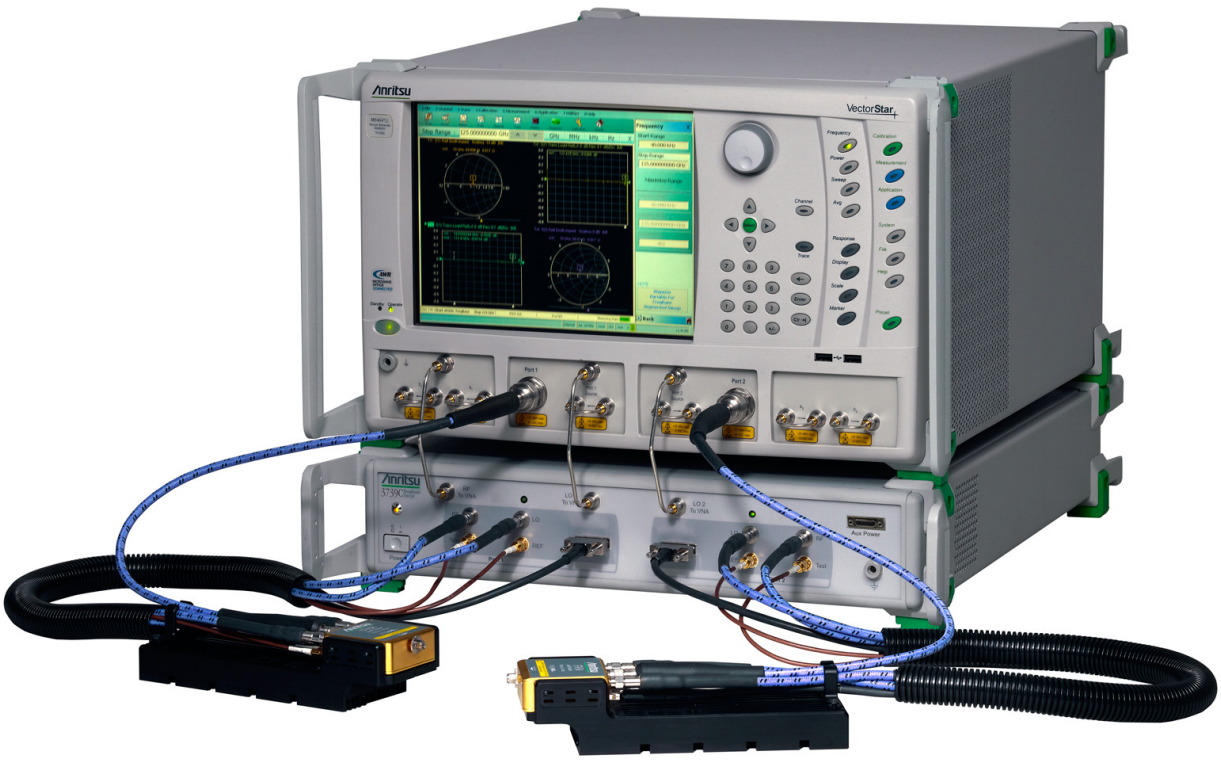
Installation Guide

VectorStar™ ME7838 Series 2-Port Broadband/Banded mmWave VNA System

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

ME7838A/AX mmWave VNA System, 70 kHz to 125 GHz
ME7838D mmWave VNA System, 70 kHz to 145 GHz
ME7838E/EX mmWave VNA System, 70 kHz to 110 GHz
ME7838G mmWave VNA System, 70 kHz to 220 GHz



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Chapter 1 — System Overview

1-1 Introduction

This manual provides instructions for setup and initial test of the VectorStar™ ME7838 Series Broadband/Banded mmWave Vector Network Analyzer (VNA) System. The ME7838 Series consists of the ME7838A/AX, ME7838D, ME7838G, and ME7838E/EX system models.

1-2 ME7838 Series Main Components

Broadband System Components

The ME7838 Broadband system consists of the following components:

- MS4647A/B VNA with Option 007 (Receiver Offset), Option 070 (70 kHz Low End Frequency Extension), Option 08x (Modular Broadband System – Refer to Applicable TDS) (MS4647B VNA required for the ME7838A/AX, ME7838E/EX and ME7838G systems)
- 3739B or 3739C Broadband Test Set
- Front and rear panel cables
- A pair of the following mmWave modules:
    - MA25300A Broadband mmWave Module
    - MA25400A Broadband mmWave Module
    - 3743A/AX Broadband mmWave Module
    - 3743E/EX Broadband mmWave Module

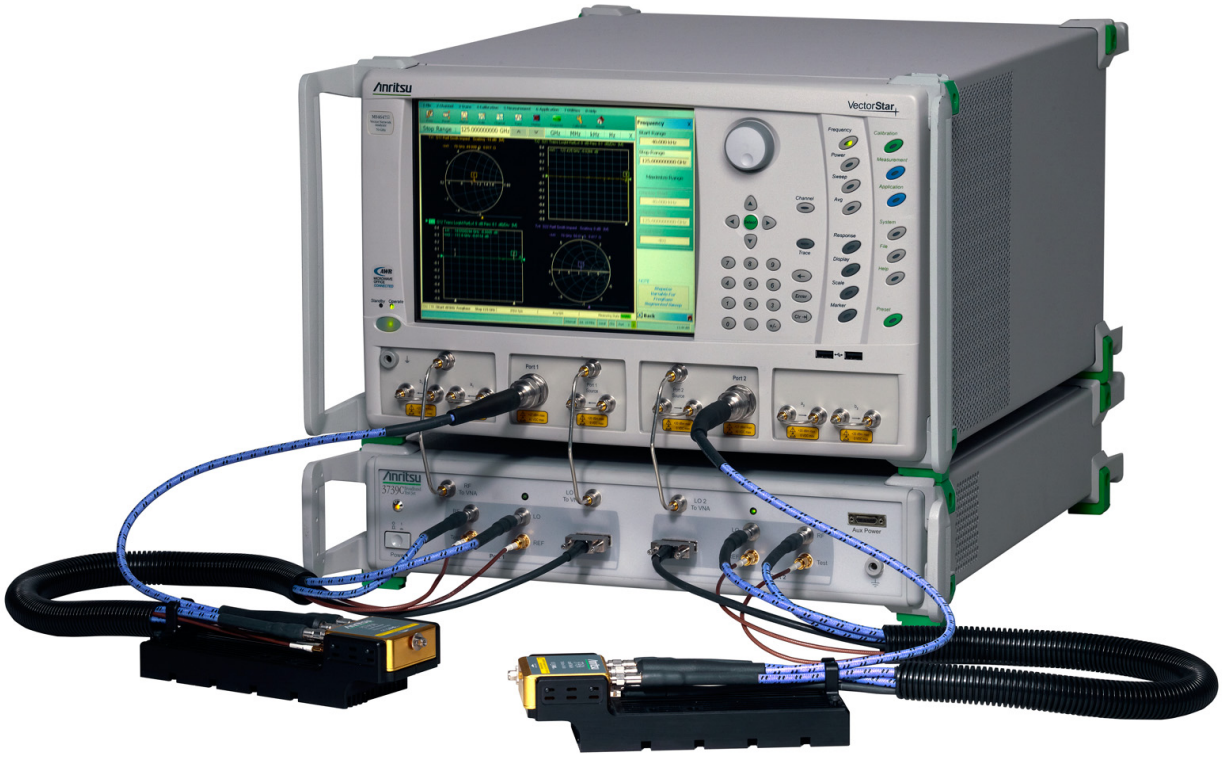
Banded System Components

The ME7838 Banded mmWave system consists of the following:

- MS4644A/B, MS4645A/B, or MS4647A/B or VNA with Option 08x (Modular Broadband System Option – Refer to Applicable TDS) (MS464xB VNA required for the ME7838A/AX, ME7838E/EX, and ME7838G-based systems)
- 3739B or 3739C Broadband Test Set
- Front and rear panel cables
- A pair of the following mmWave modules:
    - 3744A-EE Banded mmWave Module
    - 3744E-EE Banded mmWave Module
    - 3744A-EW Banded mmWave Module
    - 3744E-EW Banded mmWave Module
    - OML/VDI mmWave Modules

1-3 System Component Identification

Below, Figure 1-1 shows the major ME7838A/AX components set up on a bench top.



3739C Broadband Test Set (on bottom), MS4647B VNA with Option 081, and 3743A/AX mmWave Modules

Figure 1-1. ME7838A/AX Modular Broadband mmWave VNA System

ME7838 Series Front Panel Identification

The 3739B/C Broadband Test Set has front panel connectors and controls which connect to the MS4647A/B VNA as shown in Figure 1-2.

VNA

1 – VectorStar MS4647A/B VNA
2 – Test Port 1
3 – Test Port 2
4 – VNA RF to Test Set RF Cable Connection
5 – VNA LO1 to Test Set LO1 Cable Connection
6 – VNA LO2 to Test Set LO2 Cable Connection

Test Set

7 – 3739B/C Test Set
8 – Power Switch
9 – Power ON LED

Port 1 Connections

10 – RF
11 – Test
12 – LO
13 – Ref
14 – Power

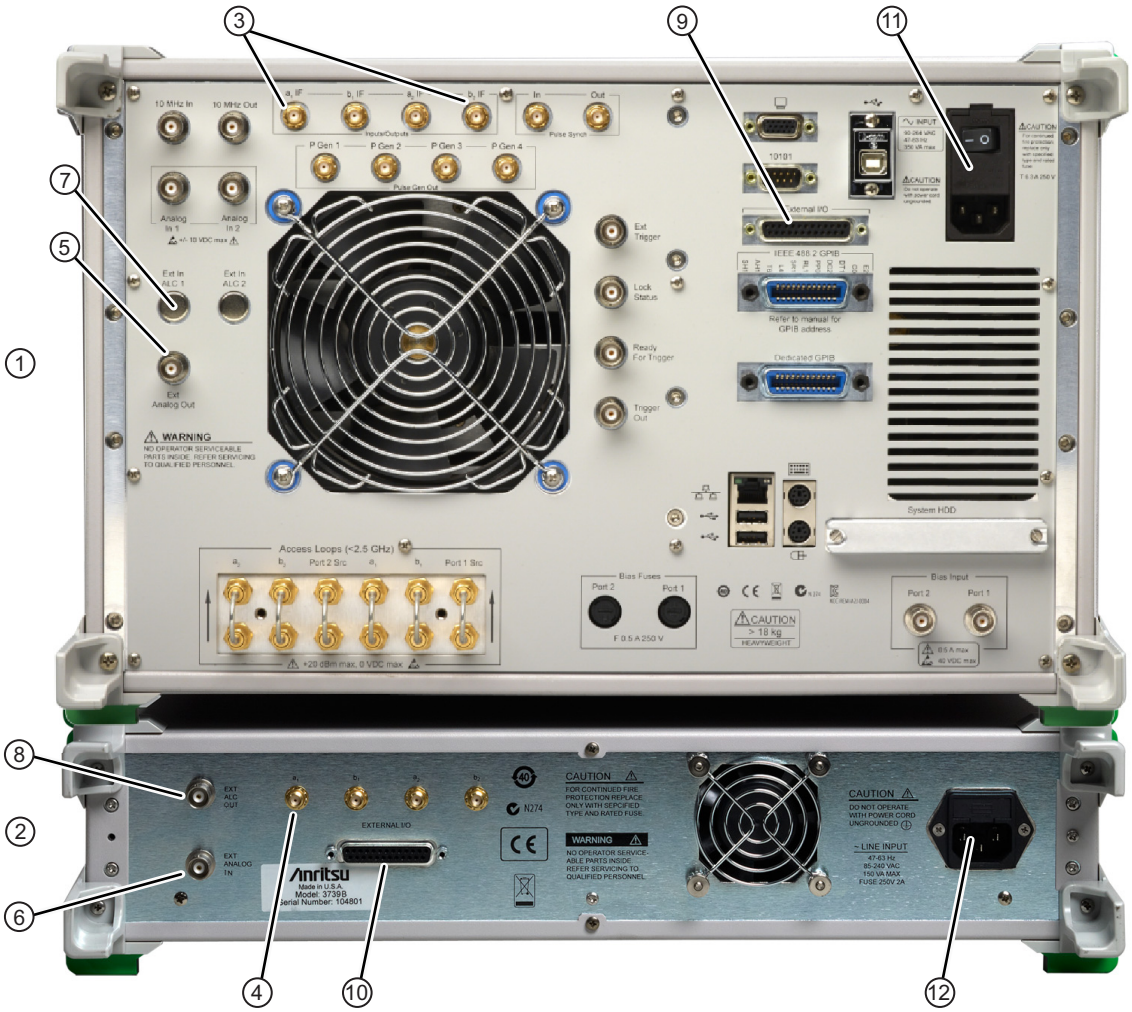
Port 2 Connections

15 – Power
16 – Ref
17 – LO
18 – Test
19 – RF
20 – Ground
21 – Aux Power

Figure 1-2. 3739C Test Set to MS4647A/B VNA – Front Panel Connectors (shown is MS4647B)

ME7838 Series Rear Panel Identification

The 3739B/C Broadband Test Set has rear panel connectors and controls which connect to the MS4647A/B VNA. Figure 1-3 shows an ME7838 System using an MS464xB VNA.



VectorStar MS4647A/B and 3739B/C Test Set	BNC Connections
1 – VectorStar MS4647A or MS4647B VNA	5 – VNA External Analog Out
2 – 3739B/C Broadband Test Set	6 – Test Set External Analog In
IF Inputs/Outputs	7 – VNA External Automatic Level Control (ALC1)
3 – VNA IF Inputs – From left to right: a1 IF Input, b1 IF Input, a2 IF Input, b2 IF Input	8 – Test Set External ALC Out
	I/O Connections
4 – 3739B/C Test Set IF Outputs – From left to right: • a1 IF Output • b1 IF Output • a2 IF Output • b2 IF Output	9 – VNA External I/O – Below, the IEEE 488.2 GPIB connector for VNA control over a GPIB network.
	10 – Test Set External I/O
	Power Connections
	11 – VNA AC Power Input Module
	12 – Test Set AC Power Input Module

Figure 1-3. 3739C Test Set to MS4647A/B VNA – Rear Panel Connectors (shown is MS4647B)

mmWave Modules

The MA25300A, MA25400A, 3743A/AX, and 3743E/EX connect to the 3739B/C Test Set ports and to Test Port 1 and Test Port 2 on the MS4647A/B VNA. The 3744A/E-xx modules connect only to the ports on the 3739B/C Test Set.

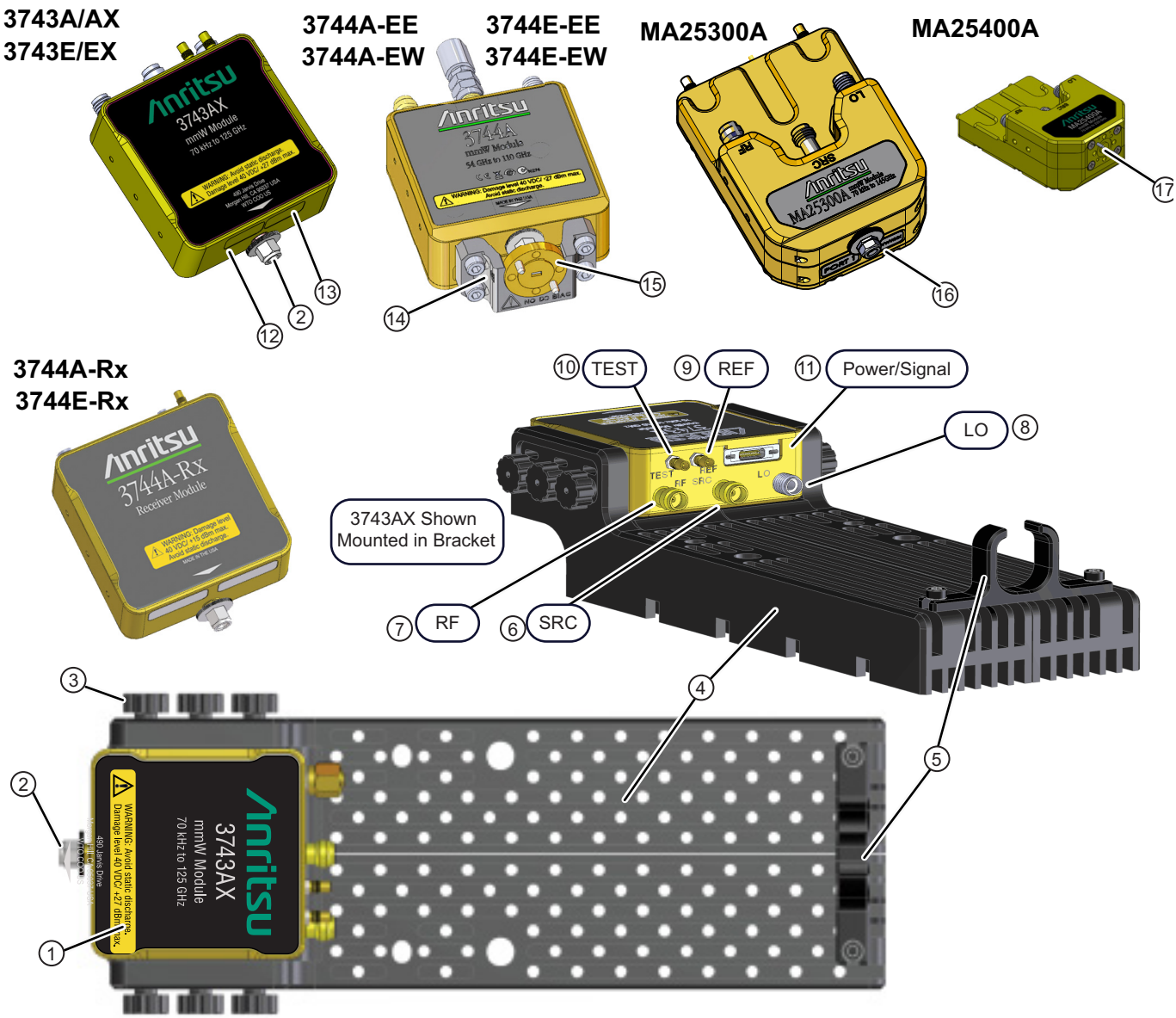


Figure 1-4. mmWave Module in Bracket (1 of 2)

1 – 3743A/AX mmWave Module in Bracket	8 – LO K connector
2 – W Connector	9 – REF SSMC connector
3 – Knurled M3 × 8 mm Mounting Screws; 3 per side (2 per side on MA25300A and MA25400A)	10 – TEST SSMC connector
4 – Module Mounting Bracket (different brackets are used for the MA25300A and for the MA25400A, not shown)	11 – Power/Signal latching Bi-Lobe™ connector
5 – Module Power/Signal Cable Restraint	12 – Factory Calibrated Port Assignment Label
6 – SRC V connector	13 – Module Serial Number Label
7 – RF V connector	14 – Waveguide Adapter Bracket
	15 – WR-10 or WR-12 Waveguide to 1 mm Adapter
	16 – 0.8 mm connector
	17 – 0.6 mm flange connector

Figure 1-4. mmWave Module in Bracket (2 of 2)

	The left-side and right-side mmW modules are identical. The modules have the same connector orientation and sequence and can be used on either port. There is no module right-hand or left-hand orientation.
Note	However, in the as-shipped configuration (except for the 3744A/E-Rx Module) each module is calibrated for a specific VNA serial number and a specific VNA Test Port. The module labels indicate the calibrated port assignment. Degradation in system performance will result if the mmW modules are installed opposite of the calibrated port assignment indicated on their label.

1-4 ME7838 Series Configuration Part Numbers

The ME7838 Series VNA system as-shipped configuration uses different combinations of the components listed in the table below. Additional configuration information is available in the relevant technical data sheet.

Table 1-1. ME7838 Series Modular Broadband/mmWave VNA System Components (1 of 3)

Applicable ME7838 System	Part Number	Name	Specifications
VNA Configuration			
ME7838A ME7838D	MS4647A/B	VectorStar Vector Network Analyzer (VNA)	Refer to Applicable TDS
ME7838AX ME7838E/EX ME7838G	MS4647B	VectorStar Vector Network Analyzer (VNA)	Refer to Applicable TDS
All	MS464xA/B-007	Receiver Offset Option	Refer to Applicable TDS
All	MS464xA/B-002	Time Domain Option	Refer to Applicable TDS
All	MS464xA/B-070	70 kHz Low End Frequency Extension Option	Refer to Applicable TDS
All	MS464xA/B-08X	Broadband System Options	Refer to Applicable TDS
All	3739B or 3739C	Broadband Test Set	With front/rear panel interface cables
MS464xA/B VNA Front Panel Options			
All	MS464xA/B-051	Direct Access Loops	Refer to Applicable TDS
All	MS464xA/B-061	Active Measurement Suite	Refer to Applicable TDS
All	MS464xA/B-062	Active Measurement Suite	Refer to Applicable TDS

Table 1-1. ME7838 Series Modular Broadband/mmWave VNA System Components (2 of 3)

Applicable ME7838 System	Part Number	Name	Specifications
Millimeter Wave Modules			
ME7838D	MA25300A	Broadband mmWave Module	70 kHz to 145 GHz
ME7838G	MA25400A	Broadband mmWave Module	70 kHz to 220 GHz
ME7838A/AX	3743A/AX	Broadband mmWave Module	70 kHz to 125 GHz
ME7838E/EX	3743E/EX	Broadband mmWave Module	70 kHz to 110 GHz
All	3744A-EE	Banded mmWave Module	56 GHz to 95 GHz
All	3744A-EW	Banded mmWave Module	65 GHz to 110 GHz
All	3744E-EE	Banded mmWave Module	56 GHz to 95 GHz
All	3744E-EW	Banded mmWave Module	65 GHz to 110 GHz
All	3744A-Rx	Receiver Module	30 GHz to 125 GHz
All	3744E-Rx	Receiver Module	30 GHz to 110 GHz
ME7838G Accessory Kit			
ME7838G	2000-1956-R	Accessory Kit, ME7838G	33GG50 Thru and 33WG50 (W1 male) adapters
Waveguide Adapter Kits			
All	–	Waveguide Accessory Kit[a], 3744A-EE and 3744A-EW	
All	SM6540	Waveguide Adapter Kit, V Band	WR-15
All	35WR12WF-EE	Waveguide Adapter Kit, E Band	WR-12
All	35WR10WF-EW	Waveguide Adapter Kit, W Band	WR-10
All	ME7838-SS020	On-Site System Assembly and Verification	Refer to Applicable TDS
Interconnect Cable Part Numbers			
All	3-67357-13	Semi-Rigid (KM-KM) Cables	Standard (Non-Rack Mount)
All	3-67357-67	Semi-Rigid (KM-KM) Cables	3739B/C-001 Rack Mount Option
All	3-75685-1	mmWave Module Interface Cables (for MA25300, MA25400A, 3743A/AX, 3743E/EX, 3744A-EE, 3744A-EW, 3744E-EE, 3744E-EW modules) Group of 5 cables for each port	Refer to Applicable TDS
All	3-75685-2	OML Module Interface Cables Group of 4 cables for each port	Refer to Applicable TDS
All		VDI Module Interface Cables Group of 4 cables for each port	Refer to Applicable TDS
All	3-75685-3	mmWave Module Interface Cables (for 3744A-Rx and 3744E-Rx modules) Group of 3 cables for one port	Refer to Applicable TDS

Table 1-1. ME7838 Series Modular Broadband/mmWave VNA System Components (3 of 3)

Applicable ME7838 System	Part Number	Name	Specifications
Phase Stable Cable Option			
All	806-206-R[b]	1.85 mm Interconnect Cable	70 cm (24 inches) V (m) to V (f) 2 cables
All	806-209-R[b]	1.85 mm Interconnect Cable	91 cm (36 inches) V (m) to V (f) 2 cables
All	806-396-R[b]	1.85 mm Phase Stable Interconnect Cable	91 cm (36 inches) V (m) to V (f) 2 cables

a. The Waveguide Accessory Kit comes without the adapter bracket, the waveguide to coax adapter, and the V210 termination. These items come already attached to the 3744A-EE, 3744A-EW, 3744E-EE and 3744E-EW modules.

b. Coaxial Cables 806-xxx-R are not included or required when using the 3744A-EE, 3744A-EW modules, or the 3744A-Rx and 3744E-Rx Receiver Module.

1-5 3656C W1 1 mm Calibration/Verification Kit with Performance Verification Software

The 3656C W1 (1 mm) Calibration and Verification Kit with 2300-616-R Performance Verification Software is recommended in applications using 1 mm coaxial cable. The kit comes with the calibration/verification hardware and the system performance verification software (PVS). For additional information, see:

- VectorStar 3656C W1 Calibration/Verification Kit and 2300-616-R PVS User Guide – 10410-00784

1-6 3659 0.8 mm Calibration/Verification Kit with 2300-580-R PVS

The 3659 0.8 mm Calibration and Verification Kit with 2300-580-R Performance Verification Software is recommended in applications using 0.8 mm coaxial cable. The kit comes with the calibration/verification hardware and the system performance verification software (PVS). For additional information, see:

- VectorStar 3659 0.8 mm Calibration/Verification Kit and 2300-580-R PVS User Guide – 10410-00327

The 0.8 mm verification process can be used with the ME7838G system up to 145 GHz with 33.8G50 adapters on both modules.

1-7 Related Documentation

Updated product information and documentation can be found on your product page:

https://www.anritsu.com/test-measurement/products/ms4640b-series

https://www.anritsu.com/test-measurement/products/me7838

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

VectorStar MS464xB Series Vector Network Analyzers

- MS464xB Series VNA Technical Data Sheet – 11410-00611
- MS464xB Series VNA Operation Manual – 10410-00317
- MS464xB Series VNA Measurement Guide – 10410-00318
- MS464xB Series VNA User Interface Reference Manual – 10410-00319
- MS464xB Series VNA Maintenance Manual – 10410-00320
- MS464xB Series VNA Programming Manual – 10410-00322
- MS464xB Series VNA Programming Manual Supplement – 10410-00323
- MS464xB Series VNA User Help System – 10450-00040

VectorStar MS464xA Series Vector Network Analyzer

- MS464xA Series VNA Technical Data Sheet – 11410-00432
- MS464xA Series VNA Operation Manual (OM) – 10410-00266
- MS464xA Series VNA Measurement Guide (MG) – 10410-00269
- MS464xA Series VNA Programming Manual (PM) – 10410-00267
- MS464xA Series VNA Help System (OM, PM, and MG) – 10450-00008
- MS464xA Series VNA Maintenance Manual (MM) – 10410-00268

VectorStar ME7838 Series 2-Port BB/mmWave VNA Measurement System

- ME7838A Modular BB/mmWave Technical Data Sheet (TDS) – 11410-00593
- ME7838AX/A4X Modular BB/mmWave Technical Data Sheet (TDS) – 11410-02825
- ME7838D Modular BB/mmWave Technical Data Sheet (TDS) – 11410-00778
- ME7838E Modular BB/mmWave Technical Data Sheet (TDS) – 11410-00767
- ME7838EX/E4X Modular BB/mmWave Technical Data Sheet (TDS) – 11410-02827
- ME7838G Modular BB/mmWave Technical Data Sheet (TDS) – 11410-01060
- ME7838A/AX Modular BB/mmWave Quick Start Guide (QSG) – 10410-00292
- ME7838D/G Modular BB/mmWave Quick Start Guide (QSG) – 10410-00732
- ME7838E/EX Modular BB/mmWave Quick Start Guide (QSG) – 10410-00729
- ME7838 Series Modular BB/mmWave Installation Guide (IG) – 10410-00293
- VectorStar Broadband/Banded mmWave Modules Reference Manual (RM) – 10410-00311
- ME7838 Series Modular BB/mmWave Maintenance Manual (MM) – 10410-00306

VectorStar ME7838 Series Multiport BB/mmWave VNA Measurement System

- ME7838A4 4-Port Broadband VNA Technical Data Sheet (TDS) – 11410-00704
- ME7838AX/A4X Modular BB/mmWave VNA Technical Data Sheet (TDS) – 11410-02825
- ME7838D4 4-Port Broadband VNA Technical Data Sheet (TDS) – 11410-01099
- ME7838E4 4-Port Broadband VNA Technical Data Sheet (TDS) – 11410-01100
- ME7838EX/E4X Modular BB/mmWave VNA Technical Data Sheet (TDS) – 11410-02827

- ME7838G4 Modular BB/mmWave VNA Technical Data Sheet (TDS) – 11410-01196
- ME7838A4/A4X Multiport Broadband VNA Quick Start Guide (QSG) – 10410-00735
- ME7838D4/G4 Multiport Broadband VNA Quick Start Guide (QSG) – 10410-00770
- ME7838E4/E4X Multiport Broadband VNA Quick Start Guide (QSG) – 10410-00771
- ME7838x4 Series Multiport BB/mmWave Installation Guide (IG) – 10410-00734
- ME7838x4 Series Multiport Modular BB/mmWave Maintenance Manual (MM) – 10410-00736

VectorStar MN469xC Series Multiport VNA Measurement System

- MN469xC Series Multiport VNA Measurement System Technical Data Sheet – 11410-00777
- MN469xC Series Multiport Test Set Installation Guide – 10410-00737
- MN469xC Series Multiport Test Set Quick Start Guide – 10410-00738
- MN469xC Series Multiport Test Set Maintenance Manual – 10410-00730

Calibration, Verification, and System Performance Verification

- 36585K and 36585V Precision Auto Calibrator (AutoCal™) Module Reference Manual – 10410-00279
- 3650A, 3652A, and 3654D Mechanical Calibration Kit Reference Manual – 10410-00278
- 366X-1 Verification Kits (3666-1 3.5mm Connectors, 3668-1 K Connectors, 3669B-1 V Connectors) and 2300-527 Performance Verification Software (PVS) User Guide – 10410-00270
- 366X-1 Verification Kit and 2300-527 PVS Quick Start Guide – 10410-00285
- 3656B W1 (1 mm) Calibration/Verification Kit and 2300-584-R System Performance Verification Software User Guide – 10410-00278
- 3656C W1 (1 mm) Calibration/Verification Kit and 2300-616-R System Performance Verification Software User Guide – 10410-00784
- 3659 Calibration/Verification Kit and 2300-580-R System Performance Verification Software User Guide – 10410-00327

Updates to Manuals

For updates to any of the VectorStar Series VNA documentation, visit Anritsu's Web site at: http://www.anritsu.com

Performance Specifications

System performance specifications for VectorStar ME7838 Series Broadband/Banded Systems are contained in the applicable Technical Data Sheet (TDS) They are available at http://www.anritsu.com. Refer to Appendix A — ME7838 Series Specifications for applicable TDS numbers.

1-8 Contacting Anritsu

To contact Anritsu, please visit:

http://www.anritsu.com/contact.asp

From here, you can select the latest sales, service and support contact information in your country or region, provide online feedback, complete a Talk to Anritsu form to get your questions answered, or obtain other services offered by Anritsu.

Chapter 2 — ME7838 Series System Assembly

2-1 Introduction

This chapter describes unpacking, assembly, and cabling procedures for the VectorStar ME7838 Series Broadband/mmWave VNA Measurement System. The major system components of this system are:

- VectorStar MS464xA or MS464xB VNA System (B series VNA required for ME7838A/AX, ME7838E/EX and ME7838G-based systems)
- 3739B or 3739C Broadband Test Set
- mmWave Modules (2 each)
- Optional OML or VDI Frequency Extension Modules (2 each)
- VNA to Test Set to Module Connection Cables
- Phase Stable RF Connection Cables (2 each) - (used with 3743A/AX and 3743E/EX, MA25300A, and MA25400A modules only).

Since the ME7838A and ME7838D supports both the MS464xA and MS464xB VNAs, this chapter has a rear panel cable connection section for each:

- Section 2-5 “Rear Panel Connections – MS464xA VNA and Test Set” on page 2-4
- Section 2-6 “Rear Panel Connections – MS464xB VNA and Test Set” on page 2-6

2-2 Assembly Notes

The following general assembly notes apply to the unpacking, installation, and assembly procedures:

- **Heavy**

  The VectorStar VNA instrument is quite heavy. Use at least two people when lifting the VNA.

- **Fragile RF Cables and Cable Loops**

  The VNA instrument has fragile RF cables (such as the **Cable Loops**) connected to both the front and rear panels. Be careful not to bend these cables when handling the instrument.

- **V, K, SMA, and 3.5 mm RF Connectors**

  Best practices recommend using an **Anritsu 01-201 Torque End Wrench** to tighten the 8 mm (5/16”) ME7838 V, K, and SMA/3.5 mm connectors. The correct torque setting is 0.9 N·m (8 lbf·in).

  Use the torque wrench with an open end backing wrench. Best practices recommend using an **Anritsu 01-204 8 mm (5/16”) End Wrench**.

- **W1 RF Connectors**

  Best practices recommend using an **Anritsu 01-504 Torque End Wrench** to tighten the 6 mm nut on W1 connectors. The correct torque setting is 0.45 N·m (4 lbf·in).

  Use a 6 mm end wrench with the torque wrench above. Best practices recommend using an **Anritsu 01-505 6 mm/7mm Open End Wrench**.

- **0.8 mm RF Connectors**

  Best practices recommend using an **Anritsu 01-524 Torque End Wrench** to tighten the 6 mm nut on 0.8 mm connectors. The correct torque setting is 0.45 N·m (4 lbf·in).

  Use a 6 mm end wrench with the torque wrench above. Best practices recommend using an **Anritsu 01-525 6 mm/7mm Open End Wrench**.

- **0.6 mm Flange RF Connectors**

  Best practices recommend using an **Anritsu 01-530-R Hex Drive Torque Wrench** to tighten the mounting bolts for the flange assembly. The correct torque setting is 6 cN·m (0.5 lbf·in).

  Certain devices that mate with the 0.6 mm flange RF connector (e.g., the 33GG50 through and on-wafer probes) have a male center pin that can move laterally if bumped. Check that this pin is roughly centered (using a magnifying loupe, such as the one in the ME7838G accessory kit, or a microscope) before mating to the MA25400A module.

- **SSMC Connectors**

  For the 3743A/AX, MA25300A, and MA25400A Modules, the **TEST** and **REF** connectors are SSMC-type connectors. Best practices recommend using an **Anritsu 01-529-R 4 mm (5/32") Torque End Wrench** set to 0.17 N·m (1.5 lbf·in).

  Alternatively, use a 4 mm (5/32") end wrench and carefully hand tighten to less than 0.17 N·m (1.5 lbf·in).

- **Knurled-Head Thumbscrews on Module Mounting Brackets**

  In the as-shipped module bracket configuration, each module is held into its bracket by knurled head thumbscrews, with two (2) M3 × 8 mm on each side of the MA25300A and MA25400A modules and with three (3) M2 × 8 mm on each side of all other module models. Only use hand tightening for these screws. If the module is installed in a user-provided bracket, use hand tightening and make sure that between 5 and 6 mm of screw threads are engaged in the module body. Do not bottom out screws. Do not over torque.

Note	While the MA25300A and MA25400A use the same screw threads, the head is smaller for the MA25400A (and can be used with the MA25300A bracket).

- **mmWave Module Operating Environment**

  The following notes should be considered before operating the MA25300A, MA25400A, 3743x, 3744x-Ex, and 3744x-Rx mmWave Modules:

  The modules require use of heatsink with adequate air circulation. Thermal heat sinking similar to the supplied mounting brackets of the mmWave Module should be considered in custom mounting applications.

  Each MA25300A Module consumes a maximum of 12 watts.

  Each MA25400A Module consumes a maximum of 12 watts.

  Each 3743x Module consumes a maximum of 12 watts.

  Each 3744x-EE and 3744x-EW Module consumes a maximum of 12 watts.

  Each 3744x-Rx Module consumes a maximum of 7 watts.

  The primary heat sinking path for the module is on the two external side surfaces used to mount to the support brackets.

  With the attached cable mounting brackets, the case temperature rise is approximately 15 °C to 20 °C above ambient.

Note	For instructions on waveguide alignment on the 3744x-xx series mmWave modules, refer to *10410-00311, VectorStar® Broadband/Banded mmWave Modules Reference Manual.*

Caution	To avoid connector damage or inaccurate measurements, before making any connections, ensure the connectors are clean, undamaged, and meet pin depth specification. Observe connector torque requirements where indicated in this guide.

2-3 Required Tools

- **Anritsu 01-201 8mm (5/16 in) Torque Wrench** or equivalent rated at 0.9 N · m (8 lbf·in) for SMA, K, and V connectors
- **Anritsu 01-204 8 mm (5/16 in) End Wrench**
- **Anritsu 01-504 6 mm Torque End Wrench** or equivalent rated at 0.45 N·m (4 lbf·in)
- **Anritsu 01-505 6 mm/7mm Open End Wrench**
- **Anritsu 01-524 Torque End Wrench** or equivalent rated at 0.45 N·m (4 lbf·in) for 0.8 mm connectors
- **Anritsu 01-525 6 mm/7mm Open End Wrench**
- **Anritsu 01-529-R 4 mm Torque Wrench** or equivalent rated at 0.17 N·m (1.5 lbf·in) for SSMC connectors
- **Anritsu 01-530-R Hex Drive Torque Wrench**
- **4 mm (5/32 in) End Wrench** for mmWave Module SSMC connectors
- **Small flat-blade screwdriver**
- **Phillips screwdriver**

2-4 Unpacking the Instruments

Caution

A fully loaded MS4647A/B VNA unit weighs approximately 22 kg (50 pounds) and must be installed by at least two people.

If mounting on a workbench surface, first position the 3739B/C Broadband Test Set with access to its front and rear panels.

If mounting into rack or console, make sure the 3739B/C Test Set has 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.

Unpack the various components and set aside in a clean static-free environment. Note that the Millimeter-Wave Modules come in separate shipping containers.

2-5 Rear Panel Connections – MS464xA VNA and Test Set

In this section, connect the **IF** flexible coaxial cables, the **External Analog** and **ALC** BNC cables, and the **External I/O** DB-25 cable between the MS464xA VNA and 3739B/C Test Set as shown below in Figure 2-1 and Table 2-1.

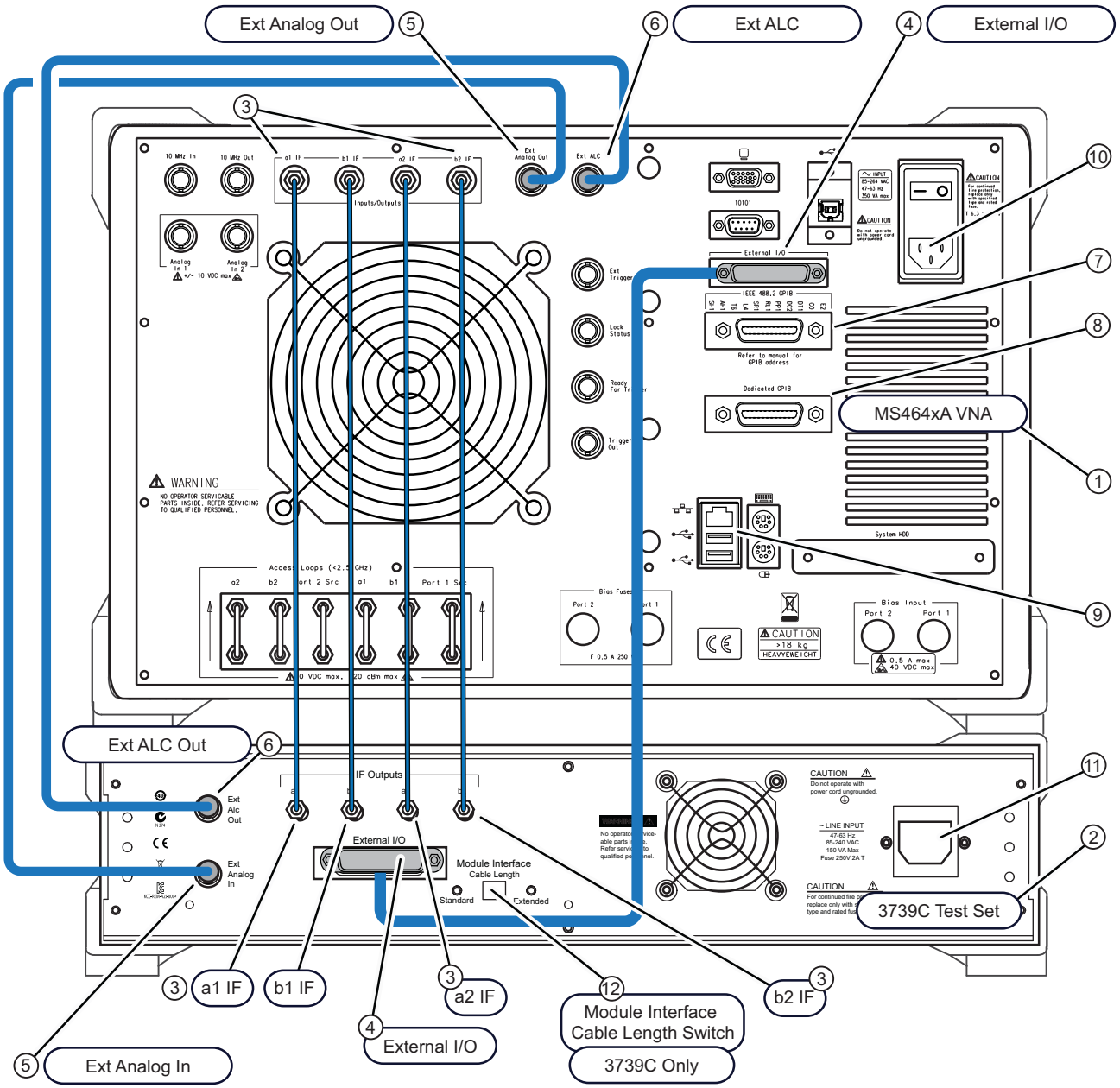


Figure 2-1. ME7838 Broadband/mmWave VNA System – Rear Panel Cables (MS464xA VNA)

Caution	After attaching the power cords to the VNA and the Test Set, *do not* yet plug the power cords into main AC power source.

Caution	To avoid connector damage or inaccurate measurements, before making any connections, ensure the connectors are clean, undamaged, and meet pin depth specification. Observe connector torque requirements where indicated in this guide.

Table 2-1. ME7838 Cable Rear Panel Connections

Part Number	Index	Description	From VNA Location	To 3739B/C Test Set Location
MS464xA VNA	1			
3739B/C Test Set	2			
3-73598-1 [a] (5 cable bundle)	3	IF Interface Cables	a1 IF b1 IF a2 IF b2 IF	a1 IF b1 IF a2 IF b2 IF
	4	External I/O Cable[b]	External I/O	External I/O
3-806-225	5	BNC (M-M) Cable	VNA Ext Analog Out	Test Set EXT ANALOG IN
3-806-225	6	BNC (M-M) Cable	VNA Ext ALC	Test Set EXT ALC OUT
GPIB Cable (Not supplied)	7	Cable for programmatic control	IEEE 488.2 GPIB (for remote controlling ME7838)	NA
GPIB Cable (Not supplied)	8	Cable for programmatic control	Dedicated GPIB (For controlling peripherals such as Power Meter)	NA
Ethernet Cable (Not supplied)	9	Cable for programmatic control	Ethernet Port	NA
USB Type B Cable (Not supplied)		Cable for programmatic control	USB Port (2)	NA
–	10	AC Power Cord[c]	AC Power Input	NA
–	11	AC Power Cord[c]	NA	AC Power Input
–	12	Module Interface Cable Length Switch (Included with Option 3739C-003)		

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).

b. Tighten the connector screws with a flat blade screwdriver.

c. Do not yet connect to AC power cords to the AC source.

2-6 Rear Panel Connections – MS464xB VNA and Test Set

In this section, connect the **IF** flexible coaxial cables, the **External Analog** and **ALC** BNC cables, and the **External I/O** DB-25 cable between the MS464xB VNA and 3739B/C Test Set as shown in Figure 2-2 and Table 2-2.

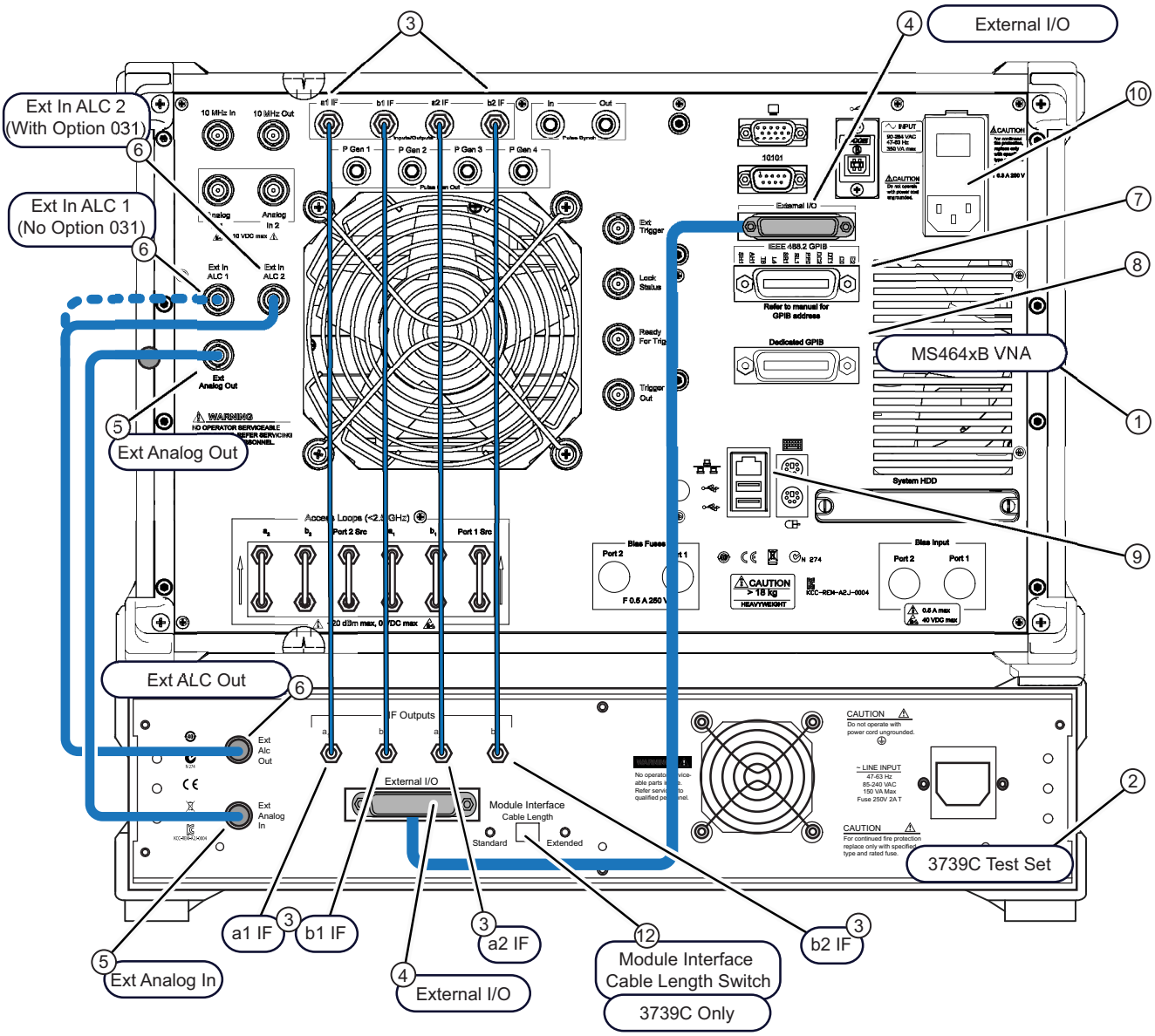


Figure 2-2. ME7838 Broadband/mmWave VNA System – Rear Panel Cables (MS464xB VNA)

Caution	After attaching the power cords to the VNA and the Test Set, *do not* yet plug the power cords into main AC power source.

Caution	To avoid connector damage or inaccurate measurements, before making any connections, ensure the connectors are clean, undamaged, and meet pin depth specification. Observe connector torque requirements where indicated in this guide.

Table 2-2. ME7838 Cable Rear Panel Connections – MS464xB VNA

Part Number	Index	Description	From VNA Location	To 3739B/C Test Set Location
MS464xB VNA	1			
3739B/C Test Set	2			
3-73598-1 [a] (5 cable bundle)	3	IF Interface Cables	a1 IF b1 IF a2 IF b2 IF	a1 IF b1 IF a2 IF b2 IF
	4	External I/O Cable[b]	External I/O	External I/O
3-806-225	5	BNC (M-M) Cable	Ext Analog Out	Test Set EXT ANALOG IN
3-806-225	6	BNC (M-M) Cable	Ext In ALC 1 (without Option 031) Ext In ALC 2 (with Option 031)	Test Set EXT ALC OUT
GPIB Cable (Not supplied)	7	Cable for programmatic control	IEEE 488.2 GPIB (for remote controlling ME7838)	NA
GPIB Cable (Not supplied)	8	Cable for programmatic control	Dedicated GPIB (For controlling peripherals such as Power Meter)	NA
Ethernet Cable (Not supplied)	9	Cable for programmatic control	Ethernet Port	NA
USB Type B Cable (Not supplied)		Cable for programmatic control	USB Port (2)	NA
–	10	AC Power Cord[c]	AC Power Input	NA
–	11	AC Power Cord[c]	NA	AC Power Input
–	12	Module Interface Cable Length Switch (Included with Option 3739C-003)		

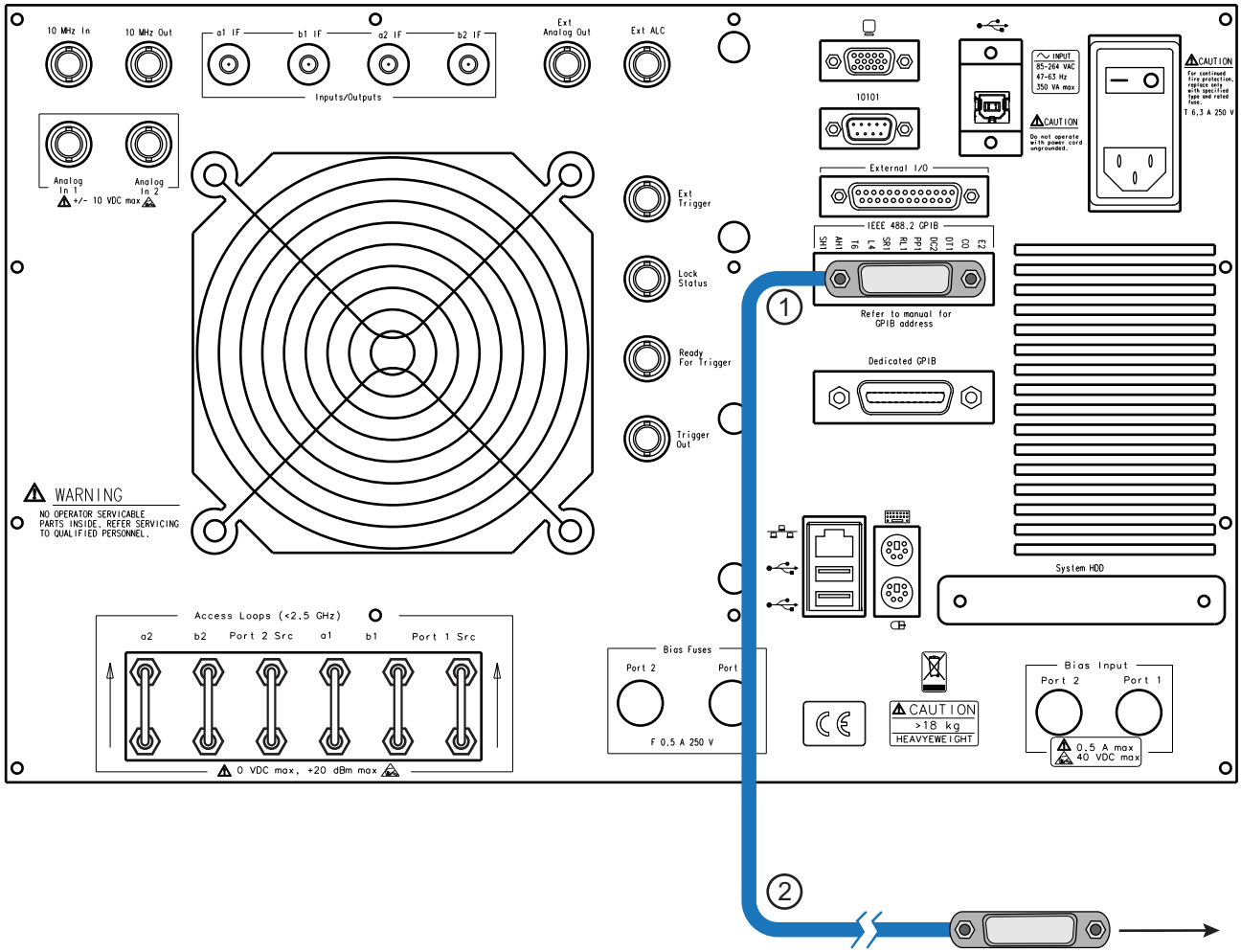
a. Tighten each cable in this group using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in).

b. Tighten the connector screws with a flat blade screwdriver.

c. Do not yet connect to AC power cords to the AC source.

2-7 Optional - Rear Panel VNA GPIB Connection

If the VNA is to be controlled over a GPIB network by a PC or other GPIB controller, install the GPIB cable to the **IEEE 488.2 GPIB** rear panel connector. Figure 2-3 shows an MS464xA rear panel. This connection is the same on both the MS464xA and MS464xB VNA.



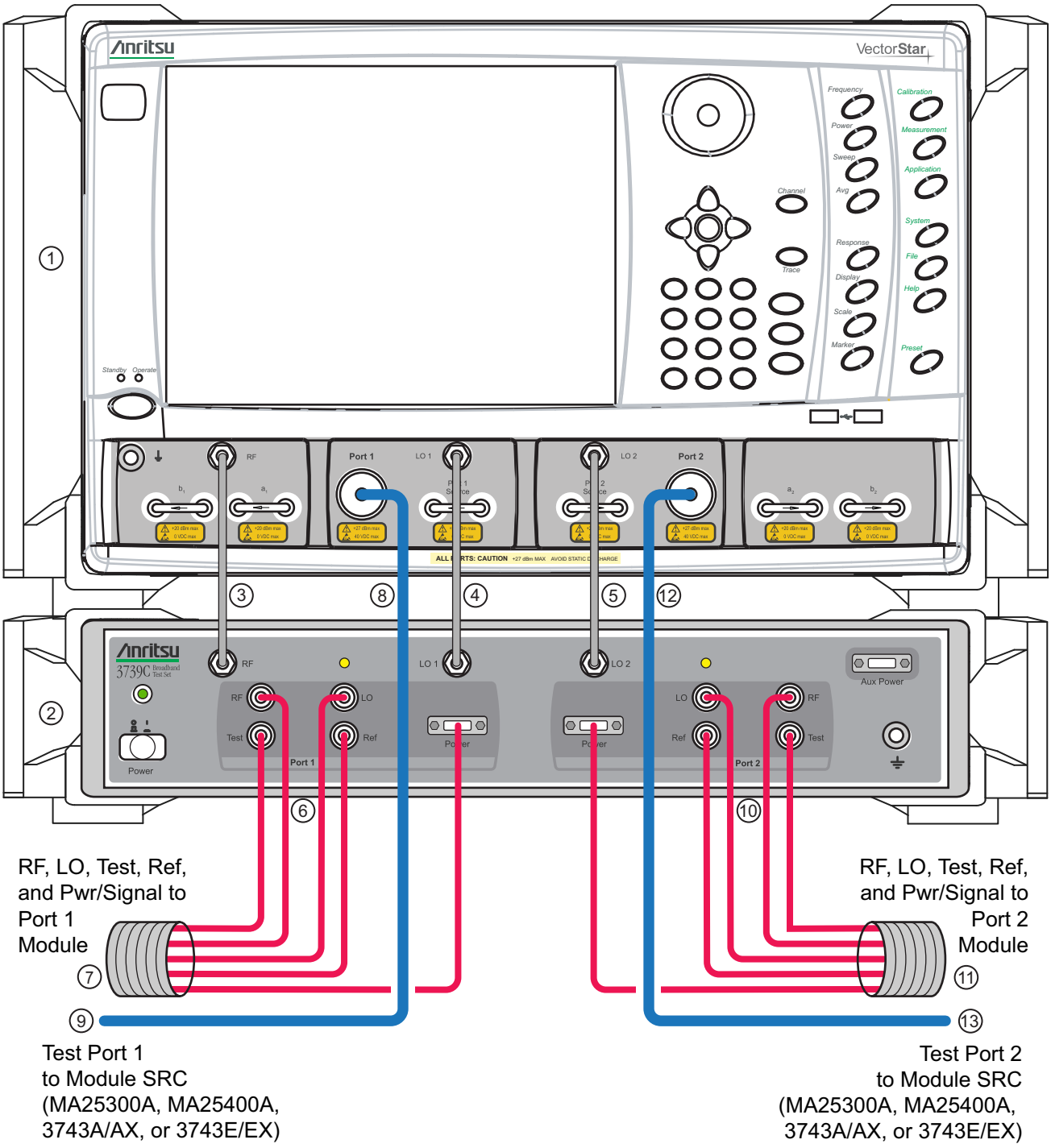
1 – VNA Rear Panel – IEEE 488.2 GPIB Port – For operational control of VNA by external GPIB Controller.

2 – GPIB Connector and Cable – To GPIB network and GPIB Controller.

Figure 2-3. Optional – MS764xA/B Rear Panel – IEEE 488.2 GPIB Port – Cable Connection

2-8 Front Panel Connections

Make the cable connections between the VNA and the Test Set and install the cable assemblies for Test Port 1 and Test Port 2 on the Test Set front panel as described in Figure 2-4 and in Table 2-3. The cable ends will be connected later to the mmWave Modules or OML/VDI Modules.



Example MS464xA VNA equipped with Option 051, 061, or 062 with included Front Panel Loops

Note: The cables for Test Port 1 to Module SRC (key 8 to 9) and Test Port 2 to Module SRC (key12 to13) are not used with mmWave modules 3744x-EE, 3744x-EW, or 3744x-Rx.

Figure 2-4. Front Panel Cables between 3739B/C Test Set, MS464xA/B VNA, and Modules

Table 2-3. ME7838 Cable Interconnect Part Numbers and Locations

Part Number	Index	Description	Connection From	Connection To
MS464xA/B	1	MS464xA or MS464xB VNA	NA	NA
3739B/C	2	3739B or 3739C Test Set	NA	NA
3-67357-xx (See Note 1)	3	Semi-Rigid (KM-KM) Cable • Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in).	VNA RF	Test Set RF
3-67357-xx (See Note 1)	4	Semi-Rigid (KM-KM) Cable • Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in).	VNA LO1	Test Set LO1
3-67357-xx (See Note 1)	5	Semi-Rigid (KM-KM) Cable • Tighten using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in).	VNA LO2	Test Set LO2
3-75685-1 [a]	6-7, 10-11	mmWave Module Interface Cables (for all BB/mmW modules except 3744A/E-Rx) 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).	Test Set (Port 1, Port 2) RF, LO, Test, Ref, Power/Signal	Module (Port 1, Port 2) RF, LO, Test, Ref, Power/Signal
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).	Test Set (Port 1, Port 2) RF, LO, Test, Ref	Module (Port 1, Port 2) 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).	Test Set (Port 1, Port 2) RF, LO, Test, Ref	Module (Port 1, Port 2) RF Input, LO Input, Meas. IF, Ref IF
3-75685-3 [a]		mmWave Module Interface Cables (for 3744A/E-Rx modules) Group of 3 cables Tighten at Test Set using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in).	Test Set (Port 1, Port 2) LO, Test, Power/Signal	Module (Port 1, Port 2) LO, Test, Power/Signal
806-xxx-R [a,b] (See Note 2)	8-9, 12-13	Coaxial Cable (for MA25300A, MA25400A, 3743A/AX, and 3743E/EX) Tighten at VNA using an 8 mm (5/16 in) torque end wrench set to 0.9 N·m (8 lbf·in).	VNA (Port 1, Port 2)	Module SRC (Port 1, Port 2)

Cable Selection Notes

	Cable Selection	Description
Note 1	3-67357-13	Standard (Non-Rack Mount)
	3-67357-67	3739B/C-001 Rack Mount Option
	Cable Selection	**Description**
Note 2	806-206-R	24 in, 1.85 mm M-F coaxial cable
	806-209-R	36 in, 1.85 mm M-F coaxial cable
	806-396-R	36 in, 1.85 mm M-F phase stable coaxial cable

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

b. The 806-xxx-R Coaxial Cables are not included or required when using the 3744A-EE, 3744A-EW, 3744E-EE, 3744E-EW mmWave modules, or the 3744x-Rx Receiver Module.

2-9 mmWave Module Connections

Connect the 3739B/C Broadband Test Set cables to the modules as shown below, observing the correct torque limits for each connector. See Figure 2-5, Figure 2-6, and Table 2-5.

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 (except the 3744A-Rx and 3744E-Rx) is characterized for absolute power for a specific VNA Serial Number and VNA Test Port as designated on the module port assignment label (see item 10 in Figure 2-5 - Port Designation). Ensure the module matches the correct VNA and Test Set port.

If an alternative 3743 series mmWave module is used there will be approximately 1 dB of absolute power inaccuracy which can be corrected by performing a power calibration.

For more detailed information on the modules including DUT Waveguide (WG) connection alignment and custom bracket mounting, refer to *10410-00311-VectorStar Broadband/Banded Millimeter-Wave Modules*

1. Remove the module from its heatsink bracket.
2. Install the cable assembly to the module and then reinstall the module in the bracket.
3. Route the cable assembly through the cable restraint.

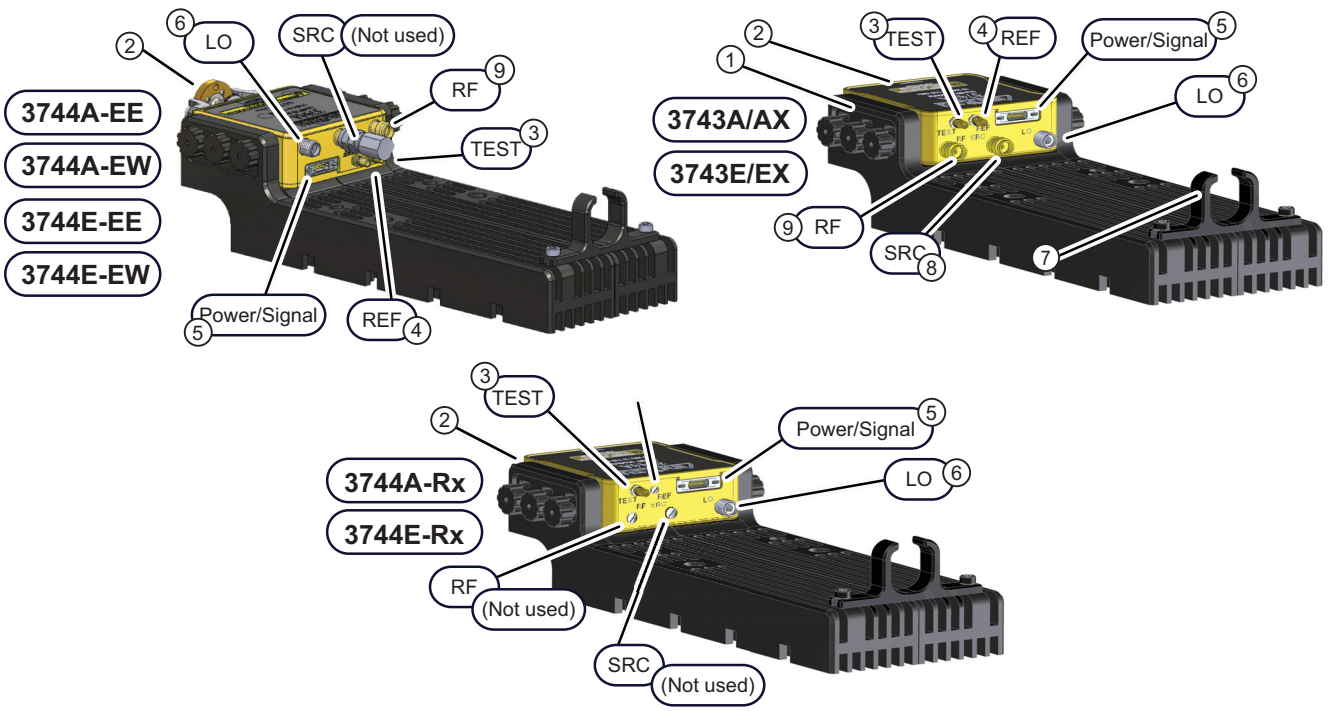


Figure 2-5. mmWave Module Connections—374x Modules

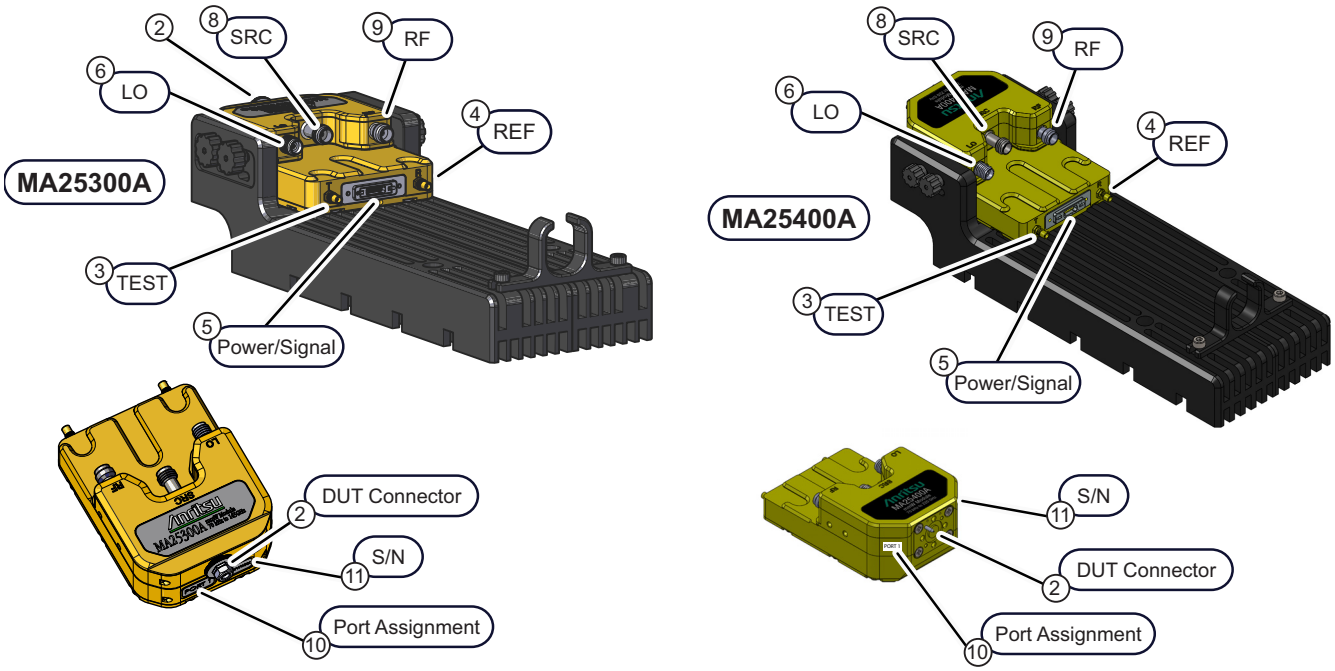


Figure 2-6. mmWave Module Connections—MA25300A and MA25400A modules

Table 2-4. mmWave Module Connections

Cable P/N	Index	Description
N/A	1	mmWave Module in bracket
DUT Connector	2	**0.8 mm Connector (*MA25300A module*)** • 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 01-524. • 6 mm / 7 mm Open End Wrench. Recommended is Anritsu 01-525. **0.6 mm Flange Connector (*MA25400A module*)** • Tighten using a hex torque wrench set to 6 cN·m (0.5 lbf-in). Recommended is Anritsu 01-530-R. **W1** - 1 mm Connector **(*3743A/AX, 3743E/EX, 3744x-Rx 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 to 1 mm connector (*3744A-EE, 3744A-EW, 3744E-EE, 3744E-EW*)** • 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 2-4. mmWave Module Connections

Cable P/N	Index	Description
3-75685-1 [a] or 3-75685-3 [b,c]	3	**TEST** - SSMC Connector ***(Connected on all 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 ***(Connected on all Modules except 3744A-Rx and 3744E-Rx)*** • 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** Latching Bi-Lobe™ Connector ***(Connected on all modules)***
	6	**LO** - K Connector ***(Connected on all 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
806-206-R [d] or 806-209-R [d] or 806-396-R [d]	8	**SRC** - V Connector ***(Connected on MA25300A, MA25400A, 3743A/AX, and 3743E/EX 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.
3-75685-1 [a]	9	**RF -** V Connector ***(Connected on all Modules except 3744A-Rx and 3744E-Rx)*** • 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.
N/A	10	Factory Calibrated Port Assignment Label
N/A	11	Module Serial Number Label

a. Cable assembly 3-75685-1 is used on MA25300A, MA25400A, 3743A/AX, 3743E/EX, 3744A-EE, 3744A-EW, 3744E-EW, and 3744E-EW modules.

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

c. Cable assembly 3-75685-3 is used on 3744A-Rx and 3744E-Rx modules.

d. The 806-xxx-R Coaxial Cables are used only with the MA25300A, MA25400A, 3743A/AX, and 3743E/EX modules.

Inverting the Module

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

1. Remove the six Knurled Head M2 × 8 mm thumbscrews (four M3 x 8 mm on the MA25300A or MA25400A); note that screws with smaller thumbwheels are needed with the MA25400A.
2. Turn the module over.
3. Install the cable assembly.
4. Install into the bracket and then install the thumbscrews.

2-10 OML/VDI Module Connections

Connect the front panel cables between the 3739B or 3739C Test Set, and the OML or VDI frequency extension modules as shown in Figure 2-7, Figure 2-8, and Figure 2-9, and as described in Table 2-5, Table 2-6, and Table 2-7.

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

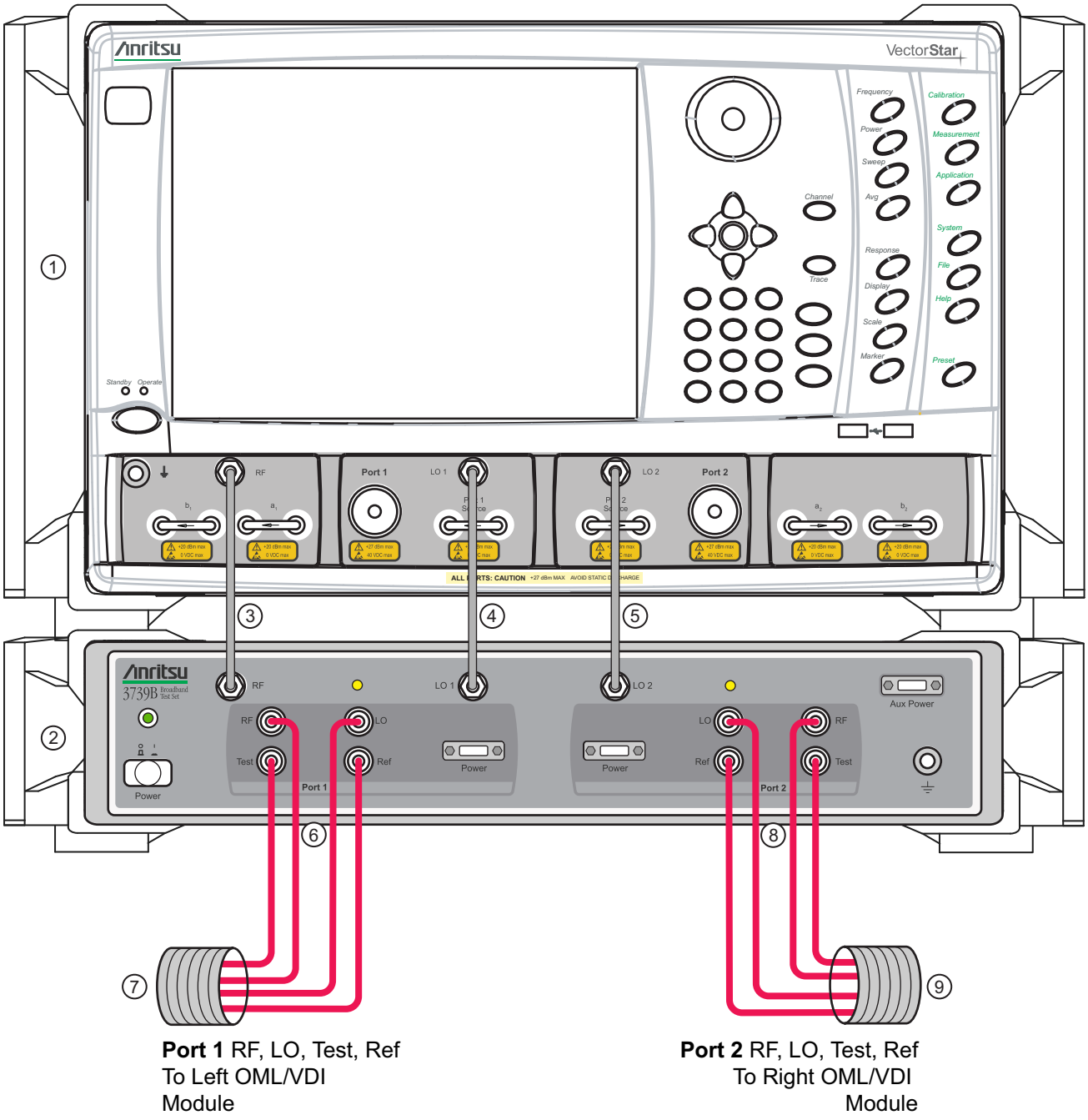


Figure 2-7. Cable Connections between VNA, 3739B or 3739C Test Set, and OML or VDI Frequency Extension Modules

Table 2-5. ME7838 Series Cable Interconnect Part Numbers and Locations

Part Number	Index	Description	Connection From	Connection To
MS464xA or MS464xB	1	MS464xA or MS464xB VNA		
3739B or 3739C	2	3739B or 3739C Test Set		
3-67357-xx (See Note 1)	3	Semi-Rigid (KM-KM) Cable • 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.	VNA RF	Test Set RF
3-67357-xx (See Note 1)	4	Semi-Rigid (KM-KM) Cable • 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.	VNA LO1	Test Set LO1
3-67357-xx (See Note 1)	5	Semi-Rigid (KM-KM) Cable • 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.	VNA LO2	Test Set LO2
3-75685-2	6-7, 8-9	OML Module Interface Cables Group of 4 cables for each port	**Test Set** (Port 1, Port 2) Ref RF LO Test	**OML Module** (Port 1, Port 2) Ref IF RF Input LO Input Test IF
3-75685-2		VDI Module Interface Cables Group of 4 cables for each port	**Test Set** (Port 1, Port 2) RF Ref Test LO	**VDI Module** (Port 1, Port 2) RF Input Ref. IF Meas. IF LO Input

Cable Selection Notes

		Cable Selection	Description
Note 1		3-67357-13	Standard (Non-Rack Mount)
		3-67357-67	3739B/C-001 Rack Mount Option

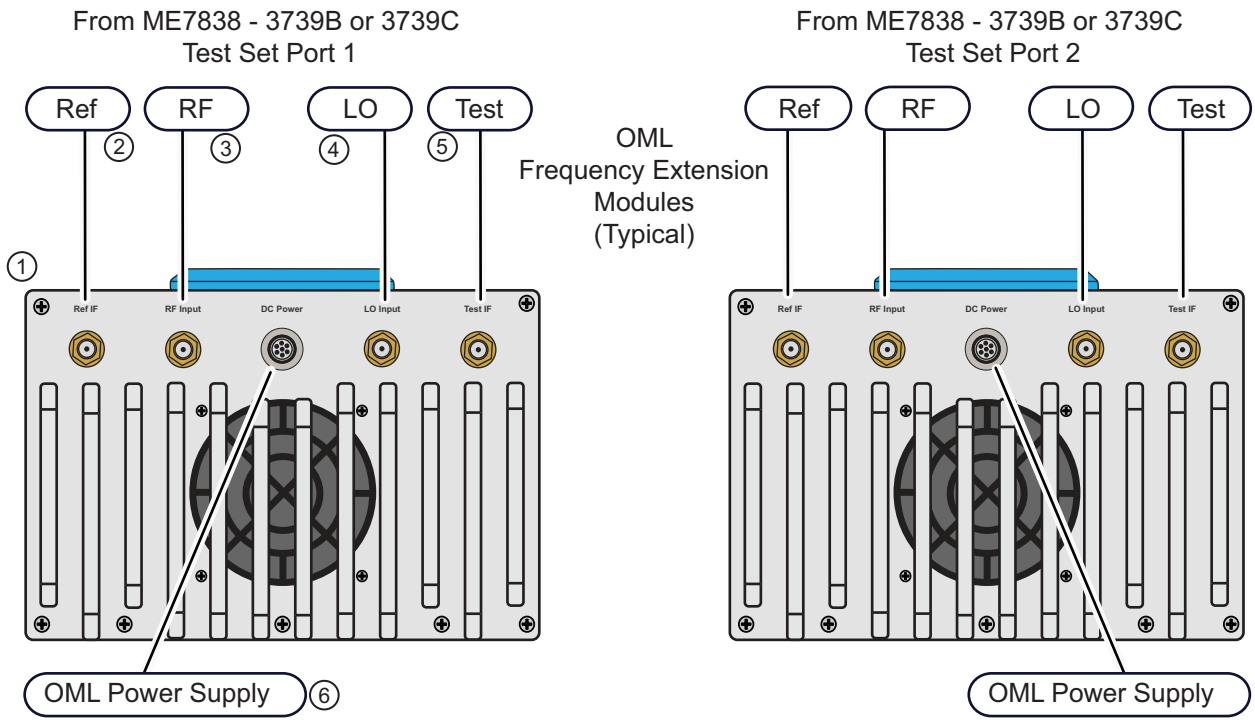


Figure 2-8. VNA/Test Set Cable Connections to OML Modules

Table 2-6. OML Module Connections

Cable P/N	Index	Description
N/A	1	OML Module
3-75685-2	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.
N/A	6	OML Module Power Supply

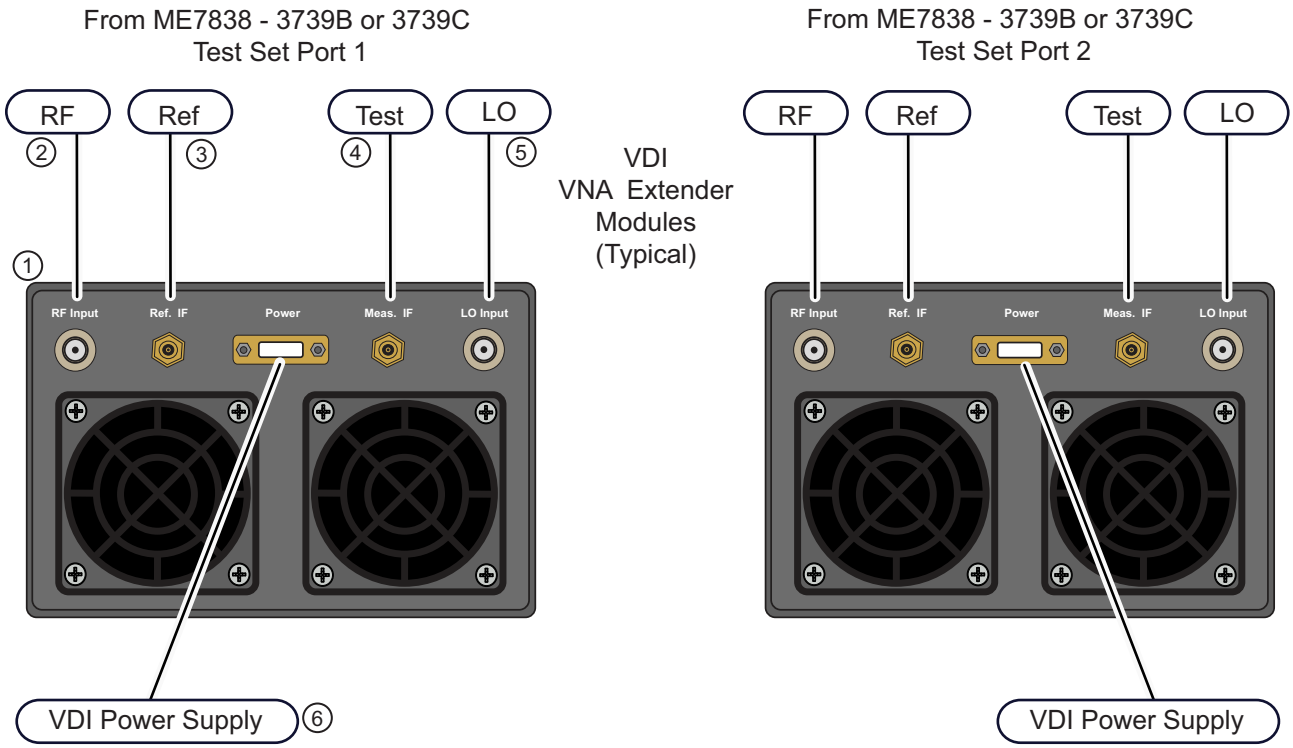


Figure 2-9. VNA/Test Set Cable Connections to VDI Modules

Table 2-7. VDI Module Connections

Cable P/N	Index	Description
N/A	1	VDI Module
3-75685-2	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

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.

Chapter 3 — ME7838A/AX Initial System Checkout

3-1 Introduction

This chapter provides the general initial system checkout for a completely assembled ME7838A/AX Broadband/Banded mmWave System. Since the ME7838A/AX supports both the MS464xA and MS464xB Series VNAs, this chapter has an initial system checkout section for each VNA series:

- Section 3-4 “MS464xA VNA Broadband/Banded Configuration” on page 3-2
- Section 3-5 “MS464xB VNA Broadband/Banded Configuration” on page 3-10

Once this procedure is complete, the system is ready for full calibration and system performance verification.

3-2 Power Up Procedure

Use this procedure to power up the MS464xA/B VNA and the 3739B or 3739C Broadband Test Set. There are no AC power connections required for the mmWave Modules.

1. At the 3739B/C Broadband Test Set Rear Panel, connect the **AC Line Cord** to AC main power.
2. At the VNA Rear Panel, connect the **AC Line Cord** to the AC main power.
   - Power requirements are 90 to 264 VAC, 47 to 63 Hz, power factor controlled.
3. Make sure a USB or PS2 **mouse** is connected to the VNA.
4. At the Test Set front panel press the left side **AC Power Button**. The green **Power LED** should light.
5. At the VNA Rear Panel, turn the **AC Power Rocker Switch** to “|” or **ON**.
   - The front panel **Standby/Operate** key illuminates with an orange Standby LED.
   - The VNA is in Standby mode.
6. Press and hold the **Standby/Operate** key for at least one (1) second.
   - The front panel Standby/Operate key illuminates with a green Operate LED.
   - The VNA is in Operate mode.

3-3 VNA Preset Procedure

1. If the VNA is configured to preset to the factory as-shipped default configuration:
   a. Press the VNA front panel **Preset** button.
      The VNA resets to the factory-default configuration,
   b. Continue with the next applicable section.
2. If the VNA has been configured to a user-defined preset:
   a. Use the right side menus to navigate to the PRESET SETUP menu.
      Utilities | System | Setup | Preset Setup
   b. Select the Default button, and then click the Preset icon on the icon toolbar.
      The VNA resets to the factory-default configuration.
   c. Continue with the next applicable section.

3-4 MS464xA VNA Broadband/Banded Configuration

Receiver Configuration for Broadband

Configure the VNA for Modular Broadband Operation by performing the following steps:

1. Make sure the MS4647A VNA and the 3739B/C Broadband Test Set are both on and warmed up.
2. If not already done, perform Section 3-3 “VNA Preset Procedure” on page 3-1.
3. At the MAIN menu, select Application. The APPLICATION menu appears.
4. MAIN | Application | APPLICATION
5. Select the BB/mmWave (3739 Test Set) button in the Receiver Configuration area.

   The Standard, Multiple Source, and BB/mmWave (3738 Test Set) buttons are deselected.

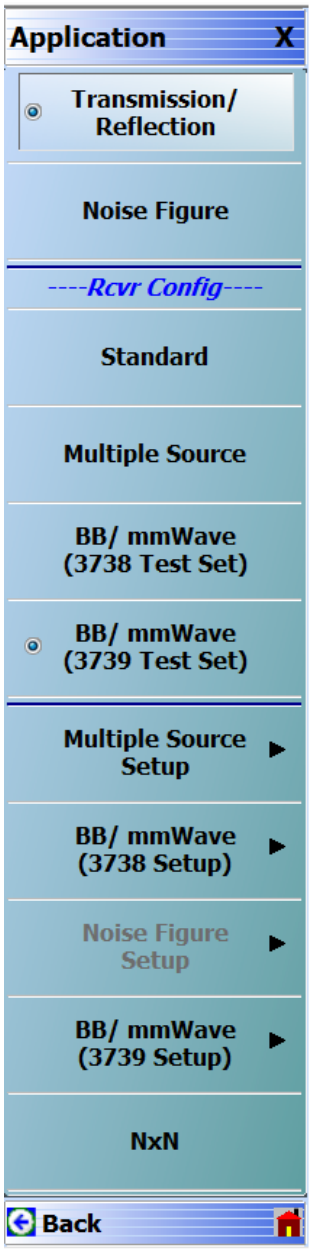


Figure 3-1. Broadband Configuration Selection (MS464xA Systems)

3739 Setup for Broadband

Configure the VectorStar VNA for Broadband Operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 3-3 "VNA Preset Procedure" on page 3-1.
3. Navigate to the Application menu and select:

   Application | BB/mmWave (3739 Setup) | Broadband to 125 GHz

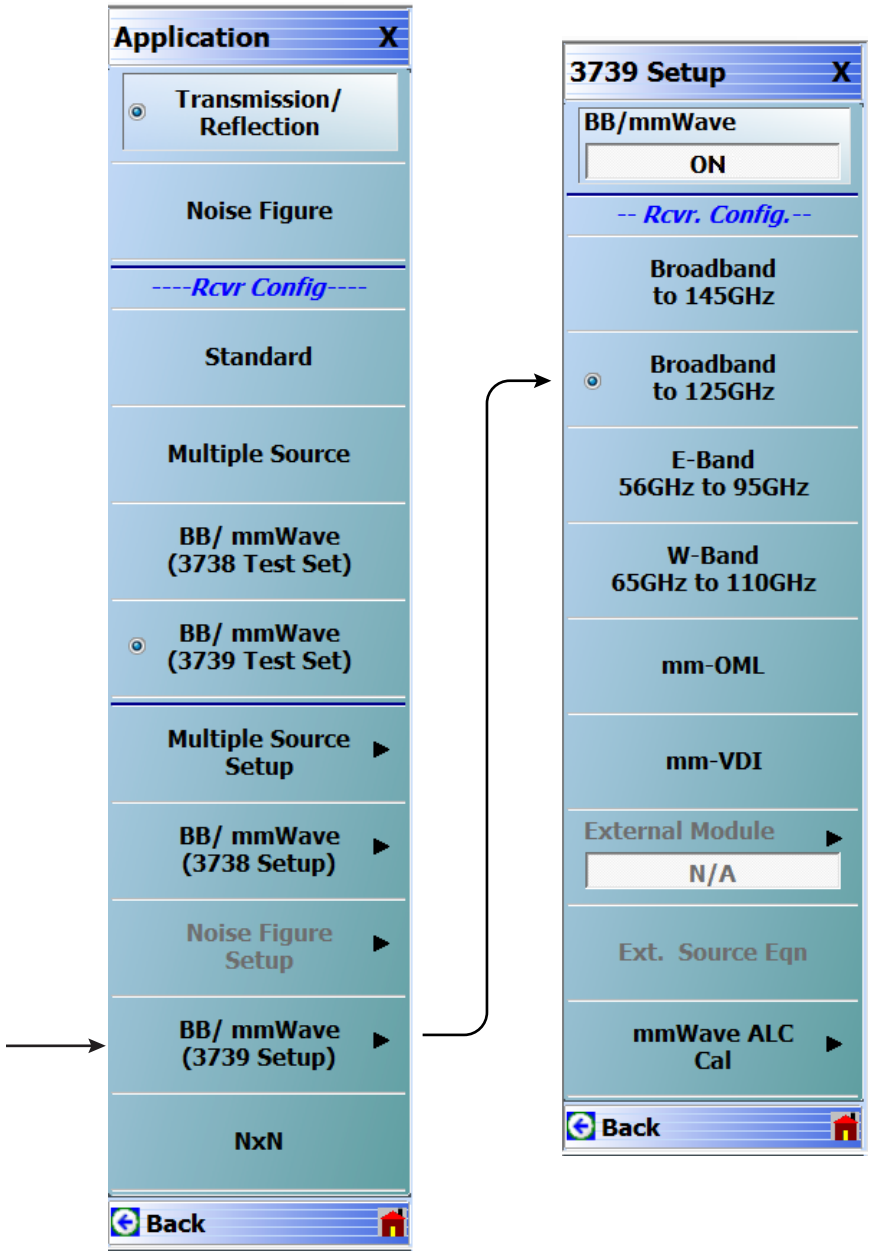


Figure 3-2. 3739 Setup for Broadband Module (MS464xA Systems)

Frequency Setup

1. Navigate to the FREQUENCY menu.
   - MAIN | Frequency | FREQUENCY
2. At the FREQUENCY menu, set the following frequency parameters:
   - Start Frequency = **70.000000000 kHz**
   - Stop Frequency = **125.000000000 GHz**
   - # of Points = **201**
3. The following frequency parameters are automatically set:
   - Center Frequency = **62.500035000 GHz**
   - Span Frequency = **124.999930000 GHz**
   - Step Size = **624.999650 MHz**
4. The system should now be sweeping fully from 70 kHz to 125 GHz.

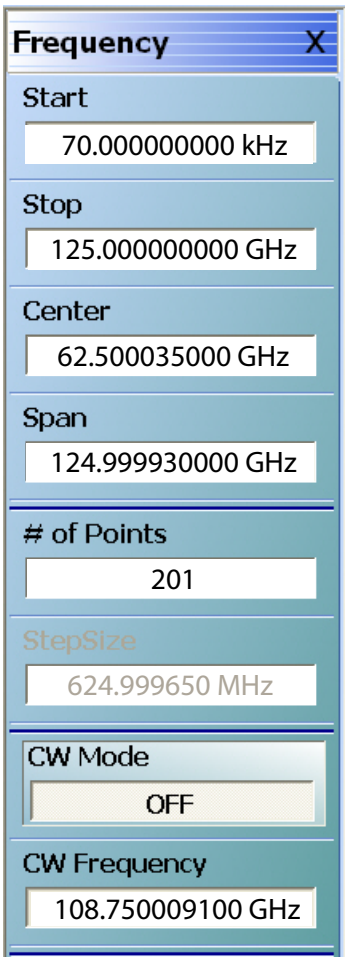


Figure 3-3. FREQUENCY Menu – Settings for 70 kHz to 125 GHz Sweep

Receiver Configuration for Multiple Source

Configure the VectorStar VNA for Multiple Source Broadband Operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 3-3 "VNA Preset Procedure" on page 3-1.
3. From the Application menu select Multiple Source Setup.
4. If not already done, from the Multiple Source menu, toggle Multiple Source to ON.
5. Select Ext. Mod. Ctrl.
6. On the External Module Ctrl dialog, select 125 GHz.

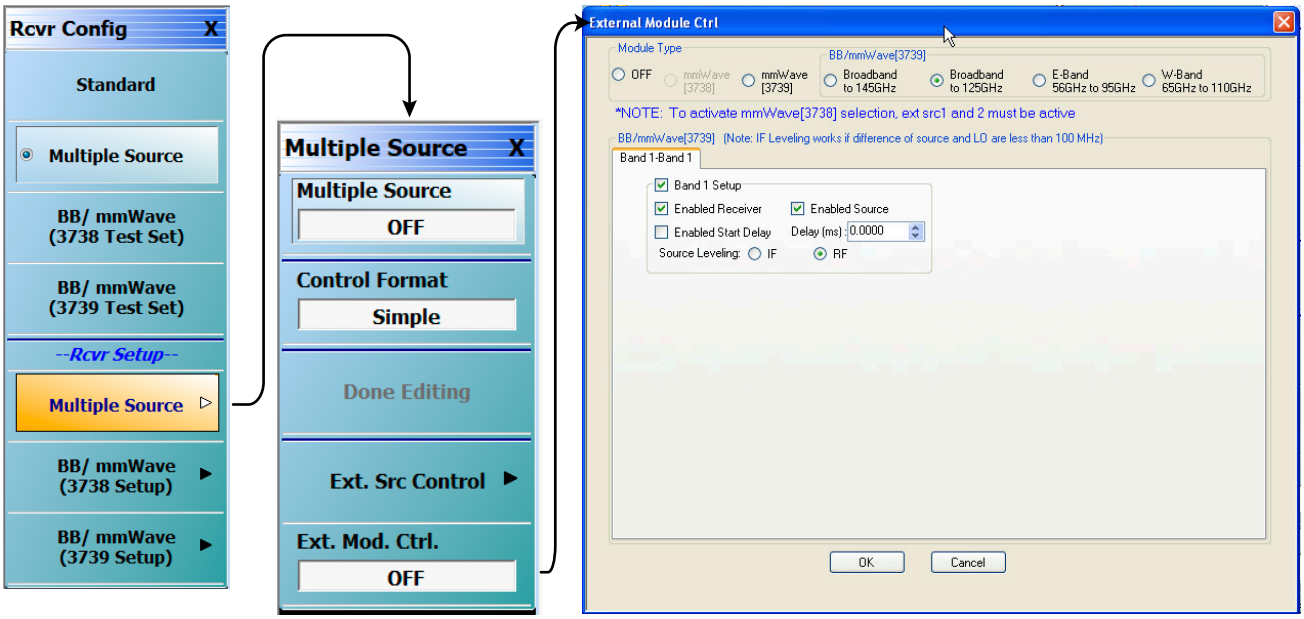


Figure 3-4. Receiver Configuration for Multiple Source (MS464xA Systems)

3739 Setup for Banded Modules

Configure the VectorStar VNA for BB/mmWave Operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 3-3 “VNA Preset Procedure” on page 3-1.
3. From the Application menu select BB/mmWave (3739 Setup).
4. Select E-Band or W-Band depending on your 3744A module.

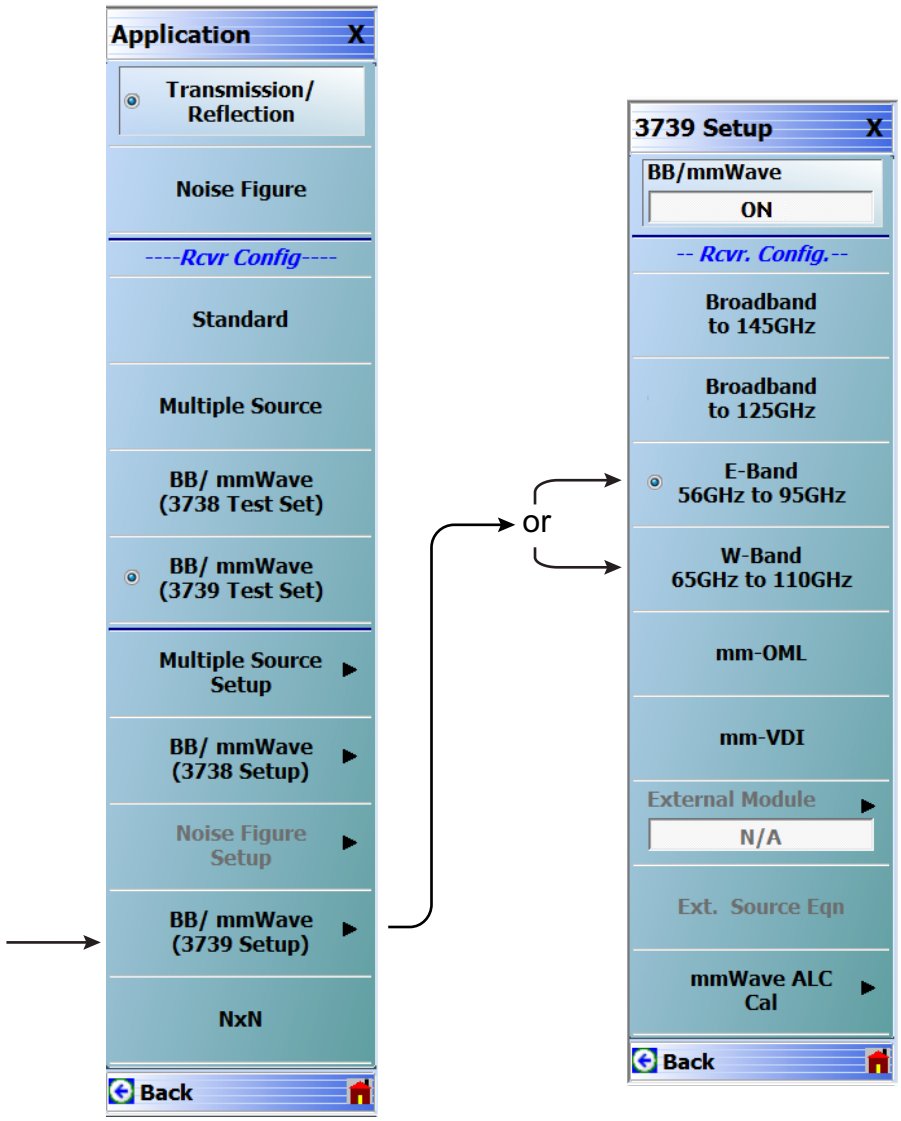


Figure 3-5. 3739 Setup for Banded Modules (MS464xA Systems)

3739 Setup for OML/VDI Selection

Configure the VectorStar VNA for OML or VDI operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 3-3 "VNA Preset Procedure" on page 3-1.
3. Navigate to the Application menu and select:

   BB/mmWave (3739 Setup) | mm-OML (or mm-VDI)

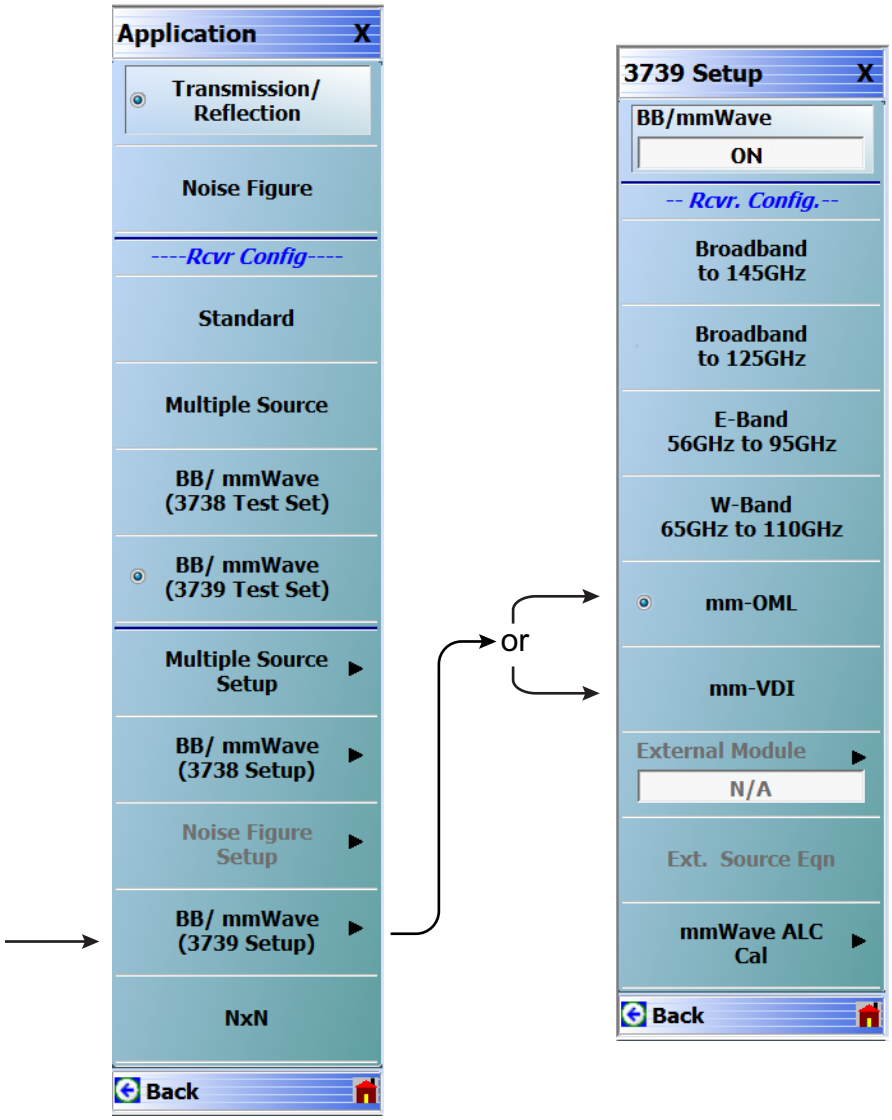


Figure 3-6. 3739 Setup for OML/VDI Selection (MS464xA Systems)

OML Band Selection

Configure the VectorStar VNA for OML operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 3-3 “VNA Preset Procedure” on page 3-1.
3. Navigate to Application | BB/mmWave (3739 Setup).

   The 3739 Setup menu opens (Figure 3-7).
4. The External Module option is initially disabled. Select mm-OML; this will enable the External Module option. The applicable OML module band can then be selected from External Module and applied.
5. Select External Module option.
6. In the External Module Selection dialog box, select the applicable OML Module band and click Apply.

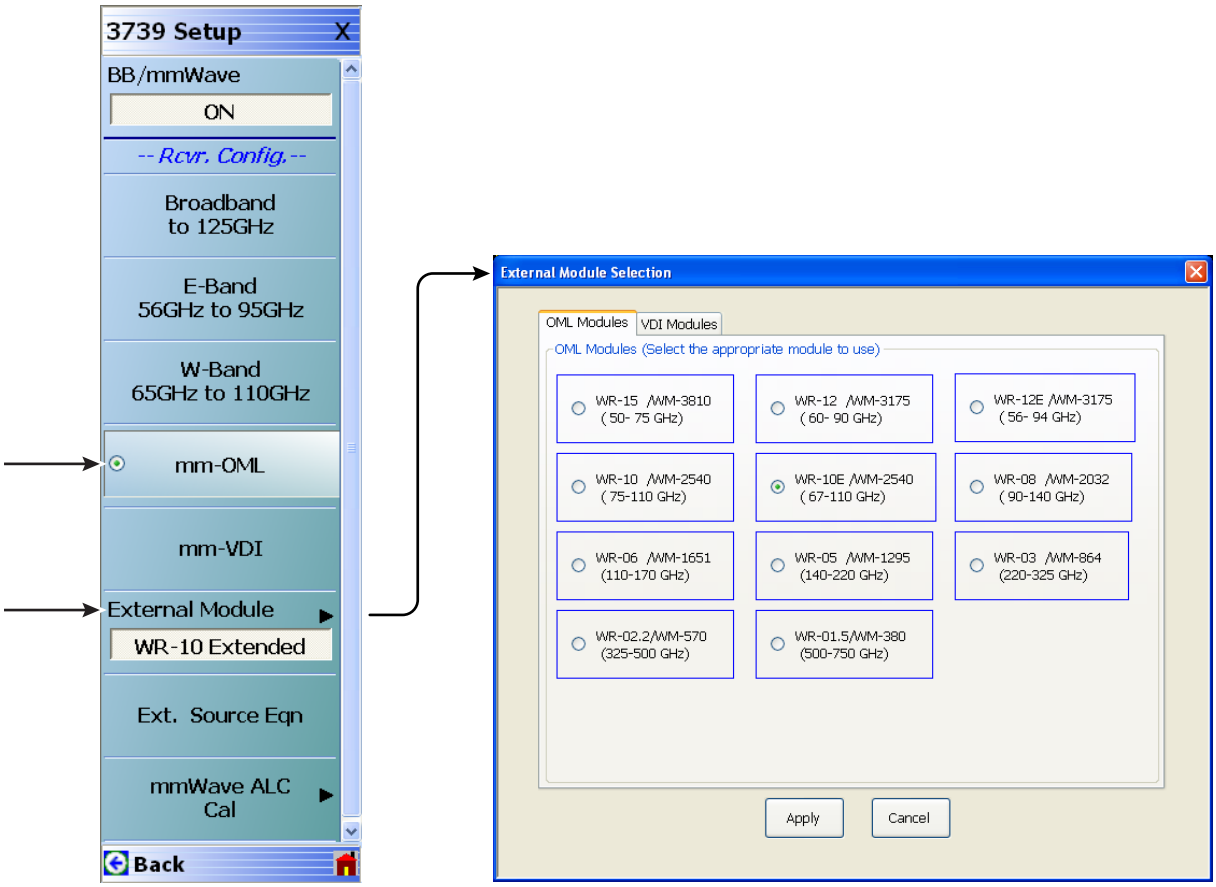


Figure 3-7. 3739 Setup Menu – OML Selection (MS464xA Systems)

VDI Band Selection

Configure the VectorStar VNA for OML operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 3-3 "VNA Preset Procedure" on page 3-1.
3. Navigate to Application | BB/mmWave (3739 Setup).

   The 3739 Setup menu opens (Figure 3-8).
4. The External Module option is initially disabled. Select mm-VDI; this will enable the External Module option. The applicable VDI module band can then be selected from External Module and applied.
5. Select External Module option.
6. In the External Module Selection dialog box, select the applicable VDI Module band and click Apply.

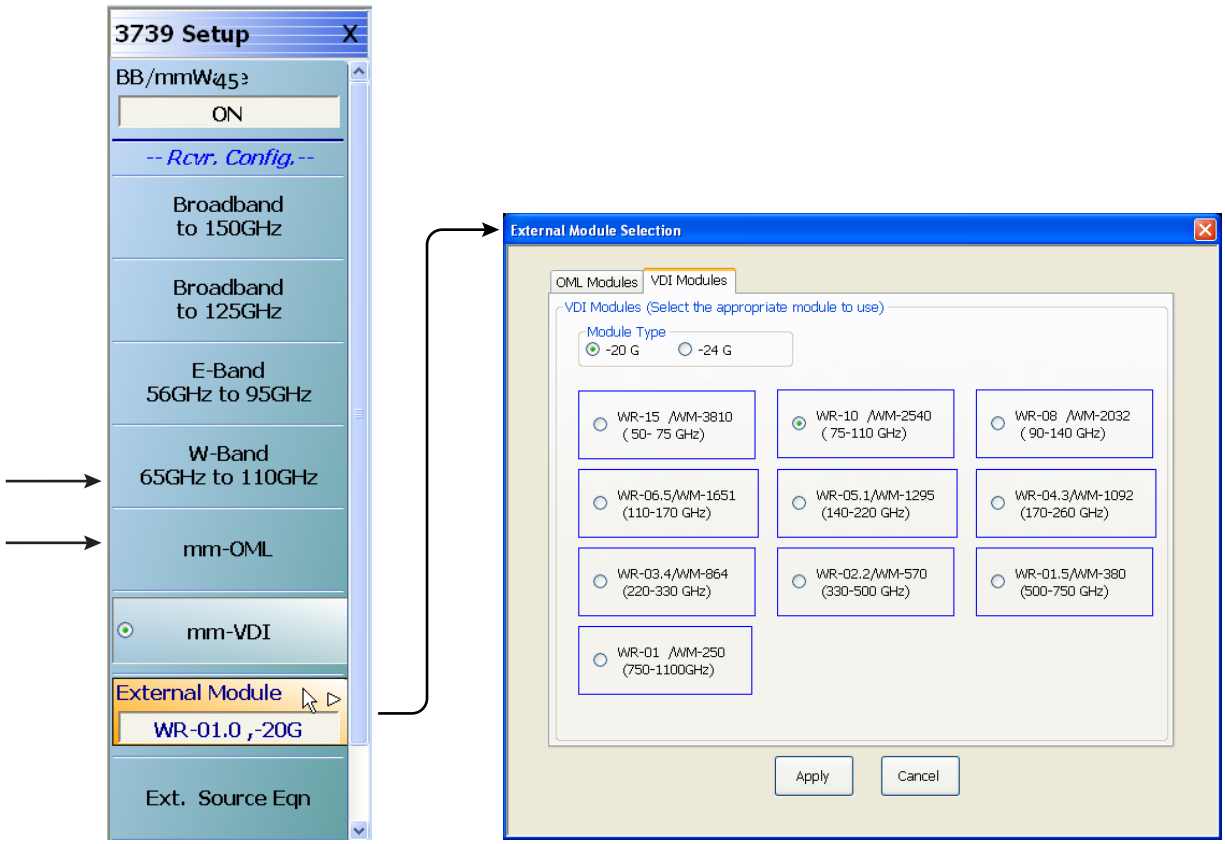


Figure 3-8. 3739 Setup Menu – VDI Band Selection (MS464xA Systems)

3-5 MS464xB VNA Broadband/Banded Configuration

Configure the VNA for Modular Broadband Operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 3-3 “VNA Preset Procedure” on page 3-1.

Receiver Configuration for Broadband

1. At the MAIN menu, select Application. The APPLICATION menu appears as shown in Figure 3-9.

   MAIN | Application | APPLICATION
2. Select the Rcvr Config Button to open the Rcvr Config menu.
3. Select the BB/mmWave (3739 Test Set) button.

   The Receiver Config button on the Application menu now shows 3739 Test Set is selected.

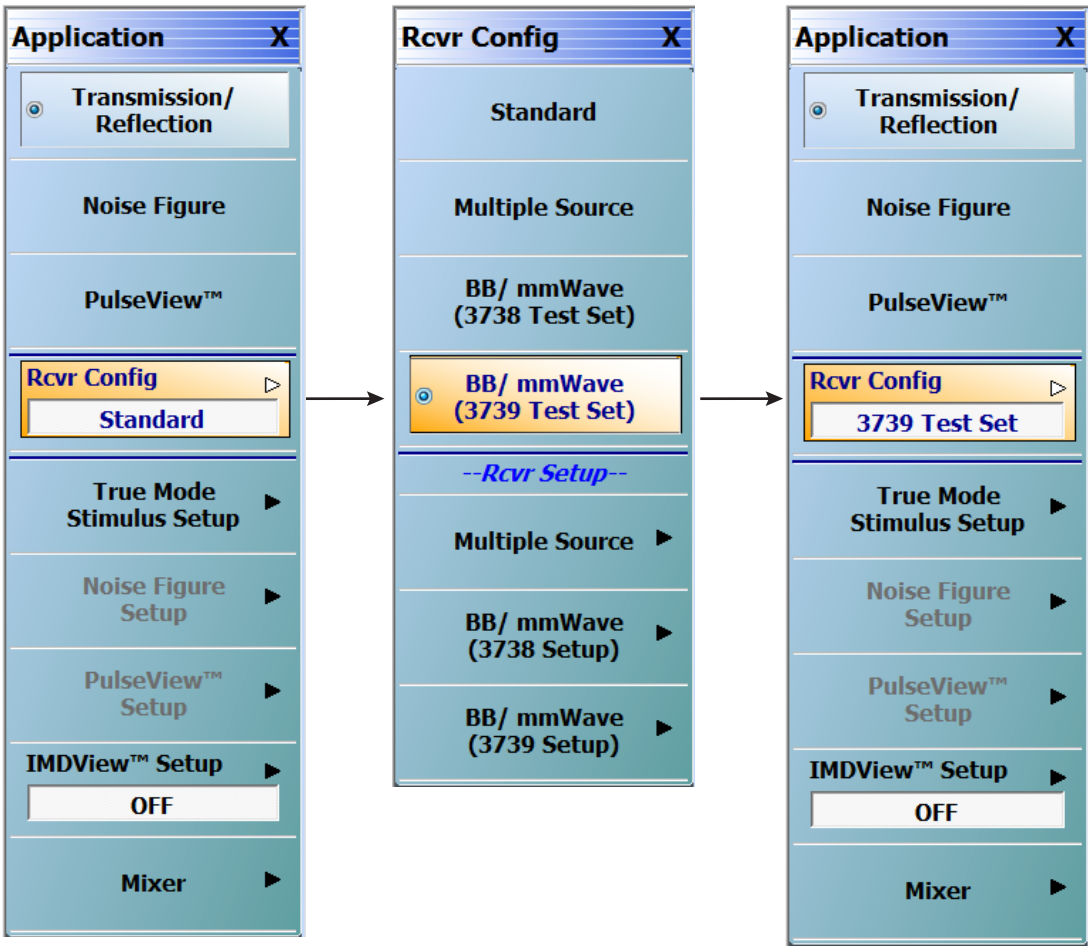


Figure 3-9. APPLICATION Menu – Receiver Configuration to 3739 Test Set (MS464xB Systems)

3739 Setup for Broadband

Configure the VectorStar VNA for Broadband Operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 3-3 "VNA Preset Procedure" on page 3-1.
3. Navigate:

   Main | Application | Rcvr Config
4. Select the BB/mmWave (3739 Setup) button to open the 3739 SETUP menu.
5. Select Broadband to 125 GHz as shown in Figure 3-10

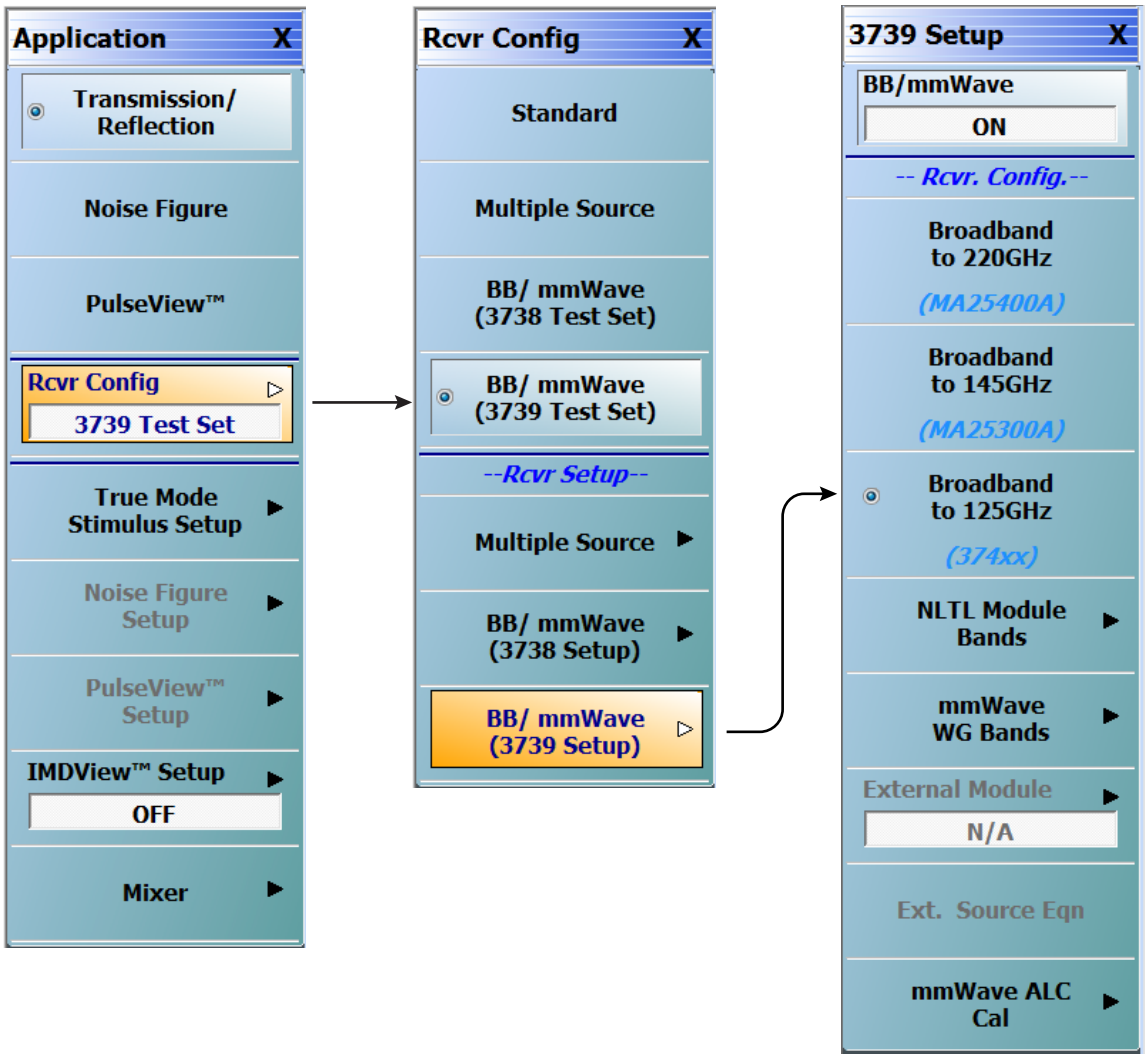


Figure 3-10. 3739 Setup for Broadband Modules (MS464xB Systems)

Frequency Setup

1. Navigate to the FREQUENCY menu.
   - MAIN | Frequency | FREQUENCY
2. At the FREQUENCY menu, set the following frequency parameters:
   - Start Frequency = **70.000000000 kHz**
   - Stop Frequency = **125.000000000 GHz**
   - # of Points = **201**
3. The following frequency parameters are automatically set:
   - Center Frequency = **62.500035000 GHz**
   - Span Frequency = **124.999930000 GHz**
   - Step Size = **624.999650 MHz**
4. The system should now be sweeping fully from 70 kHz to 125 GHz.

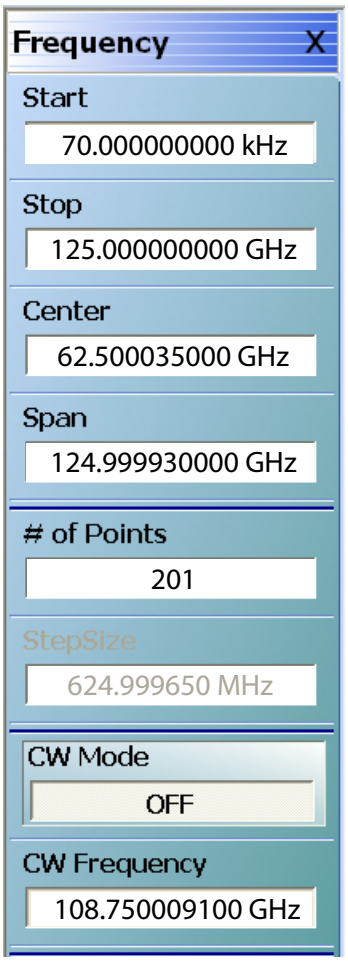


Figure 3-11. FREQUENCY Menu – Settings for 70 kHz to 125 GHz Sweep

Receiver Configuration for Multiple Source

Configure the VectorStar VNA for Multiple Source Broadband Operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 3-3 "VNA Preset Procedure" on page 3-1.
3. Navigate: Main | Application | Rcvr Config | (See Figure 3-12).
4. From the Rcvr Config menu select the Multiple Source button, then in the Rcvr Setup area, select Multiple Source to open that menu.
5. From the Multiple Source menu select Ext. Mod. Ctrl. to open the dialog box. The External Module Control button is available from either Control Format.
6. Select Broadband to 125 GHz.

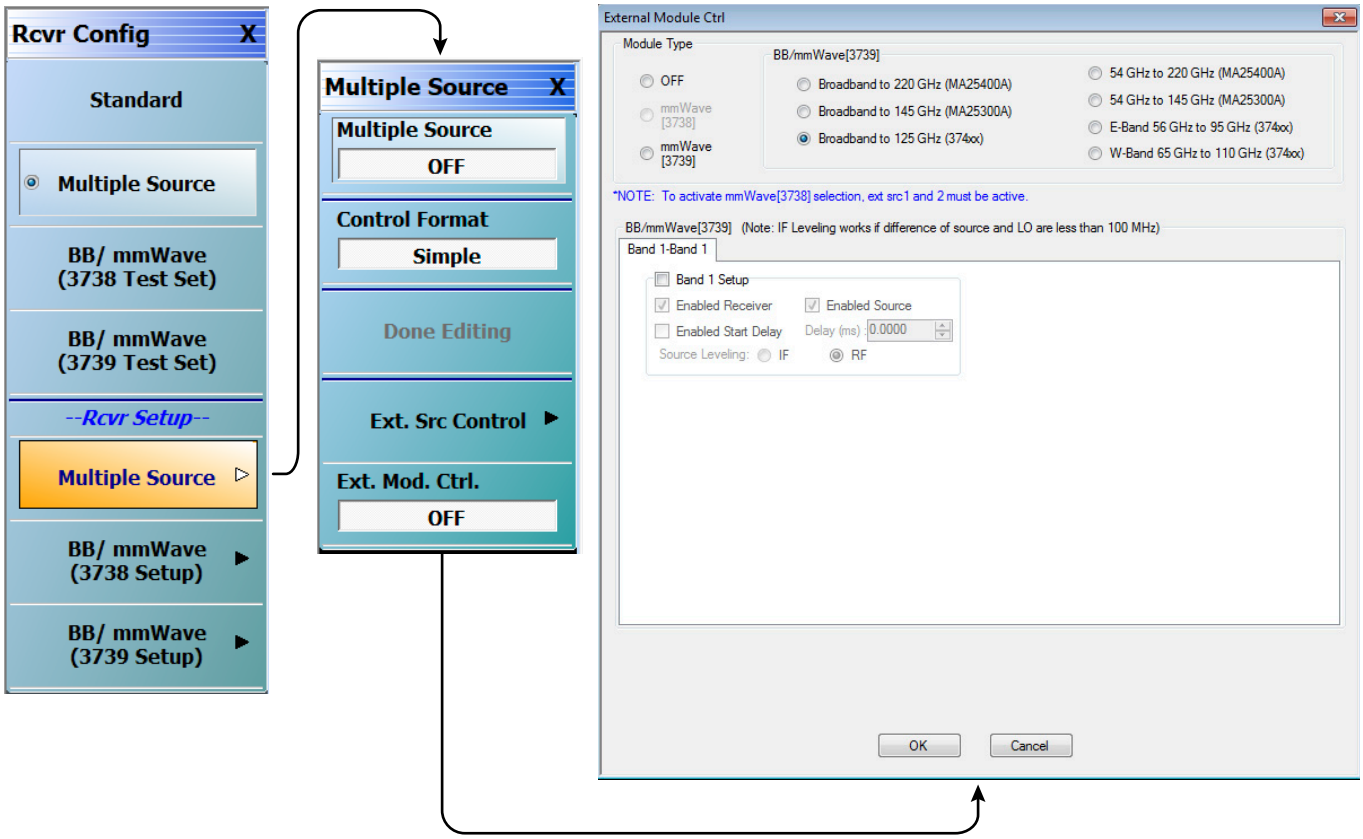


Figure 3-12. Receiver Configuration for Multiple Source (MS464xB Menu)

3739 Setup for Banded Modules

Configure the VectorStar VNA for Banded Operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 3-3 “VNA Preset Procedure” on page 3-1.
3. Navigate: Application | Rcvr Config | BB/mmWave (3739 Setup)
4. From the 3739 Setup menu, select NLTL Module Bands.
5. From the NLTL Module menu, E-Band or W-Band (for 3744A-EE/EW modules).

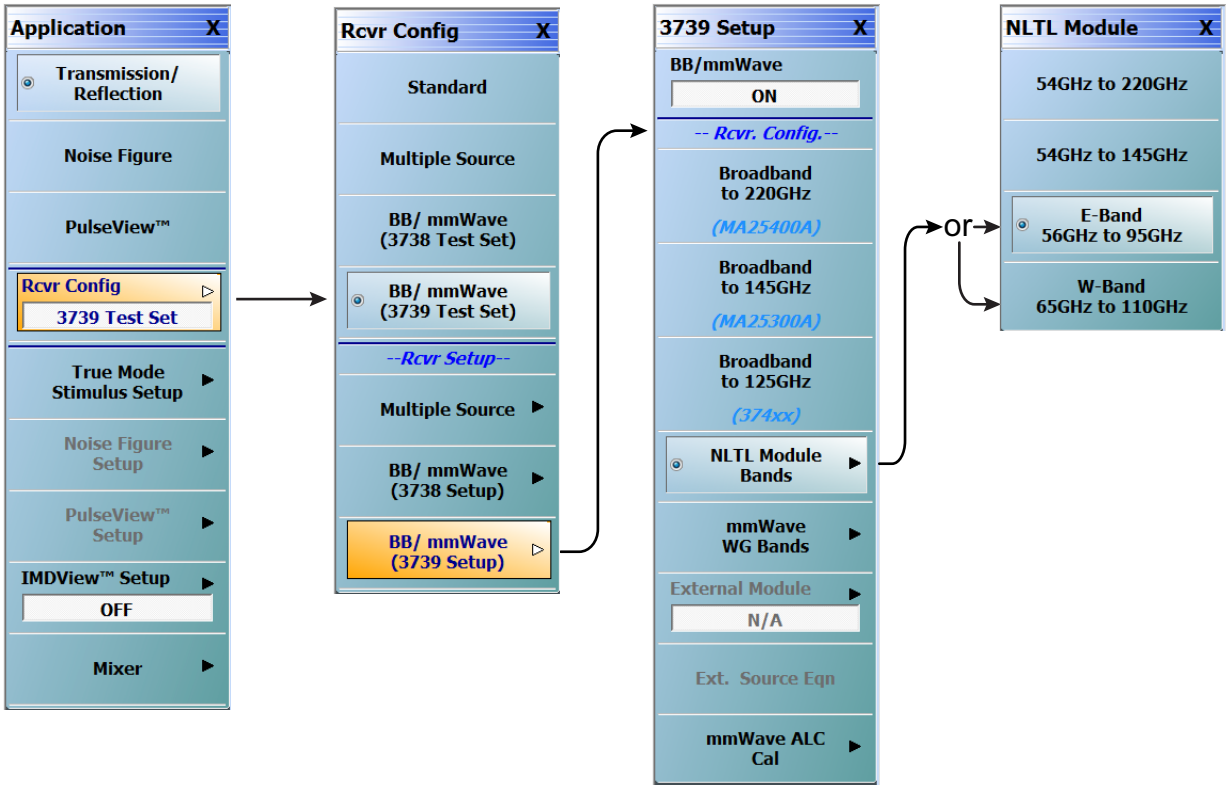


Figure 3-13. 3739 Setup for Banded Modules (MS464xB Systems)

3739 Setup for OML/VDI Selection

Configure the VectorStar VNA for OML or VDI operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 3-3 "VNA Preset Procedure" on page 3-1.
3. Navigate to the Application menu and select:

   Rcvr Config | BB/mmWave (3739 Setup) | mmWave WG Bands | mm-OML (or mm-VDI)

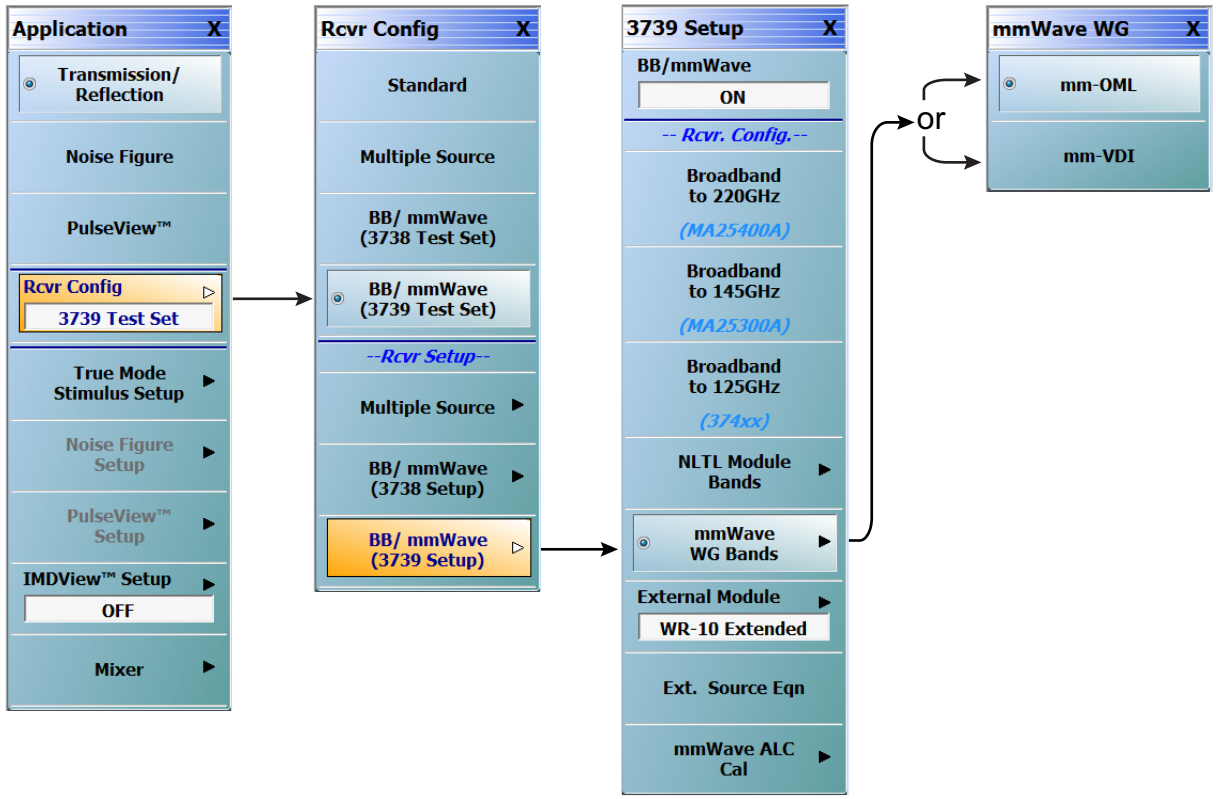


Figure 3-14. 3739 Setup for OML/VDI Selection (MS464xB Systems)

OML Band Selection

1. At the MAIN menu, select Application. The APPLICATION menu appears.

   MAIN | Application | APPLICATION

2. From the Application menu select:

   Rcvr Config | BB/mmWave (3739 Setup) | External Module

3. Select the applicable OML module type and band and click Apply.

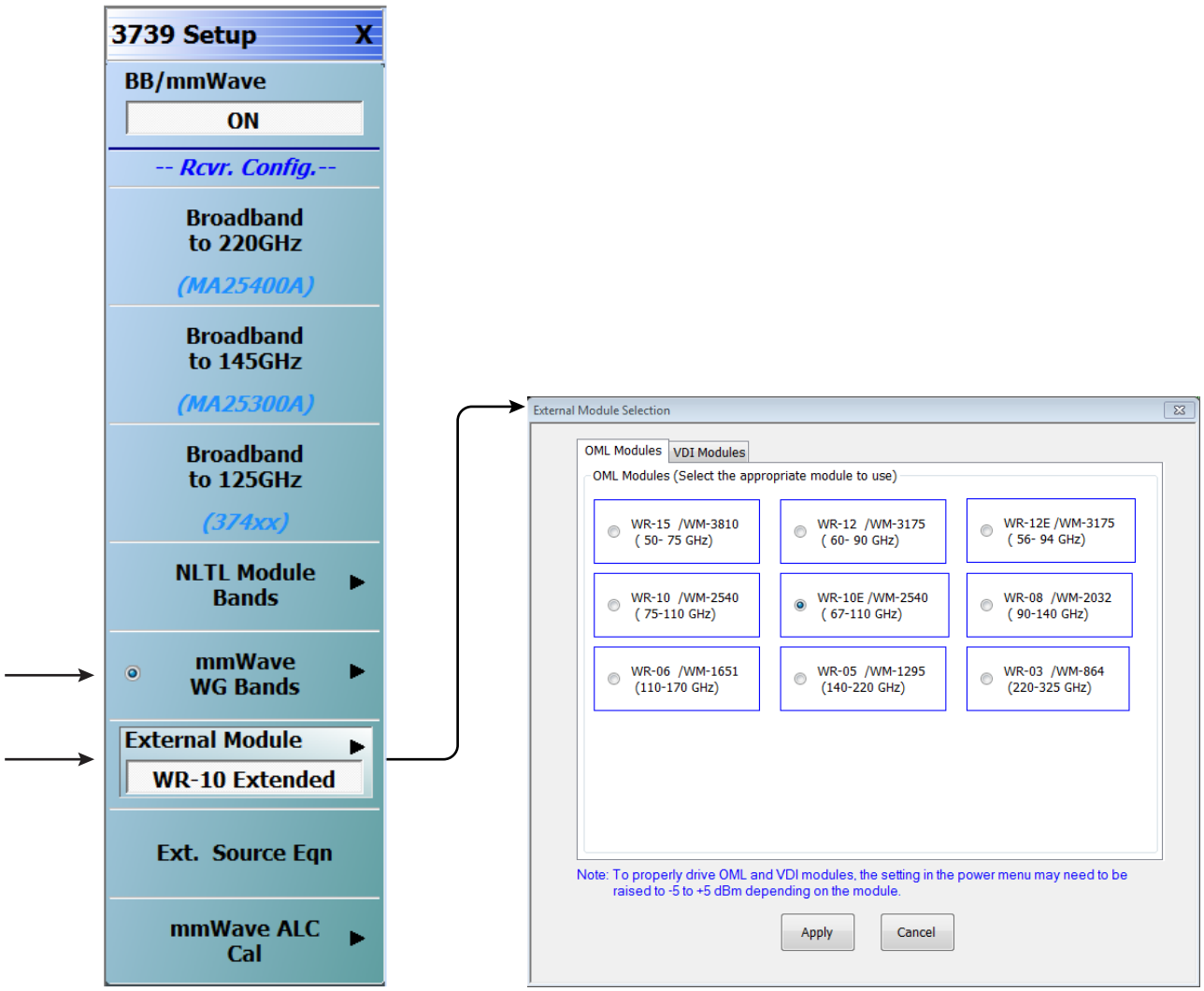


Figure 3-15. 3739 Setup Menu – OML Band Selection (MS464xB Systems)

VDI Band Selection

1. At the MAIN menu, select Application. The APPLICATION menu appears.

   MAIN | Application | APPLICATION

2. From the Application menu select:

   Rcvr Setup | BB/mmWave (3739 Setup) | External Module

3. Select the applicable VDI module type and band and click Apply.

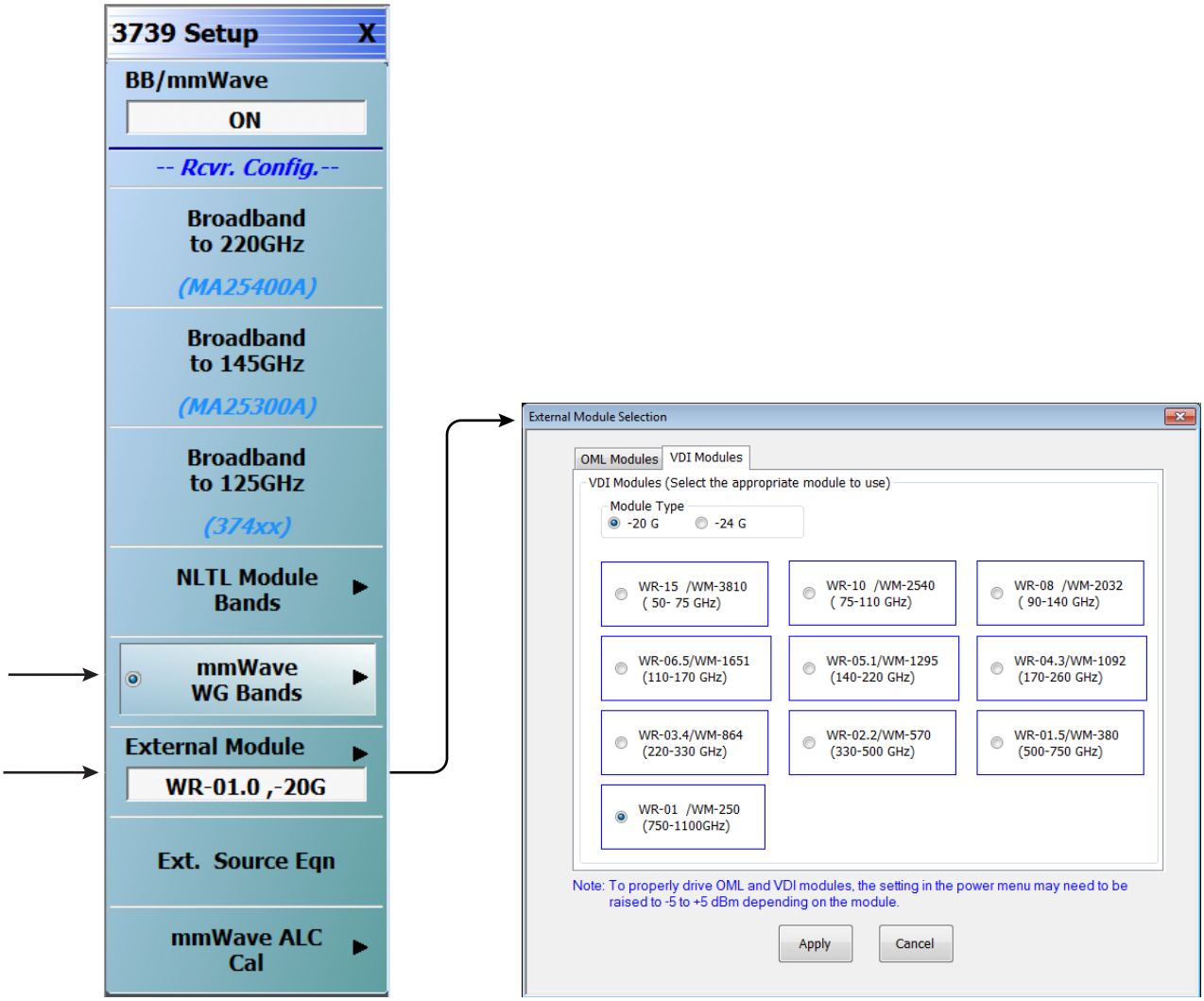


Figure 3-16. 3739 Setup Menu – VDI Band Selection (MS464xB Systems)

3-6 ME7838A/AX Configuration Verification – BB/mmW Modules

Note	This verification procedure applies when using 3743A/AX broadband modules.

Preliminary

1. Ensure system is sweeping from 70 kHz to 125 GHz, with:
   - Trace 1 set to S11
   - Trace 2 set to S12
   - Trace 3 set to S21
   - Trace 4 set to S22

Configure Trace 1

2. Select Trace 1 and then select DISPLAY | Trace Format, and set to **Log Mag.**
3. Select the USER-DEFINED menu.
   - MAIN | Response | REPONSE | User-defined | USER-DEFINED
4. On the USER-DEFINED menu, set the parameters as:
   - Numerator = **A1**
   - Denominator = **1**
   - Driver Port = **1**
5. Using a mouse, move the Reference Line to one graticule below top scale.
   - Trace label changes to Tr1 [A1/1|P1] LogM

Configure Trace 2

6. Select Trace 2 and then select DISPLAY | Trace Format, and set to **Log Mag.**
7. Select the USER-DEFINED menu.
   - MAIN | Response | REPONSE | User-defined | USER-DEFINED
8. On the USER-DEFINED menu, set the parameters as:
   - Numerator = **B1**
   - Denominator = **1**
   - Driver Port = **1**
9. Using a mouse, move the Reference Line to one graticule below top scale.
   - The trace label changes to Tr2 [B1/1|P1] LogM

Configure Trace 3

10. Select Trace 3 and then select DISPLAY | Trace Format, and set to **Log Mag.**
11. Select the USER-DEFINED menu.
    - MAIN | Response | REPONSE | User-defined | USER-DEFINED
12. On the USER-DEFINED menu, set the parameters as:
    - Numerator = **A2**
    - Denominator = **1**
    - Driver Port = **2**
13. Using a mouse, move the Reference Line to one graticule below top scale.
    - The trace label changes to Tr3 [A2/1|P2] LogM

Configure Trace 4

14. Select Trace 4 and then select DISPLAY | Trace Format, and set to **Log Mag.**

15. Select the USER-DEFINED menu.

- MAIN | Response | REPONSE | User-defined | USER-DEFINED

16. On the USER-DEFINED menu, set the parameters as:

- Numerator = **B2**
- Denominator = **1**
- Driver Port = **2**

17. Using a mouse, move the Reference Line to one graticule below top scale.

- The trace label changes to Tr4 [B2/1|P2] LogM.

Set Power

18. Navigate to the POWER menu:

- MAIN | Power | POWER

19. Set the Port 1 Power to –10 dBm.

- If Port Power = Coupled, this also sets Port 2 Power to –10 dBm.

20. If Port Power = Not Coupled, set the Port 2 Power to –10 dBm.

21. Connect **shorts** to both W1 connectors on the 3743A/AX Modules, and ensure the resultant display looks similar to Figure 3-17 below.

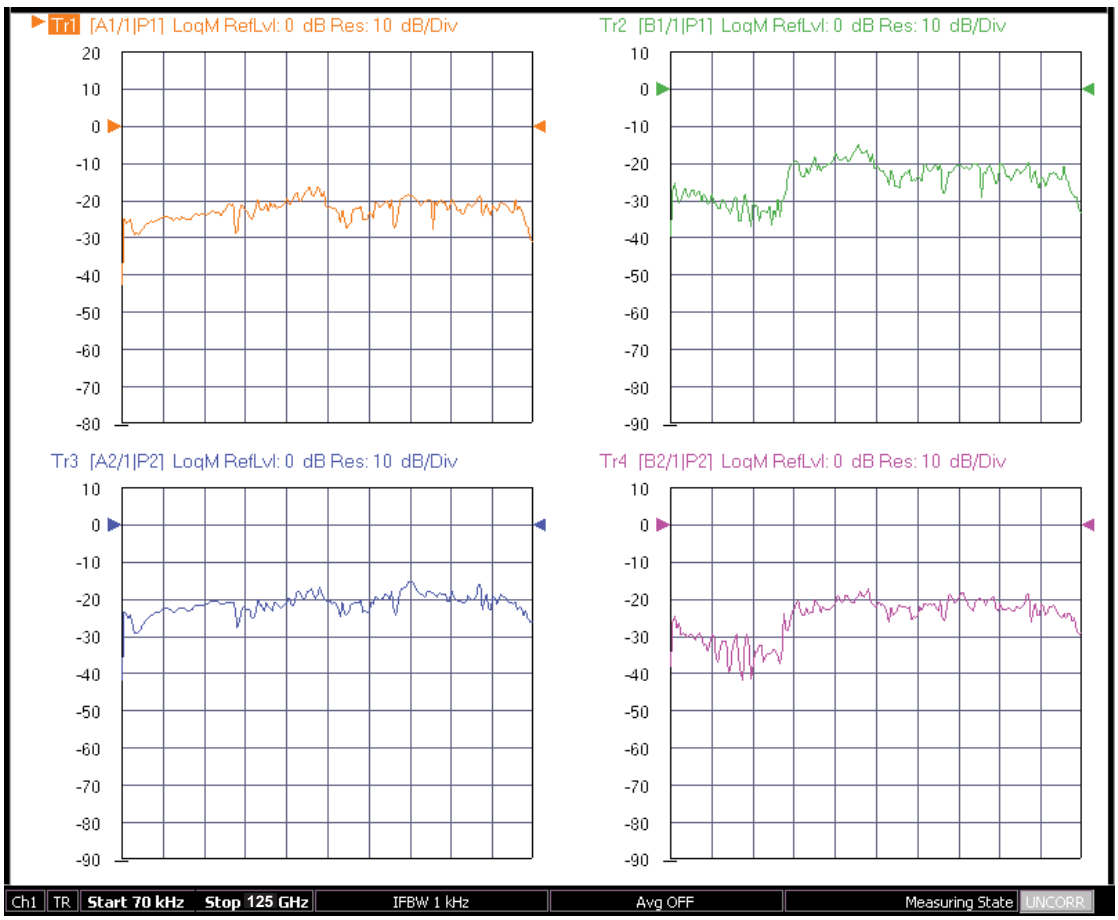


Figure 3-17. Typical VNA Four-Trace Display of Non-Ratioed Parameters for Initial Checkout

VNA Power Down

1. With the VNA in operate mode, the front panel **Standby/Operate** button is illuminated with a green LED.
2. Press and hold the **Standby/Operate** button for at least one (1) second. The orange **Standby LED** is illuminated with an orange LED. The VNA is in Standby mode.
3. To completely shut down the VNA, at the rear panel, set the **AC Power Rocker Switch** in the AC Power Input Module to "**O**" or OFF.
4. If required, disconnect the VNA Power Cord from the AC Mains.

Test Set Power Down

5. At the Test Set front panel, press the **AC Power Button**. The green **Power LED** goes out.
6. If required, disconnect the Test Set rear panel AC Power Cord from the AC main power source.

Chapter 4 — ME7838D Initial System Checkout

4-1 Introduction

This chapter provides the general initial system checkout for a completely assembled ME7838D Broadband/Banded mmWave System. Since the ME7838D supports both the MS464xA and MS464xB Series VNAs, this chapter has an initial system checkout section for each VNA series:

- Section 4-4 “MS464xA VNA Broadband/Banded Configuration” on page 4-2
- Section 4-5 “MS464xB VNA Broadband/Banded Configuration” on page 4-10

Once this procedure is complete, the system is ready for full calibration and system performance verification.

4-2 Power Up Procedure

Use this procedure to power up the MS464xA/B VNA and the 3739B or 3739C Broadband Test Set. There are no AC power connections required for the mmWave Modules.

1. At the 3739B or 3739C Broadband Test Set Rear Panel, connect the **AC Line Cord** to AC main power.
2. At the VNA Rear Panel, connect the **AC Line Cord** to the AC main power.
   - Power requirements are 90 to 264 VAC, 47 to 63 Hz, power factor controlled.
3. Make sure a USB or PS2 **mouse** is connected to the VNA.
4. At the Test Set front panel press the left side **AC Power Button**. The green **Power LED** should light.
5. At the VNA Rear Panel, turn the **AC Power Rocker Switch** to “|” or **ON**.
   - The front panel **Standby/Operate** key illuminates with an orange Standby LED.
   - The VNA is in Standby mode.
6. Press and hold the **Standby/Operate** key for at least one (1) second.
   - The front panel Standby/Operate key illuminates with a green Operate LED.
   - The VNA is in Operate mode.

4-3 VNA Preset Procedure

1. If the VNA is configured to preset to the factory as-shipped default configuration:
   a. Press the VNA front panel **Preset** button.
      The VNA resets to the factory-default configuration,
   b. Continue with the next applicable section.
2. If the VNA has been configured to a user-defined preset:
   a. Use the right side menus to navigate to the PRESET SETUP menu.
      Utilities | System | Setup | Preset Setup
   b. Select the Default button, and then click the Preset icon on the icon toolbar.
      The VNA resets to the factory-default configuration.
   c. Continue with the next applicable section.

4-4 MS464xA VNA Broadband/Banded Configuration

Receiver Configuration for Broadband

Configure the VNA for Modular Broadband Operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 4-3 “VNA Preset Procedure” on page 4-1.
3. At the MAIN menu, select Application. The APPLICATION menu appears.

   MAIN | Application | APPLICATION |
4. Select the BB/mmWave (3739 Test Set) button.

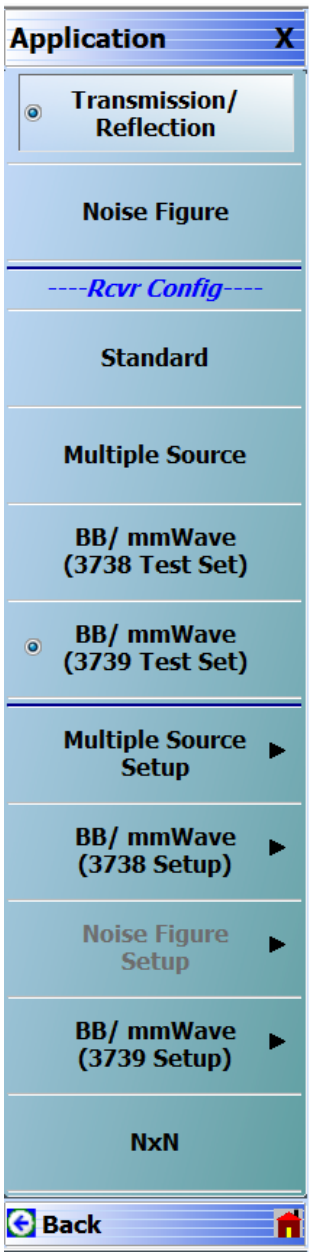


Figure 4-1. Broadband Configuration Selection (MS464xA Systems)

3739 Setup for Broadband

Configure the VectorStar VNA for Broadband Operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 4-3 "VNA Preset Procedure" on page 4-1.
3. Navigate to the Application menu and select:

   BB/mmWave (3739 Setup) | Broadband to 145 GHz

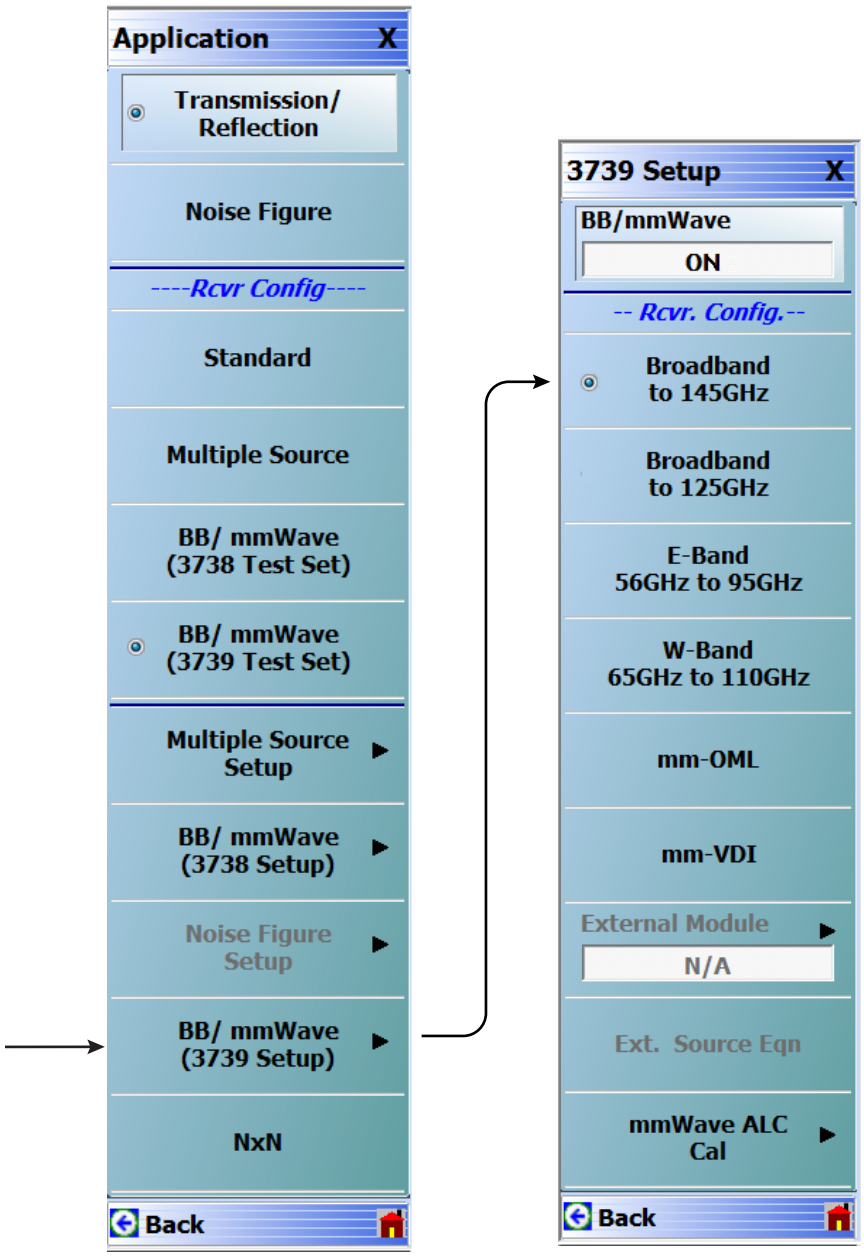


Figure 4-2. 3739 Setup for Broadband Module (MS464xA Systems)

Frequency Setup

1. Navigate to the FREQUENCY menu.
   - MAIN | Frequency | FREQUENCY
2. At the FREQUENCY menu, set the following frequency parameters:
   - Start Frequency = **70.000000000 kHz**
   - Stop Frequency = **145.000000000 GHz**
   - # of Points = **201**
3. The following frequency parameters are automatically set:
   - Center Frequency = **72.500000000 GHz**
   - Span Frequency = **144.999300000 GHz**
   - Step Size = **769.99650000 MHz**
4. The system should now be sweeping fully from 70 kHz to 145 GHz.

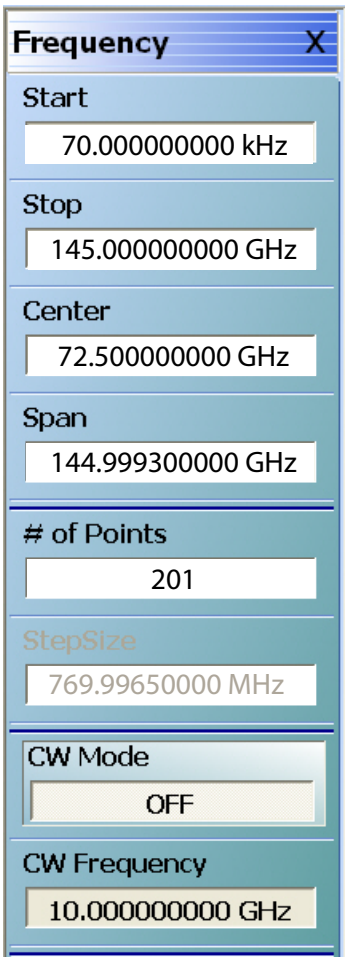


Figure 4-3. FREQUENCY Menu – Settings for 70 kHz to 145 GHz Sweep (MS464xA Systems)

Receiver Configuration for Multiple Source

Configure the VectorStar VNA for Multiple Source Broadband Operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 4-3 "VNA Preset Procedure" on page 4-1.
3. From the Application menu select Multiple Source Setup.
4. If not already done, from the Multiple Source menu, toggle Multiple Source to ON.
5. Select Ext. Mod. Ctrl.
6. On the External Module Ctrl dialog, select 145 GHz.

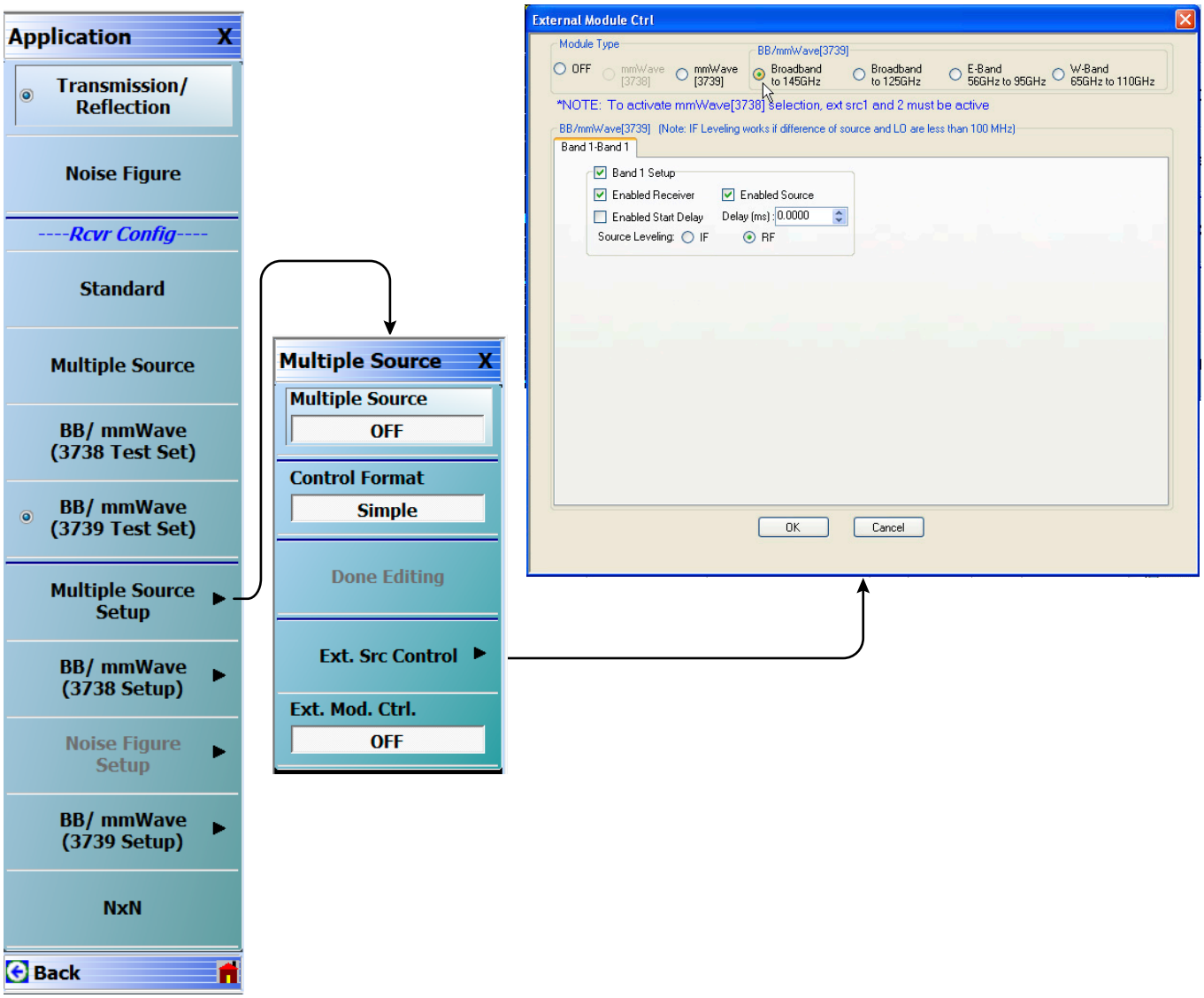


Figure 4-4. Receiver Configuration for Multiple Source (MS464xA Systems)

3739 Setup for Banded Modules

Configure the VectorStar VNA for BB/mmWave Operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 4-3 “VNA Preset Procedure” on page 4-1.
3. From the Application menu select BB/mmWave (3739 Setup).
4. Select E-Band or W-Band depending on your 3744A module.

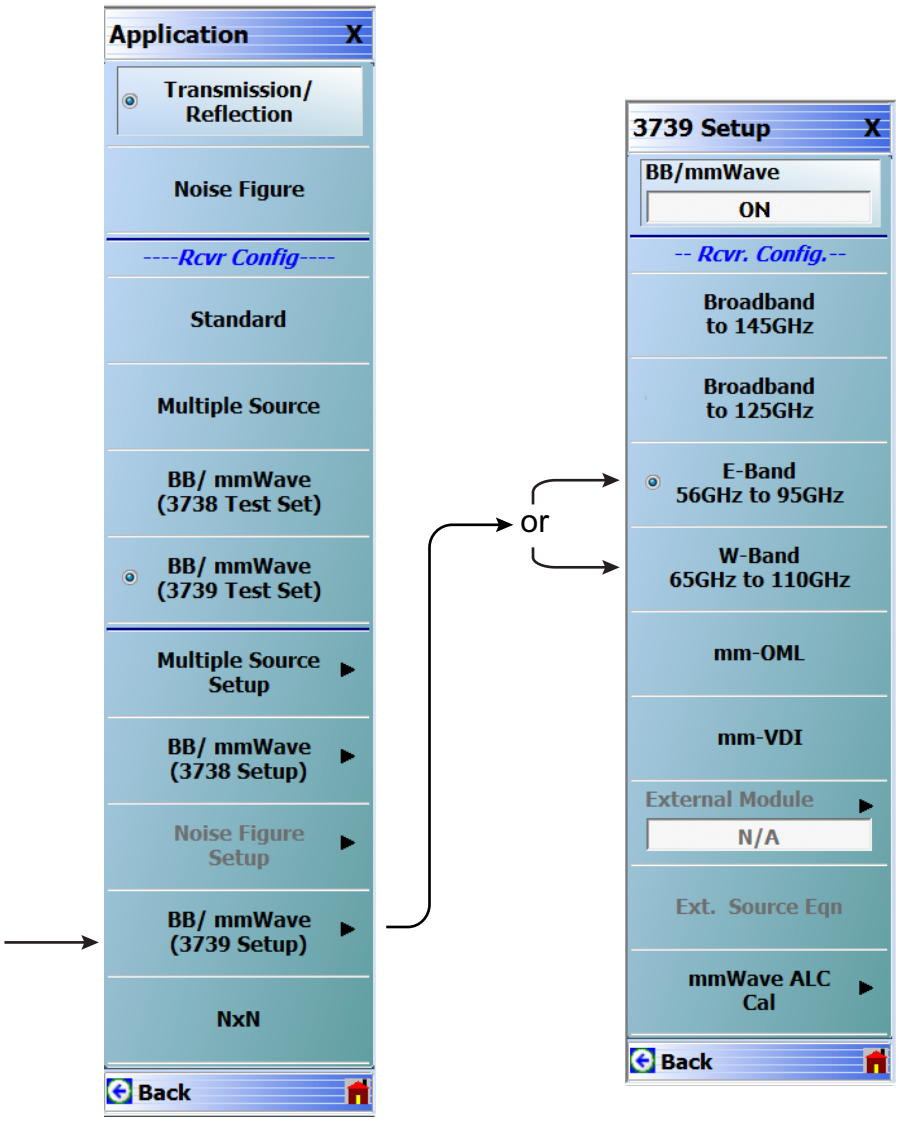


Figure 4-5. 3739 Setup for Banded Modules (MS464xA Systems)

3739 Setup for OML/VDI Selection

Configure the VectorStar VNA for OML or VDI operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 4-3 "VNA Preset Procedure" on page 4-1.
3. Navigate to the Application menu and select:

   BB/mmWave (3739 Setup) | mm-OML (or mm-VDI)

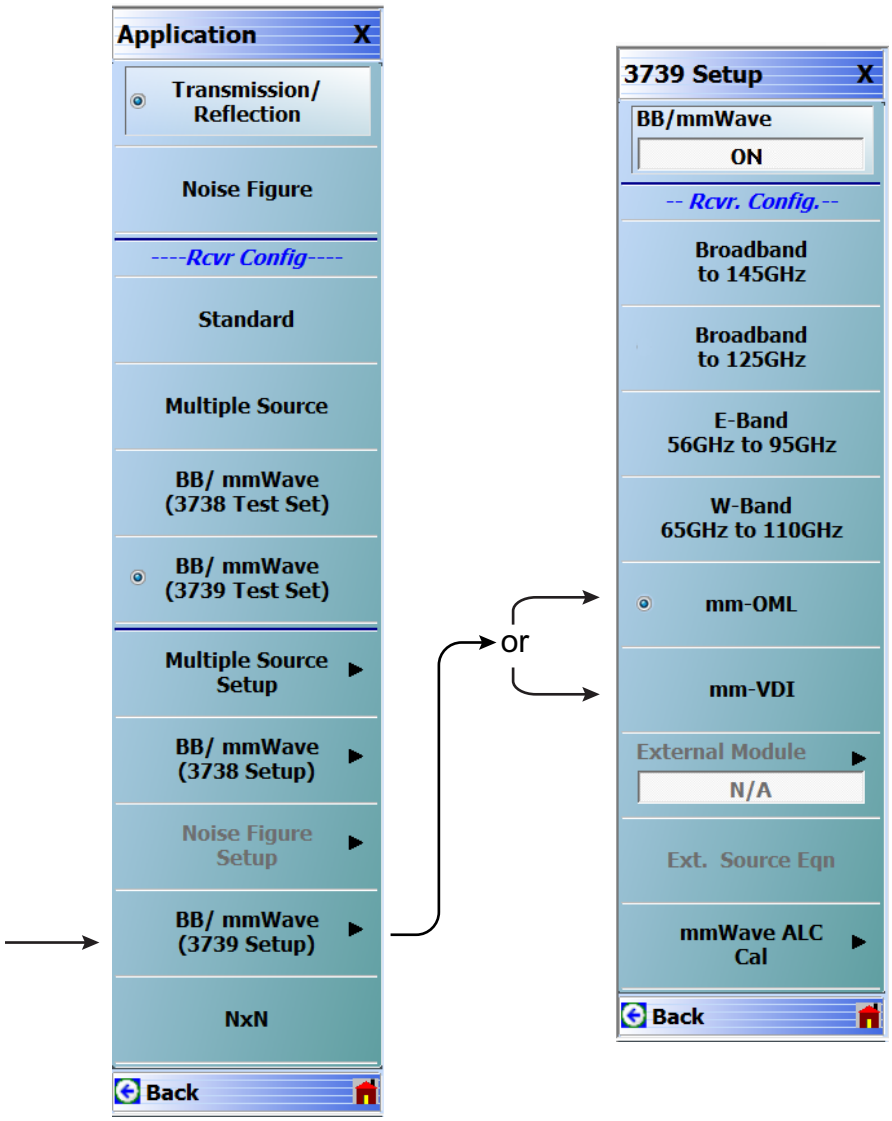


Figure 4-6. 3739 Setup for OML/VDI Selection (MS464xA Systems)

OML Band Selection

Configure the VectorStar VNA for OML operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 4-3 “VNA Preset Procedure” on page 4-1.
3. Navigate to the Application menu and select BB/mmWave (3739 Setup).

   The 3739 Setup menu opens (Figure 4-7).
4. The External Module option is initially disabled. Select mm-OML; this will enable the External Module option. The applicable OML module band can then be selected from External Module and applied.
5. Select External Module option.

   In the External Module Selection dialog box, select the applicable OML Module band and click Apply.

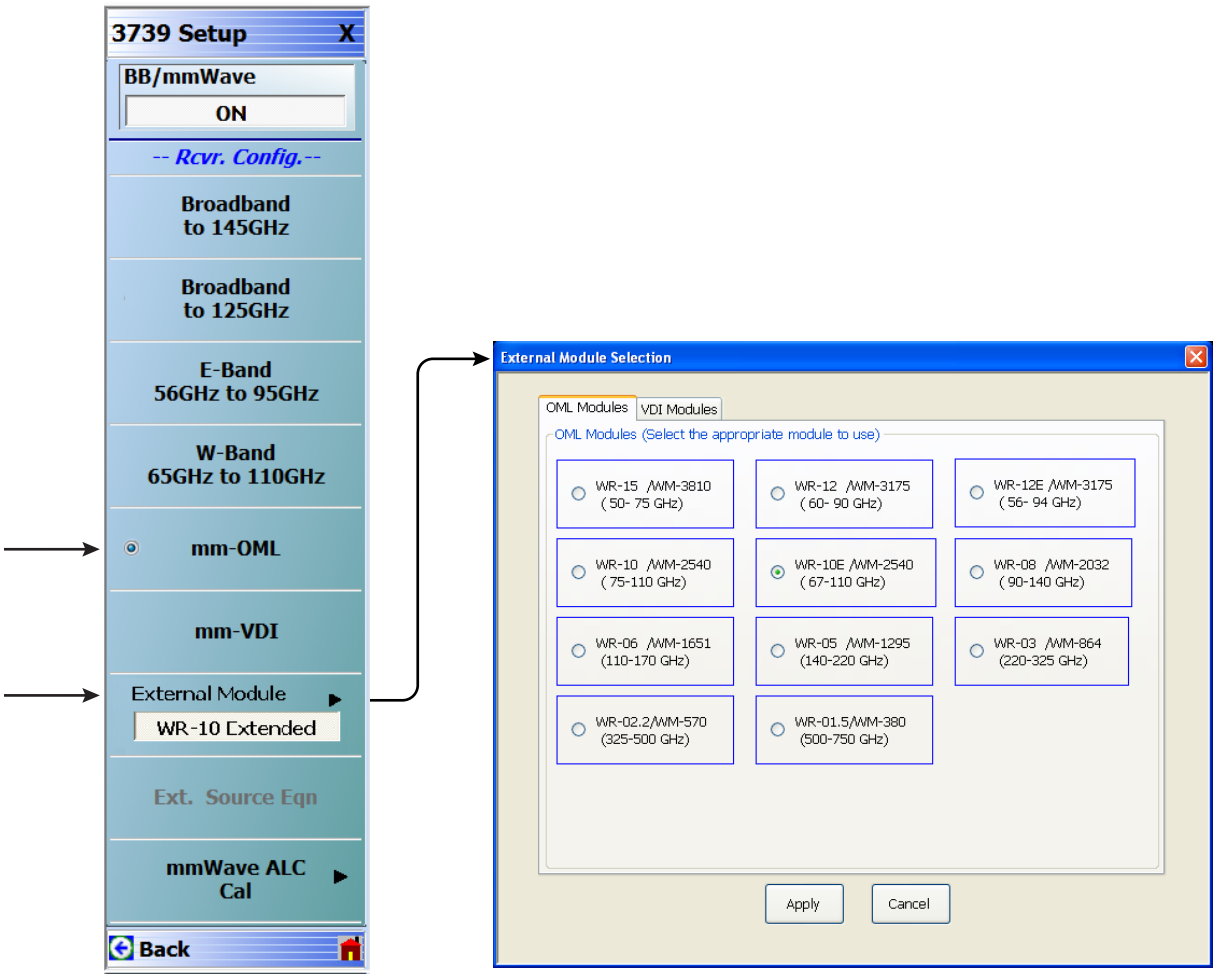


Figure 4-7. 3739 Setup Menu – OML Selection (MS464xA Systems)

VDI Band Selection

Configure the VectorStar VNA for OML operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 4-3 "VNA Preset Procedure" on page 4-1.
3. Navigate to the Application menu and select BB/mmWave (3739 Setup).

   The 3739 Setup menu opens (Figure 4-8).
4. The External Module option is initially disabled. Select mm-VDI; this will enable the External Module option. The applicable VDI module band can then be selected from External Module and applied.
5. Select External Module option.
6. In the External Module Selection dialog box, select the applicable VDI Module band and click Apply.

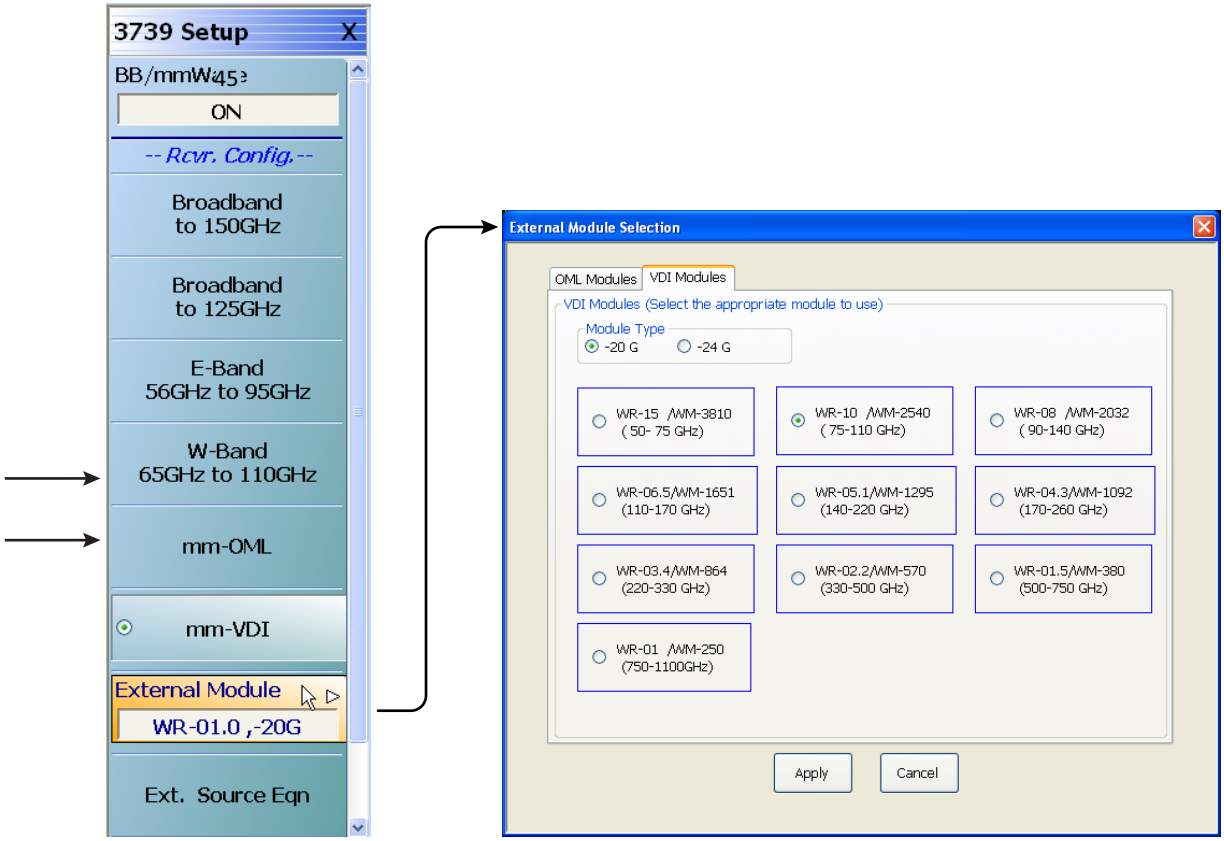


Figure 4-8. 3739 Setup Menu – VDI Selection (MS464xA Systems)

4-5 MS464xB VNA Broadband/Banded Configuration

Configure the VNA for Modular Broadband Operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 4-3 “VNA Preset Procedure” on page 4-1.

Receiver Configuration for Broadband

3. At the MAIN menu, select Application. The APPLICATION menu appears as shown in Figure 4-9 on page 4-10.

   MAIN | Application | APPLICATION

4. Select the BB/mmWave (3739 Test Set) button in the Receiver Config menu.

   The Standard, Multiple Source, and BB/mmWave (3738 Test Set) buttons are deselected.

   The Receiver Config button on the Application menu now shows 3739 Test Set is selected.

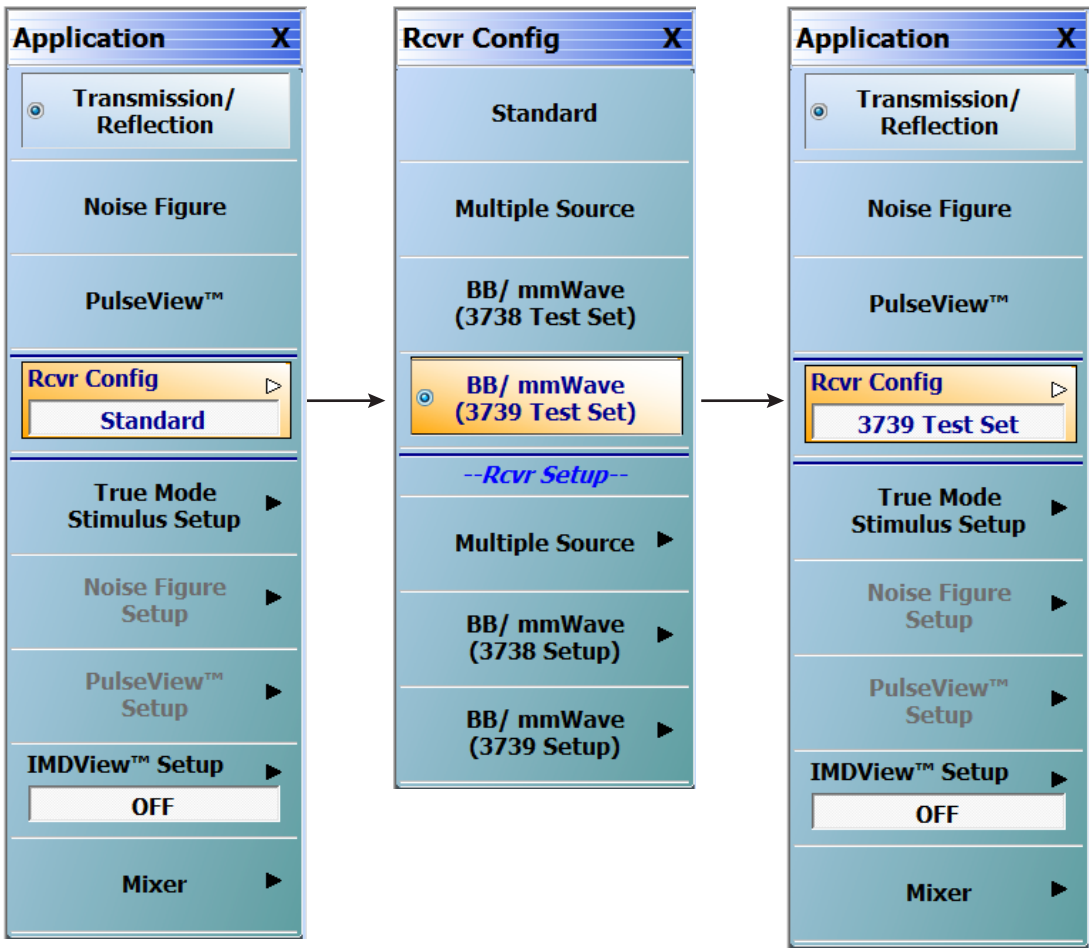


Figure 4-9. APPLICATION Menu – Receiver Configuration to 3739 Test Set (MS464xB Systems)

3739 Setup for Broadband

Configure the VectorStar VNA for Broadband Operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 4-3 "VNA Preset Procedure" on page 4-1.
3. Navigate:

   Main | Application | Rcvr Config
4. Select the BB/mmWave (3739 Setup) button to open the 3739 SETUP menu.
5. Select Broadband to 145 GHz as shown in Figure 4-10.

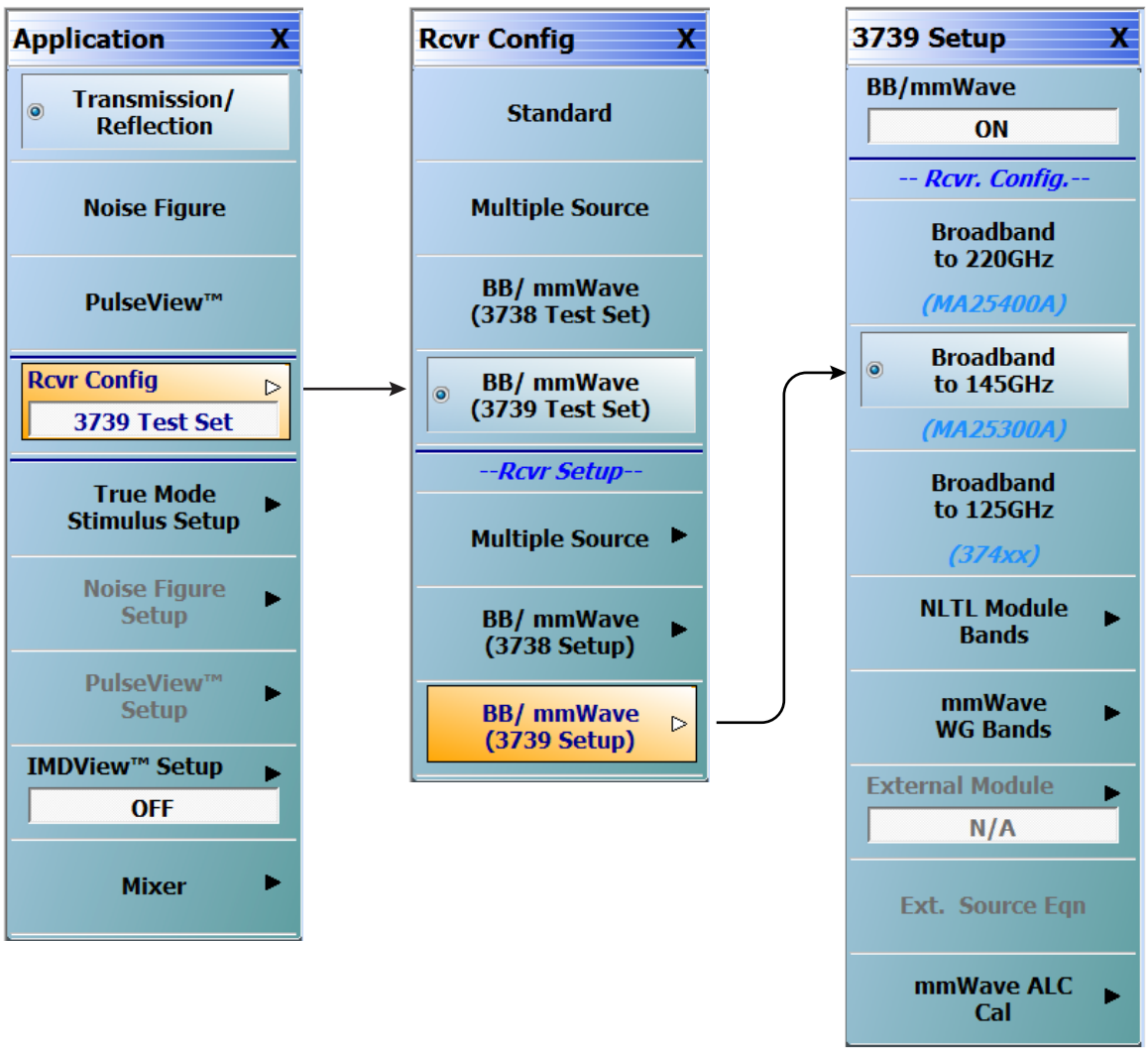


Figure 4-10. 3739 Setup for Broadband Modules (MS464xB Systems)

Frequency Setup

1. Navigate to the FREQUENCY menu.
   - MAIN | Frequency | FREQUENCY
2. At the FREQUENCY menu, set the following frequency parameters:
   - Start Frequency = **70.000000000 kHz**
   - Stop Frequency = **145.000000000 GHz**
   - # of Points = **201**
3. The following frequency parameters are automatically set:
   - Center Frequency = **72.499965000 GHz**
   - Span Frequency = **144.999930000 GHz**
   - Step Size = **721.392686 MHz**
4. The system should now be sweeping fully from 70 kHz to 145 GHz.

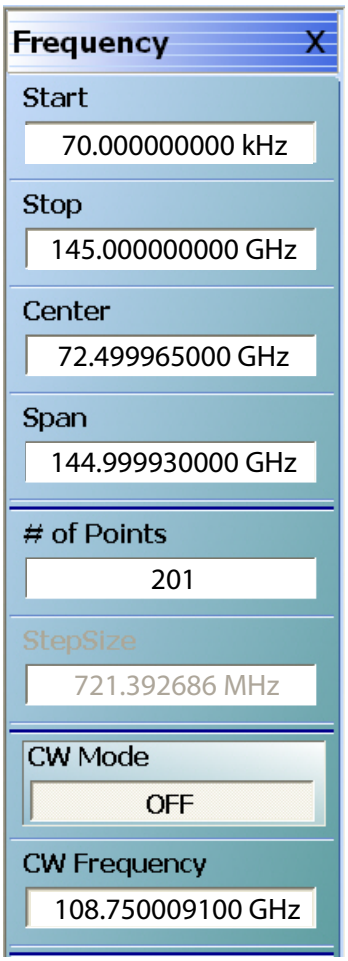


Figure 4-11. FREQUENCY Menu – Settings for 70 kHz to 145 GHz Sweep (MS464xB Systems)

Receiver Configuration for Multiple Source

Configure the VectorStar VNA for Multiple Source Broadband Operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 4-3 "VNA Preset Procedure" on page 4-1.
3. Navigate: Main | Application | Rcvr Config | (See Figure 4-12).
4. From the Rcvr Config menu select the Multiple Source button, then in the Rcvr Setup area, select Multiple Source to open that menu.
5. From the Multiple Source menu select External Module Ctrl to open the dialog box.
6. Select Broadband to 145 GHz.

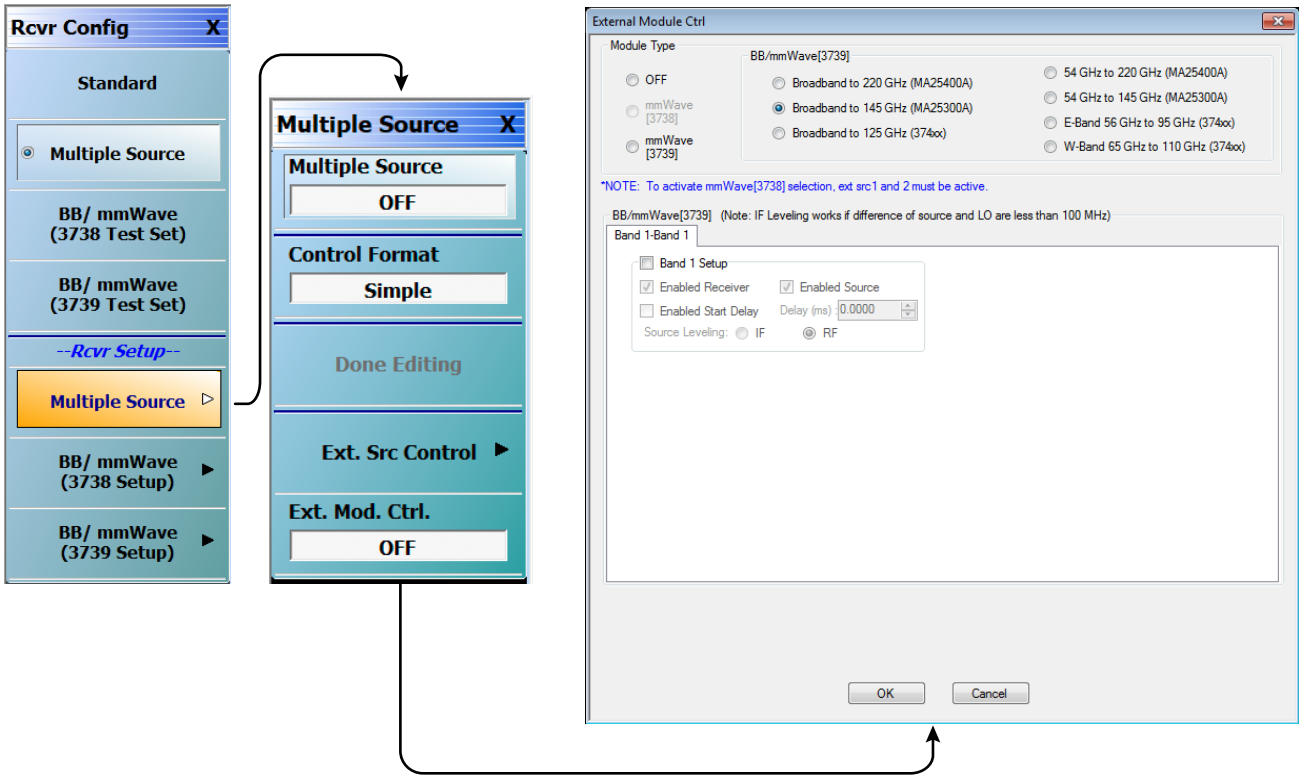


Figure 4-12. Receiver Configuration for Multiple Source (MS464xB Systems)

3739 Setup for Banded Modules

Configure the VectorStar VNA for Banded Operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 4-3 "VNA Preset Procedure" on page 4-1.
3. Navigate: Application | Rcvr Config | BB/mmWave (3739 Setup)
4. From the 3739 Setup menu, select NLTL Module Bands | E-Band or W-Band (for 3744x-EE/EW modules).

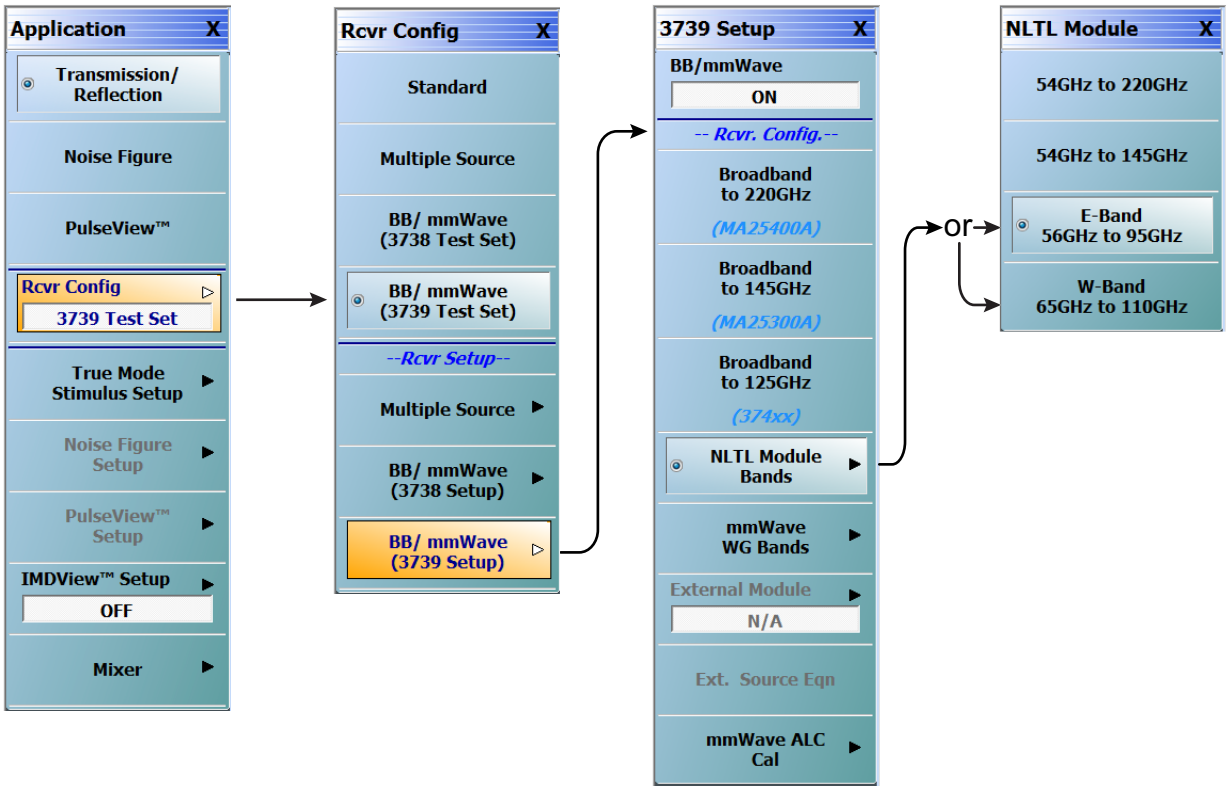


Figure 4-13. 3739 Setup for Banded Modules (MS464xB Systems)

3739 Setup for OML/VDI Selection

Configure the VectorStar VNA for OML or VDI operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 4-3 "VNA Preset Procedure" on page 4-1.
3. Navigate to the Application menu and select:

   Rcvr Config | BB/mmWave (3739 Setup) | mmWave WG Bands | mm-OML (or mm-VDI)

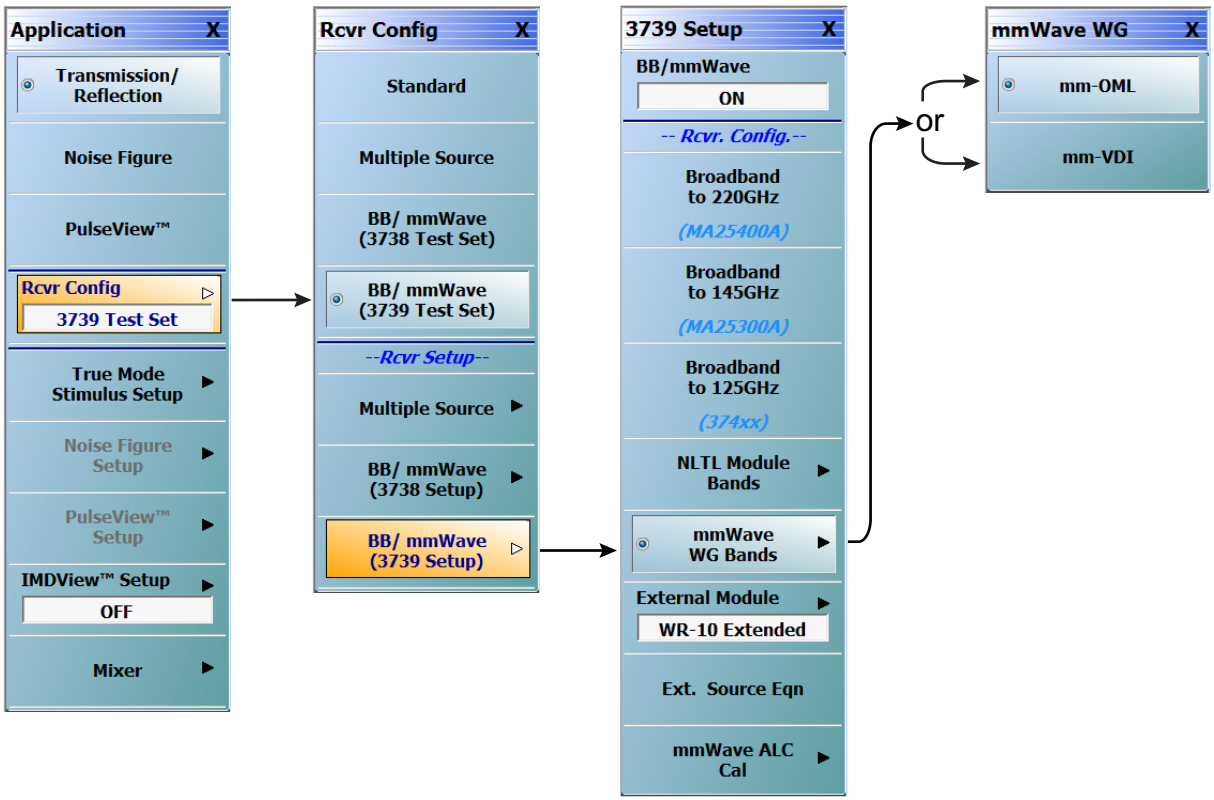


Figure 4-14. 3739 Setup for OML/VDI Selection (MS464xB Systems)

OML Band Selection

1. At the MAIN menu, select Application. The APPLICATION menu appears.

   MAIN | Application | APPLICATION

2. From the Application menu select:

   Rcvr Config | BB/mmWave (3739 Setup) | External Module

3. Select the applicable OML module type and band and click Apply.

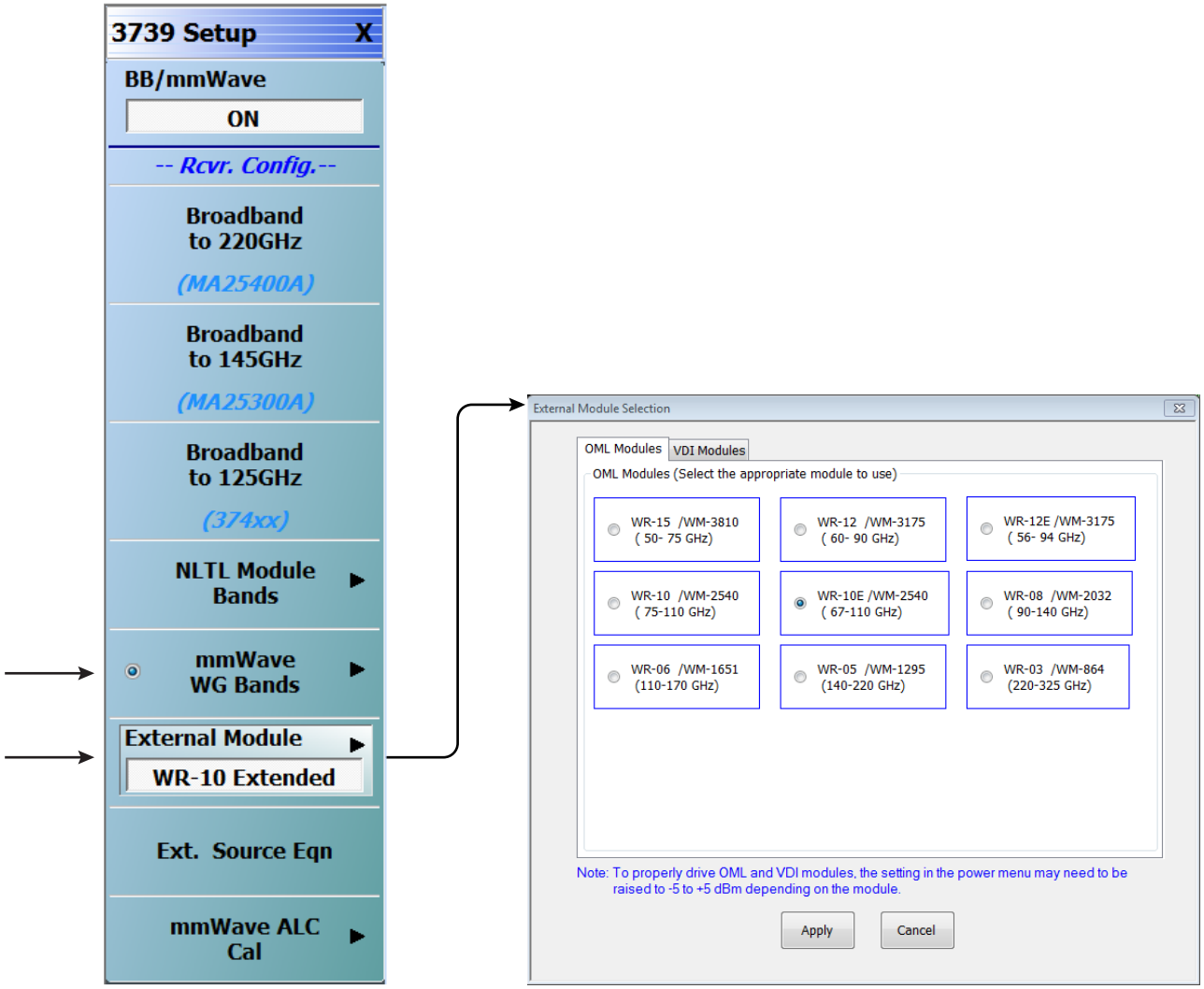


Figure 4-15. 3739 Setup Menu – OML Band Selection (MS464xB Systems)

VDI Band Selection

1. At the MAIN menu, select Application. The APPLICATION menu appears.

   MAIN | Application | APPLICATION

2. From the Application menu select:

   Rcvr Config | BB/mmWave (3739 Setup) | External Module

3. Select the applicable VDI module type and band and click Apply.

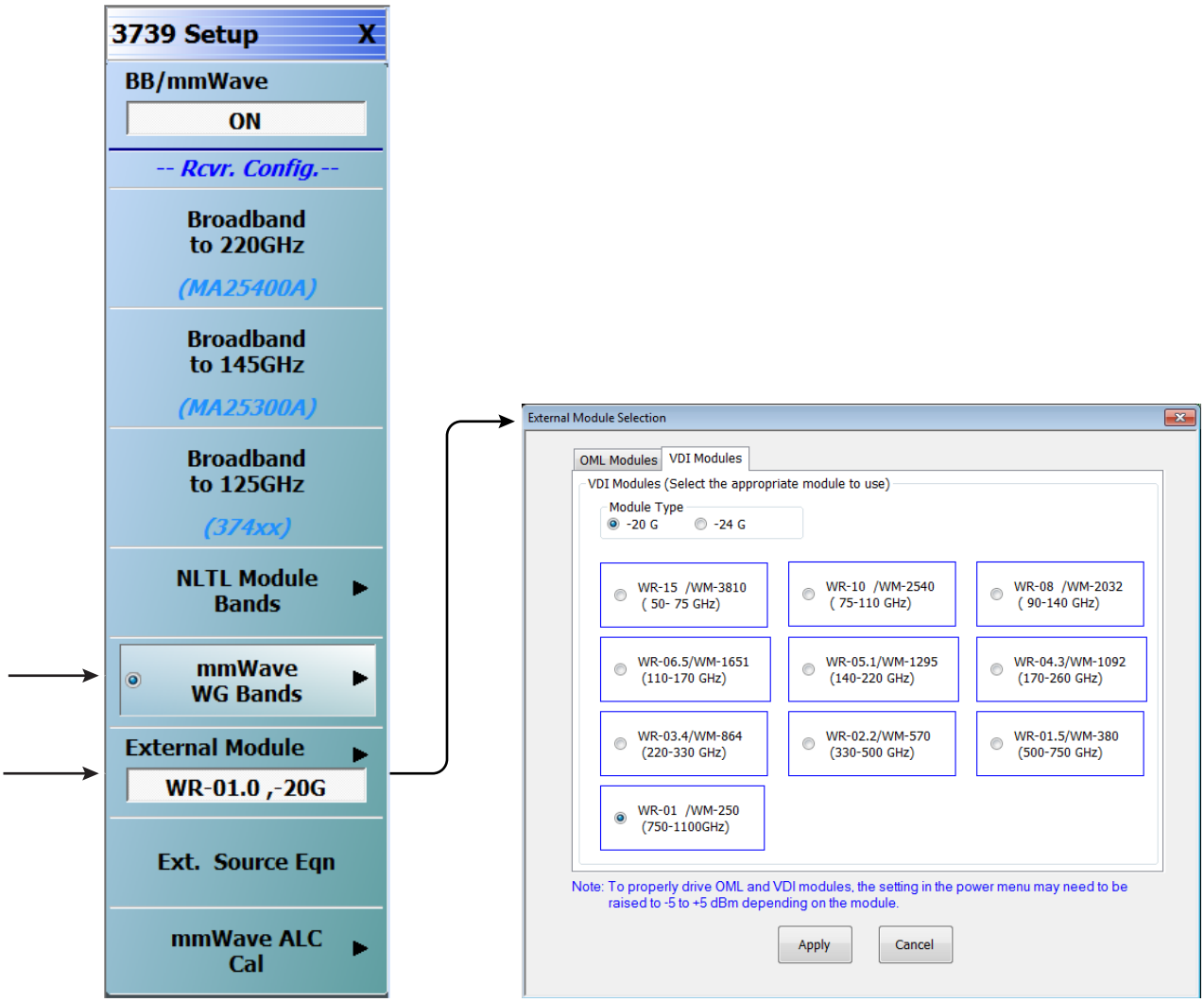


Figure 4-16. 3739 Setup Menu – VDI Band Selection (MS464xB Systems)

4-6 ME7838D Configuration Verification – BB/mmW Modules

Note	This verification procedure applies when using MA25300A broadband modules.

Preliminary

1. Ensure system is sweeping from 70 kHz to 145 GHz, with:

- Trace 1 set to S11
- Trace 2 set to S12
- Trace 3 set to S21
- Trace 4 set to S22

Configure Trace 1

2. Select Trace 1 and then select DISPLAY | Trace Format, and set to **Log Mag.**

3. Select the USER-DEFINED menu.

- MAIN | Response | REPONSE | User-defined | USER-DEFINED

4. On the USER-DEFINED menu, set the parameters as:

- Numerator = **A1**
- Denominator = **1**
- Driver Port = **1**

5. Using a mouse, move the Reference Line to one graticule below top scale.

- Trace label changes to Tr1 [A1/1|P1] LogM

Configure Trace 2

6. Select Trace 2 and then select DISPLAY | Trace Format, and set to **Log Mag.**

7. Select the USER-DEFINED menu.

- MAIN | Response | REPONSE | User-defined | USER-DEFINED

8. On the USER-DEFINED menu, set the parameters as:

- Numerator = **B1**
- Denominator = **1**
- Driver Port = **1**

9. Using a mouse, move the Reference Line to one graticule below top scale.

- The trace label changes to Tr2 [B1/1|P1] LogM

Configure Trace 3

10. Select Trace 3 and then select DISPLAY | Trace Format, and set to **Log Mag.**

11. Select the USER-DEFINED menu.

- MAIN | Response | REPONSE | User-defined | USER-DEFINED

12. On the USER-DEFINED menu, set the parameters as:

- Numerator = **A2**
- Denominator = **1**
- Driver Port = **2**

13. Using a mouse, move the Reference Line to one graticule below top scale.

- The trace label changes to Tr3 [A2/1|P2] LogM

Configure Trace 4

14. Select Trace 4 and then select DISPLAY | Trace Format, and set to **Log Mag.**

15. Select the USER-DEFINED menu.

- MAIN | Response | REPONSE | User-defined | USER-DEFINED

16. On the USER-DEFINED menu, set the parameters as:

- Numerator = **B2**
- Denominator = **1**
- Driver Port = **2**

17. Using a mouse, move the Reference Line to one graticule below top scale.

- The trace label changes to Tr4 [B2/1|P2] LogM.

Set Power

18. Navigate to the POWER menu:

- MAIN | Power | POWER

19. Set the Port 1 Power to –10 dBm.

- If Port Power = Coupled, this also sets Port 2 Power to –10 dBm.

20. If Port Power = Not Coupled, set the Port 2 Power to –10 dBm.

21. Connect **shorts** to both 0.8 mm connectors on the MA25300A Modules, and ensure the resultant display looks similar to Figure 4-17 below.

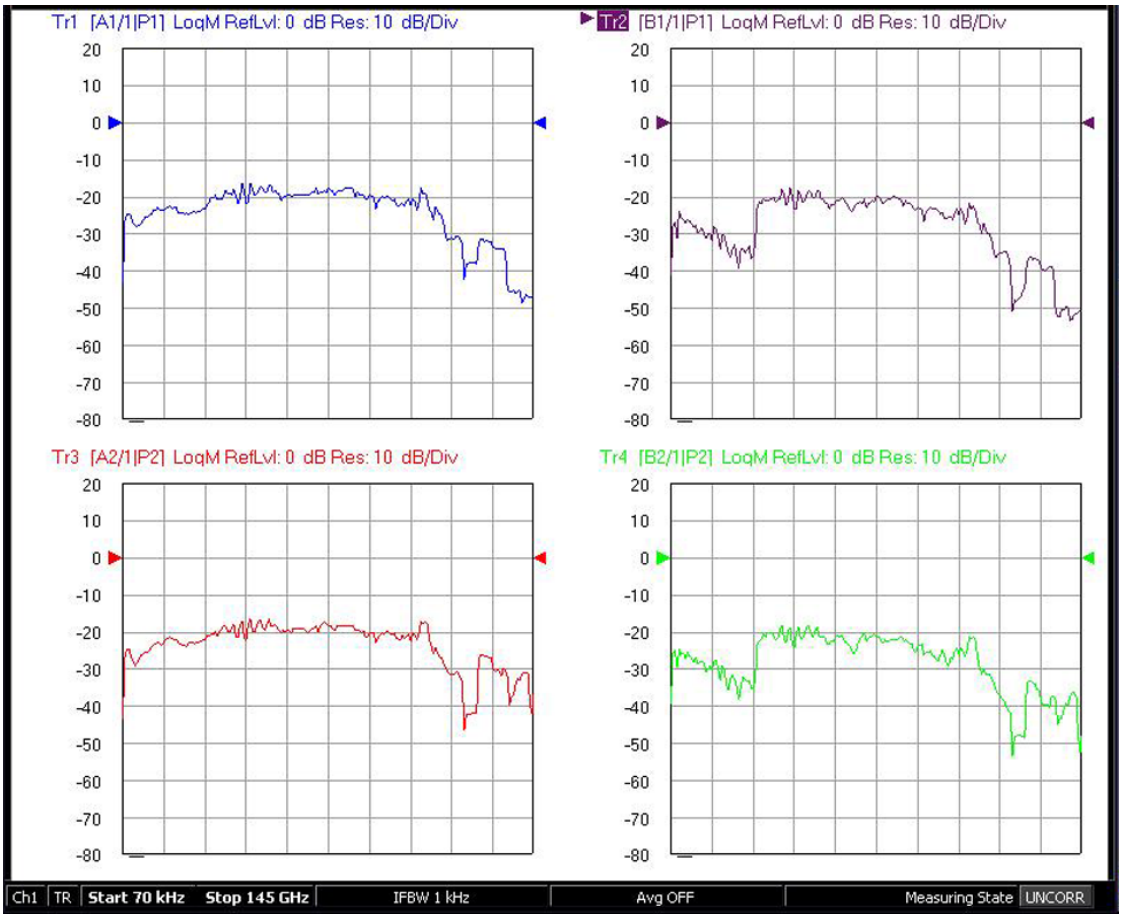


Figure 4-17. Typical VNA Four-Trace Display of Non-Ratioed Parameters for Initial Checkout

VNA Power Down

1. With the VNA in operate mode, the front panel **Standby/Operate** button is illuminated with a green LED.
2. Press and hold the **Standby/Operate** button for at least one (1) second. The orange **Standby LED** is illuminated with an orange LED. The VNA is in Standby mode.
3. To completely shut down the VNA, at the rear panel, set the **AC Power Rocker Switch** in the AC Power Input Module to "**O**" or OFF.
4. If required, disconnect the VNA Power Cord from the AC Mains.

Test Set Power Down

5. At the Test Set front panel, press the **AC Power Button**. The green **Power LED** goes out.
6. If required, disconnect the Test Set rear panel AC Power Cord from the AC main power source.

Chapter 5 — ME7838G Initial System Checkout

5-1 Introduction

This chapter provides the general initial system checkout for a completely assembled ME7838G Broadband/Banded mmWave System. Once this procedure is complete, the system is ready for full calibration and system performance verification.

5-2 Power Up Procedure

Use this procedure to power up the MS464xB VNA and the 3739C Broadband Test Set. There are no AC power connections required for the mmWave Modules.

1. At the 3739C Broadband Test Set Rear Panel, connect the **AC Line Cord** to AC main power.
2. At the VNA Rear Panel, connect the **AC Line Cord** to the AC main power.
   - Power requirements are 90 to 264 VAC, 47 to 63 Hz, power factor controlled.
3. Make sure a USB or PS2 **mouse** is connected to the VNA.
4. At the Test Set front panel press the left side **AC Power Button**. The green **Power LED** should light.
5. At the VNA Rear Panel, turn the **AC Power Rocker Switch** to "|" or **ON**.
   - The front panel **Standby/Operate** key illuminates with an orange Standby LED.
   - The VNA is in Standby mode.
6. Press and hold the **Standby/Operate** key for at least one (1) second.
   - The front panel Standby/Operate key illuminates with a green Operate LED.
   - The VNA is in Operate mode.

5-3 VNA Preset Procedure

1. If the VNA is configured to preset to the factory as-shipped default configuration:
   a. Press the VNA front panel **Preset** button.

      The VNA resets to the factory-default configuration,

   b. Continue with the next applicable section.
2. If the VNA has been configured to a user-defined preset:
   a. Use the right side menus to navigate to the PRESET SETUP menu.

      Utilities | System | Setup | Preset Setup

   b. Select the Default button, and then click the Preset icon on the icon toolbar.

      The VNA resets to the factory-default configuration.

   c. Continue with the next applicable section.

5-4 MS464xB VNA Broadband/Banded Configuration

Configure the VNA for Modular Broadband Operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 5-3 “VNA Preset Procedure” on page 5-1.

Receiver Configuration for Broadband

3. At the MAIN menu, select Application. The APPLICATION menu appears as shown in Figure 5-1 on page 5-2.

   MAIN | Application | APPLICATION

4. Select the BB/mmWave (3739 Test Set) button in the Receiver Config menu.

   The Standard, Multiple Source, and BB/mmWave (3738 Test Set) buttons are deselected.

   The Receiver Config button on the Application menu now shows 3739 Test Set is selected.

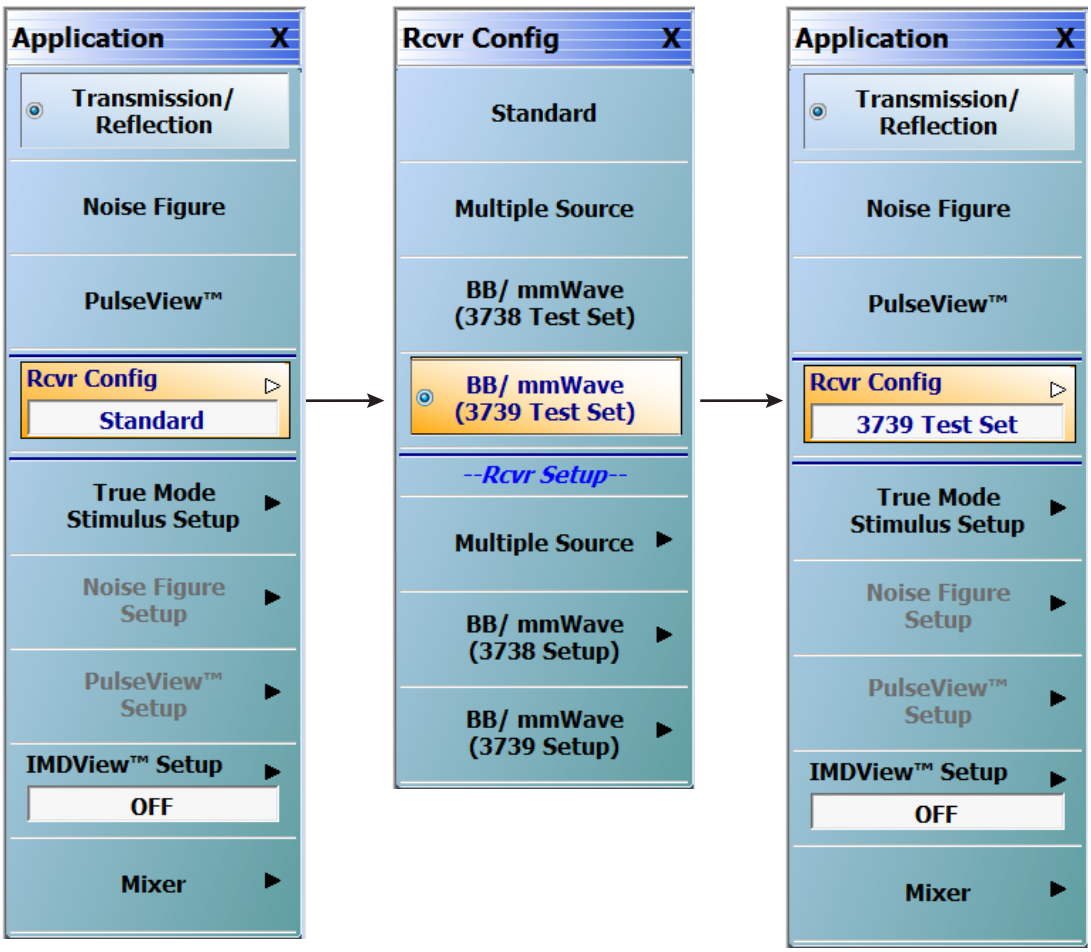


Figure 5-1. APPLICATION Menu – Receiver Configuration to 3739 Test Set (MS464xB Systems)

3739 Setup for Broadband

Configure the VectorStar VNA for Broadband Operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 5-3 "VNA Preset Procedure" on page 5-1.
3. Navigate:

   Main | Application | Rcvr Config
4. Select the BB/mmWave (3739 Setup) button to open the 3739 SETUP menu.
5. Select Broadband to 220 GHz as shown in Figure 5-2.

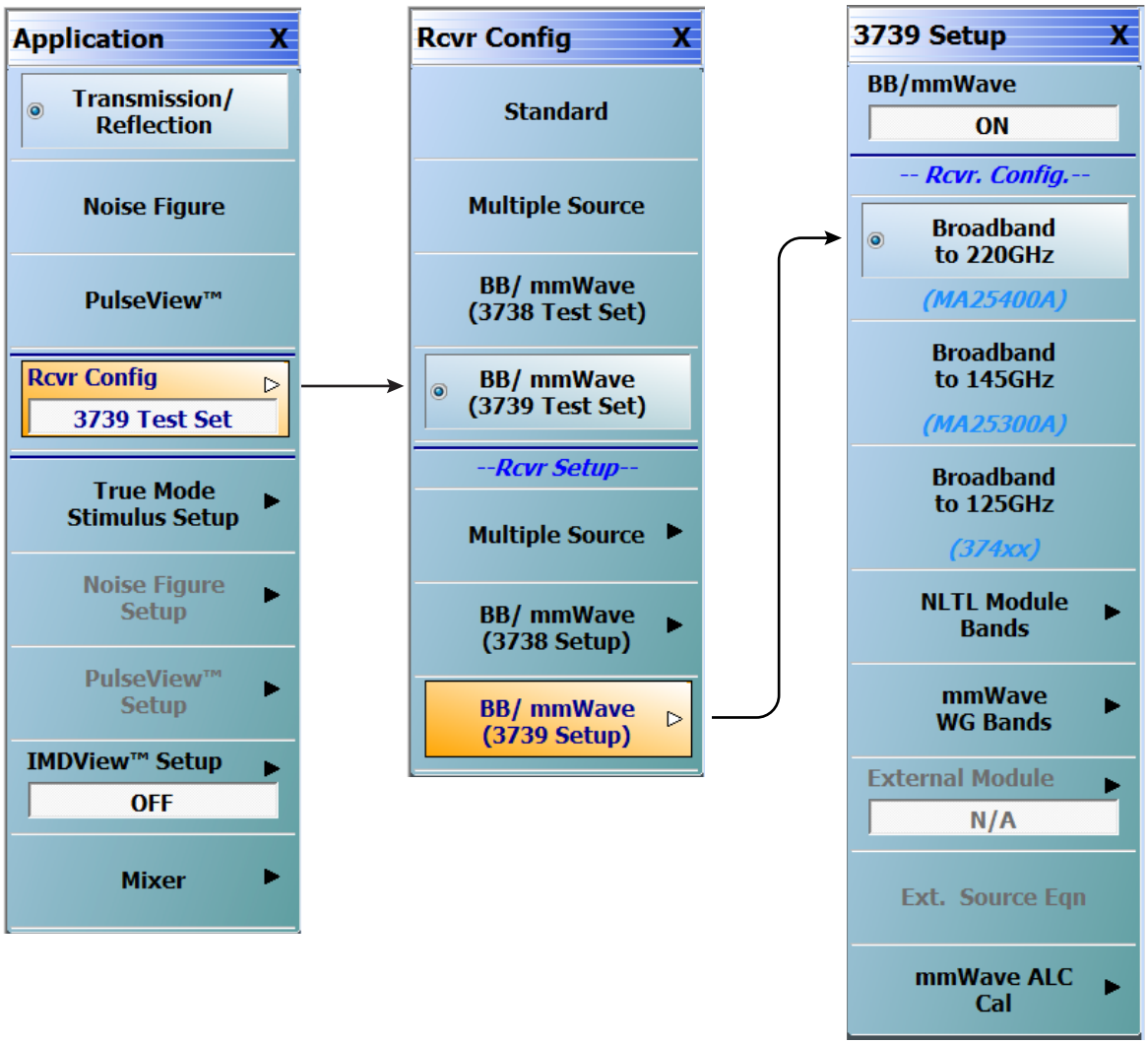


Figure 5-2. 3739 Setup for Broadband Modules (MS464xB Systems)

Frequency Setup

1. Navigate to the FREQUENCY menu.
   - MAIN | Frequency | FREQUENCY
2. At the FREQUENCY menu, set the following frequency parameters:
   - Start Frequency = **70.000000000 kHz**
   - Stop Frequency = **220.000000000 GHz**
   - # of Points = **201**
3. The following frequency parameters are automatically set:
   - Center Frequency = **110.000035 GHz**
   - Span Frequency = **219.99993 GHz**
   - Step Size = **1.099999650 GHz**
4. The system should now be sweeping fully from 70 kHz to 220 GHz.

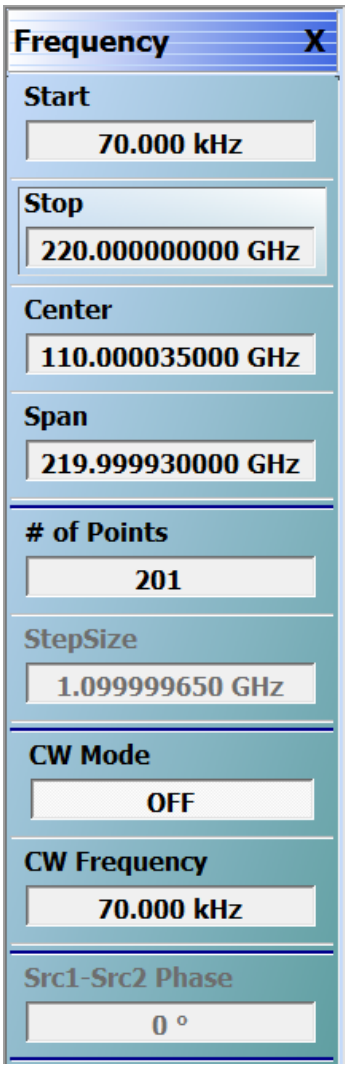


Figure 5-3. FREQUENCY Menu – Settings for 70 kHz to 220 GHz Sweep (MS464xB Systems)

Receiver Configuration for Multiple Source

Configure the VectorStar VNA for Multiple Source Broadband Operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 5-3 "VNA Preset Procedure" on page 5-1.
3. Navigate: Main | Application | Rcvr Config | (See Figure 5-4).
4. From the Rcvr Config menu select the Multiple Source button, then in the Rcvr Setup area, select Multiple Source to open that menu.
5. From the Multiple Source menu select External Module Ctrl to open the dialog box.
6. Select Broadband to 220 GHz.

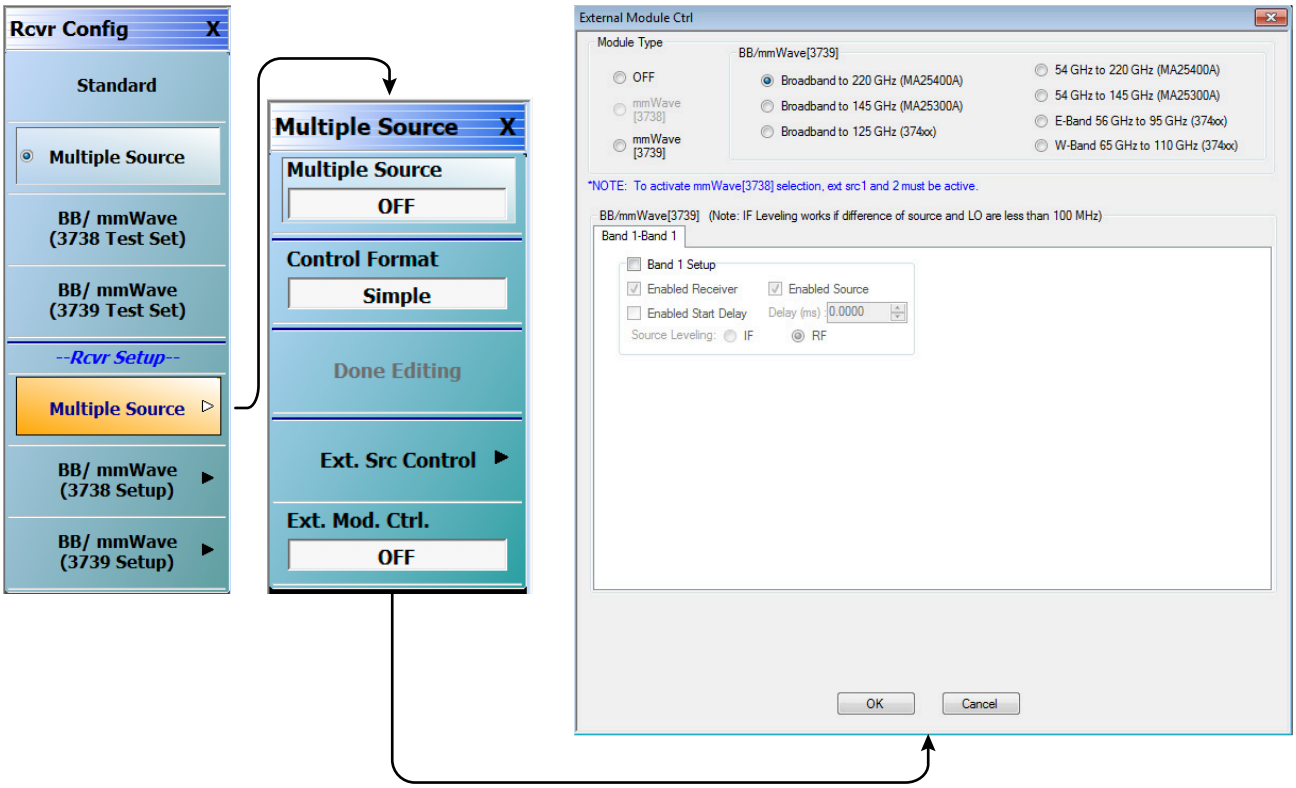


Figure 5-4. Receiver Configuration for Multiple Source (MS464xB Systems)

3739 Setup for Banded Modules

Configure the VectorStar VNA for Banded Operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 5-3 "VNA Preset Procedure" on page 5-1.
3. Navigate: Application | Rcvr Config | BB/mmWave (3739 Setup)
4. From the 3739 Setup menu, select NLTL Module Bands | E-Band or W-Band (for 3744x-EE/EW modules).

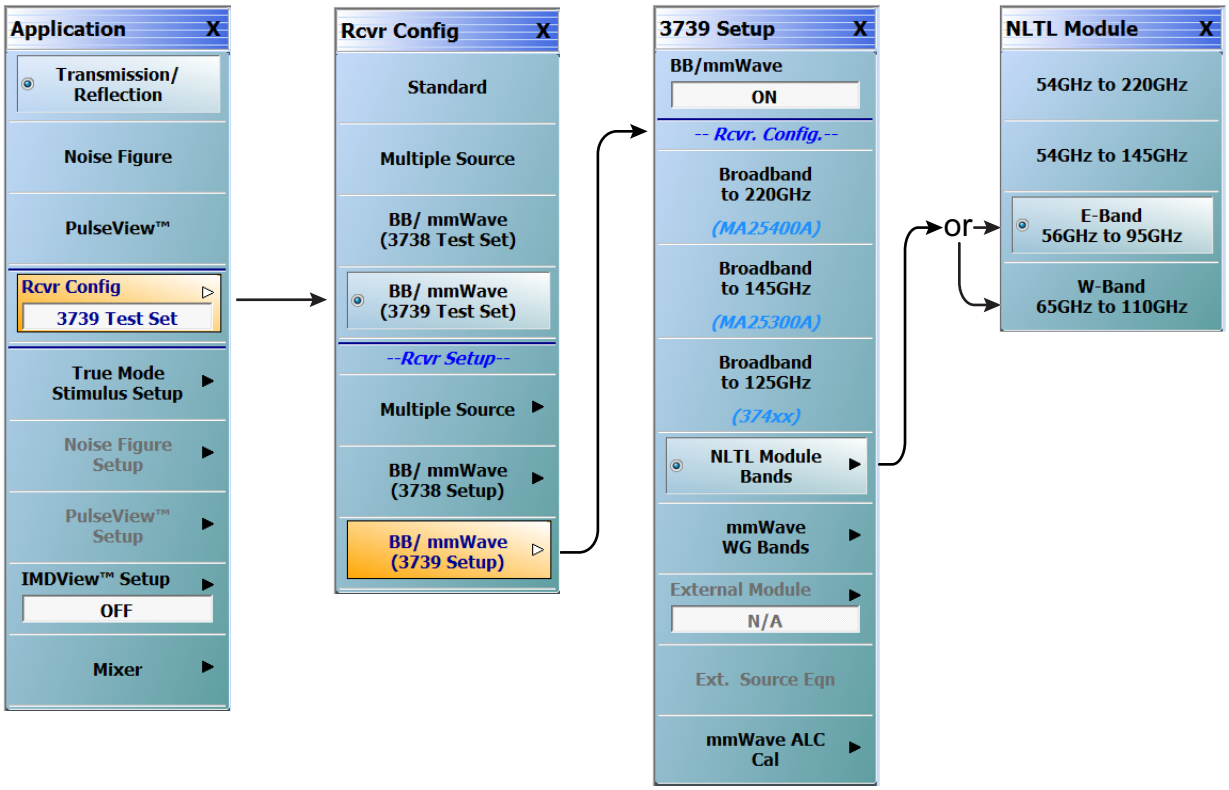


Figure 5-5. 3739 Setup for Banded Modules (MS464xB Systems)

3739 Setup for OML/VDI Selection

Configure the VectorStar VNA for OML or VDI operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 5-3 "VNA Preset Procedure" on page 5-1.
3. Navigate to the Application menu and select:

   Rcvr Config | BB/mmWave (3739 Setup) | mmWave WG Bands | mm-OML (or mm-VDI)

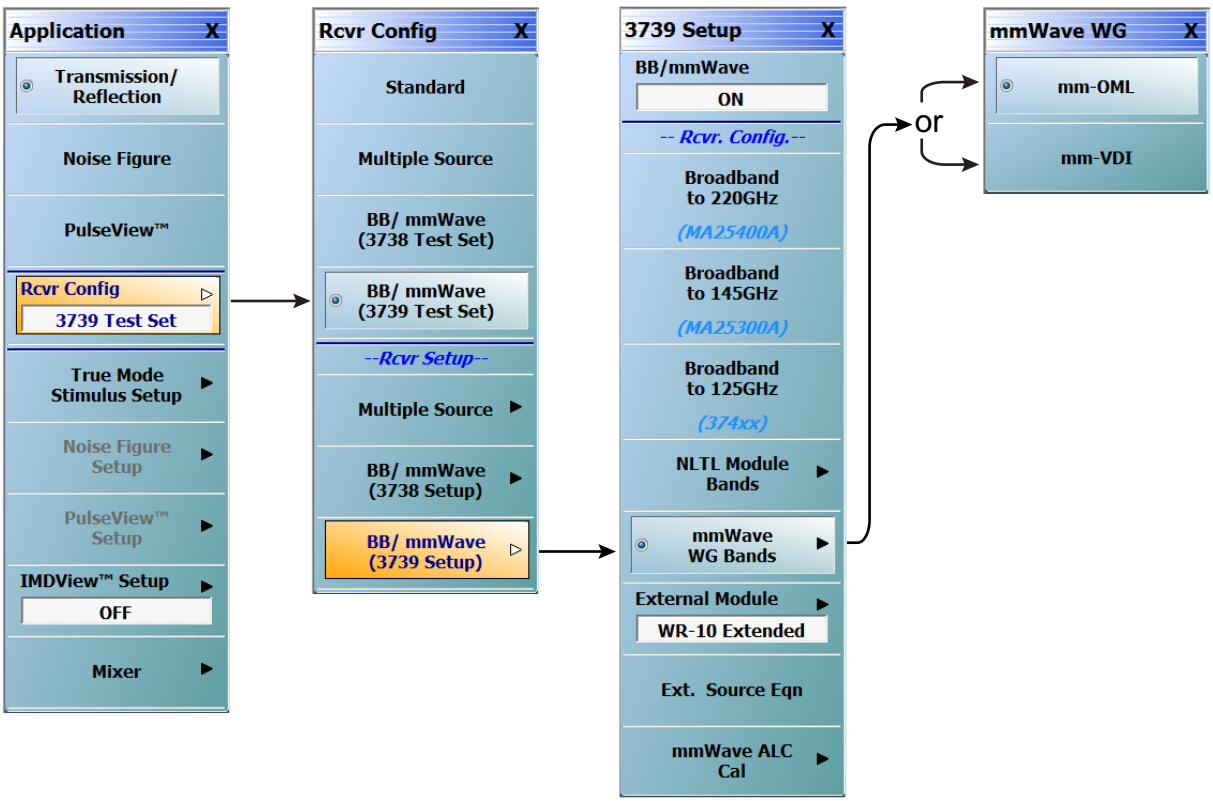


Figure 5-6. 3739 Setup for OML/VDI Selection (MS464xB Systems)

OML Band Selection

1. At the MAIN menu, select Application. The APPLICATION menu appears.

   MAIN | Application | APPLICATION

2. From the Application menu select:

   Rcvr Config | BB/mmWave (3739 Setup) | External Module

3. Select the applicable OML module type and band and click Apply.

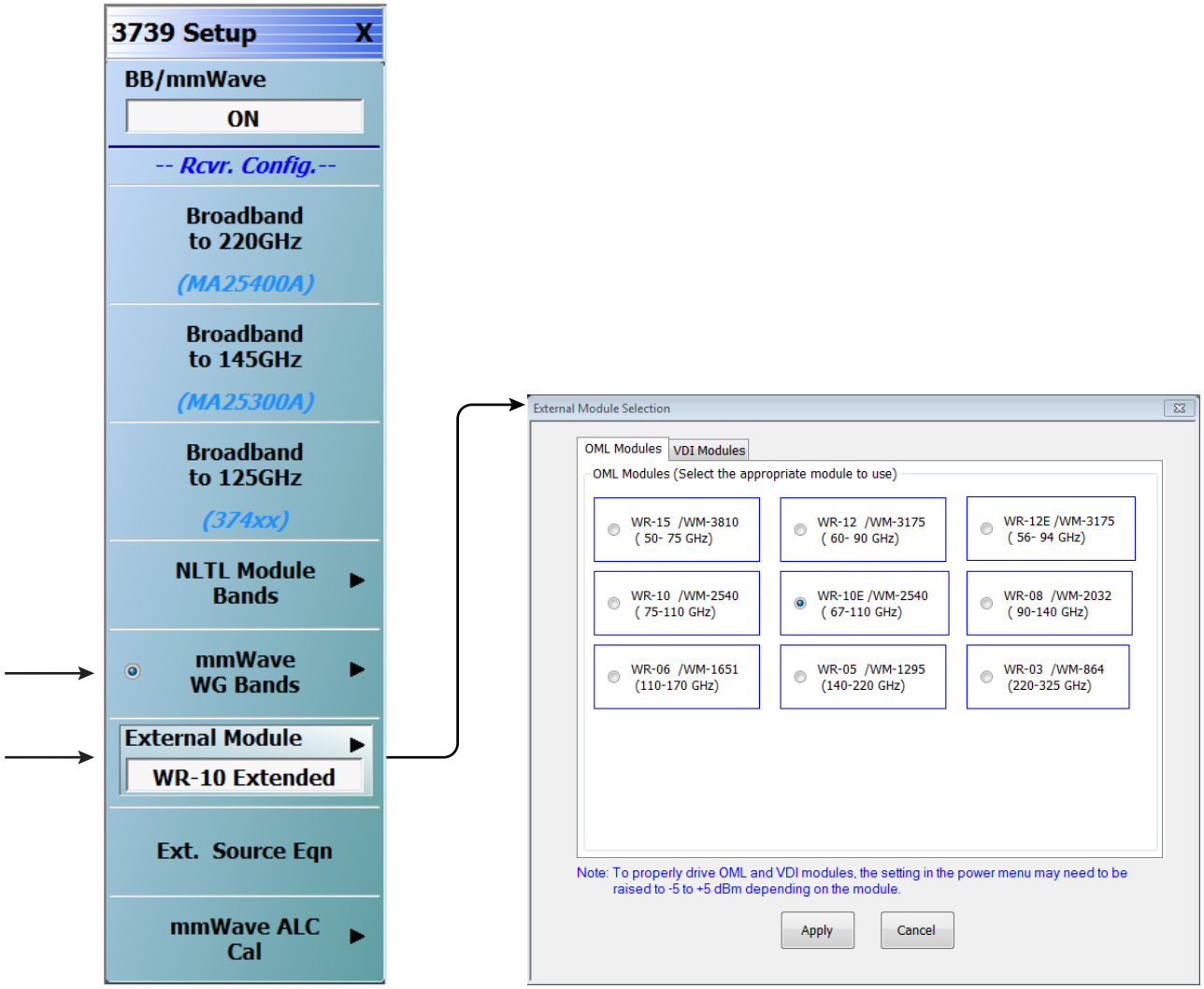


Figure 5-7. 3739 Setup Menu – OML Band Selection (MS464xB Systems)

VDI Band Selection

1. At the MAIN menu, select Application. The APPLICATION menu appears.

   MAIN | Application | APPLICATION

2. From the Application menu select:

   Rcvr Config | BB/mmWave (3739 Setup) | External Module

3. Select the applicable VDI module type and band and click Apply.

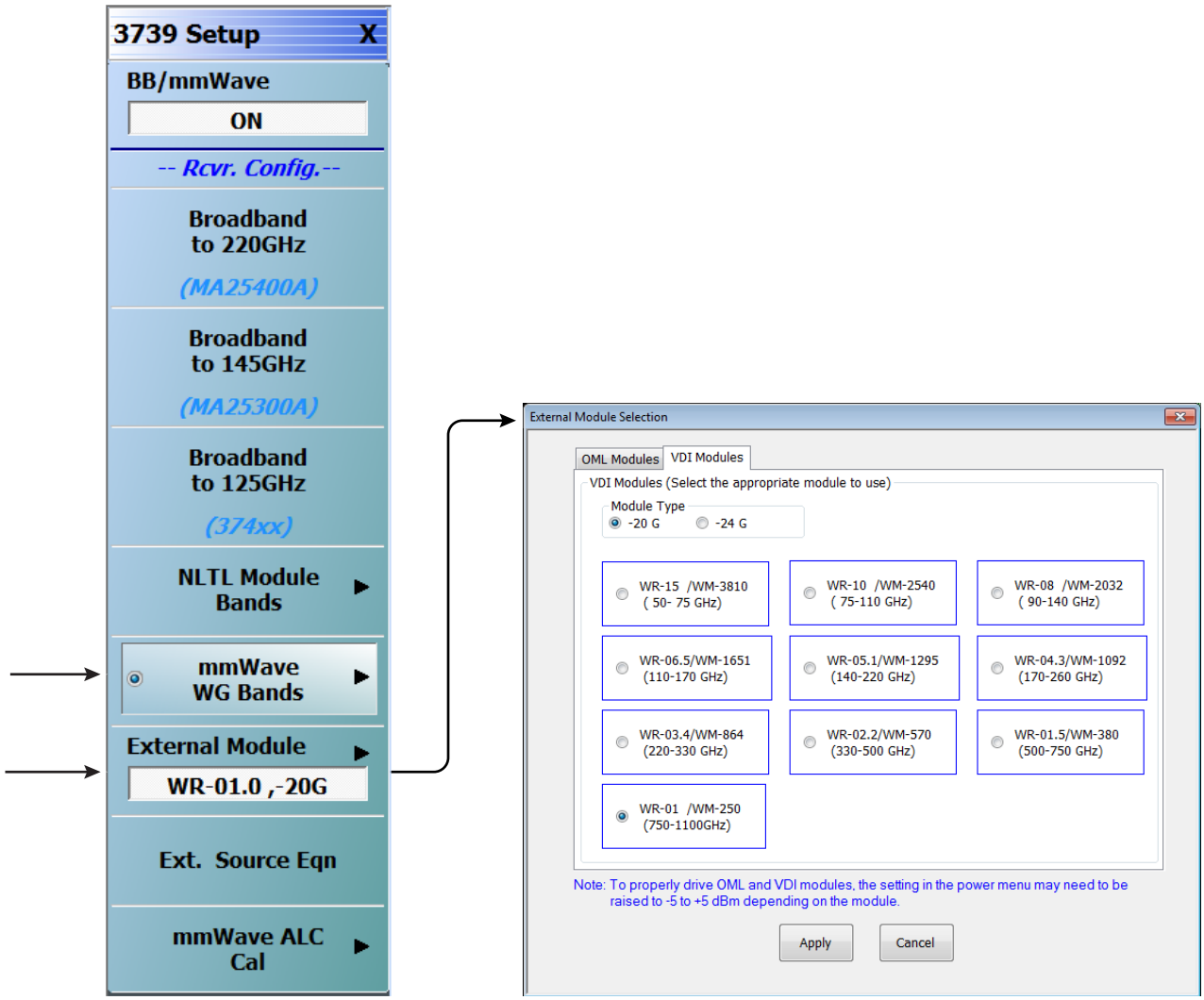


Figure 5-8. 3739 Setup Menu – VDI Band Selection (MS464xB Systems)

5-5 ME7838G Configuration Verification – BB/mmW Modules

Note	This verification procedure applies when using MA25400A broadband modules.

Preliminary

1. Ensure system is sweeping from 70 kHz to 220 GHz, with:

- Trace 1 set to S11
- Trace 2 set to S12
- Trace 3 set to S21
- Trace 4 set to S22

Configure Trace 1

2. Select Trace 1 and then select DISPLAY | Trace Format, and set to **Log Mag.**

3. Select the USER-DEFINED menu.

- MAIN | Response | REPONSE | User-defined | USER-DEFINED

4. On the USER-DEFINED menu, set the parameters as:

- Numerator = **A1**
- Denominator = **1**
- Driver Port = **1**

5. Using a mouse, move the Reference Line to one graticule below top scale.

- Trace label changes to Tr1 [A1/1|P1] LogM

Configure Trace 2

6. Select Trace 2 and then select DISPLAY | Trace Format, and set to **Log Mag.**

7. Select the USER-DEFINED menu.

- MAIN | Response | REPONSE | User-defined | USER-DEFINED

8. On the USER-DEFINED menu, set the parameters as:

- Numerator = **B2**
- Denominator = **1**
- Driver Port = **1**

9. Using a mouse, move the Reference Line to one graticule below top scale.

- The trace label changes to Tr2 [B2/1|P1] LogM

Configure Trace 3

10. Select Trace 3 and then select DISPLAY | Trace Format, and set to **Log Mag.**

11. Select the USER-DEFINED menu.

- MAIN | Response | REPONSE | User-defined | USER-DEFINED

12. On the USER-DEFINED menu, set the parameters as:

- Numerator = **A2**
- Denominator = **1**
- Driver Port = **2**

13. Using a mouse, move the Reference Line to one graticule below top scale.

- The trace label changes to Tr3 [A2/1|P2] LogM

Configure Trace 4

14. Select Trace 4 and then select DISPLAY | Trace Format, and set to **Log Mag.**

15. Select the USER-DEFINED menu.

- MAIN | Response | REPONSE | User-defined | USER-DEFINED

16. On the USER-DEFINED menu, set the parameters as:

- Numerator = **B1**
- Denominator = **1**
- Driver Port = **2**

17. Using a mouse, move the Reference Line to one graticule below top scale.

- The trace label changes to Tr4 [B1/1|P2] LogM.

Set Power

18. Navigate to the POWER menu:

- MAIN | Power | POWER

19. Set the Port 1 Power to –20 dBm.

- If Port Power = Coupled, this also sets Port 2 Power to –20 dBm.

20. If Port Power = Not Coupled, set the Port 2 Power to –20 dBm.

21. Connect the 33GG50 **thru** line between the MA25400A Modules, and ensure the resultant display looks similar to Figure 5-9. Variances in the absolute levels of up to 10 dB from those in the picture are normal.

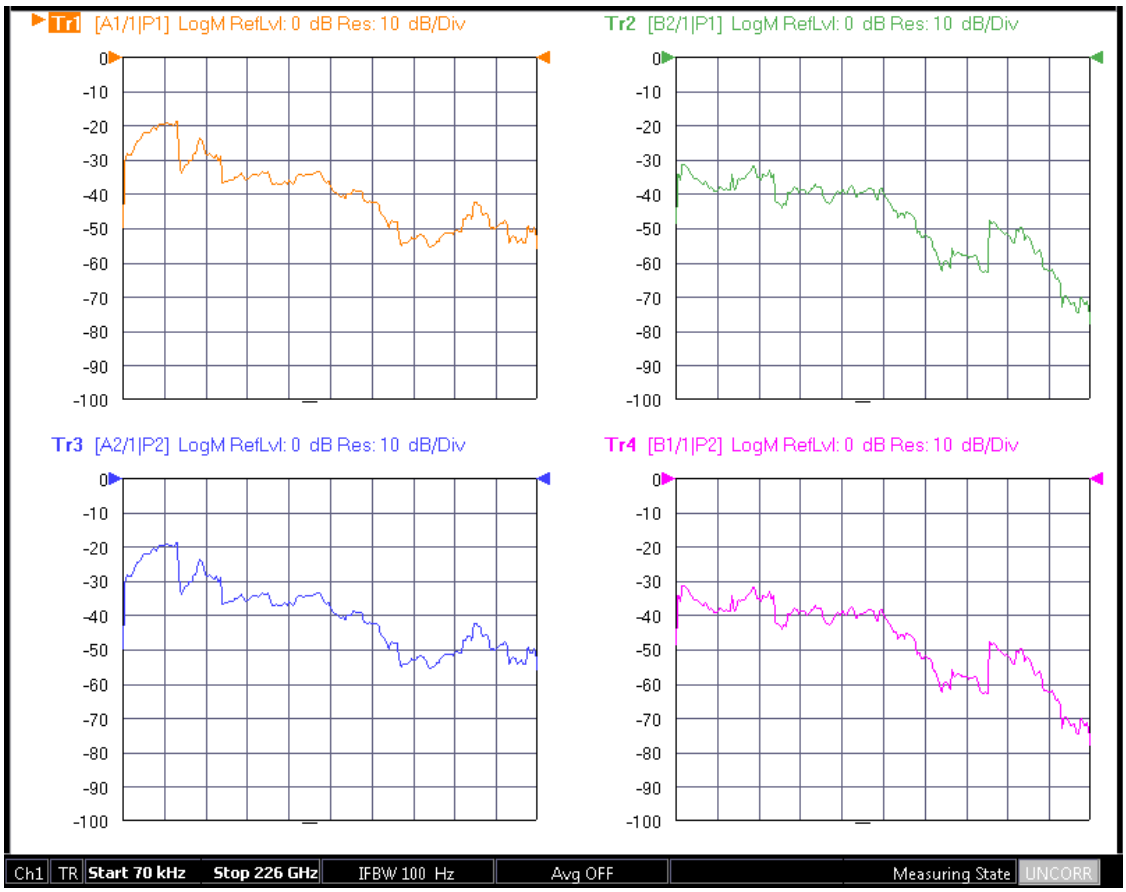


Figure 5-9. Typical VNA Four-Trace Display of Non-Ratioed Parameters for Initial Checkout

VNA Power Down

1. With the VNA in operate mode, the front panel **Standby/Operate** button is illuminated with a green LED.
2. Press and hold the **Standby/Operate** button for at least one (1) second. The orange **Standby LED** is illuminated with an orange LED. The VNA is in Standby mode.
3. To completely shut down the VNA, at the rear panel, set the **AC Power Rocker Switch** in the AC Power Input Module to "**O**" or OFF.
4. If required, disconnect the VNA Power Cord from the AC Mains.

Test Set Power Down

5. At the Test Set front panel, press the **AC Power Button**. The green **Power LED** goes out.
6. If required, disconnect the Test Set rear panel AC Power Cord from the AC main power source.

Chapter 6 — ME7838E/EX Initial System Checkout

6-1 Introduction

This chapter provides the general initial system checkout for a completely assembled ME7838E/EX Broadband/Banded mmWave System. Once this procedure is complete, the system is ready for full calibration and system performance verification.

6-2 Power Up Procedure

Use this procedure to power up the MS464xB VNA and the 3739B or 3739C Broadband Test Set. There are no AC power connections required for the mmWave Modules.

1. At the 3739B or 3739C Broadband Test Set Rear Panel, connect the **AC Line Cord** to AC main power.
2. At the VNA Rear Panel, connect the **AC Line Cord** to the AC main power.
   - Power requirements are 90 to 264 VAC, 47 to 63 Hz, power factor controlled.
3. Make sure a USB or PS2 **mouse** is connected to the VNA.
4. At the Test Set front panel press the left side **AC Power Button**. The green **Power LED** should light.
5. At the VNA Rear Panel, turn the **AC Power Rocker Switch** to "|" or **ON**.
   - The front panel **Standby/Operate** key illuminates with an orange Standby LED.
   - The VNA is in Standby mode.
6. Press and hold the **Standby/Operate** key for at least one (1) second.
   - The front panel Standby/Operate key illuminates with a green Operate LED.
   - The VNA is in Operate mode.

6-3 VNA Preset Procedure

1. If the VNA is configured to preset to the factory as-shipped default configuration:
   a. Press the VNA front panel **Preset** button.

      The VNA resets to the factory-default configuration,

   b. Continue with the next applicable section.
2. If the VNA has been configured to a user-defined preset:
   a. Use the right side menus to navigate to the PRESET SETUP menu.

      Utilities | System | Setup | Preset Setup

   b. Select the Default button, and then click the Preset icon on the icon toolbar.

      The VNA resets to the factory-default configuration.

   c. Continue with the next applicable section.

6-4 MS464xB VNA Broadband/Banded Configuration

Configure the VNA for Modular Broadband Operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 6-3 “VNA Preset Procedure” on page 6-1

Receiver Configuration for Broadband

3. At the MAIN menu, select Application. The APPLICATION menu appears as shown in Figure 6-1 on page 6-2.

   MAIN | Application | APPLICATION

4. Select the BB/mmWave (3739 Test Set) button in the Rcvr Config menu.

   The Standard, Multiple Source, and BB/mmWave (3738 Test Set) buttons are deselected.

   The Receiver Config button on the Application menu now shows 3739 Test Set is selected.

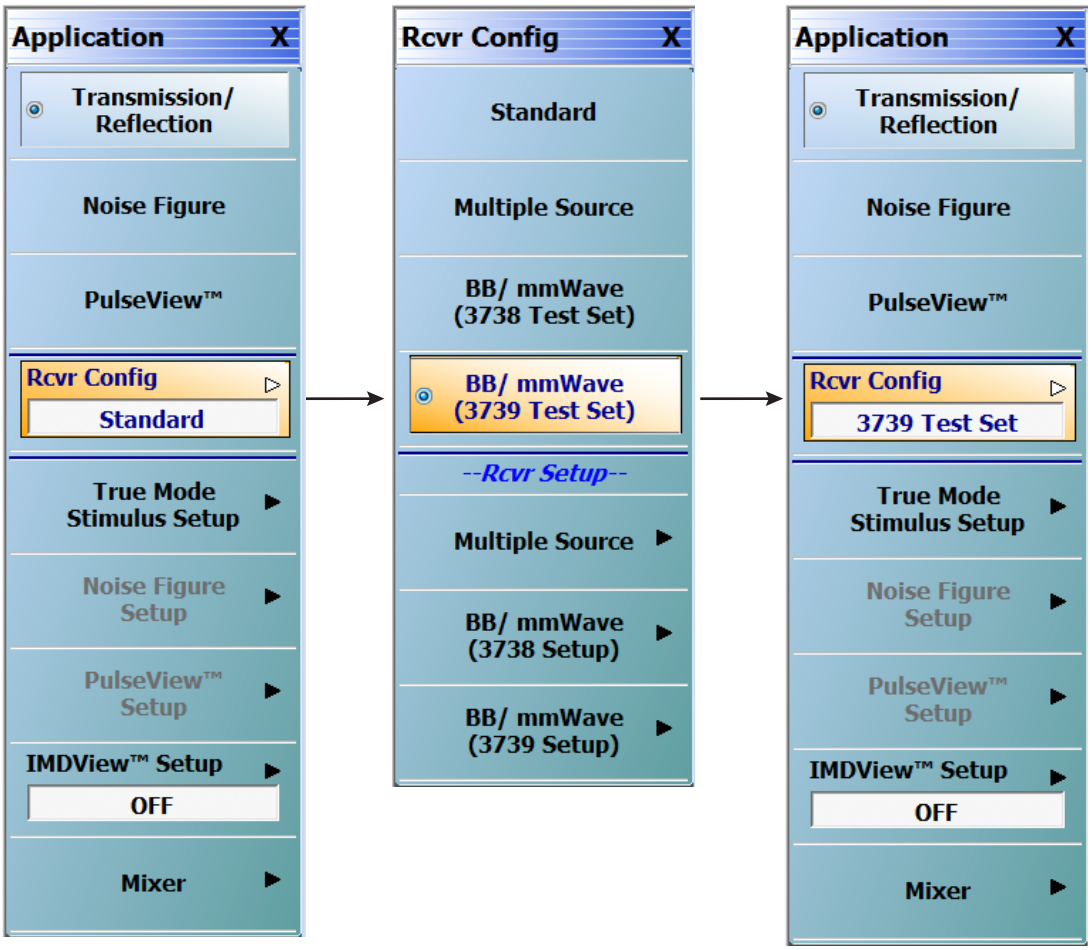


Figure 6-1. APPLICATION Menu – Receiver Configuration to 3739 Test Set

3739 Setup for Broadband

Configure the VectorStar VNA for Broadband Operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 6-3 "VNA Preset Procedure" on page 6-1.
3. Navigate:

   Main | Application | Rcvr Config
4. Select the BB/mmWave (3739 Setup) button to open the 3739 SETUP menu.
5. Select Broadband to 110 GHz as shown in Figure 6-2.

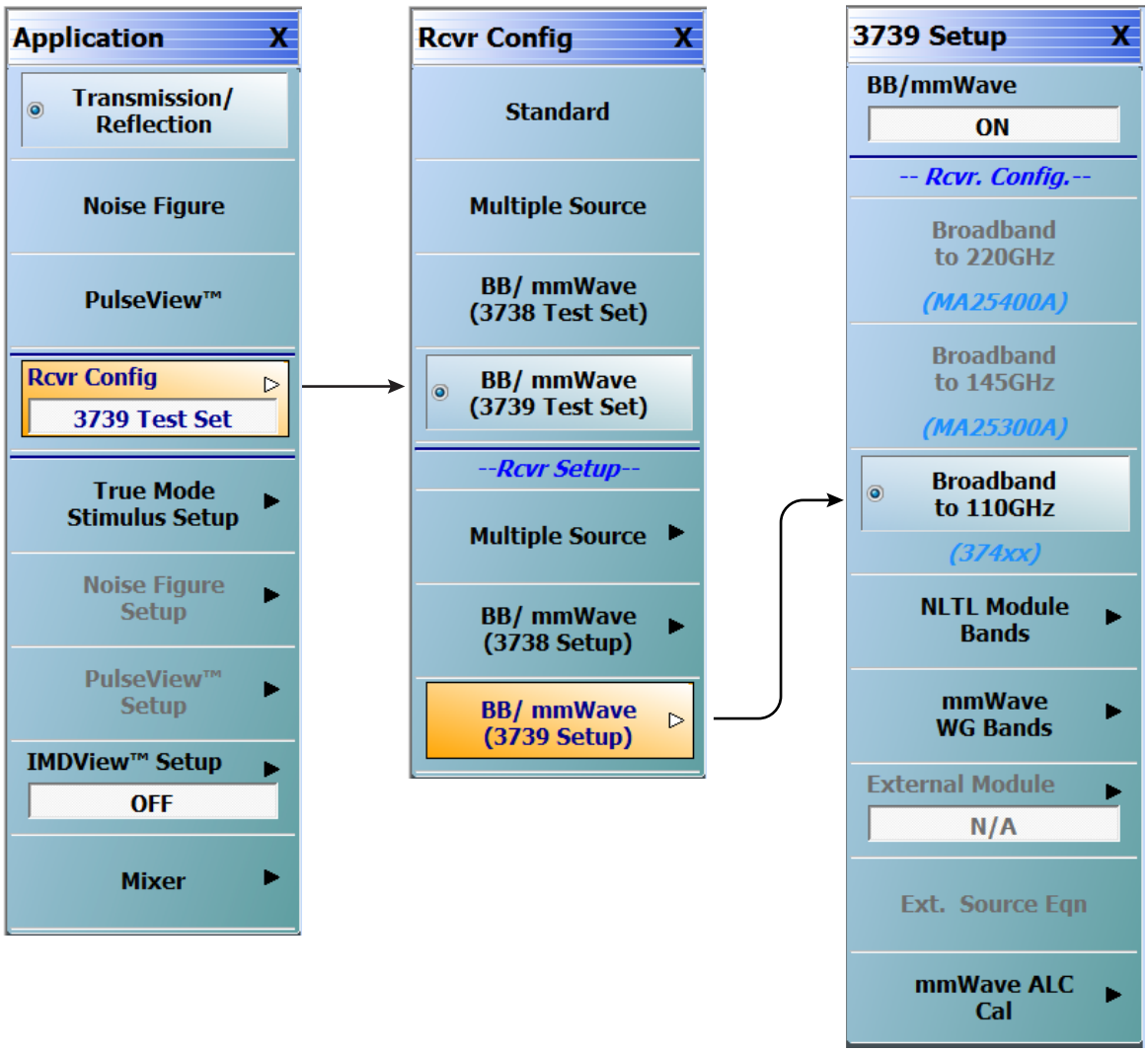


Figure 6-2. 3739 Setup for Broadband Modules

Frequency Setup

6. Navigate to the FREQUENCY menu.

- MAIN | Frequency | FREQUENCY

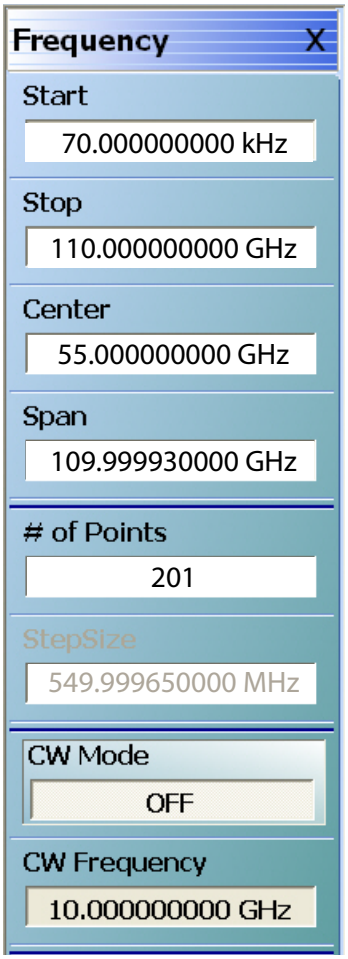


Figure 6-3. FREQUENCY Menu – Settings for 70 kHz to 110 GHz Sweep

7. At the FREQUENCY menu, set the following frequency parameters:

- Start Frequency = **70.000000000 kHz**
- Stop Frequency = **110.000000000 GHz**
- # of Points = **201**

8. The following frequency parameters are automatically set:

- Center Frequency = **55.000000000 GHz**
- Span Frequency = **109.999930000 GHz**
- Step Size = **549.999650000 MHz**

9. The system should now be sweeping fully from 70 kHz to 110 GHz.

Receiver Configuration for Multiple Source

Configure the VectorStar VNA for Multiple Source Broadband Operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 6-3 "VNA Preset Procedure" on page 6-1.
3. From the Application menu select Rcvr Setup (Figure 6-4).
4. From the Rcvr Setup menu select Multiple Source.
5. If not already done, from the Multiple Source menu, toggle Multiple Source to ON.
6. From the Multiple Source menu select External Module Ctrl.
7. On the External Module Ctrl dialog, select Broadband to 110 GHz.

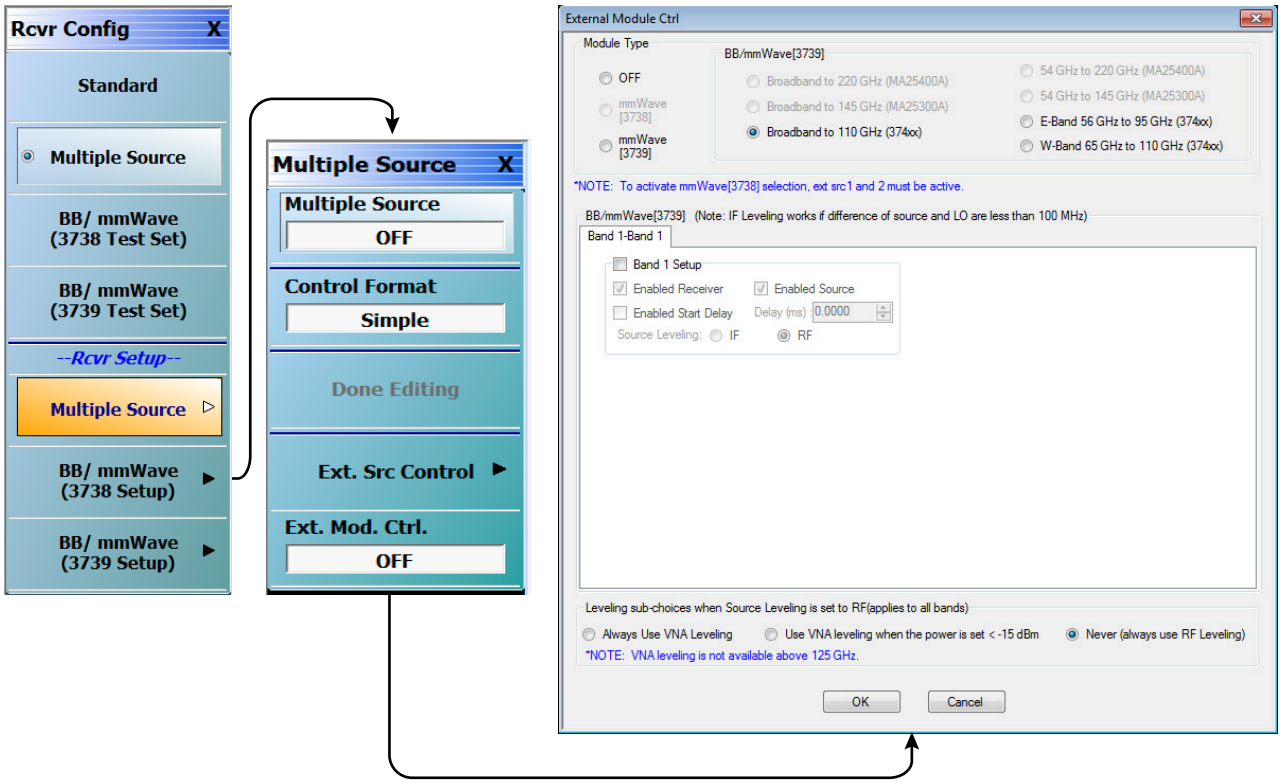


Figure 6-4. Receiver Configuration for Multiple Source

3739 Setup for Banded Modules

Configure the VectorStar VNA for Banded Operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 6-3 “VNA Preset Procedure” on page 6-1.
3. Navigate: Application | Rcvr Config | BB/mmWave (3739 Setup)
4. From the 3739 Setup menu, select NLTL Module Bands | E-Band or W-Band (for 3744E-EE/EW modules).

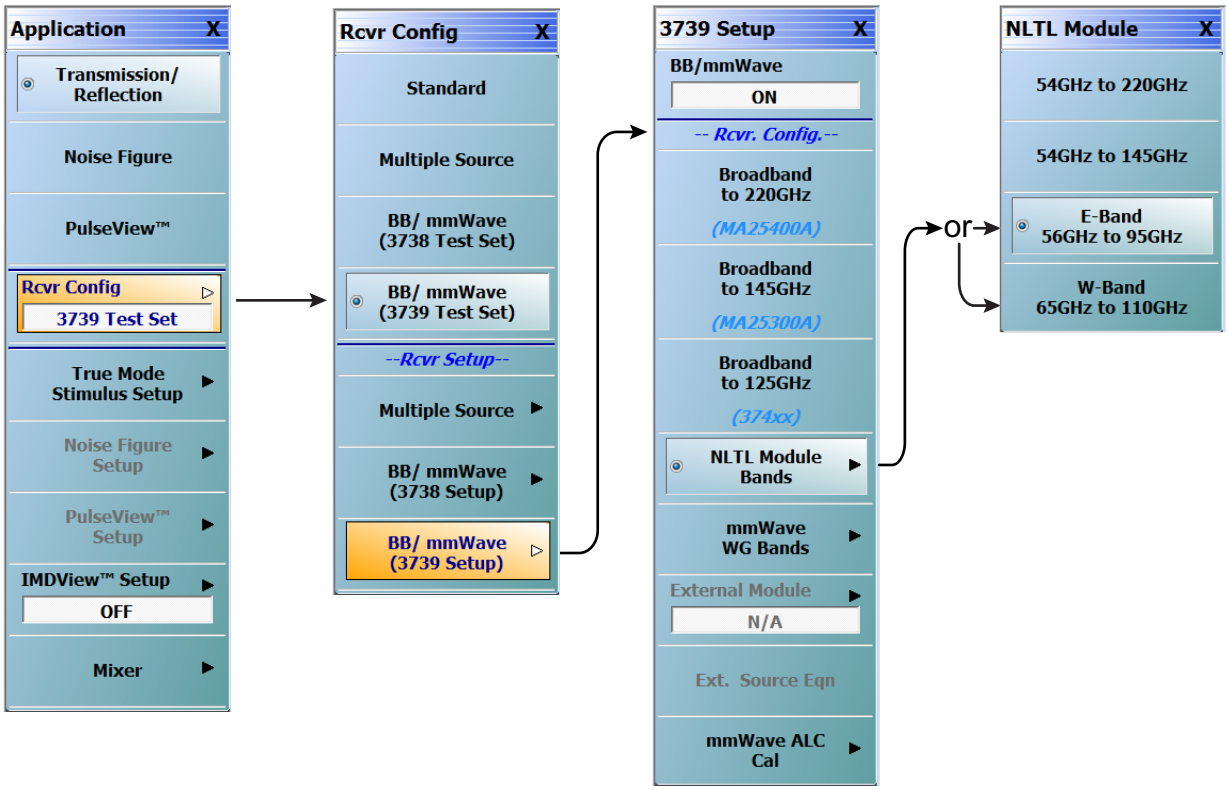


Figure 6-5. 3739 Setup for Banded Modules

3739 Setup for OML/VDI Modules

Configure the VectorStar VNA for OML or VDI operation by performing the following steps:

1. Make sure the VNA and the broadband test set are both on and warmed up.
2. If not already done, perform Section 6-3 “VNA Preset Procedure” on page 6-1.
3. Navigate to the Application menu and select:

   Rcvr Config | BB/mmWave (3739 Setup) | mmWave WG Bands | mm-OML (or mm-VDI)

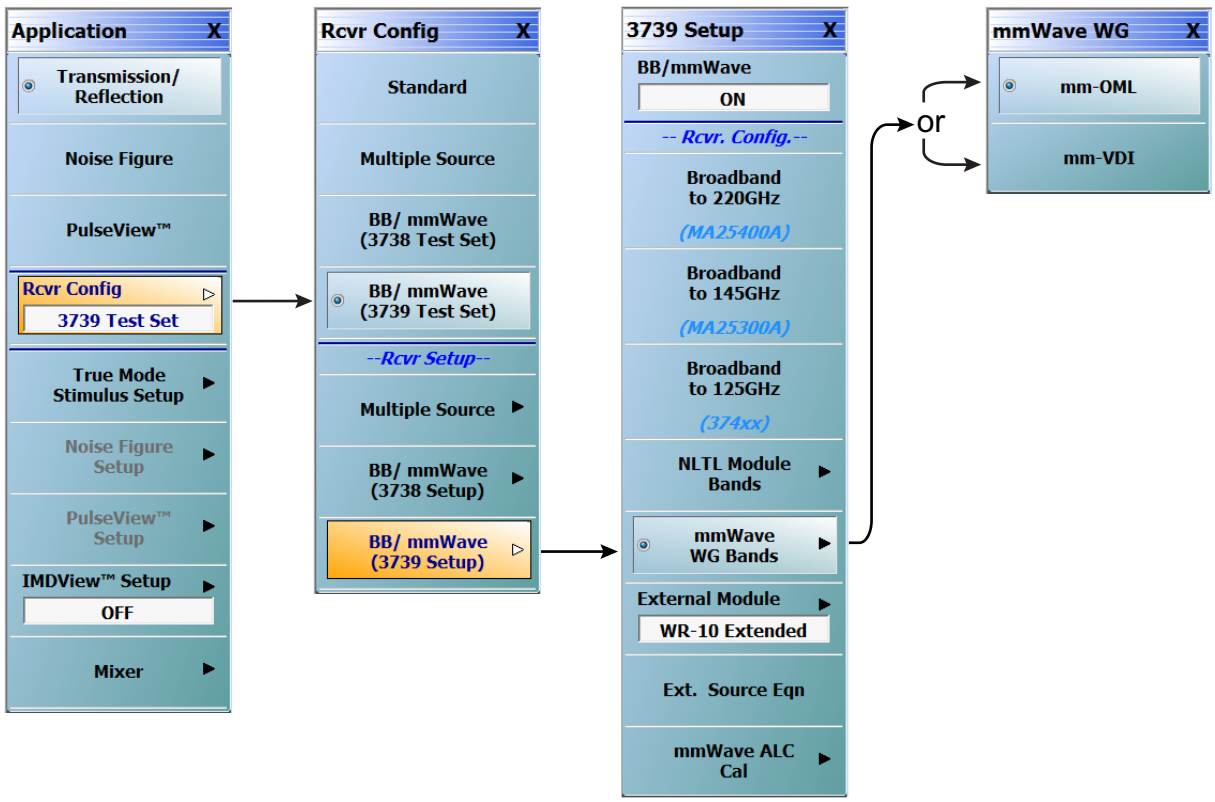


Figure 6-6. 3739 Setup for OML/VDI Modules

OML Band Selection

1. At the MAIN menu, select Application. The APPLICATION menu appears.

   MAIN | Application | APPLICATION

2. From the Application menu select:

   Rcvr Config | BB/mmWave (3739 Setup) | External Module

3. Select the applicable OML module type and band and click Apply.

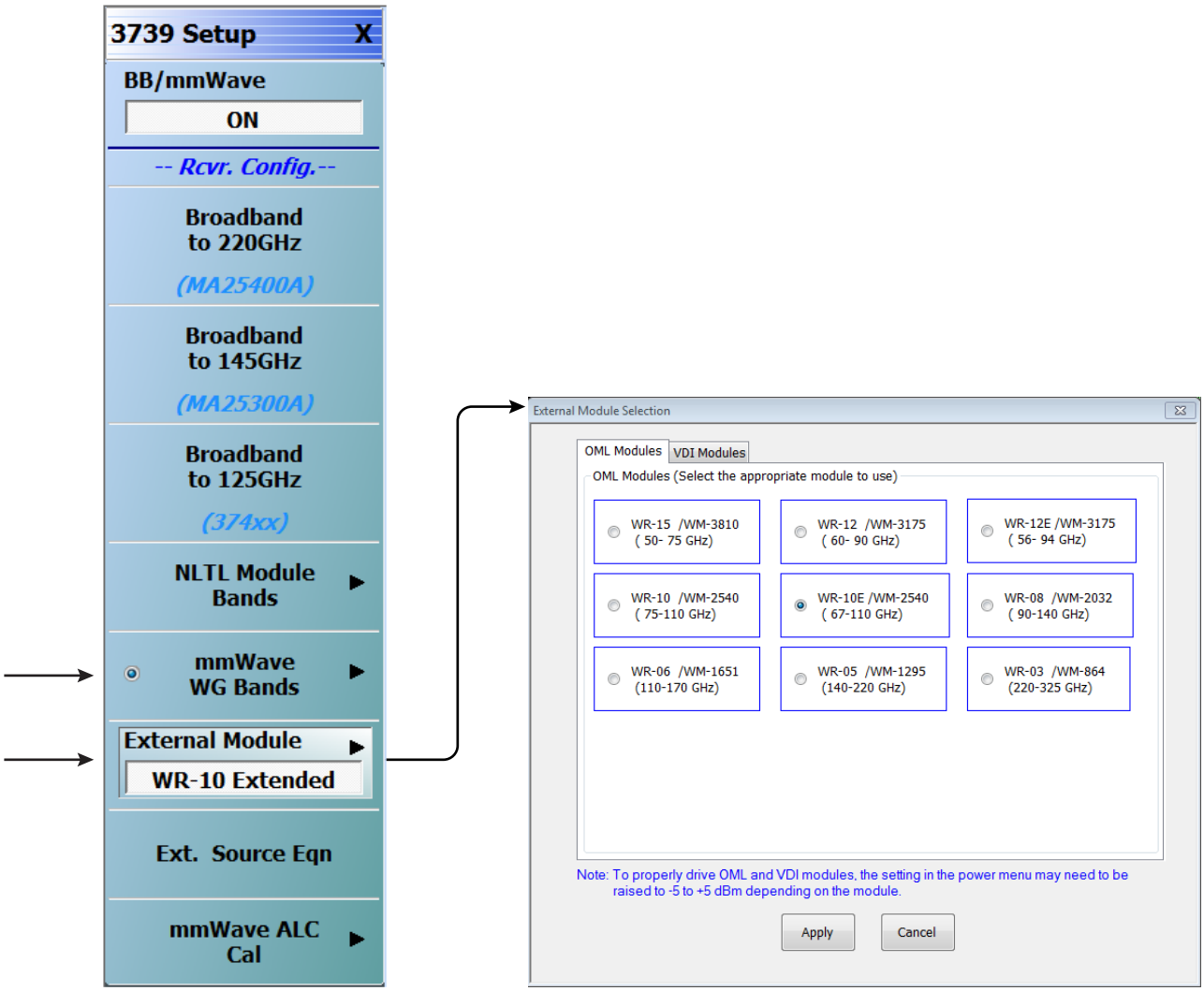


Figure 6-7. 3739 Setup Menu – OML Selection

VDI Band Selection

1. At the MAIN menu, select Application. The APPLICATION menu appears.

   MAIN | Application | APPLICATION

2. From the Application menu select:

   Rcvr Config | BB/mmWave (3739 Setup) | External Module

3. Select the applicable VDI module type and band and click Apply.

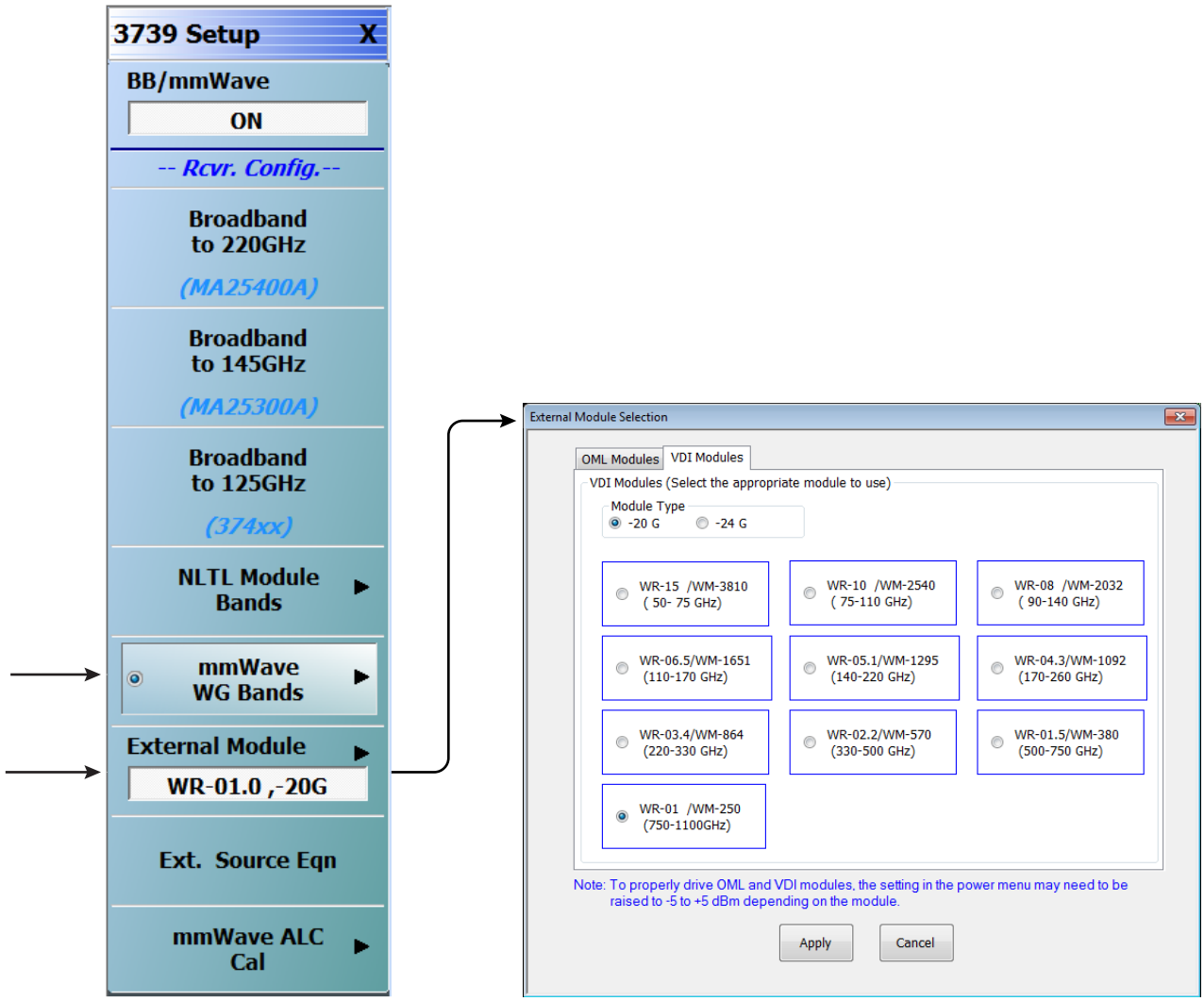


Figure 6-8. 3739 Setup Menu – VDI Selection

6-5 ME7838E/EX Configuration Verification – BB/mmW Modules

Note	This verification procedure applies when using 3743E/EX broadband modules.

Preliminary

1. Ensure system is sweeping from 70 kHz to 110 GHz, with:
   - Trace 1 set to S11
   - Trace 2 set to S12
   - Trace 3 set to S21
   - Trace 4 set to S22

Configure Trace 1

2. Select Trace 1 and then select DISPLAY | Trace Format, and set to **Log Mag.**
3. Select the USER-DEFINED menu.
   - MAIN | Response | REPONSE | User-defined | USER-DEFINED
4. On the USER-DEFINED menu, set the parameters as:
   - Numerator = **A1**
   - Denominator = **1**
   - Driver Port = **1**
5. Using a mouse, move the Reference Line to one graticule below top scale.
   - Trace label changes to Tr1 [A1/1|P1] LogM

Configure Trace 2

6. Select Trace 2 and then select DISPLAY | Trace Format, and set to **Log Mag.**
7. Select the USER-DEFINED menu.
   - MAIN | Response | REPONSE | User-defined | USER-DEFINED
8. On the USER-DEFINED menu, set the parameters as:
   - Numerator = **B1**
   - Denominator = **1**
   - Driver Port = **1**
9. Using a mouse, move the Reference Line to one graticule below top scale.
   - The trace label changes to Tr2 [B1/1|P1] LogM

Configure Trace 3

10. Select Trace 3 and then select DISPLAY | Trace Format, and set to **Log Mag.**
11. Select the USER-DEFINED menu.
    - MAIN | Response | REPONSE | User-defined | USER-DEFINED
12. On the USER-DEFINED menu, set the parameters as:
    - Numerator = **A2**
    - Denominator = **1**
    - Driver Port = **2**
13. Using a mouse, move the Reference Line to one graticule below top scale.
    - The trace label changes to Tr3 [A2/1|P2] LogM

Configure Trace 4

14. Select Trace 4 and then select DISPLAY | Trace Format, and set to **Log Mag.**

15. Select the USER-DEFINED menu.

- MAIN | Response | REPONSE | User-defined | USER-DEFINED

16. On the USER-DEFINED menu, set the parameters as:

- Numerator = **B2**
- Denominator = **1**
- Driver Port = **2**

17. Using a mouse, move the Reference Line to one graticule below top scale.

- The trace label changes to Tr4 [B2/1|P2] LogM.

Set Power

18. Navigate to the POWER menu:

- MAIN | Power | POWER

19. Set the Port 1 Power to –10 dBm.

- If Port Power = Coupled, this also sets Port 2 Power to –10 dBm.

20. If Port Power = Not Coupled, set the Port 2 Power to –10 dBm.

21. Connect **shorts** to both W1 connectors on the 3743E/EX Modules, and ensure the resultant display looks similar to Figure 6-9 below.

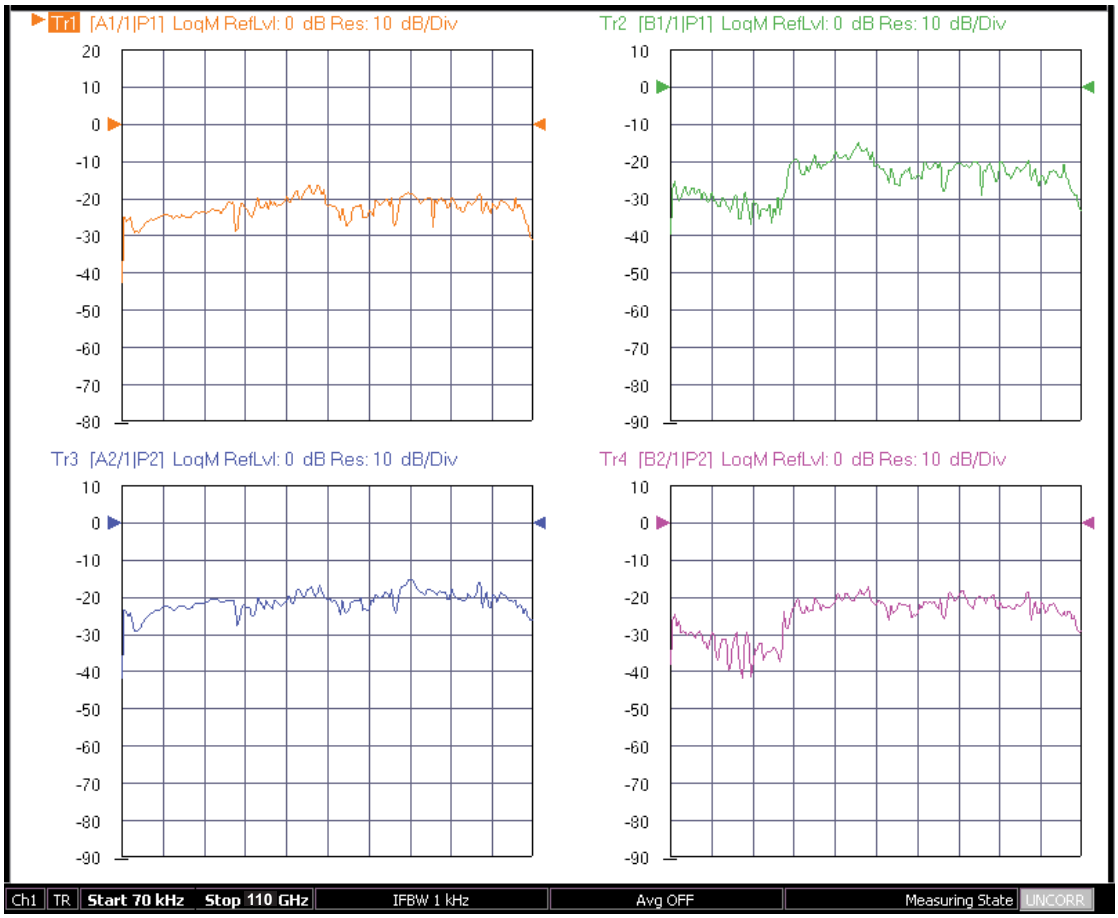


Figure 6-9. Typical VNA Four-Trace Display of Non-Ratioed Parameters for Initial Checkout

VNA Power Down

1. With the VNA in operate mode, the front panel **Standby/Operate** button is illuminated with a green LED.
2. Press and hold the **Standby/Operate** button for at least one (1) second. The orange **Standby LED** is illuminated with an orange LED. The VNA is in Standby mode.
3. To completely shut down the VNA, at the rear panel, set the **AC Power Rocker Switch** in the AC Power Input Module to "**O**" or OFF.
4. If required, disconnect the VNA Power Cord from the AC Mains.

Test Set Power Down

5. At the Test Set front panel, press the **AC Power Button**. The green **Power LED** goes out.
6. If required, disconnect the Test Set rear panel AC Power Cord from the AC main power source.

Appendix A — ME7838 Series Specifications

A-1 ME7838 2-Port Broadband/Banded VNA System Specifications

- **VectorStar ME7838A Broadband/mmWave VNA System Technical Data Sheet – 11410-00593**
- **VectorStarME7838A4 Broadband/mmWave VNA Technical Data Sheet – 11410-00704**
- **VectorStarME7838AX/AX4 Broadband/mmWave VNA Technical Data Sheet – 11410-02825**
- **VectorStar ME7838D Broadband/mmWave VNA System Technical Data Sheet – 11410-00778**
- **VectorStar ME7838E Broadband/mmWave VNA System Technical Data Sheet – 11410-00767**
- **VectorStarME7838E4 Broadband/mmWave VNA Technical Data Sheet – 11410-01100**
- **VectorStarME7838EX/E4X Broadband/mmWave VNA Technical Data Sheet – 11410-02827**
- **VectorStar ME7838G Broadband/mmWave VNA System Technical Data Sheet – 11410-01060**
- **VectorStar MS464xA Series VNA Technical Data Sheet – 11410-00432**
- **VectorStar MS464xB Series VNA Technical Data Sheet – 11410-00611**
- **VectorStar Broadband/Banded mmWave Modules Reference Manual – 10410-00311**

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