

# Keysight Technologies

## RF Power Amplifier Test, Reference Solution

9 kHz to 27 GHz

### Configuration Guide



# Overview

This configuration guide contains information to help you configure your RF Power Amplifier Test, Reference Solution and tailor the system to meet your requirements.

Table of Contents	Page Number
<b>Hardware</b>	
A: Select Options for M9381A PXIe VSG	3
B: Select PXIe VSA	4
C: Add M9300A PXIe Frequency Reference(s)	5
D: Select Hardware for Envelope Tracking and DUT Control	5
E: Select Controller	6
F: Select a Chassis & Accessories	8
<b>Reference solution</b>	
G: Select Solution Start-up Kit (optional)	8
<b>Physical Connection Diagram for Controllers, Chassis &amp; Accessories</b>	9
<b>Software</b>	
H: Select Software for M9381A PXIe VSG	10
I: Select Software for PXIe VSA (M9391A or M9393A)	11
<b>Services</b>	
J: Select Services: Warranty, Calibration, Start-up Assistance	13
<b>Configurations</b>	
Single PXIe VSA/G or PXIe VSG and PXIe Performance VSA	14
<b>Other</b>	
Upgrading Your System	15
Using a Non-Keysight Chassis	15
PC Requirements for M9381A PXIe VSG and M9391A/M9393A PXIe VSA Control	16
Related Literature	16

## A. Select Options for M9381A PXIe VSG

Recommended options for RF Power Amplifier Test, Reference Solution indicated ■ below.

<b>Step 1. Start with M9381A PXIe VSG base configuration</b>			
■	The M9381A PXIe VSG (occupies 4 slots) includes:		
	M9301A	PXIe Synthesizer	– Frequency range 1 MHz - 3 GHz
	M9310A	PXIe Source Output	– Modulation bandwidth 40 MHz
	M9311A	PXIe Digital Vector Modulator	– Memory 32 MSa
			– One day start up assistance
			– Modular interconnect cables
			– Software, example programs and product information on CD
			– Return to Keysight Technologies, Inc. warranty - 3 years
<b>Step 2. Choose recommended frequency range</b>			
<input type="checkbox"/>	M9381A-F03	1 MHz - 3 GHz	Included in base configuration of M9381A
■	M9381A-F06	1 MHz - 6 GHz	
<b>Step 3. Choose recommended modulation bandwidth</b>			
<input type="checkbox"/>	M9381A-B04	40 MHz	Included in base configuration of M9381A
■	M9381A-B10	100 MHz	
<input type="checkbox"/>	M9381A-B16	160 MHz	
<b>Step 4. Choose recommended memory size</b>			
■	M9381A-M01	32 MSa	Included in base configuration of M9381A
<input type="checkbox"/>	M9381A-M05	512 MSa	
<input type="checkbox"/>	M9381A-M10	1024 MSa	
<b>Step 5. Add high output power (optional)</b>			
Minimizes need for external amplification to overcome power loss			
<input type="checkbox"/>	M9381A-1EA	High output power	Max output power +18 dBm across the frequency range
<b>Step 6. Add recommended fast switching speed</b>			
Accelerates test throughput			
■	M9381A-UNZ	Fast switching	240 $\mu$ s RF tuning and 10 $\mu$ s baseband tuning in list mode
<b>Step 7. Add analog modulation (optional)</b>			
<input type="checkbox"/>	M9381A-UNT	Analog modulation	AM, FM, phase, pulse & multitone modulation

## B. Select PXIe Vector Signal Analyzer (either M9391A or M9393A)

Recommended options for RF Power Amplifier Test, Reference Solution indicated below.

### B1. For M9391A PXIe VSA

Step 1. Start with M9391A PXIe VSA base configuration			
■	The M9391A PXIe VSA base configuration (occupies 3 slots) includes:		
	M9301A	PXIe synthesizer	– Frequency range 1 MHz - 3 GHz
	M9350A	PXIe downconverter	– Analysis bandwidth 40 MHz
	M9214A	PXIe IF digitizer	– Memory 128 MSa (512 MB)
			– One day start up assistance
			– Modular interconnect cables
			– Software, example programs and product information on CD
			– Return to Keysight warranty - 3 years
Step 2. Choose recommended frequency range			
<input type="checkbox"/>	M9391A-F03	1 MHz - 3 GHz	Included in base configuration of M9391A
■	M9391A-F06	1 MHz - 6 GHz	
Step 3. Choose recommended analysis bandwidth			
<input type="checkbox"/>	M9391A-B04	40 MHz	Included in base configuration of M9391A
■	M9391A-B10	100 MHz	
<input type="checkbox"/>	M9391A-B16	160 MHz	
Step 4. Choose recommended memory size			
■	M9391A-M01	128 MSa	Included in base configuration of M9391A
<input type="checkbox"/>	M9391A-M05	512 MSa	
<input type="checkbox"/>	M9391A-M10	1024 MSa	
Step 5. Add recommended fast switching speed			
Accelerates test throughput			
■	M9391A-UNZ	Fast switching	

### B2. M9393A PXIe Performance VSA

Recommended when harmonics measurements > 6 GHz are required

Step 1. Start with M9393A PXIe Performance VSA base configuration			
<input type="checkbox"/>	The M9393A PXIe performance VSA base configuration (occupies 4 slots) includes:		
	M9308A	PXIe synthesizer	– Frequency range 9 kHz - 8.4 GHz
	M9365A	PXIe downconverter	– Analysis bandwidth 40 MHz
	M9214A	PXIe IF digitizer	– Memory 128 MSa (512 MB)
			– One day start up assistance
			– Modular interconnect cables
			– Software, example programs and product information on CD
			– Return to Keysight warranty - 3 years
Step 2. Choose a frequency range			
<input type="checkbox"/>	M9393A-F08	9 kHz – 8.4 GHz	Included in base configuration
<input type="checkbox"/>	M9393A-F14	9 kHz – 14 GHz	
<input type="checkbox"/>	M9393A-F18	9 kHz – 18 GHz	
<input type="checkbox"/>	M9393A-F27	9 kHz – 27 GHz	

## B2. M9393A PXIe Performance VSA (continued)

Recommended when harmonics measurements > 6 GHz are required

Step 3. Choose an analysis bandwidth			
<input type="checkbox"/>	M9393A-B04	40 MHz	Included in base configuration
<input type="checkbox"/>	M9393A-B10	100 MHz	
<input type="checkbox"/>	M9393A-B16	160 MHz	
Step 4. Choose memory size			
<input type="checkbox"/>	M9393A-M01	128 MSa	Included in base configuration
<input type="checkbox"/>	M9393A-M05	512 MSa	
<input type="checkbox"/>	M9393A-M10	1024 MSa	
Step 5. Add fast switching speed (optional)			
Accelerates test throughput and stepped spectrum analysis			
<input type="checkbox"/>	M9393A-UNZ	Fast tuning	
Step 6. Add pre-amplifier (optional)			
Enhances sensitivity to detect low-level signals			
<input type="checkbox"/>	M9393A-P08	9 kHz – 8.4 GHz	
<input type="checkbox"/>	M9393A-P14	9 kHz – 14 GHz	
<input type="checkbox"/>	M9393A-P18	9 kHz – 18 GHz	
<input type="checkbox"/>	M9393A-P27	9 kHz – 27 GHz	

## C. Add M9300A PXIe Frequency Reference(s)

Required to meet data sheet specifications

Step 1. Add a M9300A PXIe frequency reference (occupies 1 slot)			
One frequency reference required per chassis. It can support up to five VSGs or VSAs			
<input checked="" type="checkbox"/>	M9300A	PXIe Frequency Reference	Five 100 MHz outputs One 10 MHz output Internal 10 MHz OCXO timebase output

## D. Select Hardware for Envelope Tracking and DUT Control







Recommended options for RF Power Amplifier Test, Reference Solution indicated below.

Step 1. Select Waveform Generator		
Plays envelope waveform for envelope tracking measurement		
<input checked="" type="checkbox"/>	33522B	Waveform generator, 30 MHz, 2-channel
<input checked="" type="checkbox"/>	33522B-OCX	Adds high stability OCXO timebase
<input checked="" type="checkbox"/>	33522B-MEM	Adds 16 MB memory
Step 2. Select SMU		
For DUT control		
<input checked="" type="checkbox"/>	N6700B	Low profile modular power system mainframe
<input checked="" type="checkbox"/>	N6782A	2-quadrant source/measure unit (SMU) for functional test
<input type="checkbox"/>	N6784A	4-quadrant source/measure unit (SMU) for functional test
Step 3. Select power sensor		
For calibration		
<input checked="" type="checkbox"/>	U2004A	USB power sensor 9 kHz to 6 GHz



E. Select Controller (either PXIe embedded controller or external PC controller) <sup>1</sup>

E2. For external PC controller, select options for laptop or desktop PC, below <sup>1</sup>

To use your laptop PC as a controller:			
<input type="checkbox"/>	M9045B	PCIe ExpressCard adapter	
<input type="checkbox"/>	Y1200B	PCIe cable	
<input type="checkbox"/>	M9021A	PCIe cable interface <sup>2</sup> : 1 slot	
To use your desktop PC as a controller:			
<input type="checkbox"/>	M9048A	PCIe desktop adapter	
<input type="checkbox"/>	Y1202A	PCIe cable	
<input type="checkbox"/>	M9021A	PCIe cable interface <sup>2</sup> : 1 slot	

1. For list of qualified external controllers, please see Tested Computer List Technical Note literature no. 5990-7632EN. See physical connections diagram on page 9.

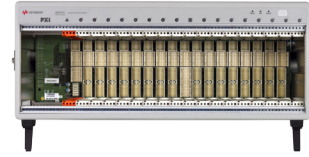
2. The M9021A is used for either PC control option and can only be used with the Keysight M9018A 18-slot chassis.

## F. Select a Chassis and Accessories

Recommended options for RF Power Amplifier Test, Reference Solution indicated below.

### Step 1. Select a chassis

- M9018A PXIe 18-slot chassis



### Step 2. Choose enough slot blocker kits and EMC filler panels to fill every open slot

Recommended to achieve data sheet specifications

- Y1212A Qty 2 Slot blocker kit: 5 slots

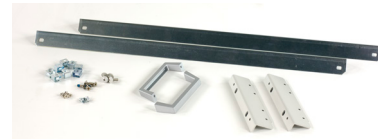


- Y1213A Qty 2 PXI EMC filler panel kit: 5 slots



### Step 3. Choose a rack mount kit (optional)

- Y1215A Rack mount kit for M9018A PXIe 18-slot chassis



### Step 4. Choose an air inlet kit<sup>1</sup> (optional)

Recommended for rack mounted systems with less than 1U space below chassis

- Y1214A Air inlet kit: M9018A PXIe 18-slot chassis<sup>1</sup>



## G. Select a Solution Start-up Kit

### Choose a solution level start-up kit (optional)

Includes documentation, configuration software and example programs

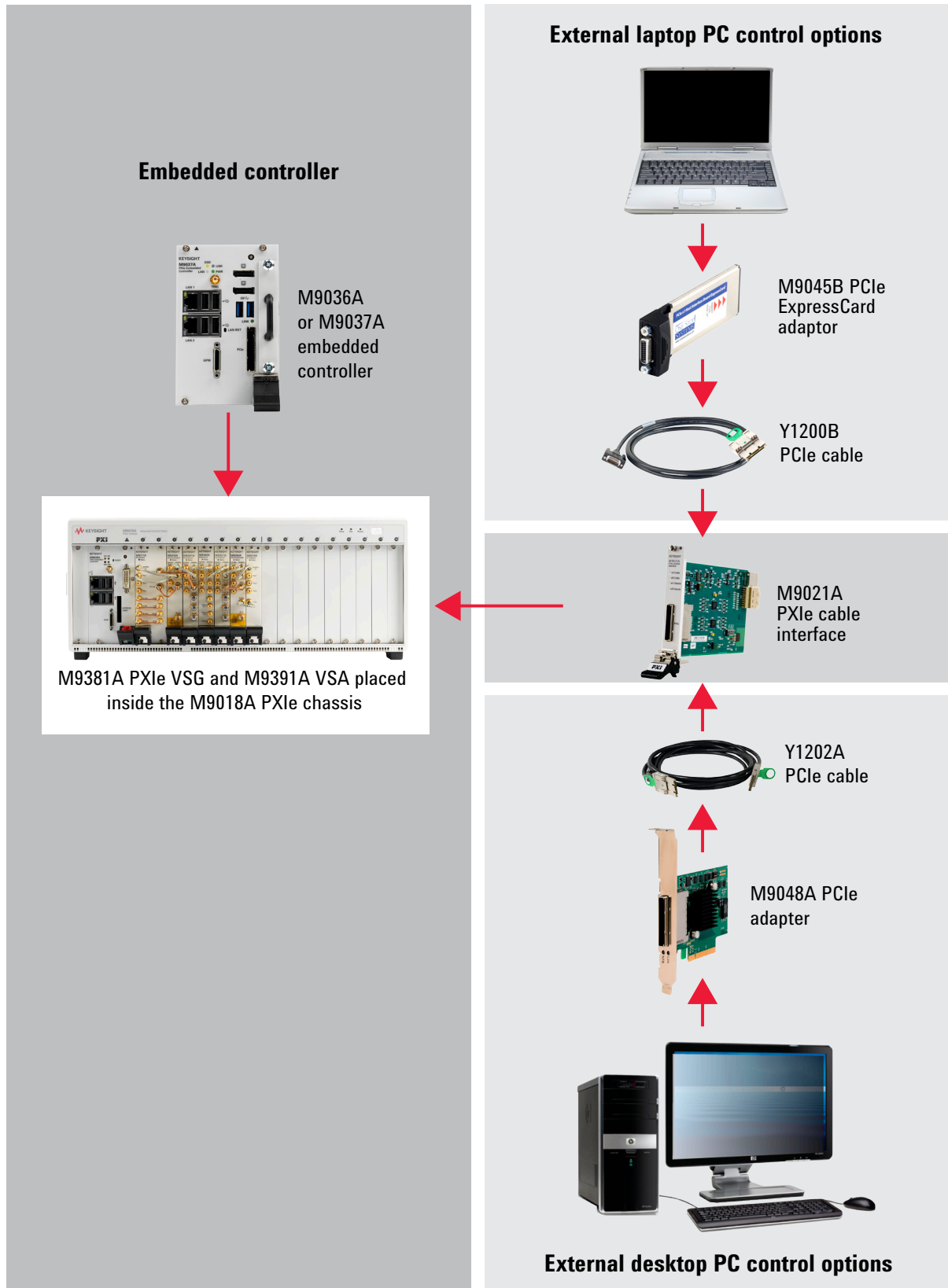
- Y1299A-002 RF power amplifier test, reference solution

1. Available in 1-slot, 2-slot or 3-slot options depending on the chassis configuration.  
For more information, please visit [www.keysight.com/find/m9018a](http://www.keysight.com/find/m9018a)



# Physical Connections

## Physical Connection Diagram for Controllers



## H. Select Software for M9381A PXIe VSG

### Step 1. Start with M9381A base configuration

- The M9381A comes standard with the following software:
  - Keysight IO Libraries Suite including Connection Expert <sup>1</sup>
  - Instrument software, soft front panel, drivers for use with MATLAB, LabVIEW, Visual Studio (including VB Net, C#, C/C++), Keysight VEE <sup>2</sup>
  - Sample waveforms and programming examples

### Step 2. Download free Keysight Command Expert software <sup>4</sup> (optional)

FREE software that provides fast and easy instrument control for the PC. Command Expert combines instrument command sets, command sequences, documentation, syntax checking and command execution in one simple interface. Command Expert helps you to:

- Find instrument commands
- Access command documentation
- Verify command syntax
- Build instrument command sequences
- Execute instrument command sequences
- Integrate sequences in MATLAB, Visual Studio, Excel, LabVIEW, Keysight VEE or Keysight SystemVue PC application environment
- Generate code for command sequences in MATLAB, Visual C#, Visual Basic.NET and Visual C/C++
- Profile command execution time
- Debug command sequences using breakpoints and single stepping

### Step 3. Add Signal Studio software <sup>3,5</sup> (optional)

Provides performance optimized referenced signals validated by Keysight

Cellular Communications		
<input type="checkbox"/>	N7600B	Signal Studio for W-CDMA / HSPA+
<input type="checkbox"/>	N7601B	Signal Studio for cdma2000® / 1xEV-DO
<input type="checkbox"/>	N7602B	Signal Studio for GSM / EDGE / EVO
<input type="checkbox"/>	N7612B	Signal Studio for TD-SCDMA / HSDPA
<input checked="" type="checkbox"/>	N7624B	Signal Studio for LTE / LTE-Advanced FDD
<input type="checkbox"/>	N7625B	Signal Studio for LTE / LTE-Advanced TDD
Wireless Connectivity		
<input type="checkbox"/>	N7606B	Signal Studio for <i>Bluetooth</i> ®
<input type="checkbox"/>	N7615B	Signal Studio for Mobile WiMAX™
<input type="checkbox"/>	N7617B	Signal Studio for WLAN 802.11a/b/g/n/ac
Audio/Video Broadcasting		
<input type="checkbox"/>	N7611B	Signal Studio for Broadcast Radio
<input type="checkbox"/>	N7623B	Signal Studio for Digital Radio

To use Signal Studio with modular instruments, you must purchase a "connect to" license for each Signal Studio license used (see list at left).

- 9FP Connect to M9381A/M9252A fixed perpetual license (recommended)
- 9TP Connect to M9381A/M9252A transportable perpetual license

For LTE (N7624B or N7625B), the following licensing options are recommended:

- HFP Basic LTE FDD Rel 9 fixed perpetual license
- JFP Basic LTE-Advanced FDD Rel 10 fixed perpetual license
- KFP Envelope tracking fixed perpetual license

### Step 4. Add MATLAB software <sup>6</sup> (optional)

Create arbitrary waveforms, customize measurement and data analysis routines, create your own instruments applications and test systems, automate measurements, signal generation, and report generation

<input type="checkbox"/>	N6171A-M01	MATLAB Basic Package
<input type="checkbox"/>	N6171A-M02	MATLAB Standard Package
<input type="checkbox"/>	N6171A-M03	MATLAB Advanced Package

1. Both IO library (version 16.3 or newer) and Connection Expert software need to be installed on the PC controlling the equipment. To download, visit [www.keysight.com/find/iosuite](http://www.keysight.com/find/iosuite)
2. Find latest versions of this software at [www.keysight.com/find/m9381a](http://www.keysight.com/find/m9381a)
3. For more information, see Signal Studio brochure, literature number 5989-6448EN.
4. To download or get more information on Command Expert, visit [www.keysight.com/find/commandexpert](http://www.keysight.com/find/commandexpert)
5. To generate an envelope, Signal Studio for LTE must be purchased.
6. For more information on MATLAB software, visit [www.keysight.com/find/n6171a](http://www.keysight.com/find/n6171a)

# I. Select Software for PXIe VSA (M9391A or M9393A)

## Step 1. Start with M9391A or M9393A base configuration

- The M9391A and M9393A come standard with the following software:
  - Keysight IO Libraries Suite including Connection Expert <sup>1</sup>
  - Instrument software, soft front panel, drivers for use with MATLAB, LabVIEW, Visual Studio (including VB Net, C#, C/C++), Keysight VEE <sup>2</sup>
  - Sample waveforms and programming examples

## Step 2. Download free Keysight Command Expert software <sup>3</sup> (optional)

FREE software that provides fast and easy instrument control for the PC. Command Expert combines instrument command sets, command sequences, documentation, syntax checking and command execution in one simple interface. Command Expert helps you to:

- Find instrument commands
- Access command documentation and verify command syntax
- Build and execute instrument command sequences
- Integrate sequences in MATLAB, Visual Studio, Excel, LabVIEW, Keysight VEE or Keysight SystemVue PC application environment
- Generate code for command sequences in MATLAB, Visual C#, Visual Basic.NET and Visual C/C++
- Profile command execution time
- Debug command sequences using breakpoints and single stepping

## Step 3. Add X-Series Measurement Applications for Modular Instruments <sup>4</sup> (optional)

Provides essential RF conformance measurements and tasks for specific communications standards.

■	M9080B	LTE/LTE-Advanced FDD <sup>5</sup>	To use X-series measurement applications with modular instruments, you must purchase the license with product number "M90XX" and select either: <ul style="list-style-type: none"><li>– 1FP Fixed perpetual license (recommended)</li><li>– 1TP Transportable perpetual license</li></ul>
<input type="checkbox"/>	M9082B	LTE/LTE-Advanced TDD <sup>5</sup>	
<input type="checkbox"/>	M9073A	W-CDMA/HSPA+	
<input type="checkbox"/>	M9071A	GSM/EDGE/EVO	
<input type="checkbox"/>	M9079A	TD-SCDMA/HSPA	
<input type="checkbox"/>	M9076A	1xEV-DO	
<input type="checkbox"/>	M9072A	cdma2000/cdmaOne	
<input type="checkbox"/>	M9077A	WLAN 802.11a/b/g/n/ac	

1. Both IO library (version 16.3 or newer) and Connection Expert software need to be installed on the PC controlling the equipment.

To download, visit [www.keysight.com/find/iosuite](http://www.keysight.com/find/iosuite)

2. Find latest versions of this software at [www.keysight.com/find/m9391a](http://www.keysight.com/find/m9391a)

3. To download or get more information on Command Expert, visit [www.keysight.com/find/commandexpert](http://www.keysight.com/find/commandexpert)

4. For more information, see "Accelerate PXI VSA Measurements with X-Series Measurement Applications," literature number 5991-2604EN.

5. For LTE-Advanced licenses, select options – 2FP or – 2TP. For more information, see the M9080/82B technical overview, literature number 5991-4610EN.

## I. Select Software for PXIe VSA (M9391A or M9393A)

<b>Step 4. Add 89600 VSA Software<sup>1</sup> (optional)</b>		
Provides time, spectrum and stepped spectrum measurements, powerful displays, data recording and playback, links to MATLAB and more		
<input type="checkbox"/>	89601B-200	Basic 89600 VSA software
<input type="checkbox"/>	89601B-300	Hardware connectivity to over 40 Keysight instruments (required if using 89600 VSA software with modular instruments)
<input type="checkbox"/>	89601B-SSA	Spectrum analysis <sup>2</sup>
Measurement options		
<input type="checkbox"/>	89601B-AYA	General purpose vector modulation analysis of over 30 types of presets
<input type="checkbox"/>	89601B-BHF	Custom OFDM modulation analysis of proprietary and pre-standard OFDM formats
<input type="checkbox"/>	89601B-B7R	WLAN 802.11a/b/g/j/p
<input type="checkbox"/>	89601B-B7Z	WLAN 802.11n MIMO
<input type="checkbox"/>	89601B-BHJ	WLAN 802.11ac MIMO (requires 89601B-B7Z)
<input type="checkbox"/>	89601B-BHD	LTE FDD
<input type="checkbox"/>	89601B-BHG	LTE-Advanced FDD
<input type="checkbox"/>	89601B-BHE	LTE TDD
<input type="checkbox"/>	89601B-BHH	LTE-Advanced TDD
<input type="checkbox"/>	89601B-B7T	cdma2000/cdmaOne
<input type="checkbox"/>	89601B-B7U	W-CDMA/HSPA+
<input type="checkbox"/>	89601B-B7W	1xEV-DO
<input type="checkbox"/>	89601B-B7X	TD-SCDMA
<input type="checkbox"/>	89601B-B7R	3G Bundle (includes cdma2000, W-CDMA/HSPA+, 1xEV-DO & TD-SCDMA options)
<input type="checkbox"/>	89601B-BHC	RFID
<input type="checkbox"/>	89601B-BHK	Custom IQ

1. For more information, see 89600 VSA software configuration guide literature number 5990-6386EN.

2. Select for harmonics measurements. For best speed, M9391A/M9393A-UNZ and -B16 are recommended.

## J. Select Services: Warranty, Calibration, Start-up Assistance

■	One day start-up assistance	Included in base configuration
■	Return to Keysight warranty - 3 years	Included in base configuration
□	R-51B-001-5Z	Return to Keysight warranty - 5 years
□	M9381A-UK6	Commercial calibration certificate with test data for M9381A (M9301A, M9310A, M9311A)
□	M9391A-UK6	Commercial calibration certificate with test data for M9391A (M9301A, M9350A, M9214A)
□	M9300A-UK6	Commercial calibration certificate with test data for M9300A
□	R-51B-001-3X	Express warranty - 5 day turnaround For 3 years
□	R-51B-001-5X	Express warranty - 5 day turnaround For 5 years
□	N7800A	Calibration and adjustment software

### Global warranty

Keysight Technologies provides the peace of mind that today's high tech industry requires. Your investment is protected by Keysight's global reach in more than 100 countries (either directly or through distributors). The warranty gives you convenient standard coverage for the country in which the product is used, eliminating the need to ship equipment back to the country of purchase. Keysight's warranty service provides:

- All parts and labor necessary to return your investment to full specified performance
- Recalibration for products supplied originally with a calibration certificate
- Return shipment

### Express warranty

Reduce downtime with the fastest repair service in the industry. The express warranty upgrades the global warranty to provide:

- 5 day typical turnaround repair service in the US, Japan, China and many EU countries or up to a 10 day improvement in turnaround time in the rest of the world
- Priority return shipment

### One day start-up assistance

A Keysight Technologies applications engineer will get you started quickly by helping you install the modules in a chassis, configure the controller, load software and start making measurements.

### Calibration services

The modular products are factory calibrated and shipped with an ISO-9002, NIST-traceable calibration certificate. A one year calibration cycle is recommended. The M9381A PXIe VSG and M9391A PXIe VSA are supported by the Keysight N7800A Calibration Software to perform calibrations that test all product specifications and is compliant with ISO 17025:2005, ANSI/NCSL Z540.3-2006 and Measurement Uncertainty per ISO Guide to Expression of Measurement Uncertainty 1995.

### N7800A calibration & adjustment software

The M9381A PXIe VSG and M9391A PXIe VSA are supported by Keysight's calibration and adjustment software. This is the same software used at Keysight's service centers to automate calibration. The software offers compliance tests for ISO 17025:2005, ANSI/NCSL Z540.3-2006, and measurement uncertainty per ISO Guide to Expression of Measurement Uncertainty.

Product Information: [www.keysight.com/find/contactus](http://www.keysight.com/find/contactus)  
Or call: 1 800 829-4444 US

Repair and Calibration: [www.keysight.com/find/infoline](http://www.keysight.com/find/infoline)  
Parts and Accessories: [www.parts.keysight.com](http://www.parts.keysight.com)  
Email Updates: [www.keysight.com/find/emailupdate](http://www.keysight.com/find/emailupdate)  
For all modular products: [www.keysight.com/find/modular](http://www.keysight.com/find/modular)

## Configurations

In each of the configurations shown below, the M9300A PXIe frequency reference needs to be ordered separately, or as an option to the M9381A PXIe VSG or M9391A/M9393A PXIe VSA.

Cables for module to module connections are shipped with the product. Additional cables for external connections shipped with the product are listed below.

Please see the startup guides for detailed cabling diagram and parts list:

- For M9381A PXIe VSG and M9391A PXIe VSA: literature number M9300-90090
- For M9393A PXIe Performance VSA: literature number M9393-90002

### PXIe VSA/G (M9391A + M9381A) for power amplifier test



### PXIe VSG and PXIe performance VSA (M9381A + M9393A) for power amplifier test with extended harmonics measurements



## Upgrading Your System

Your product can be easily upgraded after the initial purchase. All PXIe VSA and PXIe VSG options are controlled by a licensing key and can be quickly upgraded.

### How to upgrade your M9391A/M9393A PXIe VSA or M9381A PXIe VSG:

1. Contact your Keysight representative to place an order for an option upgrade.
2. You will receive your hardware entitlement certificate via email.
3. Redeem the certificate online by following the instructions provided to receive a license key file.
4. Install the license key file using the Keysight License Manager.
5. Begin using the new capability.

## Using a Non-Keysight Chassis

The M9381A and M9391A/M9393A (with M9300A frequency reference) can be successfully installed in a non-Keysight PXI chassis. Please use the following guidelines.

- Ensure that the chassis has 5 consecutive PXIe or PXI-H slots which can be used by the M9381A or M9391A/M9393A and M9300A.
- Ensure that the chassis and controller supports peer-to-peer PXI Express I/O switch topology.
- Ensure that controller selected is compatible with chassis.

Keysight M9018A PXIe chassis is required for MIMO capability and 89600 VSA software is required for MIMO analysis.

Please contact your Keysight representative for more detailed information. For technical assistance with non-Keysight equipment, please refer to the equipment manufacturer's website.

# PC Requirements for M9381A PXIe VSG and M9391A/M9393A PXIe VSA Control<sup>1</sup>

	Windows 7 and Vista	Windows XP <sup>3</sup>
Operating system	Windows 7 (32 & 64 bit) Windows Vista, SP 1 & 2 (32 & 64 bit)	Windows XP, SP <sup>3</sup>
Processor speed	1.5 GHz dual core (x86 or x64) minimum, 2.4 GHz recommended No support for Itanium64	1.5 GHz dual core minimum, 2.4 GHz recommended
Available memory	4 GB minimum 8 GB recommended	3 GB minimum
Available disk space 1	1.5 GB available hard disk space includes: 1 GB for Microsoft.NET framework 3.5 SPI <sup>2</sup> 100 MB for Keysight IO libraries suite 1.5 GB available hard disk space includes: 1 GB for Microsoft.NET framework 3.5 SPI <sup>2</sup> 100 MB for Keysight IO libraries suite	
Video	Support for DirectX 9 graphics with 128 MB graphics recommended (SuperVGA supported)	SuperVGA (800 x 600) 256 colors or more
Browser	Microsoft Internet Explorer 7.0 or greater	Microsoft Internet Explorer 6.0 or greater

1. For a list of computers compatible with Keysight Technologies PXIe M9018A chassis, refer to Tested Computer Technical Note (literature no. 5990-7632EN).
2. NET framework runtime components are installed by default with Windows Vista and Windows 7. Therefore, you may not need this amount of available disk space.
3. M9393A PXIe Performance VSA cannot be used with Windows XP.

## Related Literature

For more detailed product and specification information refer to the following literature and web pages:

- M9381A PXIe VSG, Data Sheet (literature no. 5991-0279EN)
- M9391A PXIe VSA, Data Sheet (literature no. 5991-2603EN)
- M9393A PXIe Performance VSA, Flyer (literature no. 5991-4035EN)
- M9391A PXIe VSA and M9381A PXIe VSG, Startup Guide (literature no. M9300-90090).
- Increase Power Amplifier Test Throughput with the M9381A PXIe VSG and M9391A PXIe VSA (literature no. 5991-0652EN)
- M9018A PXIe 18 slot Chassis, Data Sheet (literature no. 5990-6583EN)
- M9036A PXIe Embedded Controller, Data Sheet (literature no. 5990-8465EN)
- M9037A PXIe Embedded Controller, Data Sheet (literature no. 5991-3661EN)
- X-Series Measurement Applications for Modular Instruments, Brochure (literature no. 5991-2604EN)
- RF Power Amplifier Test, Reference Solution, Brochure (literature no. 5991-4104EN)
- 33522B Series Waveform Generator, Data Sheet (literature no. 5991-0692EN)
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