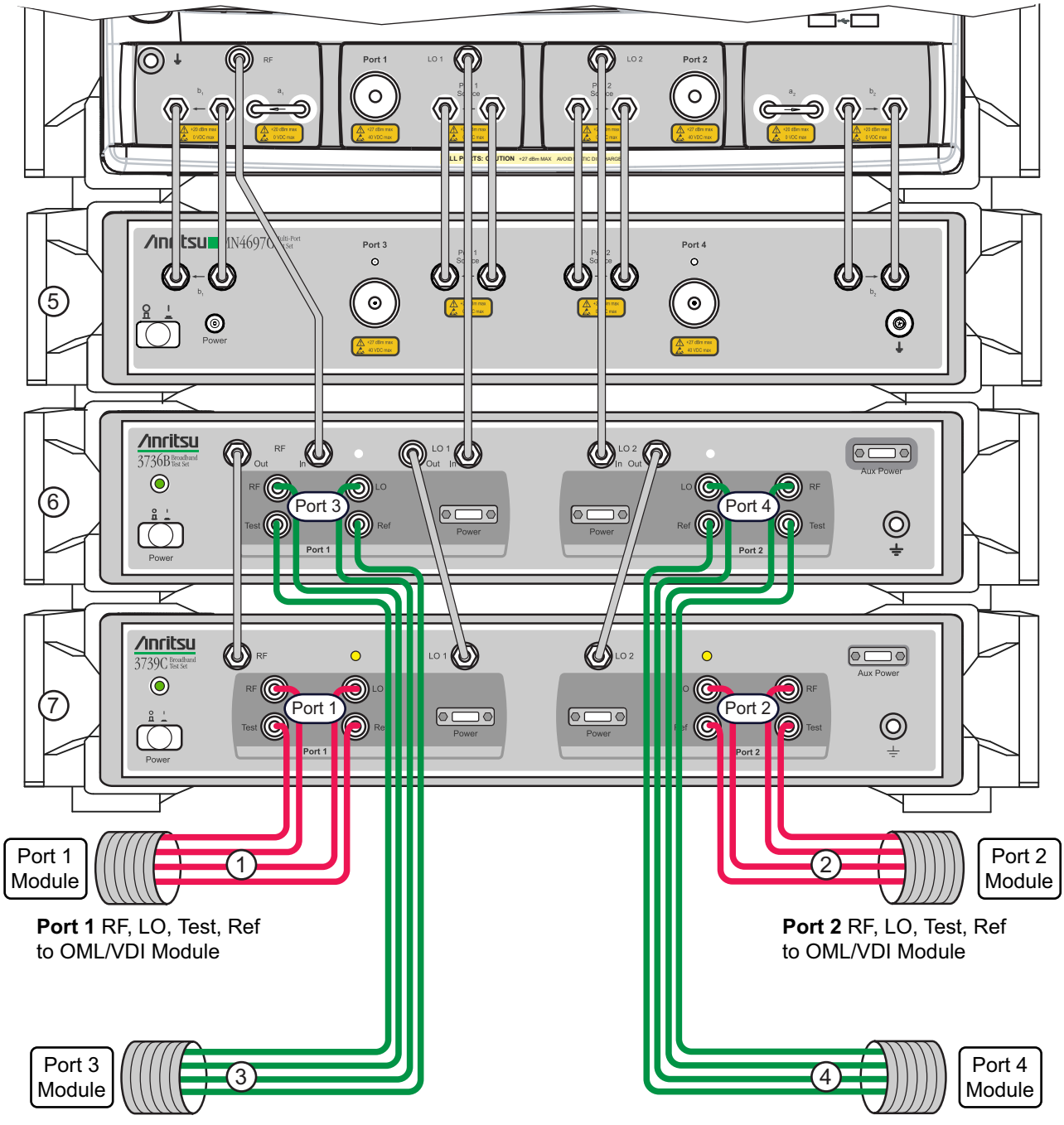


Figure 7 Cable Connections between 3736B, 3739C Test Sets, and OML or VDI Frequency Extension Modules

Table 5. ME7838E4/E4X OML/VDI Cable Interconnect Part Numbers and Locations

Index	Part Number	Description	Connection From	Connection To
1	3-75685-2 (2 each)	OML Module Interface Cable Assembly Group of 4 cables for each port	3739C Test Set Port 1, Port 2 **Ref** **RF** **LO** **Test**	OML Modules: Port 1, Port 2 Modules **Ref IF** **RF Input** **LO Input** **Test IF**
2		OML Module Interface Cable Assembly Group of 4 cables for each port	3736B Test Set Port 1, Port 2 (Port 3, Port 4) **Ref** **RF** **LO** **Test**	OML Modules: Port 3, Port 4 Modules **Ref IF** **RF Input** **LO Input** **Test IF**
3	3-75685-2 (2 each)	VDI Module Interface Cables Assembly Group of 4 cables for each port	3739C Test Set Port 1, Port 2 **RF** **Ref** **Test** **LO**	VDI Modules: Port 1, Port 2 Modules **RF Input** **Ref. IF** **Meas. IF** **LO Input**
4		VDI Module Interface Cables Assembly Group of 4 cables for each port	3736B Test Set Port 1, Port 2 (Port 3, Port 4) **RF** **Ref** **Test** **LO**	VDI Modules: Port 3, Port 4 Modules **RF Input** **Ref. IF** **Meas. IF** **LO Input**
5	MN469xC Test Set			
6	3736B Test Set			
7	3739C Test Set			

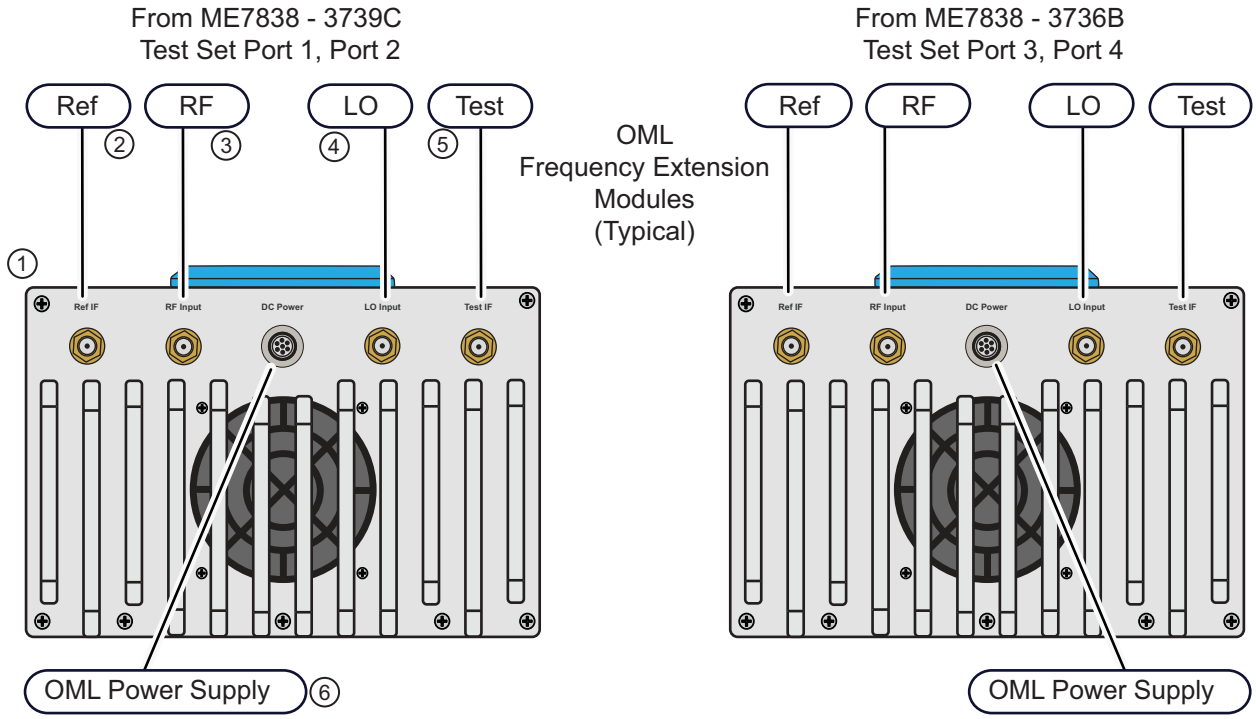


Figure 8 VNA/ Test Set Cable Connections to OML Modules

Table 6. OML Module Connections

Index	Cable P/N	Description
1	N/A	OML Module
2	3-75685-2	**Ref IF** – SMA Connector • Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in). • Recommended is Anritsu 01-201.
3		**RF Input** – SMA Connector • Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in). • Recommended is Anritsu 01-201.
4		**LO Input** – SMA Connector • Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in). • Recommended is Anritsu 01-201.
5		**Test IF** – SMA Connector • Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in). • Recommended is Anritsu 01-201.
6	N/A	OML Module Power Supply Connector

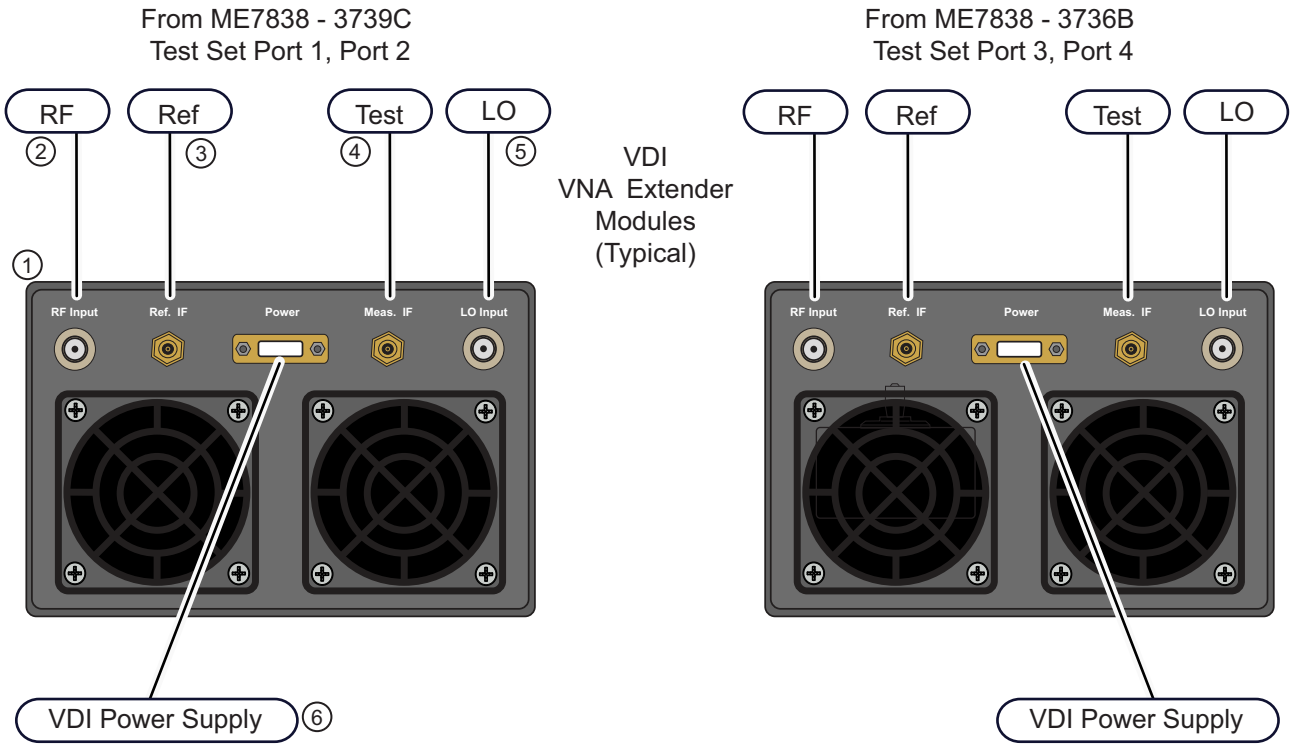


Figure 9 VNA/ Test Set Cable Connections to VDI Modules

Table 7. VDI Module Connections

Index	Cable P/N	Description
1	N/A	VDI Module
2	3-75685-2	**RF Input** – K (2.92 mm) Connector • Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in). • Recommended is Anritsu 01-201.
3		**Ref. IF** – SMA Connector • Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in). • Recommended is Anritsu 01-201.
4		**Meas. IF** – SMA Connector • Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in). • Recommended is Anritsu 01-201.
5		**LO Input** – K (2.92 mm) Connector • Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in). • Recommended is Anritsu 01-201.
6[a]		VDI Module Power Supply Connector

a.The VDI module connectors may differ slightly than on the illustration shown above. For example, depending on the model and date built, the power supply connector may be round instead of rectangular.

Anritsu

10410-00771

C

Anritsu utilizes recycled paper and environmentally conscious inks and toner.

Anritsu Company
490 Jarvis Drive
Morgan Hill, CA 95037-2809
USA
http://www.anritsu.com