Agilent
ESA Series Spectrum Analyzers
Data Sheet

Express analyzer configurations

- Basic Analyzer
  Express Option BAS
- Standard Analyzer
  Express Option STD
- Communications Test Analyzer
  Express Option COM

The ESA family of spectrum analyzers have proven and guaranteed performance with the flexibility to select the right level of functionality for your test needs. Take advantage of the best overall performance on a mid-performance spectrum analyzer.

Industry best typical performance

- Warm up time: 5 minutes
- Third order intermodulation distortion: +16 dBm
- Sensitivity: -166 dBm
- Amplitude accuracy: ± 0.4 dB
- Overall phase noise (all carrier frequencies[a]):
  - -94 dBc/Hz (10 kHz)
  - -122 dBc/Hz (100 kHz)
  - -136 dBc/Hz (1 MHz)

a. Add 20LogN for frequencies > 6.7 GHz, where N is the harmonic mixing mode.

Agilent Technologies

Definitions and Conditions

The distinction between specifications and characteristics is described as follows.

- Specifications describe the performance of parameters covered by the product warranty. (The temperature range is 0 °C to 55 °C, unless otherwise noted.)
- Characteristics describe product performance that is useful in the application of the product, but is not covered by the product warranty.
- Typical performance describes additional product performance information that is not covered by the product warranty. It is performance beyond specification that 80% of the units exhibit with a 95% confidence level over the temperature range 20 to 30 °C. Typical performance does not include measurement uncertainty.
- Nominal values indicate the expected performance, or describe product performance that is useful in the application of the product, but is not covered by the product warranty.

The following conditions must be met for the analyzer to meet its specifications.

- The analyzer is within the one year calibration cycle.
- If **Auto Align All** is selected:
  - After 2 hours of storage within the operating temperature range.
  - 5 minutes after the analyzer is turned on with sweep times less than 4 seconds.
- If **Auto Align Off** is selected:
  - When the analyzer is at a constant temperature, within the operating temperature range, for a minimum of 90 minutes.
  - After the analyzer is turned on for a minimum of 90 minutes and **Align Now All** has been run.
  - When **Align Now All** is run:
    - Every hour
    - If the ambient temperature changes more than 3 °C
    - If the 10 MHz reference changes
- If **Auto Align All but RF** is selected:
  - When the analyzer is at a constant temperature, within the operating temperature range, for a minimum of 90 minutes.
  - After the analyzer is turned on for a minimum of 90 minutes and **Align Now RF** has been run.
  - When **Align Now RF** is run:
    - Every hour
    - If the ambient temperature changes more than 3 °C

Table of Contents

Frequency Specifications

Frequency range	E4411B	E4403B	E4408B
BAS configuration	9 kHz - 1.5 GHz	9 kHz - 3 GHz	9 kHz - 26.5 GHz
Custom configuration	(75 Ω input Option 1DP) 1 MHz - 1.5 GHz	N/A	N/A

Frequency range	E4402B	E4404B	E4405B	E4407B
STD or COM configuration	9 kHz - 3 GHz	9 kHz – 6.7 GHz	9 kHz – 13.2 GHz	9 kHz - 26.5 GHz
Low frequency extension Option UKB				
Custom configuration	100 Hz[a] - 3 GHz	100Hz[a] - 6.7 GHz	100Hz[a] - 13.2 GHz	100Hz[a] - 26.5 GHz External mixing Option AYZ Add 18 GHz - 325 GHz

Frequency range	100 Hz - 3 GHz	2.85 - 6.7 GHz	6.2 - 13.2 GHz	12.8 – 19.2 GHz	18.7 – 26.5 GHz
Band	0	1	2	3	4
Harmonic (N[b]) mixing mode	1-	1-	2-	4-	4-

a. 30 Hz characteristic.
b. N = LO harmonic mixing mode.

Frequency Specifications

	Basic analyzer	Standard analyzer	Communications test analyzer or ESA with Option 1D5
Frequency reference			
Frequency reference error = ± [(aging rate x time since last adjustment)+ settability + temperature stability]			
Frequency readout accuracy (start, stop, center, marker) = ±(frequency indication x frequency reference error + SP[c] +15% of RBW + 10 Hz + 1 Hz x N[a])			
Aging rate	±2 x 10^{-6}/year	±2 x 10^{-6}/year ±1 x 10^{-7}/year (Opt. 1D5)	±1 x 10^{-7}/year
Temperature stability	±5 x 10^{-6}/year	±5 x 10^{-6}/year ±1 x 10^{-8}/year[b] (Opt. 1D5)	±1 x 10–8/year[b]
Settability	±5 x 10^{-7}/year	±5 x 10^{-7}/year ±1 x 10^{-8}/year (Opt. 1D5)	±1 x 10^{-8}/year
Span coefficient (SP)[c]	0.75 % x span	[0.5 % + 1/ (sweep points –1)] x span	[0.5 % + 1/ (sweep points –1)] x span
External reference	10 MHz	10 MHz	1 - 30 MHz
Marker frequency counter[d]			
Accuracy = ±(marker frequency x frequency reference error + counter resolution) Counter resolution = selectable from 1 Hz to 100 kHz			
Frequency span			
Range = 0 Hz (zero span), 100 Hz to maximum frequency range of the analyzer			
Accuracy — Swp type linear	1% of span	±[0.5% x span + 2 x span/(sweep points – 1)]	
Accuracy — Logarithmic	N/A	2% of span, nominal	

a. N = LO harmonic mixing mode.
b. 20 to 30 °C.
c. Span coefficient of frequency readout accuracy. Sweep points fixed at 401 for basic analyzer.
d. Not available in RBW < 1 kHz (Option 1DR).

Frequency Specifications

		Basic analyzer	Standard analyzer or ESA with Option AYX	Communications test analyzer or ESA with Option B7D/B7E
Sweep time and trigger				
Range	Span = 0 Hz	4 ms – 4000 s	50 ns[a] – 4000 s	25 ns[a] - 4000 s
	Span ≥ 100 Hz	4 ms – 4000 s	1 ms– 4000 s	
Accuracy		± 1%		
Trigger type[b]		Free Run, Single, Line, Video, Offset, Delayed, External		
		Gate (1D6)		
				RF burst (B7E)
Delayed trigger range		1 us to 400 s		
Sweep (trace) points				
Range	Span = 0 Hz	401	2 - 8192	
	Span ≥ 100 Hz	401	101 - 8192	

	Basic analyzer	Standard analyzer	Communications test analyzer or ESA with Option 1DR and 1D5
Resolution bandwidths (1-3-10 sequence)			
Range			
(-3 dB) (-6 dB EMI)	1 kHz – 5 MHz 9 KHz, 120 kHz	1 kHz – 5 MHz 9 KHz, 120 kHz	1 Hz to 5 MHz 200 Hz, 9 kHz,120 kHz
With 1DR[c] (-3dB) (-6 dB EMI)	Add 100 Hz, 300 Hz Add 200 Hz	Add 10 Hz - 300 Hz 200 Hz	Included
With 1DR and 1D5[d]	N/A	Add 1 Hz and 3 Hz	Included
Accuracy			
1 Hz to 300 Hz	± 10%		
1 kHz to 3 MHz	± 15%		
5 MHz	± 30%		
Selectivity (60 dB/3 dB bandwidth ratio)			
100 Hz to 300 Hz	< 5:1 digital, approximately Gaussian		
1 kHz to 5 MHz	< 15:1 synchronously tuned four poles, approximately Gaussian		
Video bandwidths (1-3-10 sequence)			
Range with 1DR	30 Hz to 3 MHz Adds 1, 3, 10 Hz for RBWs less than 1 kHz		

a. RBW ≥ 1 kHz, 2 sweep points.
b. TV trigger available with option B7B in custom configuration for ESA-E.
c. Only available for spans < 5MHz.
d. Firmware revision A.08.00 and later.

Frequency Specifications

	Basic analyzer		Standard and communications test analyzer	ESA-E with Option 120[a]
	E4411B	E4403B/08B	E4402B/04B/05B/07B	
Stability				
Noise sidebands offset from CW signal with 1 kHz RBW, 30 Hz VBW and sample detector				
Offset from CW signal	Spec, *typical dBc/Hz applies to all frequencies ≤ 6.7 GHz*[b, c]			
≥ 1 kHz			-78 dBc/Hz (Option 1D5)	
≥ 10 kHz	-93, *-95 dBc/Hz*	-90, *-94 dBc/Hz*	-90, *-94 dBc/Hz*	
≥ 20 kHz	-100, *-102 dBc/Hz*	-100, *-105 dBc/Hz*	-100, *-105 dBc/Hz*	
≥ 30 kHz	-104, *-106 dBc/Hz*	-106, *-112 dBc/Hz*	-106, *-112 dBc/Hz*	
≥ 100 kHz	-113, *-116 dBc/Hz*	-118, *-122 dBc/Hz*	-118, *-122 dBc/Hz*	
≥ 1 MHz			-125, *-127 dBc/Hz*	-133, *-136 dBc/Hz*
≥ 5 MHz			-127, *-129 dBc/Hz*	-135, *-139 dBc/Hz*
≥ 10 MHz			-131, *-136 dBc/Hz*	-137, *-141 dBc/Hz*
Residual FM (peak-to-peak)				
1 kHz RBW, 1 kHz VBW	≤ 150 Hz x N^C (100 ms) ≤ 30 Hz x N^C (20 ms), Option 1DR		≤ 150 Hz x N^C (100 ms) ≤ 10 Hz x N^C (20 ms), Option 1DR ≤ 2 Hz peak-to-peak x N^C, (20 ms), Option 1DR & 1D5	
Option 1D5 only 100 ms			≤ 100 Hz x N^C	
Option 1DR only 20 ms			≤ 10 Hz x N^C	
Option 1DR & 1D5 20 ms			≤ 2 Hz peak-to-peak x N^C	
System related sidebands				
≥ 30 kHz offset from carrier CW signal	≤ -65 dBc + 20logN^C			

Noise Sidebands Normalized to 1 Hz Versus Offset from Carrier

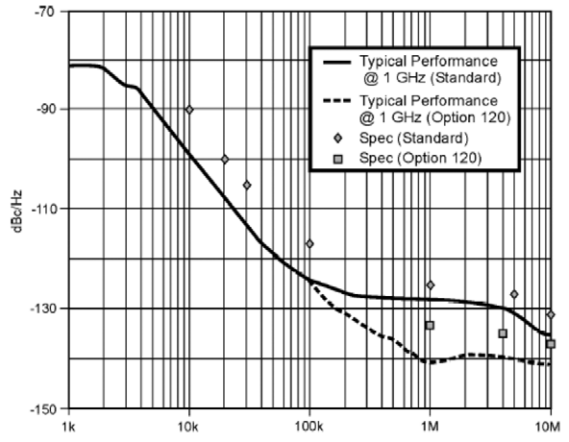

Figure 1. Typical ESA-E Series performance at 1 GHz

a. Enhanced wide offset phase noise and ACPR dynamic range.
b. Add 20log(N) for frequencies > 6.7 GHz.
c. N=LO Harmonic mixing number.

Amplitude Specifications

		E4411B	E4403B/08B	E4402B	E4404B/05B	E4407B
Amplitude range						
Measurement range		Displayed average noise level (DANL) to maximum safe input level				
Input attenuator range (5 dB step)		0 – 60 dB	0 – 65 dB	0 – 75 dB	0 – 75 dB	0 – 65 dB
Maximum safe input level						
Input attenuator setting		≥ 15 dB	≥ 5 dB average continuous power; ≥ 30 dB peak pulse power			
Average continuous power		+30 dBm (1 W)	+30 dBm (1 W)	+30 dBm (1 W)		
Peak pulse power			+50 dBm (100 W)	+50 dBm (100 W)		
DC voltage	DC coupled			0 Vdc (Option UKB)	0 Vdc	0 Vdc
	AC coupled	100 Vdc +75 dBmV (0.4 W) Option 1DP	100 Vdc	100 Vdc 50 Vdc (Opt. UKB)	50 Vdc	50 Vdc (Opt. UKB)
1 dB gain compression		Two tone				
Total power at input mixer[a]		0 dBm to 1.5 GHz 46.75 dBmV (1DP)				
50 MHz to 6.7 GHz			0 dBm			
6.7 GHz to 13.2 GHz			-3 dBm			
13.2 GHz to 26.5 GHz			-5 dBm			

a. Mixer power level (dBm) = input power (dBm) minus input attenuation (dB).

Amplitude Specifications

	Basic analyzer			Standard analyzer		Communications test analyzer or ESA with 1DR and 1D5	
	E4411B	**E4403B**	**E4408B**	**E4402B**	**E4404/05B/07B**	**E4402B**	**E4404/05/7B**
Displayed average noise level (dBm) (input terminated, 0 dB attenuation, sample detector) spec, typical							
Conditions	100 Hz RBW; 1 Hz VBW (Option 1DR);			10 Hz RBW/1 Hz VBW (Option 1DR)		1 Hz RBW/VBW (ESA with 1DR and 1D5)	
Frequency 1 MHz - 10 MHz	-123, typ -129	typ -126	typ -129	typ -139	typ-137, -139[a]	typ-146, -149[a]	typ-147, -149[a]
10 MHz - 500 MHz	-127, typ -131	-125, typ -130	-124, typ -129	-136, typ -140	-135, typ -139	typ-150	typ -149
500 MHz - 1 GHz	-125, typ -130						
1 GHz - 1.5 GHz	-121, typ -128	-124, typ -130	-123, typ -130	-135, typ -140	-135, typ -140		typ -150
1.5 GHz - 2 GHz							
2 GHz - 3 GHz		-122, typ -120	-120, typ -128	-133, typ -140	-131, typ -138		typ -148
3 GHz - 6 GHz							
6 GHz - 12 GHz			-118, typ -127		-130, typ -137		typ -147
12 GHz - 22 GHz			-115, typ -124		-126, typ -134		typ -144
22 GHz - 26.5 GHz			-109, typ -122		-125, typ -132		typ -142
Displayed average noise level (dBm) with RF preamplifier[b]							
1 MHz - 10 MHz				typ-152	typ -155	typ -162	typ -165
10 MHz - 1 GHz				-152, typ -156	-151, typ -157	typ -166	typ -167
1 GHz - 2 GHz				-152, typ -156	-151, typ -155	typ -166	typ -165
2 GHz - 3 GHz				-151, typ-154	-149, typ -152	typ -164	typ -162

a. Custom path only, Option 120, typical.
b. 20 to 30° C. For 0 to 55 °C range, see specifications guide.

Amplitude specification

	Basic analyzer	Standard analyzer or ESA with Option AYX	Communications test analyzer or ESA with Option B7D/B7E
Display			
Display range	0.1, 0.2, 0.5 dB/division and 1 to 20 dB/division in 1 dB steps (10 display divisions)		
Log scale			
RBW ≥ 1 kHz RBW ≤ 300 Hz	Calibrated 0 to -85 dB from reference level Calibrated 0 to -120 dB[a] from reference level		
Linear scale	10 divisions		
Scale units	dBm, dBmV, dBµV, dBµA, A, V, and W	dBm, dBmV, dBµV, dBµA, A, V, W and Hz (Option BAA)	
Trace detectors	Peak, negative peak, sample, rms, average		
Trace functions	Clear/write, max. hold, min. hold, view, blank, operations, normalize		
Display resolution[b]	640 x 480		
Marker readout resolution			
Log scale 0 to – 85 dB	0.04		
0 to –120 dB (1DR)			
Linear scale	0.01% of reference level		
Reference level			
Range	–149.9 dBm to maximum mixer level + attenuator setting		
Resolution Log scale	±0.1 dB		
Linear scale	± 0.12% of reference level		
Accuracy[c] For reference level (dBm) – input attenuator setting (dB) + preamp gain (dB)			
-10 dBm to > -60 dBm	± 0.3 dB		
-60 dBm to > -85 dBm	± 0.5 dB		
-85 dBm to > -90 dBm	± 0.7 dB		
Display scale switching uncertainty (referenced to 1 kHz at reference level)			
Linear to log switching	± 0.15 dB at reference level		
Resolution bandwidth switching uncertainty (referenced to 1 kHz at reference level)			
1 Hz to 10 Hz RBW		± 0.3 dB (1DR, 1D5)	± 0.3 dB
100 Hz to 3 MHz RBW	± 0.3 dB (1DR)		± 0.3 dB
5 MHz RBW	± 0.6 dB		

a. 0 to -70 dB range when span = 0 Hz, or when IF gain fixed.

b. The LCD display is manufactured using high precision technology. However, there may be up to six bright points (white, blue, red or green in color) that constantly appear on the LCD screen. These points are normal in the manufacturing process and do not affect the measurement integrity of the product in any way.

c. 50 Ω, accuracy (at a fixed frequency, a fixed attenuator, and referenced to -35 dBm (-10 dBm, Preamp On (Option 1DS))).

Amplitude Specifications

	Basic analyzer	Standard, communications test analyzer or custom configuration
Input attenuator switching uncertainty (at 50 MHz)		
Attenuator setting 0 dB to 5 dB	± 0.3 dB	
10 dB	Reference	
15 dB	± (0.1 dB + 0.01 x attenuator setting)	
20 dB to 60 dB		
Frequency response (10 dB input attenuation)		
Absolute[a]/typical/relative[b] 100 Hz to 9 kHz[c]		± 0.5 dB/NA/± 0.5 dB
9 kHz to 3 GHz	± 0.5 dB/NA/± 0.5 dB	± 0.46 dB/± 0.14 dB/± 0.5 dB ± 0.5 dB/NA/± 0.5 dB[a] (Option UKB)
3 GHz to 6.7 GHz	± 1.5 dB/NA/± 1.3 dB	± 1.5 dB/± 0.38 dB/± 1.3 dB
6.7 GHz to 13.2 GHz	± 2 dB/NA/± 1.8 dB	± 2 dB/± 0.68 dB/± 1.8 dB
13.2 GHz to 26.5 GHz		± 2 dB/± 0.86 dB/± 1.8 dB
Absolute amplitude accuracy		
At reference settings[d]	± 0.4dB	± 0.34 dB, ± 0.16 dB typical
Preamp on		± 0.37 dB, ± 0.14 dB typical
Overall amplitude accuracy[e]	± (0.6dB + absolute frequency response)	± (0.54 dB + absolute frequency response)
(95% confidence)[f]		± 0.4 dB (95%)
Display scale fidelity		
Log max cumulative dB below reference level RBW ≥ 1 kHz 0 dB reference	± (0.3dB + 0.01 x dB from reference level	0 dB
> 0 to 10 dB		±0.3 dB, typ ±0.08 dB
> 10 to 20 dB		±0.4 dB, typ ±0.09 dB
> 20 to 30 dB		±0.5 dB, typ ±0.1 dB
> 30 to 40 dB		±0.6 dB, typ ±0.23 dB
> 40 to 50 dB		±0.7 dB, typ ±0.35 dB
> 50 to 60 dB		±0.7 dB, typ ±0.35 dB
> 60 to 70 dB		±0.8 dB, typ ±0.39 dB
> 70 to 80 dB		±0.8 dB, typ ±0.46 dB
> 80 to 85 dB		±1.15 dB, typ ±0.79 dB
RBW ≤ 300 Hz (Option 1DR) span > 0 Hz, auto range on 0 to 98 dB[g] 0 to 98 dB[g]	± (0.3dB + 0.01 x dB from reference level)	
> 98 to 120 dB	± 2.0 dB from reference level, characteristic	
Log incremental accuracy dB below reference level 0 to 80 dB[g]	± 0.4 dB / 4 dB	
Linear accuracy	± 2% of reference level	

a. Frequency response values are referenced to the amplitude at 50 MHz (20 to 30 °C).
b. Referenced to midpoint between highest and lowest frequency response deviations (20 to 30 °C).
c. Custom path ESA-E only Option UKB, typical.
d. Settings are: reference level -25 dBm; (75 Ω reference level +28.75 dBmV); input attenuation 10 dB; center frequency 50 MHz; RBW 1 kHz; VBW 1 kHz; amplitude scale linear or log; span 2 kHz; frequency scale linear; sweep time coupled, sample detector, signal at reference level.
e. For reference level 0 to -50 dBm; input attenuation 10 dB; RBW 1 kHz; VBW 1 kHz; amplitude scale log, log range 0 to -50 dB from reference level; frequency scale linear; sweep time coupled; signal input 0 to -50 dBm; span ≤ 20 kHz. (20 to 30 °C).
f. Input frequency < 3GHz; -50 dBm ≤ input power ≤ 0 dBm; -50 dBm ≤ reference level ≤ 0 dBm; -20 dB ≤ input power - ref level ≤ 0 dB; input attenuation = 10 dB; 10 Hz ≤ RBW ≤ 1 MHz; (20 to 30 °C). Computed from the observation of a statistically significant number of instruments. Observations of the 50 MHz amplitude accuracy, a component of the computation of this number are performed immediately after invoking RF and IF alignments to minimize the effects of alignment drifts.
g. 0 to 30 dB for RBW = 200 Hz.

Amplitude Specifications

	Basic analyzer E4411B/03B/08B	Standard, communications test analyzer or customer configuration E4402B/04B/05B/07B
Spurious responses		
Third order intermodulation distortion	For two -30 dBm signals at input mixer[a] and > 50 kHz separation	
10 MHz to 100 MHz		
100 MHz to 3 GHz	< -75 dBc, + 7.5 dBm TOI	< -85 dBc, +12.5 dBm; typ +16 dBm TOI
3.0 GHz to 6.7 GHz		< -82 dBc, +11 dBm; typ +18 dBm TOI
6.7 GHz to 13.2 GHz		< -75 dBc, +7.5 dBm; typ +12 dBm TOI
13.2 GHz to 26.5 GHz		< -75 dBc, +7.5 dBm; typ +11 dBm TOI
Second harmonic distortion		
2 MHz to 750 MHz - 40 dBm tone at input mixer[a]	< -75 dBc, + 35 dBm SHI (E4411B)	
10 MHz to 500 MHz - 30 dBm tone at input mixer[a]	< -60 dBc, + 30 dBm SHI	< -65 dBc, + 35 dBm SHI
500 MHz to 1.5 GHz - 30 dBm tone at input mixer[a]	< -70 dBc, + 40 dBm SHI	< -75 dBc, + 45 dBm SHI
1.5 GHz to 2.0 GHz - 10 dBm tone at input mixer[a]	< -80 dBc, + 70 dBm SHI	< -85 dBc, + 75 dBm SHI
> 2 GHz - 10 dBm tone at input mixer[a]	≤ -95 dBc, + 85 dBm TOI	< -100 dBc, + 90 dBm SHI
WCDMA ACPR dynamic range[b]	Input terminated and 0 dB attenuation	
Offset frequency 5 MHz		-60 dBc, -65 dBc, -66.5 dBc noise correction (Opt 120)
10 MHz		-64.5 dBc, -65.5 dBc, -67 dBc noise correction (Opt 120)
Other input related spurious		
Inband > 30 kHz offset	< -65 dBc for -20 dBm tone at input mixer[a]	
Out of band responses	< -80 dBc -10 dBm tone at input mixer[a]	

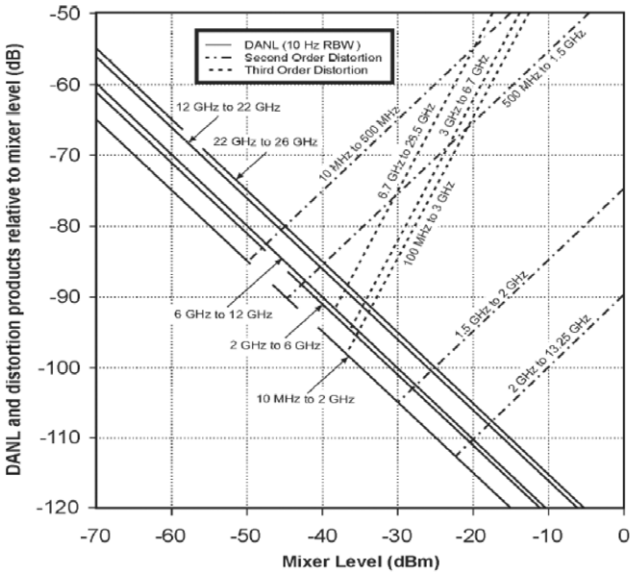

Figure 2. Specified dynamic range for E4407B spectrum analyzer

a. Mixer power level (dBm) = input power (dBm) - input attenuation (dB).

b. Characteristic. Measured by selecting "Measure, ACP", 20 to 30 °C, 3GPP (3.1 Dec 1999) W-CDMA signal with 1 DPCH, channel power -9 dBm/3.84 MHz, integration bandwidth 3.84 MHz, carrier frequency 2 GHz, reference level -16 dBm, input attenuation 0 dB, RBW 30 kHz. Noise correction can be turned on by selecting Meas Setup, More, Noise Corr On.

General Specifications

	Basic analyzer			Standard, communications test analyzer or custom configuration	
	E4411B	**E4403B**	**E4408B**	**E4402B**	**E4404/05/07B**
Temperature range					
Operating	0 °C to +55 °C				
Storage	-40 °C to +75 °C				
Disk drive	10 °C to +40 °C				
EMI compatibility	Conducted and radiated interference is in compliance with CISPR Pub. 11/1990 Group 1 Class A Conducted and radiated interference is in compliance with CISPR Pub. 11/1990 Group 1 Class B[a] (Option 060)				
Audible noise sound pressure at 25 °C	< 40 dBa pressure and < 4.6 bels power (ISODP7779)				
Military specifications	Type tested to the environmental specifications of MIL-PRF-28800F class 3				
Power requirements	Type tested to the environmental specifications of MIL-PRF-28800F class 3				
AC operation on (line |)	90 to 132 V rms, 47 to 440 Hz 195 to 250 V rms, 47 to 66 Hz Power consumption < 300W				
Standby (line⏻)	Power consumption < 5W				
DC operation	12 to 20 Vdc, < 200 W power consumption				
Data storage (nominal)					
Internal[b]	200 traces or states				8.0 MB
External	3.5" 1.44 MB, MS-DOS				
Memory usage (nominal)					
State	16 kB[c]				
State plus 401- point trace	20 kB[c]				
Weight (without options)					
Kilograms	13.2 kg 29.1 lb	15.5 kg 34.2 lb	17.1 kg 37.7 lb	15.5 kg 34.2 lb	17.1 kg 37.7 lb
Measurement speed					
Local measurement rate	≥ 35/sec	≥ 30/sec	≥ 28/sec	≥ 45/sec	≥ 40/sec
Remote measurement and GPIB transfer	≥ 30/sec	≥ 30/sec	≥ 30/sec	≥ 45/sec	≥ 40/sec
RF center freq tuning time	≤ 90 ms	≤ 90 ms	≤ 90 ms	≤ 75 ms	≤ 75 ms

a. Meeting class A performance during DC operation.
b. For serial numbers < US414400 or MY41440000, 1MB without Option B72, 8 Mb with Option B72.
c. 401 sweep points. The size of a state will increase depending on the installed application(s).

Inputs/outputs	
Front panel	
Input	50 Ω type N (f); 75 Ω type N (f) (Option 1DP); 50 Ω APC 3.5 (m) (Option BAB)
RF out	50 Ω type N (f); 75 Ω BNC (f) (Option 1DQ)
Probe power	+ 15 Vdc, -12.6 Vdc at 150 mA maximum (characteristic)
External keyboard	6-pin mini-DIN, PC keyboards (for entering screen titles and file names)
Headphone Power output	Front panel knob controls volume 0.2 Ω into 4 Ω (characteristic)
AMPT REF out	50 Ω BNC (nominal)
IF INPUT (Option AYZ)	50 Ω SMA (nominal)
LO OUTPUT (Option AYZ)	50 Ω SMA (nominal)
Rear panel	
10 MHz REF OUT	50 Ω BNC (f), > 0 dBm (characteristic)
10 MHz REF IN	50 Ω BNC (f), -15 to +10 dBm (characteristic)
GATE TRIG/EXT TRIG IN	BNC (f), 5 V TTL
GATE /HI SWP OUT	BNC (f), 5 V TTL
VGA OUTPUT	VGA compatible monitor, 15-pin mini D-SUB, (31.5 kHz horizontal, 60 Hz vertical sync rates, non-interlaced analog RGB 640 x 480
IF, sweep and video ports (Option A4J or AYX)	
AUX IF OUT	BNC (f), 21.4 MHz, nominal -10 to -70 dBm (uncorrected)
AUX VIDEO OUT	BNC (f), 0 to 1V, characteristic (uncorrected)
HI SWP IN	BNC (f), low stops sweep, (5 V TTL)
HI SWP OUT	BNC (f), (5 V TTL)
SWP OUT	BNC (f), 0 to +10 V ramp
GPIB interface (Option A4H)	IEEE-488 bus connector
Serial interface (Option 1AX)	RS-232, 9-pin D-SUB (m)
Parallel interface	
(Option A4H or 1AX)	25-pin D-SUB (f) printer port only

Option Ordering

For information on ordering options, please refer to the *ESA/EMC Spectrum Analyzer Configuration Guide*, literature number 5968-3412E.

More Information

For the latest information on the Agilent ESA-E Series see our Web page at:

www.agilent.com/find/esa

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