Quick Start Guide

366xX-1 Verification Kits and 2300-579 Performance Verification Software for VectorStar™ MS4640A/B Series VNA

3669B-1 Verification Kit, V Connectors
3668-1 Verification Kit, K Connectors
3666-1 Verification Kit, SMA/3.5 mm Connectors
3663-1 Verification Kit, Type N Connectors
2300-579 PVS Application

Anritsu

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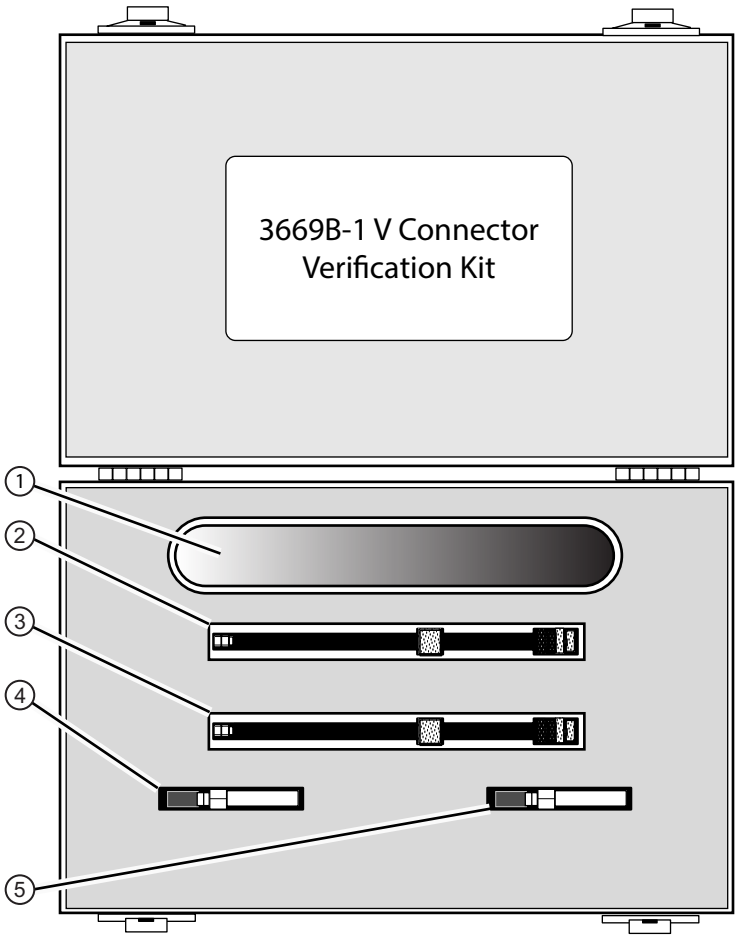
1. Introduction to the Quick Start Guide

This quick start guide provides a brief overview of the installation and use of 366xX-1 Verification Kits and the 2300-579 Performance Verification Software (PVS) with VectorStar MS4640A/B Series VNAs. Refer to the VectorStar™ MS4640A/B Series 366xX-1 Verification Kits and 2300-579 PVS User Guide – 10410-00270 for detailed information about safety, installation, configuration, setup, and verification testing.

2. Verification Kit Components

The supplied Verification Kit components are listed in the general reference figure below. The actual appearance of individual calibration kits and components varies.



Item	Verification Kit Number and Component Part Numbers			
	3669B-1 V connector	**3668-1 K connector**	**3666-1 SMA/3.5 mm**	**3663-1 Type N connector**
1. USB Memory Device	Contains: • PVS Application Installer • Component Device Characterization Data • Test Definition Files • Factory Calibration Reports for the kit components • Documentation			
2. Precision Airline (m-f)	19V50-5	19K50-7	19S50-7	18N50-10
3. Beatty Airline (m-f)	19V50-5B	19K50-7B	19S50-7B	18N50-10B

Figure 1. VectorStar 366xX-1 Verification Kit Components (1 of 2)

4. 20dB Offset (Pad) Attenuator (m-f)	20 dB 42V-20	20 dB 42K-20	20 dB 42S-20	20 dB 42N-20
5. 40 dB or 50 dB Offset (Pad) Attenuator (m-f)	40 dB 42V-40	50 dB 42K-50	50 dB 42S-50	50 dB 42N-50

Figure 1. VectorStar 366xX-1 Verification Kit Components (2 of 2)

3. Required PC Controller Equipment

The following Personal Computer (PC) Controller equipment and software are required to control the VectorStar MS4640A/B Series VNA. The PC Controller and the VNA are connected over a GPIB network. The required GPIB cable, test port adapters, and phase-stable through line with any required adapters are not included in the verification kit.

The Performance Verification Software (PVS) must be run on a PC controller equipped as described below in Table 1. with a National Instruments (NI) PCI GPIB Interface card, the NI VISA library, and VISA Runtime Version 3.6 or later. The NI VISA Runtime license is available from NI as a stand-alone software package or as part of the NI GPIB Adapter hardware package. Please contact NI for additional details.

Table 1. Required PC Controller Equipment

Component	Description
PC Controller	Personal computer with: • Microsoft Windows XP or Microsoft Windows 7 • 233 MHz minimum single or dual processor system. Recommended is a PC with an Intel Pentium/Celeron family processor or an AMD K6/Athlon-/Duron-family processor • At least 1 GB RAM • CD drive • USB 2.0 minimum Type A Ports • At least 20 MB of hard disk space • Mouse • Keyboard • Monitor with minimum display resolution of 1024 x 786 • Printer • A printer is not required because the verification results and data are stored in four files on the computer hard disk drive. These files are saved in ASCII format for easy viewing and printing.

National Instruments	The following hardware and software are required from National Instruments (NI):
	• NI PCI GPIB board
	  • For desktop PCs, the NI Model PCI-GPIB board with Driver Software Version 2.1 and above.
	  • For laptop PCs, the NI Instruments Model PCMCIA-GPIB card with Driver Software Version 2.1 and above. The PCMCIA-GPIB card may come with a GPIB cable with card-to-standard GPIB connectors.
	• NI GPIB Driver Software V 2.1 or higher
	• VISA Runtime Version 3.6 or higher

GPIB Cable	A General Purpose Instrument Bus (GPIB) Cable is required between PC Controller and the VectorStar VNA. Available Anritsu parts are: • 2100-1, GPIB Cable – 1 m • 2100-2, GPIB Cable – 2 m – Recommended cable or equivalent. • 2100-4, GPIB Cable – 4 m The GPIB cable is connected to the VNA Rear Panel at the IEEE 488.2 GPIB Port.

4. Summary of Required Anritsu Hardware

The required Anritsu hardware depends on the VNA Model, the reference plane connector types, and whether automatic calibrator or manual calibration kits are to be used. Table 2 summarizes the required support hardware for each verification kit and VNA combination and provides fully insertable (m-f) DUT measurement reference planes.

Note	As described in the section above, the PC Controller, related hardware and software, and the connecting GPIB cable are also required. Only a single calibration kit, automatic or mechanical, is required. Not all configurations support the use of AutoCal Module Calibration Kits.

Table 2. Required Anritsu Hardware (1 of 2)

Verification Kit	VNA Model and Adapters	VNA Test Port Connections Required Adapters and/or Through Lines	Required Calibration Kit	
			AutoCal Module Cal Kit	Mechanical Cal Kit
3669B-1 V Connector Verification Kit With Two Adapters	**MS4647A/B or MS4645A/B** V Test Ports	**Test Port 1 V(m)** 33VFVF50C V(f) to V(f) Adapter on Port 1 **Test Port 2 V(m)** Through Line Cable on Port 2, use one: • 3670V50A-2 Test Port Cable V(f) to V(m), Ruggedized Semi-Rigid, 61 cm (24”) • 3671VFV50-100 Test Port Cable, Flexible Phase Stable, *Note #1* 33VVF50C V(m) to V(f) Adapter on cable above	36585V-2MF Precision AutoCal Module, V(m) to V(f) Connectors	3654D V Mechanical Calibration Kit with Fixed Loads 3654D-1 V Mechanical Calibration Kit with Sliding Loads
3666-1 3.5 mm Connector Verification Kit With Four Adapters	**MS4647A/B or MS4645A/B** V Test Ports with adapters for 3.5 mm	**Test Port 1 V(m)** 34VFKF50 V(f) to K(f) Adapter on Port 1 33SSF50 Adapter – 3.5 mm (m) to 3.5 mm (f), *Note #2* **Test Port 2 V(m)** 34VFK50 V(f) to K(m) Adapter on Port 2 Through Line Cable on adapter above, 3670K50-2 Test Port Cable K(f) to K(m), Ruggedized Semi-Rigid, 61 cm (24”) 33SSF50 3.5 mm (m) to 3.5 mm (f) Adapter on cable above	*AutoCal is not available for 3.5 mm Verification Kits*	3650A SMA/3.5 mm Mechanical Calibration Kit with Fixed Loads 3650A-1 SMA/3.5 mm Mechanical Calibration Kit with Sliding Loads
3668-1 K Connector Verification Kit With Two Adapters	**MS4644A/B or MS4642A/B** K Test Ports	**Test Port 1 K(m)** 33KFKF50B K(f) to K(f) Adapter on Port 1 **Test Port 2 K(m)** Through Line Cable on Port 2, use one: • 3670K50-2 Test Port Cable K(f) to K(m), Ruggedized Semi-Rigid, 61 cm (24”) • 3671KFK50-100 Test Port Cable, Flexible Phase Stable, 100 cm (39.4”) K(f) to K(m), *Note #3* 33KKF50B K(m) to K(f) Adapter on cable above.	36585K-2MF Precision AutoCal Module with K(m) to K(f) Connectors	3652A K Connector Mechanical Calibration Kit with Fixed Loads 3652A-1 K Connector Mechanical Calibration Kit with Sliding Loads

Table 2. Required Anritsu Hardware (2 of 2)

Verification Kit	VNA Model and Adapters	VNA Test Port Connections Required Adapters and/or Through Lines	Required Calibration Kit	
			AutoCal Module Cal Kit	Mechanical Cal Kit
3666-1 3.5 mm Connector Verification Kit With Two Adapters	**MS4644A/B or MS4642A/B** K Test Ports with adapters for 3.5 mm	**Test Port 1 K(m)** 33SFSF50 3.5 mm(f) to 3.5 mm(f) Adapter on Port 1, *Note #2*	AutoCal is not available for 3.5 mm Verification Kits	3650A SMA/3.5 mm Mechanical Calibration Kit with Fixed Loads 3650A-1 SMA/3.5 mm Mechanical Calibration Kit with Sliding Loads
		Test Port 2 K(m) Test Port Cable on Port 2, use one: • 3670K50-2 Test Port Cable K(f) to K(m), Ruggedized Semi-Rigid, 61 cm (24") • 3671KFK50-100 Test Port Cable K(f) to K(m), Flexible Phase Stable, 100 cm (39.4"), *Note #3* 33SSF50 3.5 mm (m) to 3.5 mm (f) Adapter on cable above		
3663-1 Type N Connector Verification Kit With Three Adapters	**MS4644A/B or MS4642A/B** K - Type N adapters	**Test Port 1 K(m)** Test Port Cable on Port 1: • 3671KFK50-60, Test Port Cable K(f) to K(m), Flexible Phase Stable, 60 cm (23.6"), *Note #3* 71693-R K(f) to N(f) Adapter on cable above	AutoCal is not available for Type N Verification Kits	3653A Type N Connector Mechanical Calibration Kit with Fixed Loads
		Test Port 2 K(m) Test Port Cable on Port 2: • 3671KFK50-60, Test Port Cable K(f) to K(m), Flexible Phase Stable, 60 cm (23.6") 71693-R K(f) to N(f) Adapter on cable above 33NN50B N(m) to N(m) Adapter on adapter above		

Naming – V connectors are also "1.85 mm connectors." K connectors are also "2.92 mm connectors."

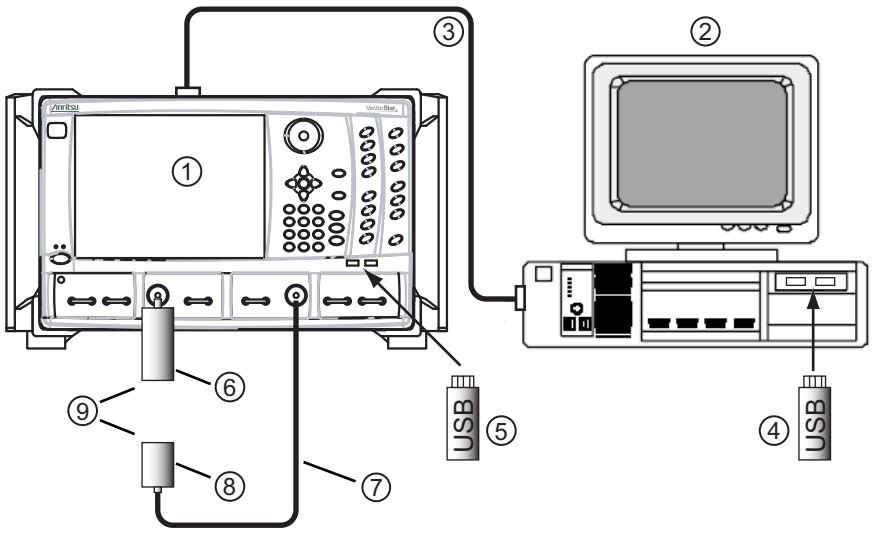
Note #1 – The ruggedized style V(f) connector on this cable is only for VNA V Test Ports. The connector does not fit standard V(m) connectors.

Note #2 – 3.5 mm connectors are mechanically compatible with K connectors.

Note #3 – The ruggedized style K(f) connector on this cable is only for VNA K Test Ports. The connector does not fit standard K(m) connectors.

5. PC Controller Cable Connections to VNA

The basic connections between the PC Controller, the VNA, and the verification components are shown below.



1. VectorStar MS4640A/B Series VNA
2. PC Controller:
   - With National Instruments (NI) PCI GPIB Card
   - With installed NI VISA Library
   - With installed 2300-579 PVS application
3. GPIB Cable:
   - From VNA Rear Panel IEEE 488.2 GPIB Port to PC Controller with NI PCI GPIB Card
4. Verification Kit USB Device with characterization data
5. Calibration Kit USB Device with characterization data
6. Port 1 F-F Adapter
7. Test Port Through Line M-F Cable
8. M-F Adapter attached to Through Line and Port 2
9. Insert calibration or verification components here.

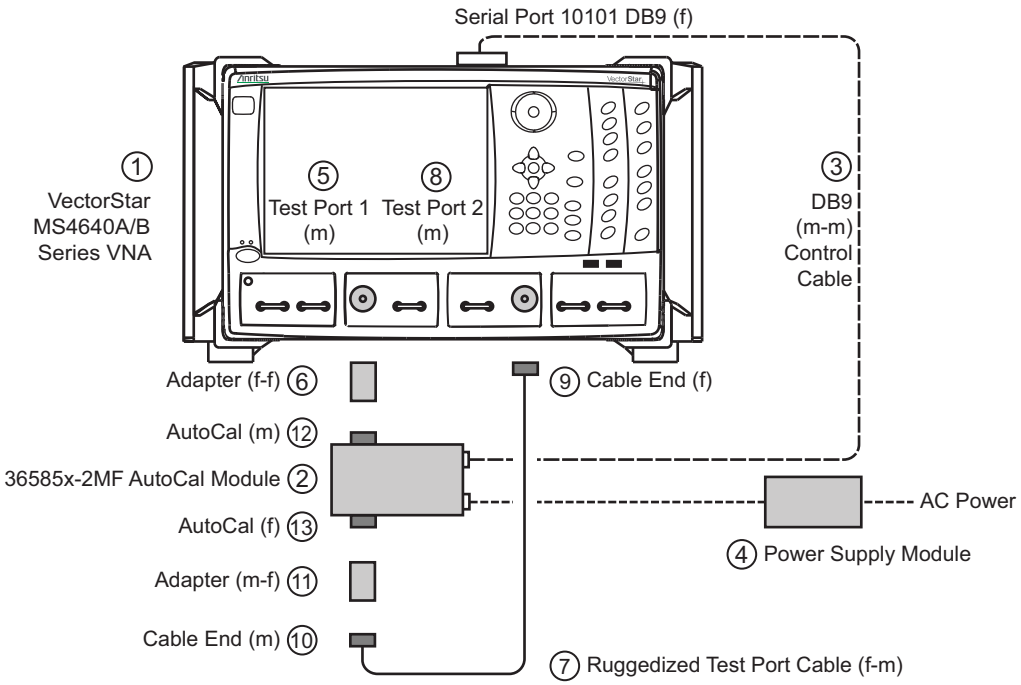
Note: The setup for the 3666-1 3.5 mm and 3663-1 Type N Verification Kits vary slightly with additional adapters.

Figure 2. PC Controller to VNA Cable Connections

Note	Beginning with PVS Version 2.41, support for 4-Port Performance Verification is included for 2.92mm (K-Type) and 1.85mm (V-Type) connectors using either Fixed Load Calibration or AutoCal Calibration. Please see the User Guide (10410-00270) for additional information for 4-Port systems.

6. Precision AutoCal Module Connections

If a 36585 Precision Automatic Calibrator (AutoCal) Calibration Kit is used, connect it as shown below, but do not connect it to the VNA Test Ports until directed by the PVS. If you are using a mechanical calibration kit, skip this section.

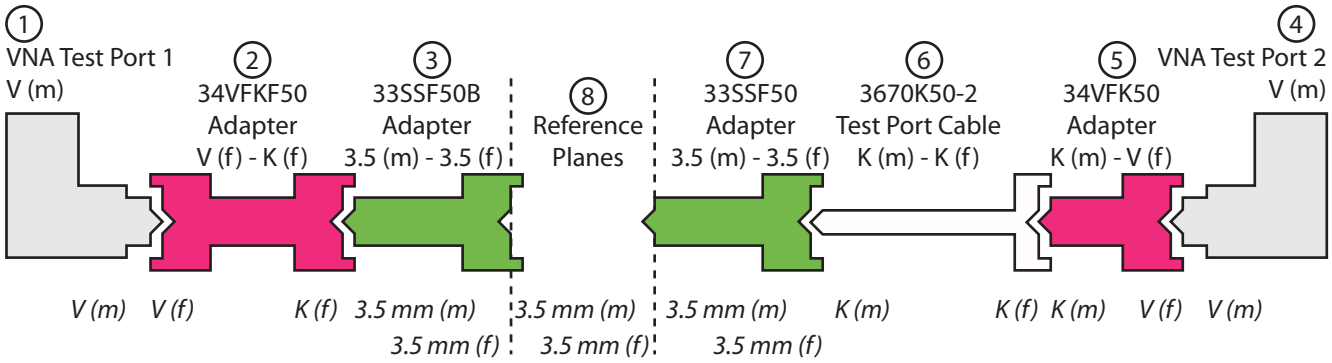


1. VectorStar VNA:
   - MS4645A/B, MS4647A/B V-Connector VNA
   - MS4642A/B, MS4644A/B K-Connector VNA
2. Precision AutoCal Module:
   - 36585V-2MF with V Connectors
   - 36585K-2MF with K Connectors
   - Other AutoCal Modules are not supported.
3. Connect the AutoCal Signal Cable (m-m) to the DB-9 connector on the Module. Connect the other end of the signal cable to the VNA Rear Panel Serial 10101 Port.
4. Connect the AC Power Block to the AutoCal Module and then to AC Power.
   - Allow the Module to warm up until its Blue LED is illuminated.
   - Do not connect the AutoCal Module to the VNA Test Ports until directed by the PVS application.
5. VNA Test Port 1 (m)
6. Install the Adapter (f-f) on Test Port 1:
   - 33VFVF50C, V(f) to V(f) Adapter on Port 1
   - 33KFKF50B, K(f) to K(f) Adapter on Port 1
7. Test Port Cable (m-f):
   - 3670V50A-2 Test Port Cable Ruggedized Semi-Rigid, 61 cm (24”) – V(f) to V(m)
   - 3670K50-2 Test Port Cable Ruggedized Semi-Rigid 61 cm (24”) – K(f) to K(m)
8. VNA Test Port 2 (m)
9. Install cable end (f) to Port 2
10. Install adapter to open end of cable on Port 2
11. Adapter (m-f):
    - 33VVF50C V(m) to V(f) Adapter on port 2 cable
    - 33KKF50B K(m) to K(f) Adapter on port 2 cable
12. Connect AutoCal male port to adapter on test port 1
13. Connect cable+adapter to female port of AutoCal

Figure 3. Connecting a Precision 36585 Series AutoCal Module

7. MS4645A/B, MS4647A/B VNAs Configured for 3.5 mm Connectors

For standard MS4645A/B and MS4647A/B VNAs equipped with V Test Ports, use the adapter configuration below to support the 3650A and 3650A-1 SMA/3.5 mm Mechanical Calibration Kits.

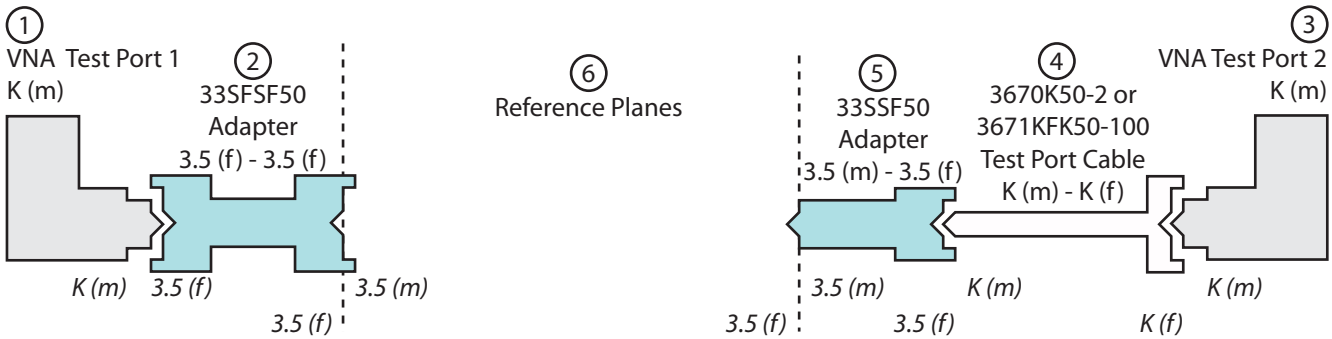


1. VNA Test Port 1 – Test Port V(m)
2. 34VFKF50 Adapter – V(f) to K(f)
3. 33SSF50B Adapter – 3.5 mm (m) to 3.5 mm (f)
   - 3.5 mm connectors are mechanically compatible with K connectors.
4. VNA Test Port 2 – Test Port K(m)
5. 34VFK50 Adapter – V(f) to K(m)
6. 3670K50-2 Test Port Cable – Test Port K(f) to K(m)
7. 33SSF50 Adapter – 3.5 mm (m) to 3.5 mm (f)
8. Fully Insertable Measurement Reference Plane – 3.5 mm (m) to 3.5 mm (f)

Figure 4. MS4645A/B, MS5647A/B V Connector VNAs with 3.5 mm Adapters

8. MS4642A/B, MS4644A/B VNAs Configured for 3.5 mm Connectors

For standard MS4642A/B and MS4644A/B VNAs equipped with K Test Ports, use the adapter configuration below to support the 3650A and 3650A-1 SMA/3.5 mm Mechanical Calibration Kits.

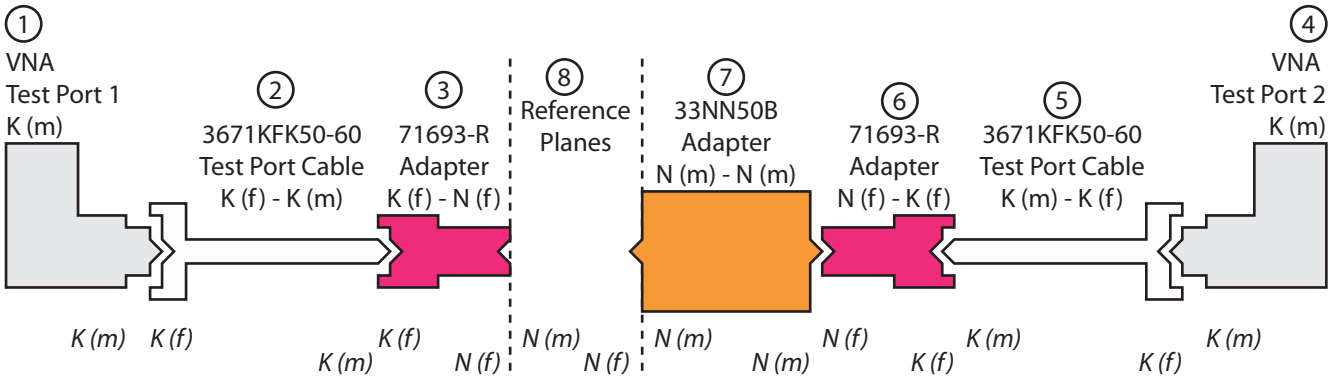


1. VNA Test Port 1 – Test Port K(m)
2. 33SFSF50 Adapter – 3.5 mm (f) to 3.5 mm (f)
3. VNA Test Port 2 – Test Port K(m)
4. Test Port Cable – Test Port K(f) to K(m)
   - 3670K50-2 Test Port Cable *or*
   - 3671KFK50-100 Test Port Cable
5. 33SSF50 Adapter – 3.5 (f) to 3.5 (m)
6. Fully Insertable Measurement Reference Plane – 3.5 mm (m) to 3.5 mm (f)

Figure 5. MS4642A/B, MS4644A/B K Connector VNAs with 3.5 mm Adapters

9. MS4642A/B, MS4644A/B VNAs Configured for Type N Connectors

Use this configuration when there is a requirement to add Type N adapters to the standard K(m) Test Ports on a VectorStar MS4642A/B, MS4644A/B VNA. This configuration requires using a 3653A Type N Connector Calibration Kit with Fixed Loads and a 3663-1 Type N Connector Verification Kit. This configuration provides a Type N connector fully insertable N(m) to N(f) measurement reference plane.



1. VNA Test Port 1 – Test Port K(m)
2. 3671KFK50-60 Test Port Cable – Test Port K(f) to K(m)
3. 71693-R Adapter – Test Port K(f) to N(f)
4. VNA Test Port 2 – Test Port K(m)
5. 3671KFK50-60 Test Port Cable – Test Port K(f) to K(m)
6. 71693-R Adapter – K(f) to N(f)
7. 33NN50B Adapter – N(m) to N(m)
8. Fully Insertable Measurement Reference Plane – N (m) to N(f)

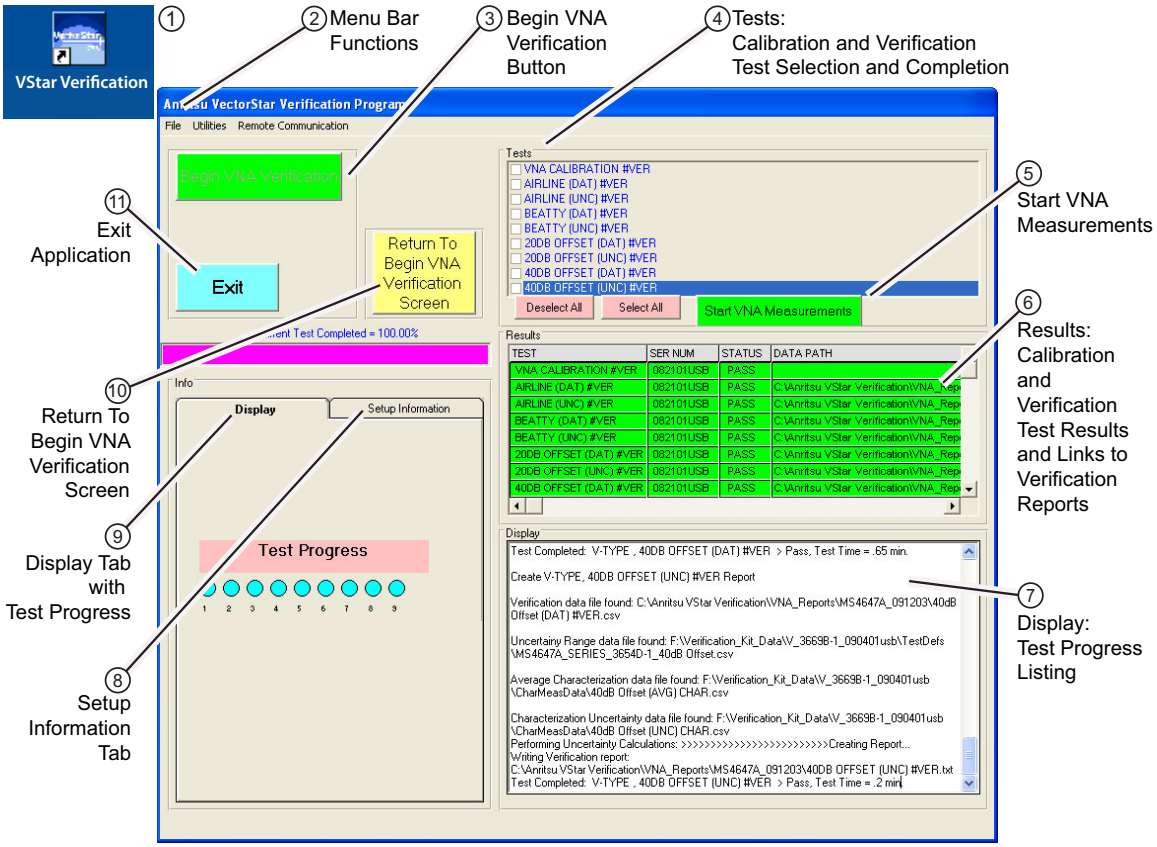
Figure 6. MS4642A/B, MS4644A/B K VNA configured with Type N Reference Planes

10. Installing and launching the PVS

1. Insert the USB Memory Device into the USB slot.
2. Open Windows Explorer, browse to the USB Drive, and double click on Startup.htm.
3. The Verification Software navigation page should then appear.
4. From the Startup screen, click the Install Anritsu VectorStar Verification Application Software link.
5. Follow the dialog-box instructions to complete the installation.
6. To launch, double-click the VStar Verification desktop icon shown below in the upper-left corner of Figure 7 at #1.
7. Alternatively, select Start | Program | Anritsu VStar Verification | VStar Verification.

11. User Interface Operation

When the PVS Application starts, preliminary screens gather information about the VNA, calibration, and verification components. When complete, the Verification Program Main Screen appears.



1. Double-click **PC Controller Desktop** icon to start.
2. Menu Bar Functions – Menus for File, Utilities, Report Printing, and Remote GPIB Communication.
3. **Begin VNA Verification** button – Starts setup process. When setup is complete, the button is unavailable.
4. Tests Area – Allows all or some tests to be selected. As each is completed, the check box is deselected.
5. Click **Start VNA Measurements** for tests.
6. Double-click color-coded row for each report.
7. Display Area – Listing of test events and file names.
8. Setup Tab – Not shown here. Lists all device model information and serial numbers.
9. Display Tab – Test Progress buttons display test completions. The Progress Bar shows individual test progress.
10. Return to Begin VNA Verification Screen Button – Restarts the setup procedure.
11. Exit Button – Exits the PVS application

Figure 7. PVS Verification Program Main Screen and User Interface Controls

12. PVS VNA Calibration/Verification Test Sequence

Any combination of tests can be selected. If all are selected, the calibration tests are completed first followed by the verification tests in the following sequence:

- VNA Calibration Test
- Airline (DAT)
- Airline (UNC)
- Beatty Airline (DAT)
- Beatty Airline (UNC)
- 20 dB Offset (Pad) (DAT)
- 20 dB Offset (Pad) (UNC)
- 40 dB Offset (Pad) (DAT) (on MS4645A/B and MS4647A/B only using the 3669B-1 V Verification Kit)
- 50 dB Offset (Pad) (DAT) (on MS4642A/B and MS4644A/B or using a MS4647A/B with the 3666-1 SMA/3.5 mm Verification Kit)
- 40 dB or 50 dB Offset (Pad) (UNC)

13. Calibration/Verification Reports

Each verification test generates CSV DAT and TXT UNC reports. The CSV DAT reports are the current measured data for the user's devices. The TXT UNC reports are the calculated uncertainties based on the measured data above and the verification kit certification data. The reports can be viewed and printed in two sizes. Other applications, such as spreadsheets or word processors, can easily import the report data.

Note	Beginning with PVS Application release version 2.4, the report format has been updated to be compliant with ILAC P14:01/2013 with regard to two significant figures for measurement uncertainty, and least significant digits for measured results. For more details, refer to the full user guide (VectorStar™ MS4640A/B Series 366xX-1 Verification Kits and 2300-579 PVS User Guide – 10410-00270). For previous users who may prefer the Historic format, the PVS Application software will support generation of this previous format. For instructions on how to change the report format, refer to the Appendix titled “Changing Report Format” in 10410-00270.

14. Test Results Grid

On the Verification Program Main Screen, the right side Results area Figure 8 displays the general status of each completed test in which:

- Green = Test Passed
- Red = Test Failed
- Magenta = Test Canceled or Aborted

For the eight (8) verification tests, clicking on the Data Path column displays the test report in the PC default text editor, usually Windows Notepad.

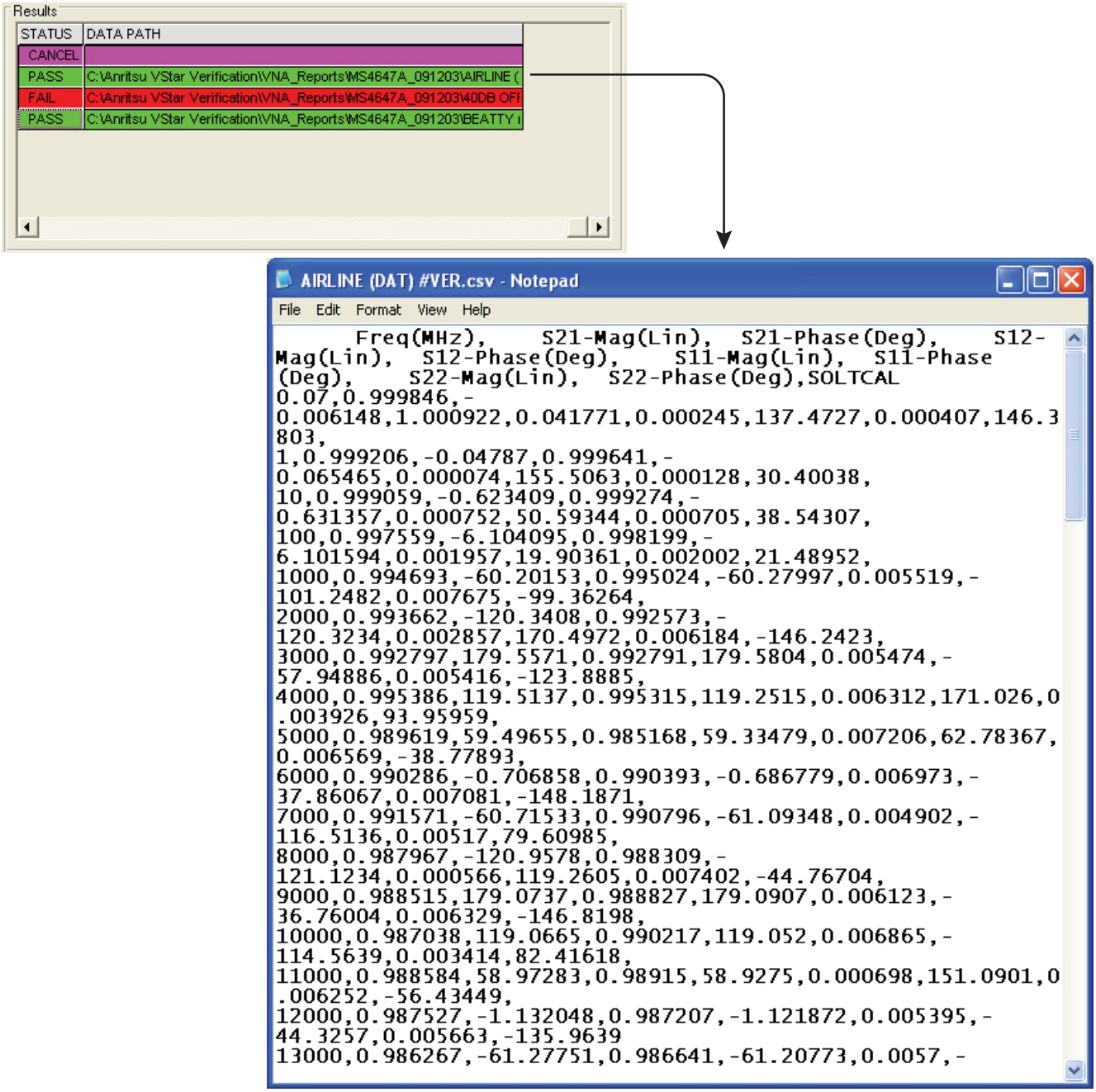


Figure 8. Test Results Grid and Related Report

Notes

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Anritsu

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Anritsu prints on recycled paper with vegetable soybean oil ink.

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