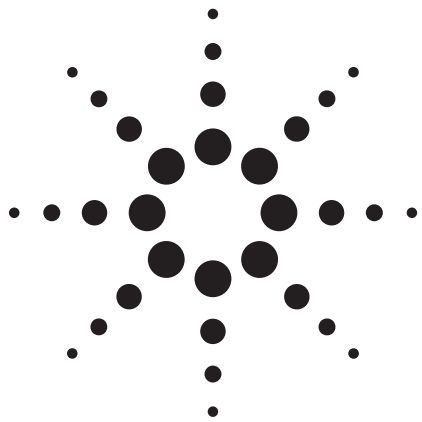
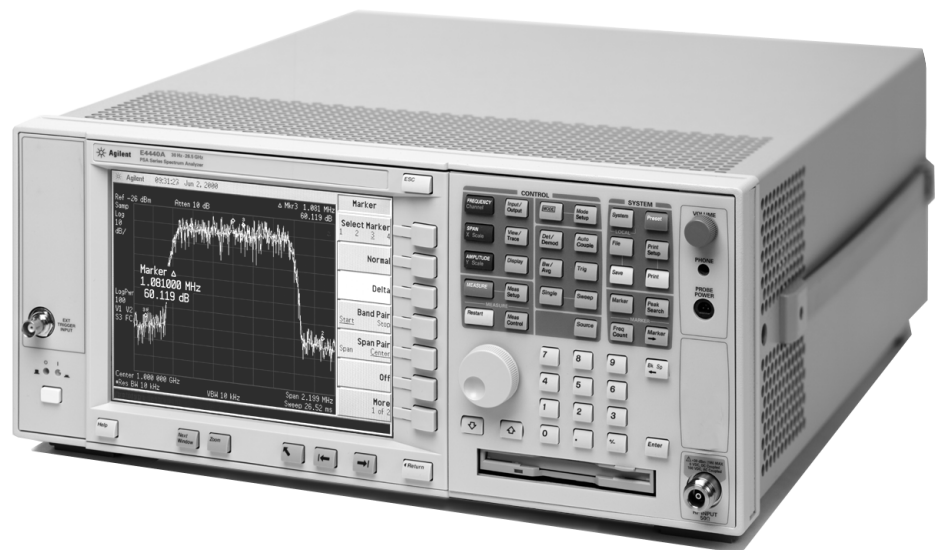




Agilent E4440A

PSA Series Performance Spectrum Analyzers

Data Sheet



Agilent Technologies

All specifications apply over 0° to 55° C unless otherwise noted. The analyzer will meet its specifications after 2 hour of storage within the operating temperature range, 30 minutes after the analyzer is turned on, and after the AUTO ALIGN (ALL) has been run.

Frequency range

E4440A	3 Hz to 26.5 GHz	(DC coupled)
	10.0 MHz to 26.5 GHz	(AC coupled)
Harmonic mixing mode (N)		
Band 0	3 Hz to 3.0 GHz	1-
Band 1	2.85 GHz to 6.6 GHz	1-
Band 2	6.2 GHz to 13.2 GHz	2-
Band 3	12.8 GHz to 19.2 GHz	4-
Band 4	18.7 GHz to 26.5 GHz	4-

Frequency reference

Accuracy (error)	+/- (Time since last adjustment x aging rate) + temperature stability + setability
Aging:	+/- 1×10^{-7} /year
Temperature stability:	+/- 1×10^{-8} (20° to 30° C)
Setability:	+/- 2×10^{-9}

Frequency readout accuracy

+/- (marker frequency x frequency reference error + 0.25% of span + 5% x RBW + 2 Hz

Marker frequency counter

Accuracy:	+/- (marker frequency x frequency reference error + 0.100 Hz)
Counter resolution:	0.001Hz

Frequency span (FFT and swept)

0 Hz (zero span), 10 Hz to 26.5 GHz	
Resolution:	2 Hz
Accuracy:	+/- 0.2% of span + span/600

Frequency sweep time

Range:	1 ms to 2000 s
Zero span range:	1 μ s to 6000 s

Resolution bandwidth

-3.01 dB bandwidth	1Hz to 3MHz (10 % steps), 4, 5, 6, 8 MHz
Power bandwidth accuracy	$\pm 1\%$ (.05 dB)
Selectivity (60 dB/3d B):	4.1:1 (nominal)

Video bandwidth range

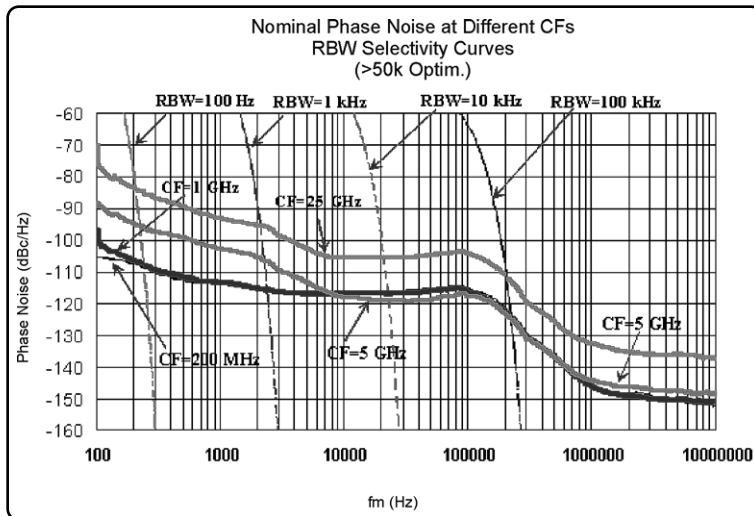
Range:	1 Hz to 3 MHz (10 % steps) 4, 5, 6, 8 MHz and wide open
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Stability

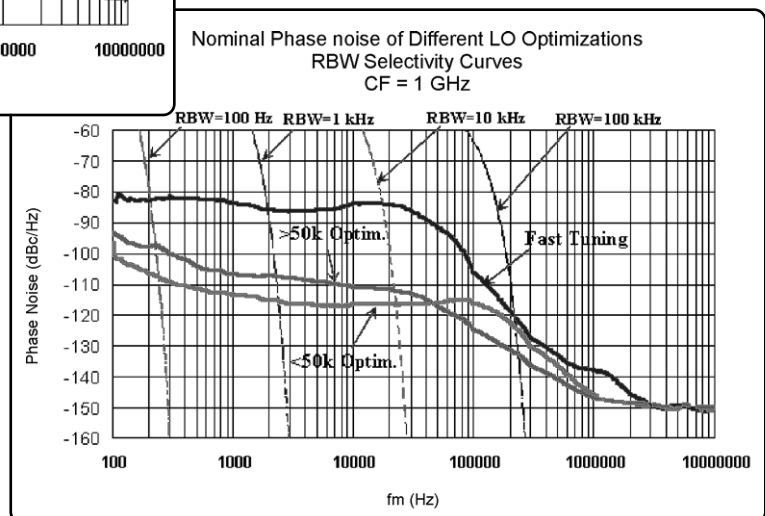
Noise sidebands (20° to 30° C) (center frequency = 1 GHz)

Offset

100 Hz:	-87 dBc/Hz
1 kHz:	-100 dBc/Hz
10 kHz:	-113 dBc/Hz
30 kHz:	-113 dBc/Hz
100kHz:	-119 dBc/Hz
1 MHz:	-142 dBc/Hz
6 MHz:	-145 dBc/Hz
10 MHz:	-148 dBc/Hz



Residual FM: <1 Hz x N harmonic mixing mode
in 1 second
See page 1 for harmonic number



Amplitude specifications

Amplitude range

Measurement range: Displayed Average Noise Level (DANL) to maximum safe input level

Input attenuator range: 0 to 70 dB in 2 dB steps (to 26.5 GHz)

Maximum safe input level

Average continuous power (10 dB attenuation): +30 dBm (1 watt)

DC volts:

DC coupled:	<+/- 0.2 Vdc
AC coupled:	+/- 100 Vdc

1 dB gain compression (total power at input mixer):

+3 dBm (200 MHz to 6.6 GHz)
-2 dBm (6.6 GHz to 26.5 GHz)

Displayed average noise level (DANL)

(Input terminated, 0 dB attenuation, sample detector, normalized to 1 Hz RBW, 20° to 30° C)

	preamp off	preamp on 500 kHz to 3 GHz
1 MHz to 10 MHz	-145 dBm	-163 dBm
10 MHz to 1.5 GHz	-155 dBm	-169 dBm
1.5 GHz to 2.5 GHz	-154 dBm	-167 dBm
2.5 GHz to 3 GHz	-153 dBm	-167 dBm
3 GHz to 6.6 GHz	-152 dBm	•
6.6 GHz to 13.2 GHz	-150 dBm	•
13.2 GHz to 22 GHz	-147 dBm	•
22 GHz to 26.5 GHz	-141 dBm	•

Display range

Log scale:	Adjustable in 1, 2, 5 sequence from 0.1 dB/div to 20 dB/div (10 display divisions)
Linear scale:	10 divisions
Scale units:	dBm, dBmV, dBuV, volts, watts

Frequency response (10 dB attenuation, 20° to 30° C, RBW ≤ 1 MHz, signal power -10 to -50 dBm, any reference level, any scale)

3 Hz to 3 GHz:	<+/- 0.4 dB
3 GHz to 6.6 GHz:	<+/- 1.50 dB
6.6 GHz to 22.0 GHz:	<+/- 2.00 dB
22.0 GHz to 26.5 GHz:	<+/- 2.50 dB

Absolute amplitude accuracy (10 dB attenuation, 20° to 30° C, RBW ≤ 1 MHz, signal power -10 to -50 dBm, any reference level, any scale)

At 50 MHz:	+/- 0.27 dB
At all frequencies:	<+/- (0.27dB + frequency response)

Input attenuation switching uncertainty

3 Hz to 3 GHz	±0.3 dB nominal
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Input VSWR: (10 dB input attenuation)

50 MHz to 3 GHz:	<1.2:1
3 GHz to 18 GHz:	<1.6:1
18 GHz to 26.5 GHz:	<1.9:1
Preamplifier on	<1.5:1 (50 MHz to 3 GHz)

Resolution bandwidth switching uncertainty

(Referenced to 30 kHz RBW)

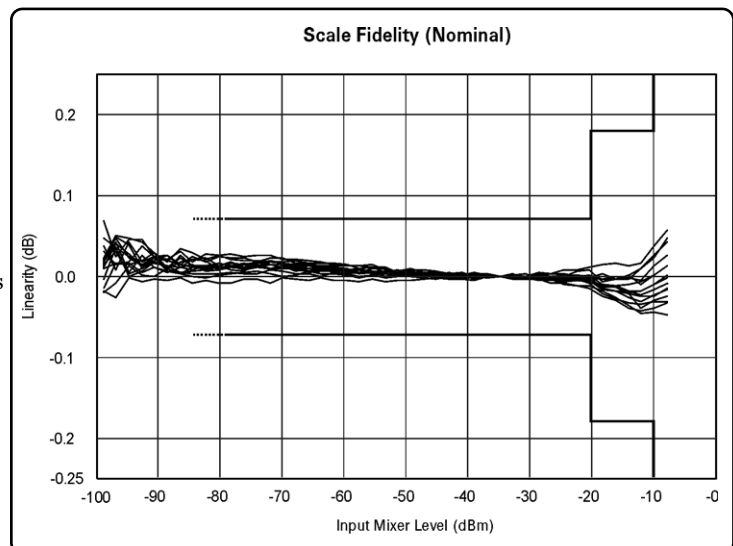
1 Hz to 1 MHz RBW:	± 0.03 dB
1.1 MHz to 3 MHz RBW:	± 0.05 dB
4,5,6,8 MHz RBW:	± 1.00 dB

Reference level

Range:	
Log scale:	-170 to + 30 dBm. In 0.1 dB steps
Linear scale:	707 pV to 7.07 V in 1 % steps

Display scale fidelity (Referenced to -35 dBm mixer level)

-20 dBm to noise	± 0.07 dB total
-10 dBm to -20 dBm	± 0.18 dB total



Linear to log switching, reference level switching

Switching between log and linear: ± 0 dB

Switching reference level ± 0 dB

Spurious responses (*mixer level -40 dBm*)

General spurious swept mode: $<(-73 + 20 \log N)$ dBc. N is LO mixing No.

Second harmonic distortion (SHI):

10 MHz to 400 MHz: +42 dBm (-40 dBm mixer level)

400 MHz to 1.25 GHz: +52 dBm (-40 dBm mixer level)

1.25 GHz to 1.5 GHz: +42 dBm (-40 dBm mixer level)

1.5 GHz to 2.0 GHz: +80 dBm (-10 dBm mixer level)

2.0 GHz to 13.25 GHz: +90 dBm (-10 dBm mixer level)

Third-order inter-modulation distortion TOI: (*-30 dBm mixer level*)

10 MHz to 400 MHz: +13 dBm (+17 dBm typical)

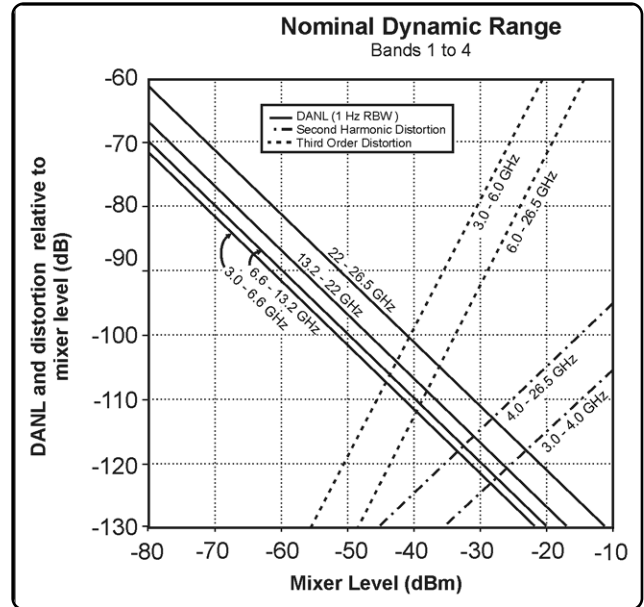
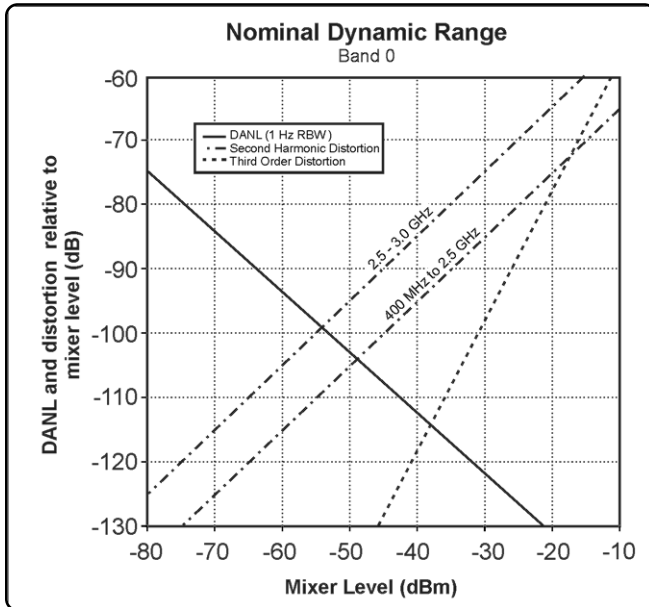
400 MHz to 2 GHz: +16 dBm (+19 dBm typical)

2 GHz to 2.7 GHz: +17 dBm (+19 dBm typical)

2.7 GHz to 3 GHz: +16 dBm (+20 dBm typical)

3 GHz to 6.0 GHz: +15 dBm (+18 dBm typical)

6.0 GHz to 26.5 GHz: +9 dBm (+12 dBm typical)



Residual responses

Input terminated and 0 dB attenuation

200 kHz to 6.6 GHz: <-100 dBm

6.6 MHz to 26.5 MHz: <-100 dBm (nominal)

General specifications

Temperature range

Operating:
0° C to +55° C

Storage:
-40° C to +75° C

Power requirements

On:
<260 Watts base (<450 Watts loaded)

Standby:
<20 Watts

EMI compatibility

Conducted and radiated interference is in compliance with CISPR pub 11/1990 group 1 class A.

Audible noise

(ISO 7779)
<33 dBA, (<4.8 Bels power) supplemental information 43

Military specification

Type tested to environmental specifications MIL-PRF-28800F class 3

Weight

23 kg (50 lbs)

Dimensions

177 mm (7.0 in) H, 426 (16.8 in) mm W,
483 (19 in) mm L

Warranty

The E4440A is supplied with a 3 year warranty

Calibration cycle

The recommended calibration cycle is one year supplied by Agilent service centers.

Option specifications

Option 1DS, preamplifier

Frequency range: 500 kHz to 3 GHz
Gain: +28 dB nominal
Noise figure: 7 dB nominal

Option BAB, APC 3.5 input connector

Replaced the precision Type N connector with the APC 3.5 input connector.

Option 1CM

Rack mount kit

Option 1CN

Front handle kit

Option 1CP

Rack mount kit with handles

Option 1CR

Rack slide kit

Option 0B1

Extra manual set (CD-ROM and measurement guide)

Option 0BW

Add service manual (assembly level repair and adjustment software)

Option 0BV

Add service manual (component level repair only)

Option AVF

Documentation kit (paper copy on CD-ROM manual)

Option UK6

Commercial calibration certificate with test data

Option W50

Five-year warranty

Inputs and outputs

RF input	Type "N", 50 ohms (Option BAB, APC 3.5) LO emissions band 0 <-120 dBm, band 1-4 <-100 dBm
Probe power	+15 volts at 150 mA, -12.6 volts at 150 mA, GND
Keyboard	6 pin mini DIN (PS2), used for entering file name and titles
10 MHz out	BNC connector, 10 MHz +/- 10 MHz x Reference Error, > 0 dBm amplitude
Ext ref in	BNC female, 1 to 30 MHz nominal, -5 to + 10 dBm
Trigger in	BNC female, 5 volt TTL
Trigger 1 and 2 outputs	BNC female, 5 volt TTL
VGA output	VGA compatible, 15-pin mini D-SUB, 31.5 kHz horizontal
GPIO interface	IEEE 488 bus connector (SH1, AH1, T6, SR1, RL1, PP0, DC1, C1, C2, C3, C28, DT1, L4, C0)
Serial interface	9 pin D-SUB male, RS 232
Parallel interface	25 pin D-SUB female, printer port only
LAN TCP/IP interface	RJ45 either twist
2nd IF output	SMA female, 321.4 MHz

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