

Select the Right Agilent Signal Analyzer for Your Needs

Selection Guide



Models

ESA-L Series ESA-E Series 856x EC Series PSA Series 89600 Series 89400 Series E4406A



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How a vector signal analyzer differs from a spectrum analyzer

Traditional spectrum analyzers have a swept-tuned architecture, a higher frequency range and wider dynamic range than vector signal analyzers, and usually better RF characteristics overall.

A vector signal analyzer's strength lies in its ability to perform signal analysis separately from signal acquisition, its ability to demodulate complex and time-varying signals, and to preserve both the magnitude and phase information of a signal in order to perform advanced time-, frequency-, and modulation-domain analysis.

Analyzer Family Overviews

Spectrum analyzers

PSA Series

- Agilent's most advanced high-performance spectrum analyzer
- up to 50 GHz frequency ranges (325 GHz with external mixing)
- · leading edge performance, flexibility, and connectivity
- comprehensive spectrum and one-button format-based modulation analysis for 2G/3G communications systems and components
- Power Suite toolset allows for fast and accurate onebutton, format-based power measurements
- general-purpose and communication-focused measurement personalities
- 8566B/8568B programming code compatibility for ease of migration
- link to 89601A PC software for flexible in-depth vector modulation analysis



E4440A

Analyzer Family Overviews, continued

856x EC Series

- high-performance portable analyzers suited for R&D, field service, and manufacturing
- up to 50 GHz frequency ranges (325 GHz with external mixing)
- adaptable to specific applications with optional measurement personality cards
- · outstanding phase noise and sensitivity
- · rugged portability, color display, 1 Hz RBW



8563EC

ESA-L Series

- Agilent's most affordable solution for basic spectrum analysis needs
- rugged, reliable, and easy to use
- fast, accurate results
- color display
- built-in floppy disk drive
- ready-to-go with minimal options



E4408B

ESA-E Series

- scalable, mid-performance platform with excellent speed, accuracy, and dynamic range
- up to 26.5 GHz frequency ranges (325 GHz with external mixing)
- general-purpose and communication-focused measurement personalities plus 6-slot card cage to accept optional hardware cards
- portable, ideal for field installation and maintenance
- 8566B/8568B and 8590 Series programming code compatibility for ease of migration
- link to 89601A PC software for flexible in-depth vector modulation analysis



E4407B

Vector signal analyzers

E4406A

- optimized for wireless manufacturing and final design verification with one-button standards-based measurements
- measure signals at up to 4 GHz
- fast measurements and ease of use allow for increased production and throughput
- optional measurement personalities support up to eight wireless formats
- baseband IQ inputs allow you to test the complete signal path
- link to 89601A PC software for flexible in-depth vector modulation analysis



E4406A

89400 Series

- \bullet flexible in-depth vector modulation analysis
- \bullet optimized for in-depth R&D diagnostic analysis and troubleshooting
- quickly identify and quantify modulation impairments with extensive, flexible built-in tools
- · superb phase noise, built in arbitrary source
- 8 MHz information bandwidth from DC up to 2.65 GHz



89441A

89600 Series

- flexible in-depth vector modulation analysis
- PC software with VXI front end hardware to 6.0 GHz
- 36 MHz analysis bandwidth
- powerful time, frequency, and modulation domain analysis
- extensive, flexible demodulation tools
- seamless integration with PC-based tools for unparalleled flexibility in simulation, troubleshooting, and diagnostics
- test your system even with missing hardware through links to Agilent's Advanced Design System (ADS) software simulation tools
- bridge the gap between virtual design world and real physical hardware
- phase coherent, two-channel RF measurements



89640A

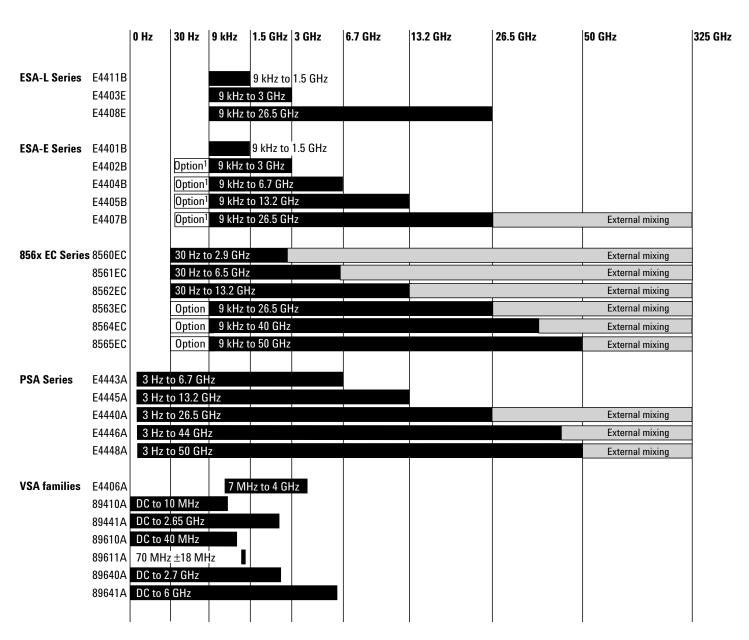
89601A software link to E4406A, ESA-E Series, PSA Series

- use the E4406A, ESA-E or PSA as an RF front end for 89601A software
- flexible in-depth vector modulation analysis and onebutton wireless standards-based design tests with one configuration
- extend modulation analysis capabilities of E4406A, ESA-E and PSA analyzers with the modulation troubleshooting tools of 89601A
- add time gating and signal capture with playback



E4407B with 89601A software

Frequency Ranges at a Glance



Note 1: 100 Hz option

Recommended Solutions for Your Application Spectrum analysis solutions

Optional				
measurement personalities	ESA-L Series	ESA-E Series	856x EC Series	PSA Series
Bluetooth™		•		
Broadcast TV		•		
Cable TV	•	•		
Cable fault location		•		
cdma2000				•
cdma0ne		•		•
Digital radio			•	
EDGE				•
EMI Precompliance		● 2		
GSM/DCS1800/PCS1900		•		•
GPRS		•		
Modulation analysis (EVM)		•		● 3
NADC (includes PCS)				•
Noise figure		•		•
PDC				•
Phase noise		•	•	•
Spurious response			•	
TD-SCDMA				•
W-CDMA				•
HSDPA (W-CDMA)				•
1xEV-D0				•
1xEV-DV (cdma2000)				•
8566B/8568B programming		•		•
code compatibility				
8590x Series programming	•	•		
code compatibility				

^{1.} Generally available as a combination of optional hardware and measurement personalities (application-specific software downloaded into the analyzer memory)

2. Available in E7400 Series

^{3.} Available as format-based measurements in individual measurement personalities

Vector signal analysis solutions

Application-specific solutions	 E4406A	89400 Series	89600 Series
Application-specific solutions	LTTUUA	03400 361163	03000 361163
Flexible vector/digital modulation analysis ¹	89601A link	•	•
Wideband R&D analysis			•
Narrowband R&D troubleshooting		•	•
Standard-compliant production	•	•	• 3
and design verification			
Non-standard signal analysis		•	•
Software simulation, integration, and analysis	s ²		•
Base station transmitter test	•		•
Mobile transmitter test	•		•
Standards-based preset measurements	5 ⁴		
1xEV-D0	•		•
1xEV-DV (cdma2000)	•		Future
HSDPA (W-CDMA)	•		Future
802.11a			•
802.11b			•
802.11g			•
APCO 25		•	•
Bluetooth		•	•
cdma2000	•		•
cdma0ne	•	•	
CDPD		•	•
DECT		•	<u> </u>
DTV8 (VSB8)		•	•
DTV16 (VSB16)		•	<u> </u>
DVB16 (QAM16)		•	<u> </u>
DVB32 (QAM32)		•	<u> </u>
DVB64 (QAM64)		•	<u> </u>
DVB-T			•
EDGE GSM	•	•	•
HIPERLAN Type 1 (high bit rate)	•	•	•
HIPERLAN Type 1 (low bit rate)			•
HIPERLAN Type 2			
iDEN			•
NADC (includes PCS)	•		
PDC	•	•	•
PHP (PHS)	•	•	•
TD-SCDMA			•
TETRA		•	•
W-CDMA		•	
VV-GDIVIA			

^{1.} Flexible modulation analysis refers to an analyzer's ability to demodulate non-standard or custom-made signals

^{2.} With link to Agilent Advanced Design System (ADS)

Wireless LAN 802.11a/b/g
 Available on E4406A through optional measurement personalities

Feature and Specification Comparison Tables Spectrum analyzers

Expanded by platform		ESA-L Series	ESA-E Series	856x EC Series	PSA Series	
Description Performance Performance options P		Basic spectrum	Mid-performance	High performance	Advanced high	
Performance			platform	portable	performance platform	
Price \$ \$ \$ \$ \$ \$ \$ \$ \$	Overview					
Applications specific solutions	Performance	*				
Schendard Sche	Price	\$	\$\$	\$\$\$	\$\$\$\$	
Performance agoinos	Application specific solutions		***	*	****	
Frequency range	Expandable platform		SStandard		Standard	
Specification summary Spe	Performance options					
Specification summary Spe	Frequency range	9 kHz to 26.5 GHz	30 Hz to 26.5 GHz ¹	30 Hz to 50 GHz	3 Hz to 50 GHz	
Speed Minimum RF sweep time	with external mixing		30 Hz to 325 GHz 1,2	30 Hz to 325 GHz 1,2	3 Hz to 325 GHz ^{1,2}	
Minimum RF sweep time 4 ms 1 ms 50 ms 1 ms Minimum Jaron span sweep time 4 ms 25 ns³ 50 ms 1 µs Local measurement rate ¹¹ ≥ 28/second ≥ 40/second 10/second ≥ 45/second Remote measurement rate over GPIB¹¹ ≥ 30 ms ≤ 75 ms Smitutes 30 minutes Phase noise y tability Phase noise at 1 GHz (10 MHz offset) −90 dBc/Hz −90 dBc/Hz −113 dBc/Hz −116 dBc/Hz Phase noise at 1 GHz (10 MHz offset) −90 dBc/Hz −90 dBc/Hz −113 dBc/Hz −116 dBc/Hz Phase noise at 1 GHz (10 MHz offset) −90 dBc/Hz −90 dBc/Hz −113 dBc/Hz −116 dBc/Hz Phase noise at 1 GHz (10 MHz offset) −90 dBc/Hz −90 dBc/Hz −113 dBc/Hz −116 dBc/Hz Phase noise at 1 GHz (10 MHz offset) −90 dBc/Hz −90 dBc/Hz −113 dBc/Hz¹ −116 dBc/Hz Phase noise at 1 GHz (10 MHz offset) −30 dBc/Hz¹ −130 dBc/Hz¹ −132 dBc/Hz¹¹ −132 dBc/Hz²¹ −112 dBc/Hz² Phase noise at 1 GHz (10 MHz offset) −18 dBc/Hz² −18 dBc/Hz²² −113 dBc/Hz²²	Specification summary					
Minimum zero span sweep time	Speed					
Local measurement rate 11 ≥ 28/second ≥ 40/second 10/second ≥ 50/second Remote measurement rate over GPIB 11 ≥ 30/second ≥ 40/second 7/second ≥ 45/second Fice center frequency tuning time 11 ≤ 90 ms ≤ 75 ms S Warm-up time 5 minutes 5 minutes 30 minutes Phase noise x 1 GHz (10 kHz offset) −90 dBc/Hz −113 dBc/Hz −116 dBc/Hz Phase noise at 1 GHz (10 kHz offset) −90 dBc/Hz −133 dBc/Hz 1 −132 dBc/Hz 10 −145 dBc/Hz Phase noise at 1 GHz (10 kHz offset) −137 dBc/Hz 1 −132 dBc/Hz 1 −145 dBc/Hz Phase noise at 1 GHz (10 kHz offset) −37 dBc/Hz 1 −132 dBc/Hz 1 −145 dBc/Hz Dynamic range Maximum third-order dynamic range at 1 GHz 88 dB1 108 dB 1.10 108 dB 113 dB Maximum third-order dynamic range at 1 GHz 83 dB1 97.5 dB 1.10 95 dB 103 dB 40 dBm +30 dBm +30 dBm +30 dBm +30 dBm Harmin range at 1 GHz 83 dB1 <	Minimum RF sweep time	4 ms	1 ms	50 ms	1 ms	
Remote measurement rate over GPIB ¹¹ ≥ 30/second ≥ 40/second 7/second ≥ 45/second RF center frequency tuning time ¹¹ ≤ 90 ms ≤ 76 ms Sminutes 5 minutes 30 minutes Phase noise y stability Phase noise at 1 GHz (10 kHz offset) −90 dBc/Hz −90 dBc/Hz −113 dBc/Hz −116 dBc/Hz Phase noise at 1 GHz (10 kHz offset) −90 dBc/Hz −137 dBc/Hz¹ −132 dBc/Hz¹ −146 dBc/Hz Phase noise at 1 GHz (10 kHz offset) −137 dBc/Hz¹ −132 dBc/Hz¹ −146 dBc/Hz −146 dBc/Hz Phase noise at 1 GHz (10 kHz offset) −137 dBc/Hz¹ −132 dBc/Hz¹ −146 dBc/Hz −146 dBc/Hz Phase noise at 1 GHz (10 kHz offset) −137 dBc/Hz¹ −132 dBc/Hz²¹ −146 dBc/Hz −146 dBc/Hz Phase noise at 1 GHz (10 kHz offset) −137 dBc/Hz²¹ −138 dBc/Hz²¹ −136 dBc/Hz²¹ −156 (−157¹¹) dBc/Hz² Phase noise at 1 GHz (10 kHz offset) −137 dBc/Hz²¹ −138 dBc/Hz²¹ −136 dBc/Hz²¹ −156 (−157¹¹) dBc/Hz² Phase noise at 1 GHz (10 kHz offset) −137 dBc/Hz²¹ −136 dBc/Hz²¹ −136 dBc/Hz²² −136 dBc/Hz²² −136 dBc/Hz²² −136 dBc/Hz²²	Minimum zero span sweep time	4 ms	25 ns ¹	50 ms	1 μs	
## Senter frequency tuning time 1	· · · · · · · · · · · · · · · · · · ·	≥ 28/second	≥ 40/second	10/second	≥ 50/second	
## RF center frequency tuning time 11	Remote measurement rate over GPIB 11	≥ 30/second	≥ 40/second	7/second	≥ 45/second	
Phase noise stability	RF center frequency tuning time 11	≤ 90 ms	≤ 75 ms			
Phase noise at 1 GHz (10 kHz offset)		5 minutes	5 minutes	5 minutes	30 minutes	
Phase noise at 1 GHz (1 MHz offset) Phase noise at 1 GHz (10 MHz offset) -137 dBc/Hz¹ -132 dBc/Hz¹0 -155 (-157¹¹) dBc/Hz Dynamic range Maximum third-order dynamic range at 1 GHz 88 dB¹ 108 dB¹.10 108 dB 113 dB Maximum second-order dynamic range at 1 GHz 83 dB¹ 97.5 dB¹.10 95 dB 103 dB 1 dB gain compression ⁵ 0 dBm 0 dBm −5 dBm +3 dBm Maximum safe input +30 dBm +30 dBm +30 dBm +30 dBm +30 dBm +30 dBm Attenuator range and step size 0 to 65 dB³ 0 to 65 dB³ 0 to 70 dB⁴ 0 to 70 dB⁴ 10 to 70 dB in 5 dB steps in 5 dB steps in 15 dB steps in 10 dB steps Displayed average noise level (DANL) at 1 GHz 0 dBl² 85 to 120 dB¹ 85 to 120 dB¹ 100 dB 7 > 110 dB m −154 dBm −168 dBm 6 Calibrated display range (log amplifier) 85 to 120 dB¹ 85 to 120 dB¹ 100 dB 7 > 110 dB m −168 dBm 6 Calibrated display range (log amplifier) 85 to 120 dB¹ 85 to 120 dB¹ 100 dB 7 > 110 dB m −168 dBm 6 Calibrated display caucacy 4 the 10 dB 7 > 110 dB m −168 dBm 6 Calibrated display caucacy 4 the 10 dB 4 the 10 dB 4 the 10 dB 7 > 110 dB m −168 dBm 6 Calibrated display caucacy 4 the 10 dB 4 the 10 dB 4 the 10 dB 4 the 10 dB 7 > 110 dB 6 the 10 dB 6 the 10 dB 6 the	Phase noise/stability					
Phase noise at 1 GHz (10 MHz offset) −137 dBc/Hz¹ −155 (−157¹¹) dBc/Hz Dynamic range Maximum third-order dynamic range at 1 GHz 88 dB¹ 108 dB¹.¹¹0 108 dB 113 dB Maximum scool-order dynamic range at 1 GHz 83 dB¹ 97.5 dB¹.¹¹0 95 dB 103 dB 1 dB gain compression 5 0 dBm 0 dBm −5 dBm +30 dBm Akaimum safe input +30 dBm +30 dBm +30 dBm Atenuator range and step size in 5 dB steps 0 to 65 dB ³ 0 to 65 dB ³ 0 to 65 dB ³ Displayed average noise level (DANL) at 1 GHz −125 dBm¹ −150 dBm¹.¹¹0/-166 dBm6.¹0 151 dBm¹ −154 dBm /−168 dBm 6 Calibrated display range (log amplifier) 85 to 120 dB¹ 85 to 120 dB¹ 100 dB² >110 dB² >110 dB W-CDMA adjacent channel power ratio −65.5 dB¹.¹1 −73 dB¹.¹1 −81 dB¹0 −81 dB¹0 Accuracy (9 kHz to 3 GHz) ± 1.1 dB ± 1.0 dB ± 1.9 dB ± 0.62 dB (±0.24 dB¹²) Span accuracy = 1 dBz²9 ± 2001 Hz ± 101 Hz ± 103 Hz ± 100 Hz <	Phase noise at 1 GHz (10 kHz offset)	-90 dBc/Hz	-90 dBc/Hz	-113 dBc/Hz	-116 dBc/Hz	
Dynamic range Maximum third-order dynamic range at 1 GHz 88 dB¹ 108 dB 1.10 108 dB 113 dB Maximum second-order dynamic range at 1 GHz 83 dB¹ 97.5 dB 1.10 95 dB 103 dB 1 dB gain compression 5 0 dBm 0 dBm -5 dBm +3 dBm Maximum safe input +30 dBm +30 dBm </td <td>Phase noise at 1 GHz (1 MHz offset)</td> <td></td> <td>–133 dBc/Hz ¹</td> <td>-132 dBc/Hz ¹⁰</td> <td>-145 dBc/Hz</td>	Phase noise at 1 GHz (1 MHz offset)		–133 dBc/Hz ¹	-132 dBc/Hz ¹⁰	-145 dBc/Hz	
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Maximum safe input +30 dBm +30 dBm +30 dBm +30 dBm 430 dBm 430 dBm 430 dBm Attenuator range and step size 0 to 65 dB ³ in 5 dB steps 0 to 65 dB ³ in 5 dB steps 0 to 70 dB ⁴ in 5 dB steps 0 to 70 dB ⁴ in 5 dB steps 0 to 70 dB ⁴ in 2 dB steps Displayed average noise level (DANL) at 1 GHz −125 dBm¹ −150 dBm¹.10/.166 dBm 6.10 151 dBm¹ −154 dBm / −168 dBm 6 Calibrated display range (log amplifier) 85 to 120 dB¹ 85 to 120 dB¹ 100 dB 7 > 110 dB W-CDMA adjacent channel power ratio −66.5 dB¹.11 −73 dB¹.11 −81 dB¹0 Accuracy (9 kHz to 3 GHz) ± 1.1 dB ± 1.0 dB ± 1.9 dB ± 0.62 dB (±0.24 dB¹²) Span accuracy ± 1.0 % ± 0.5 % ± 1% to ± 5% ± 0.2% Frequency accuracy at 1 GHz 9 ± 2001 Hz ± 101 Hz ± 103 Hz ± 100 Hz Resolution RBW range 100 Hz¹ to 5 MHz 1 Hz² to 5 MHz 1 Hz to 2 MHz 1 Hz to 8 MHz Best selectivity 5:1¹ 5:1 5:1 4.1:1 RBW step size 1,	, ,					
Attenuator range and step size						
In 5 dB steps In 5 dB steps In 5 dB steps In 10 dB steps In 10 dB steps In 2 dB steps	<u> </u>					
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at 1 GHz −125 dBm¹ −150 dBm¹.10/-166 dBm 6.10 151 dBm¹ −154 dBm / −168 dBm 6 Calibrated display range (log amplifier) 85 to 120 dB¹ 85 to 120 dB¹ 100 dB⁻ > 110 dB W-CDMA adjacent channel power ratio −66.5 dB¹.11 −73 dB¹.11 −81 dB¹0 Accuracy (9 kHz to 3 GHz) ± 1.1 dB ± 1.0 dB ± 1.9 dB ± 0.62 dB (±0.24 dB¹²) Span accuracy ± 1.0 % ± 0.5 % ± 1% to ± 5% ± 0.2% Frequency accuracy at 1 GHz¹9 ± 2001 Hz ± 101 Hz ± 103 Hz ± 100 Hz Resolution RBW range 100 Hz¹ to 5 MHz 1 Hz¹ to 5 MHz 1 Hz to 2 MHz 1 Hz to 8 MHz Best selectivity 5:1¹ 5:1 4.1:1 BBW step size 1, 3, 10 1, 3, 10 1, 3, 10 10% steps 8 Residual FM ≤ 30 Hz¹¹ ≤ 2 Hz¹ < 1 Hz	D: 1 1/DANII)	in 5 dB steps	ın 5 dB steps	in 10 dB steps	ın 2 dB steps	
Calibrated display range (log amplifier) 85 to 120 dB¹ 85 to 120 dB¹ 100 dB⁻ > 110 dB W-CDMA adjacent channel power ratio -66.5 dB¹.11 -73 dB¹.11 -81 dB¹0 Accuracy (9 kHz to 3 GHz) ± 1.1 dB ± 1.0 dB ± 1.9 dB ± 0.62 dB (±0.24 dB¹²) Span accuracy ± 1.0 % ± 0.5 % ± 1% to ± 5% ± 0.2% Frequency accuracy at 1 GHz 9 ± 2001 Hz ± 101 Hz ± 103 Hz ± 100 Hz Resolution RBW range 100 Hz¹ to 5 MHz 1 Hz¹ to 5 MHz 1 Hz to 2 MHz 1 Hz to 8 MHz Best selectivity 5:1 5:1 5:1 4.1:1 RBW step size 1, 3, 10 1, 3, 10 1, 3, 10 10% steps 8 Residual FM ≤ 30 Hz¹¹ ≤ 2 Hz¹ < 1 Hz		–125 dBm ¹	-150 dBm ^{1,10} /-166 dBm ^{6,10}	151 dBm ¹	–154 dBm / –168 dBm ⁶	
W-CDMA adjacent channel power ratio −66.5 dB¹.11 −73 dB¹.11 −81 dB¹0 Accuracy (9 kHz to 3 GHz) ± 1.1 dB ± 1.0 dB ± 1.9 dB ± 0.62 dB (±0.24 dB¹2) Span accuracy ± 1.0 % ± 0.5 % ± 1% to ± 5% ± 0.2% Frequency accuracy at 1 GHz 9 ± 2001 Hz ± 101 Hz ± 103 Hz ± 100 Hz Resolution RBW range 100 Hz¹ to 5 MHz 1 Hz¹ to 5 MHz 1 Hz to 2 MHz 1 Hz to 8 MHz Best selectivity 5:1 5:1 5:1 4.1:1 RBW step size 1, 3, 10 1, 3, 10 1, 3, 10 10% steps 8 Residual FM ≤ 30 Hz¹¹ ≤ 2 Hz¹ < 1 Hz						
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	W-CDMA adjacent channel power ratio					
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Accuracy					
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Overall amplitude accuracy					
Resolution ± 2001 Hz ± 101 Hz ± 103 Hz ± 100 Hz RBW range 100 Hz¹ to 5 MHz 1 Hz¹ to 5 MHz 1 Hz to 2 MHz 1 Hz to 8 MHz Best selectivity 5:1¹ 5:1 4.1:1 RBW step size 1, 3, 10 1, 3, 10 1, 3, 10 10% steps 8 Residual FM ≤ 30 Hz¹¹ ≤ 2 Hz¹ < 1 Hz < 1 Hz EMI resolution bandwidths 200 Hz¹, 9 kHz, & 200 Hz¹, 9 & 120 kHz 200 Hz¹, 9 & 120 kHz Hz Information bandwidth 30 MHz¹¹, 14 > 30 MHz¹¹, 13						
Resolution RBW range 100 Hz^1 to 5 MHz 1 Hz^1 to 5 MHz 1 Hz to 2 MHz 1 Hz to 8 MHz Best selectivity $5:1^1$ $5:1$ $4.1:1$ RBW step size $1, 3, 10$ $1, 3, 10$ $1, 3, 10$ 10% steps 8 Residual FM ≤ 30 Hz^{11} ≤ 2 Hz^{1} < 1 Hz < 1 Hz EMI resolution bandwidths $200 \text{ Hz}^1, 9 \text{ kHz},$ $200 \text{ Hz}^1, 9 \text{ k} 120 \text{ kHz}$ $200 \text{ Hz}^{1}, 9 \text{ k} 120 \text{ kHz}$ Information bandwidth > $30 \text{ MHz}^{11,14}$ > $30 \text{ MHz}^{11,13}$	Span accuracy					
RBW range 100 Hz¹ to 5 MHz 1 Hz¹ to 5 MHz 1 Hz to 2 MHz 1 Hz to 8 MHz Best selectivity 5:11 5:1 5:1 4.1:1 RBW step size 1, 3, 10 1, 3, 10 1, 3, 10 10% steps 8 Residual FM ≤ 30 Hz¹ ≤ 2 Hz¹ < 1 Hz < 1 Hz EMI resolution bandwidths 200 Hz¹, 9 kHz, & 200 Hz¹, 9 & 120 kHz $\frac{1}{2}$ \frac	Frequency accuracy at 1 GHz 9	± 2001 Hz	± 101 Hz	± 103 Hz	± 100 Hz	
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	Resolution					
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	RBW range	100 Hz ¹ to 5 MHz	1 Hz ¹ to 5 MHz	1 Hz to 2 MHz	1 Hz to 8 MHz	
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	Best selectivity	5:1 ¹	5:1	5:1		
EMI resolution bandwidths $ 200 \text{ Hz}^1, 9 \text{ kHz}, \\ & & 120 \text{ kHz} $ $ 200 \text{ Hz}^1, 9 \text{ & } 120 \text{ kHz} $ $ & 10 \text{ MHz}^{11} $ $ \text{Maximum IF bandwidth} $	RBW step size	1, 3, 10	1, 3, 10	1, 3, 10	10% steps 8	
EMI resolution bandwidths $ 200 \text{ Hz}^1, 9 \text{ kHz}, \\ & 8 120 \text{ kHz} $ $ 200 \text{ Hz}^1, 9 \text{ & } 120 \text{ kHz} $ $ 10 \text{ MHz}^{11} $ $ \text{Maximum IF bandwidth} 30 \text{ MHz}^{11,14} 30 \text{ MHz}^{11,13} $	Residual FM	≤ 30 Hz ¹¹				
Information bandwidth 10 MHz^{11} Maximum IF bandwidth $> 30 \text{ MHz}^{11,14}$ $> 30 \text{ MHz}^{11,13}$	EMI resolution bandwidths	200 Hz ¹ , 9 kHz,	200 Hz ¹ , 9 & 120 kHz			
Maximum IF bandwidth $> 30 \text{ MHz}^{11,14}$ $> 30 \text{ MHz}^{11,13}$		& 120 kHz				
	Information bandwidth					
80 MHz ¹⁵	Maximum IF bandwidth		> 30 MHz ^{11,14}			
					80 MHz ¹⁵	

- 1. Optional
- 2. To 110 GHz with Agilent mixers
- 3. 0 to 60 dB in 1.5 GHz models
- 4. 0 to 60 dB for 40 & 50 GHz models
- 5. At frequencies < 3 GHz

- 6. With optional built-in preamp
- 7. RBW ≤ 100 Hz, 90 dB for RBW ≥ 300 Hz
- 8. From 1 Hz to 3 MHz
- 9. Doesn't include settability or temperature stability
- 10. Typica

- 11. Nominal
- 12. 95% confidence
- 13. Option E444xA-H70
- 14. Option E440xB-H55
- 15. Option E444xA-HNQ/HN8 (AKA PSA-80BW)

Spectrum analyzers, continued

Features	ESA-L Series	ESA-E Series	856x EC Series	PSA Series
Doutous				
Performance	AAAb	A !! - L. ! -	Charadan d	Vi - 00001 A E-1
AM/FM demodulation	AM only	Available	Standard	Via 89601A link
Background auto-alignment	Standard	Standard	Standard	Standard
Battery (snap-on)/12 V DC operation	Available	Available		
Card cage for optional hardware		6-slots		2-slots
Digital demodulation		Standards-based		Standards-based
Flexible in-depth vector modulation		Via 89601A link		Via 89601A link
analysis			Chandand	
FFT function — AM analysis		A !! - L. ! -	Standard	Charadand
High stability frequency reference		Available	Standard	Standard
Measurement personalities		Available	Available	Available
Preamplifier built-in		Available		Available
20.00		(3, 26.5 GHz)		(3, 26.5 GHz)
RMS detector	Standard	Standard		Standard
Time gating		Gated video ¹	Gated video	Gated sweep, FFT
Tracking generator built-in	Available	Available	Available ²	
Ⅳ trigger		Available		
Weight	13.2 to 17.1 kg	13.2 to 17.1 kg	20 kg	23 kg
(nominal)	(29.1 to 37.7 lbs)	(29.1 to 37.7 lbs)	(44 lbs)	(50 lbs)
Zero span offset trigger	Pre/post	Pre/post	Pre/post	Pre/post
Parama addivides				
Connectivity	A 21.11	A 21.11		
Agilent ADS software link	Available	Available	A 21.11	
BenchLink PC software	Available	Available	Available	A 11.11
BenchLink Web Remote software	Available	Available		Available
ntuiLink PC connectivity software	Standard	Standard		Standard
8566B/8568B programming code		Available		Available
compatibility	A 11 - 1-1 -	A !! - L. ! -		
8590 programming code compatibility	Available	Available	1/04	VCA
Monitor output	VGA	VGA	VGA	VGA
Remote interface	GPIB, RS-232 ¹	GPIB, RS-232 ¹	GPIB	GPIB, LAN
Remote programming	SCPI	SCPI	Standard	SCPI
Removable storage media	3.5" floppy disk	3.5" floppy disk	Memory card	3.5" floppy disk
/XI plug&play drivers	Standard	Standard	Standard	Standard
VI COM drivers	Standard	Standard		Standard
No. alam				
Display	0-1	C-1-	0-1	Calan
Display	Color 16.8 cm	Color	Color 16 cm	Color
Size		16.8 cm		21.3 cm
Expandable display	Standard	Standard	Standard	Standard
Segmented sweep		Standard		
Log sweep	0. 1.1	Standard		
Split-screen display	Standard	Standard	204	404 0:4
Sweep (trace) points	401	101 to 8192 ⁴	601	101 to 8192 ⁴
Support				
Support Calibration interval	1 year	1 year	2 years 3	1 year
	1 year Available			1 year
Calibration / adjustment software		Available	Available	Available
Help built-in	Standard	Standard	1	0
Standard warranty	3 year global	3 year global	1 year global	3 year global

^{1.} Optional

 ⁸⁵⁶⁰⁻EC only
 1 year for 8564-EC and 8565-EC
 2 to 8192 for zero span
 Time gating via 89601A software link

Spectrum analyzers, continued

Power Suite one-button measurements7

Measurement	ESA-L Series	ESA-E Series	856x EC Series	PSA Series
Channel power	•	•	•	•
Occupied bandwidth	•	•	•	•
Multicarrier, multi-offset ACP	•	•	●1,8	•
Multicarrier power	•	•	● 1	•
CCDF		•		•
Harmonic distortion	•	•		•
Burst power	•	•		•
Intermod (TOI)	•	•		•
Spurious emissions	•	•		•
Spectrum emission mask	•	•		•

Vector signal analyzers

Specification summary	E4406A	89400 Series	89600 Series
Frequency range	7 MHz to 314 MHz, 329 MHz to 4 GHz	DC to 2.65 GHz	DC to 6.0 GHz
Analysis bandwidth	8 MHz	8 MHz	36 MHz (> 1 GHz with links ⁶)
RBW range	10 Hz to 7.5 MHz	< 1 Hz to 3 MHz	< 1 Hz to 10 MHz
Phase noise at 1 GHz (10 kHz offset)	–96 dBc/Hz	-116 dBc/Hz	−99 dBc/Hz ²
Third order intercept	17 dBm ³	6.5 dBm	4.0 dBm
Time capture	> 900 ksamples ³	1 Msample	384 Msamples
Sensitivity at 1 GHz	–136 dBm/Hz ⁴	-159 dBm/Hz	-159 dBm/Hz
Maximum safe input	+ 35 dBm	+ 25 dBm	+ 20 dBm
Attenuator range and step size	0 to 40 dB in 1 dB steps	0 to 75 dB in 5 dB steps	0 to 75 dB in 5 dB steps
Amplitude accuracy	± 0.6 dB	± 1.1 dB	± 2.1 dB
Frequency accuracy 4	± 100 Hz ⁵	± 100 Hz	± 100 Hz
RBW step size	arbitrary	arbitrary	arbitrary
Warm-up time	1 hour	30 minutes	30 minutes

Features			
Agilent ADS software link		Standard (file Only)	Dynamic ¹
Analog demodulation		AM/FM/PM	AM/FM/PM
Calibration interval	1 year	1 year	2 years
Digital demodulation	Standards-based ¹	Flexible	Flexible/standards-based ^{9,1}
Flexible vector modulation analysis	Via 89601A link	Available	Available
Help built-in		Standard	Standard
Monitor output	VGA	VGA	User PC
Preamplifier built-in		Standard	Standard
Remote interface	GPIB, LAN	GPIB, RS232, LAN	GPIB, RS232, LAN
Removable storage	3.5" floppy disk	3.5" floppy disk	User PC
Source		Internal source ¹	Via ESG link
Spectrogram	Via 89601A link	Available	Standard
Split-screen display	Available	Standard	Standard
Time gating	Via 89601A link	Standard	Standard
User interface	Front panel	Front panel	User PC
Warranty (standard)	3-year global	1-year global	3-year global
Weight	19 kg	25 kg	16 kg
	(42 lbs)	(55 lbs)	(36 lbs)
Baseband IQ inputs	Available		Available
Oscilloscope/analyzer links			E4406A, ESA-E, PSA and Infiniium oscilloscopes
			(54810A, 54845A/B, 54830B/D, 54846B,
			54831B/D, 54832B/D, 54853A, 54854A, 54855A)
IVI COM drivers	Standard		Not applicable

- 1. Optional
- Typical
- 3. Nominal
- 4. With +24 dB ADC gain
- 5. Does not include temperature drift, or settability
- 7. Supported one-button, wireless format setups: PSA, ESA-L/E: cdmaOne, cdma2000, GSM/EDGE, W-CDMA, NADC, PDC, Bluetooth, Tetra, 802.11 a/b/g, HiperLAN/2, DVB-T
- Single carrier
- 9. 802.11A/B/G

89601A vector modulation analysis software/hardware links¹

The 89601A vector signal analysis software is PC-based and can be "linked" by LAN, IEEE 1394, or GPIB cable to Agilent VXI hardware, spectrum analyzers, signal analyzers, and high-speed oscilloscopes. These combinations of Agilent hardware and the vector modulation analysis software from the 89600 can provide a broad array of analysis and measurement capabilities, dynamic range and bandwidths.²

Model	Frequency	Maximum analysis	Residual EVM	3rd order	Connection	Memory
range	anaiysis bandwidth	(typical)	dynamic range (typical)			
PSA Series spect	trum analyzers	bulluvviucii	(сургост)	runge (typicui)		
E4440A	3 Hz – 26.5 GHz	8 MHz (36 MHz ³ ,	< 1.0% rms	< -70 dBc	LAN	900 ksa
		80 MHz ⁵)				
E4443A	3 Hz – 6.7 GHz	Same	< 1.0% rms	< -70 dBc	LAN	900 ksa
E4445A	3 Hz — 13.2 GHz	Same	< 1.0% rms	< -70 dBc	LAN	900 ksa
E4446A	3 Hz – 44.0 GHz	Same	< 1.0% rms	< -70 dBc	LAN	900 ksa
E4448A	3 Hz - 50.0 GHz	Same	< 1.0% rms	< -70 dBc	LAN	900 ksa
ESA-E Series spe	ectrum analyzers					
E4402B	9 kHz - 3.0 GHz	10 MHz (36 MHz ³)	< 1.8% rms	-55dBc	GPIB	124 ksa
E4404B	9 kHz – 6.7 GHz	Same	< 1.8% rms	-55dBc	GPIB	124 ksa
E4405B	9 kHz - 13.2 GHz	Same	< 1.8% rms	-55dBc	GPIB	124 ksa
E4407B	9 kHz - 26.5 GHz	Same	< 1.8% rms	-55dBc	GPIB	124 ksa
E4406A VSA						
E4406A	7 MHz – 4 GHz	8 MHz	< 1% rms	< -70 dBc	LAN or GPIB	900 ksa
Infiniium oscillos	scopes					
54810A	DC - 390 MHz	390 MHz	< 2% rms	≤ -40 dBc	LAN or GPIB	32 ksa
54845A/B	DC - 1.56 GHz	1.56 GHz	< 2% rms	≤ -40 dBc	LAN or GPIB	64 ksa
54846B	DC - 2.2G Hz	2.2 GHz	< 2% rms	≤ -40 dBc	LAN or GPIB	2 Msa
54830B/D	DC – 780 MHz	780 MHz	< 2% rms	≤ -40 dBc	LAN or GPIB	2 Msa
54831B/D	DC – 780 MHz	780 MHz	< 2% rms	≤ -40 dBc	LAN or GPIB	2 Msa
54832B/D	DC - 1.0 GHz	1.0 GHz	< 2% rms	≤ -40 dBc	LAN or GPIB	2 Msa
54853A	DC — 2.5 GHz	2.5 GHz	< 2% rms	≤ -40 dBc	LAN or GPIB	32 Msa
54854A	DC - 4 GHz	4 GHz	< 2% rms	≤ -40 dBc	LAN or GPIB	32 Msa
54855A	DC – 6 GHz	6 GHz	< 2% rms	≤ -40 dBc	LAN or GPIB	32 Msa
89600 VXI bundle	ed systems					
89610A	DC – 39 MHz	39 MHz	< 1% rms	< -70 dBc	IEEE 1394	48 Msa (384
						Msa available)
89611A ⁴	52 – 88 MHz	36 MHz	< 1% rms	< -70 dBc	IEEE 1394	Same
89640A4	DC - 2.7 GHz	36 MHz	< 1% rms	< -65 dBc	IEEE 1394	Same
89641A ⁴	DC – 6 GHz	36 MHz	< 1% rms	< -65 dBc	IEEE 1394	Same



- 89600 software also links with Agilent ESG Series signal generators and EEsof Advanced Design Software.
- For more information on hardware performance using the 89601A software, please reference the appropriate performance guide available on the product Web page: ESA – p/n 5988-4097E; PSA – p/n 5988-5015EN; E4406A – p/n 5988-2906EN; Infinitium – p/n 5988-4096EN.
- 3. With Option E444xA-H70 or E440xB-H70 and when combined with 89611A.
- 4. Baseband inputs available.
- 5. With Option E444xA-HNQ/HN8 (AKA PSA-80BW) and when combined with 89610A.
- 6. Phase coherent, two channel RF measurements available.

Information Resources

For the latest product and support information including brochures, datasheets, manuals, application notes, and frequently asked questions, please visit our product Web pages:

http://www.agilent.com/find/psa http://www.agilent.com/find/esa http://www.agilent.com/find/8560 http://www.agilent.com/find/8590 http://www.agilent.com/find/89400 http://www.agilent.com/find/89600 http://www.agilent.com/find/vsa http://www.agilent.com/find/emc http://www.agilent.com/find/IntuiLink http://www.agilent.com/find/eesof Agilent Technologies' Test and Measurement Support, Services, and Assistance

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