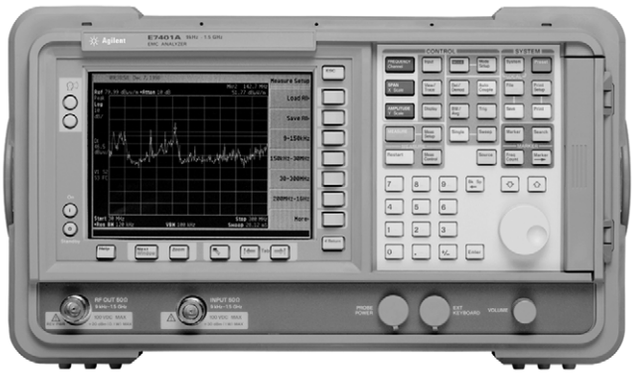
Agilent
E7400 A-series EMC Analyzers

Data Sheet

These specifications apply to the Agilent Technologies E7401A, E7402A, E7403A, E7404A and E7405A EMC analyzers.

Specifications

All specifications apply over 0° C to +55° C unless otherwise noted and are covered by the product warranty. The analyzer will meet its specifications when: it's within the one year calibration cycle, AUTO ALIGN [ALL] is selected, stored a minimum 2 hours within the operating temperature range, turned on for at least 5 minutes, and Align Now RF has been run once every 24 hour period. Typical performance describes the level at which 80% of the units will meet or exceed with a 95% confidence level over 20 to 30° C, but is not covered in the product warranty. Characteristics describe expected product performance levels that are not covered in the product warranty.



Frequency specifications

Frequency range

E7401A		
50 Ω		9 kHz to 1.5 GHz
E7402A		9 kHz to 3.0 GHz
dc coupled		30 Hz[6] to 3.0 GHz
ac coupled		100 kHz[6] to 3.0 GHz
E7403A		
dc coupled		9 kHz to 6.7 GHz
dc coupled (Option UKB)		30 Hz[6] to 6.7 GHz
ac coupled		100 kHz to 6.7 GHz
Band		
0		9 kHz to 3.0 GHz
1		2.85 GHz to 6.7 GHz
E7404A		
dc coupled		9 kHz to 13.2 GHz
dc coupled (Option UKB)		30 Hz[6] to 13.2 GHz
ac coupled		100 kHz to 13.2 GHz
Band	LO harmonic = N	
0	1-	9 kHz to 3.0 GHz
(Option UKB)		30 Hz[6] to 3.0 GHz
1	1-	2.85 GHz to 6.7 GHz
2	2-	6.2 GHz to 13.2 GHz
E7405A		9 kHz to 26.5 GHz
Band	LO harmonic = N	
0	1-	9 kHz to 3.0 GHz
0	(Option UKB)	30 Hz[6] to 3.6 GHz
1	1-	2.85 GHz to 6.7 GHz
2	2-	6.2 GHz to 13.2 GHz
3	4-	12.8 GHz to 19.2 GHz
4	4-	18.7 GHz to 26.5 GHz

Frequency reference		**(Option 1D5)**
Aging	$\pm 2 \times 10^{-6}$/year	$\pm 1 \times 10^{-7}$/year
Temperature stability	$\pm 5 \times 10^{-6}$	$\pm 1 \times 10^{-8}$
Settability	$\pm 5 \times 10^{-7}$	$\pm 1 \times 10^{-8}$

Frequency readout accuracy

(start, stop, center, marker)	±(frequency indication x frequency reference error[1] + span accuracy + 15% of RBW + 10 Hz) + 1 Hz x N[4]

Marker frequency counter[2]

Accuracy[3]	±(marker frequency x frequency reference error[1] + counter resolution)
Counter Resolution	Selectable from 1 Hz to 100 kHz

Frequency span

Range	0 Hz (zero span), 100 Hz x N[4] to the range of the spectrum analyzer
Resolution	2 Hz x N[4]
Accuracy (> 2000 sweep points)	
Sweep type linear	±0.5% of span
Sweep type log	±2% of span (characteristic)

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Sweep time

Range	
Span > 0 Hz	1 ms to 4000 s
Span = 0 Hz	10 µs[15] to 4000 s
(Option AYX)	50 ns[15] to 4000 s
Accuracy	±1%
Sweep trigger	Free run, single, line, video, external, delay, offset, and gate (Option 1D6)
Delay trigger range	1 µs to 400 s

Sweep (trace) point range 101 to 8192
Span = 0 Hz 2 to 8192

Resolution bandwidth 10 Hz to 3 MHz (-3 dB) in 1-3-10 sequence[16]
5 MHz (-3 dB) bandwidth
200 Hz[16], 9 kHz, 120 kHz, 1 MHz (-6 dB) EMI bandwidths
1 MHz (impulse) EMI bandwidth
Option 1D5 Adds 1 Hz and 3 Hz

Accuracy

10 Hz to 300 MHz (-3 dB)	±10%
1Hz and 3 Hz (Option 1D5)	±10%
1 kHz to 3 MHz (-3 dB)	±15%
5 MHz (-3 dB)	±30%
200 Hz (-6 dB)	±10%
9 kHz to 120 kHz (-6 dB)	±20%
1 MHz (-6 dB)	±10%
1 MHz (impulse)	±15%

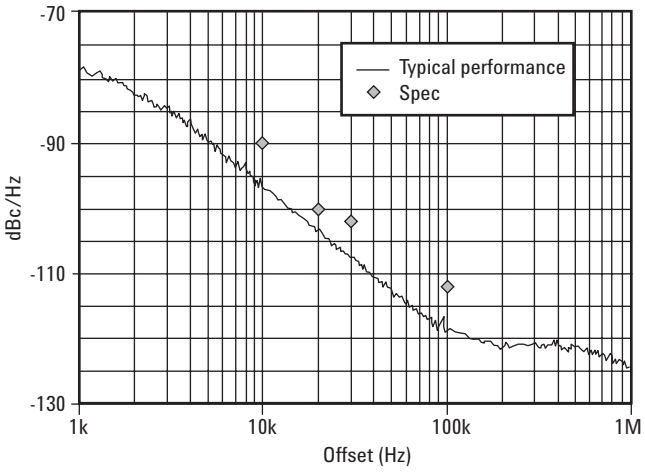
Selectivity (characteristic)

10 Hz to 300 Hz (-3 dB) (Digital, approximately Gaussian-shaped)	< 5:1 (-60 dB/-3 dB)
1 kHz to 3 MHz (-3 dB) (approximately Gaussian-shaped)	< 5:1 (-60 dB/-3 dB)
200 Hz (-6 dB) (Digital, Kaizer Windows)	< 3:1 (-40 dB/-6 dB)
9 kHz, 120 kHz, 1 MHz (-6 dB) (approximately Gaussian-shaped)	< 10:1 (-60 dB/-6 dB)
1 MHz (impulse) (approximately Gaussian-shaped)	< 10:1 (-60 dB/-6 dB)

Video bandwidth range 30 Hz to 3 MHz[6] in 1-3-10 sequence
1, 3, 10 Hz for RBW's < 1 kHz

Stability

Noise sidebands (1 kHz RBW, 30 Hz VBW and sample detector)



E7401A

≥ 1 kHz	na	≤ 79 dBc/Hz (Option 1D5)
≥ 10 kHz	≤ -93 dBc/Hz	≤ -95 dBc/Hz
> 20 kHz	≤ -100 dBc/Hz	≤ -102 dBc/Hz
> 30 kHz	≤ -104 dBc/Hz	≤ -106 dBc/Hz
> 100 kHz	≤ -113 dBc/Hz	≤ -116 dBc/Hz

E7402/03/04/05A

≥ 1 kHz	na	≤ 78 dBc/Hz (Option 1D5)
≥ 10 kHz	≤ -90 dBc/Hz[21]	≤ -94 dBc/Hz[21]
> 20 kHz	≤ -100 dBc/Hz[21]	≤ -105 dBc/Hz[21]
> 30 kHz	≤ -106 dBc/Hz[21]	≤ -112 dBc/Hz[21]
> 100 kHz	≤ -119 dBc/Hz[21]	≤ -122 dBc/Hz[21]
> 1 MHz	≤ -125 dBc/Hz[21]	≤ -127 dBc/Hz[21]
> 5 MHz	≤ -127 dBc/Hz[21]	≤ -129 dBc/Hz[21]
> 10 MHz	≤ -131 dBc/Hz[21]	≤ -136 dBc/Hz[21]

Residual FM

1 kHz RBW, 1 kHz VBW	≤ 150 x N[4] Hz pk-pk in 100 ms
Option 1D5	≤ 100 x N[4] Hz pk-pk in 100 ms
10 Hz RBW, 10 Hz VBW	≤ 2 x N[4] Hz pk-pk in 20 ms

System-related sidebands
≥ 30 kHz offset from CW signal ≤ -65 dBc + 20 Log N[4]

Amplitude specifications

Amplitude range

Measurement range	Displayed average noise level (DANL) to maximum safe input level
Input attenuator range	
E7401A	0 to 60 dB, in 5 dB steps
E7402A, 03A, 04A	0 to 65 dB (75 dB[6]), in 5 dB steps
E7405A	0 to 65 dB, in 5 dB steps

Maximum safe input level

Average continuous power	
E7401A	(input attenuator ≥15 dB) +30 dBm (1 W) (input attenuator ≥5 dB)
E7402A/03A/04A/05A	+30 dBm (1 W)
Peak pulse power	(input attenuator ≥30 dB)
E7402A/03A/04A/05A	+50 dBm (100 W)
E7401A	+30 dBm (1 W)
dc	
E7401A, E7402A	100 Vdc
E7402A (Option UKB)	0 Vdc (dc coupled) 50 V (ac coupled)
E7403A, E7404A	0 Vdc (dc coupled) 50 V (ac coupled)
E7405A	0 Vdc
(Option UKB)	0 Vdc (dc coupled) 50 V (ac coupled)

1 dB gain compression (total power at input mixer[5])

≥ 50 MHz	0 dB
≥ 6.7 GHz	-3 dB
≥ 13.2 GHz	-5 dB

Displayed average noise level (dBm)
(Input terminated, 0 dB attenuation, sample-detector)
1 kHz RBW; 30 Hz VBW
10 Hz RBW; 1 Hz VBW
1 Hz RBW; 1 Hz VBW (Option 1D5)

	1 kHz RBW	10 Hz RBW	1 kHz w/preamp on	10 Hz w/preamp on, typical	1 Hz Option 1D5 w/preamp on, typical
E7401A					
400 kHz to 10 MHz	≤ -115	≤ -134	≤ -150	≤ -155	≤ -165
10 MHz to 500 MHz	≤ -119	≤ -138	≤ -154	≤ -156	≤ -166
500 MHz to 1 GHz	≤ -117	≤ -136	≤ -152	≤ -156	≤ -166
1 GHz to 1.5 GHz	≤ -114	≤ -133	≤ -150	≤ -155	≤ -165
E7402A					
30 Hz to 9 kHz[22] (Option UKB)	na	≤-93	na	na	na
9 kHz to 100kHz[22]	na	≤-109	na	na	na
100 kHz to 1 MHz[22]	na	≤-135	na	na	na
1 MHz to 10 MHz[22]	≤-117	≤-136	na	≤-152	≤-162
10 MHz to 1 GHz	≤-117	≤-136	≤-152[19]	≤-156	≤-166
1 GHz to 2 GHz	≤-116	≤-135	≤–153[19]	≤-156	≤-166
2 GHz to 3 GHz	≤-114	≤-133	≤–151[19]	≤-154	≤-164
E7403A, 04A, 05A					
30 Hz to 9 kHz[22] (Option UKB)	na	≤ -93	na	na	na
9 kHz to 100kHz[22]	na	≤ -109[6]	na	na	na
100 kHz to 1 MHz[22]	na	≤ -135[6]	na	na	na
1 MHz to 10 MHz[22]	≤ -117[6]	≤ -137[6]	na	≤ -155	≤ -165
10 MHz to 1 GHz	≤ -116	≤ -135	≤ -151[19]	≤ -157	≤ -167
1 GHz to 2 GHz	≤ -116	≤ -131	≤ –151[19]	≤ -155	≤ -165
2 GHz to 3 GHz	≤ -112	≤ -131	≤ –149[19]	≤ -152	≤ -162
3 GHz to 6 GHz	≤ -112	≤ -131	na	≤ -138	na
6 GHz to 12 GHz	≤ -111	≤ -130	na	≤ -137	na
12 GHz to 22 GHz	≤ -107	≤ -126	na	≤ -134	na
22 GHz to 26.5 GHz	≤ -106	≤ -125	na	≤ -132	na

Display range

Log Scale	0.1, 0.2, 0.5 dB/division and 1 to 20 dB/division in 1 dB steps; ten divisions displayed
RBW ≥ 1kHz	0 to -85 dB from reference level is calibrated
RBW ≤ 300 kHz	0 to -120 dB from reference level is calibrated
Linear scale	10 divisions
Scale units	dBm, dBmV, dBµV, dBµA, Amps, Volts and Watts

Marker readout resolution

Log scale	
0 to -85 dB	0.04 dB
0 to -120 (RBW ≤ 300 Hz	0.04 dB
Linear scale	0.01% of reference level

Fast sweep times for zero span (Option AYX)

Log Scale	
0 to -85 dB	0.3 dB
Linear	0.3 dB of reference level

Frequency response (10 dB input attenuation)

	Absolute[7]	Typical	Relative flatness[8]
E7401A			
9 kHz to 1.5 GHz	±0.5 dB	na	±0.5 dB
E7402A/03A/04A/05A			
30 Hz to 3 GHz[6] (Option UKB)	±0.5 dB	na	±0.5 dB
9 kHz to 3 GHz	±0.46 dB	±0.14 dB	±0.5 dB
3.0 GHz to 6.7 GHz	±1.5 dB	±0.39 dB	±1.3 dB
6.7 GHz to 13.2 GHz	±2.0 dB	±0.68 dB	±1.8 dB
13.2 GHz to 26.5 GHz	±2.0 dB	±0.86 dB	±1.8 dB

Input attenuation switching uncertainty at 50 MHz

Attenuation setting	
0 dB to 5 dB	±0.3 dB
10 dB	Reference
15 dB	±0.3 dB
20 to 60 dB (E7401A)	±(0.1 dB + 0.01 x attenuator setting)
20 to 65 dB	±(0.1 dB + 0.01 x attenuator setting)

Absolute amplitude accuracy		Typical
At reference settings[13]	±0.34 dB	±0.13 dB
E7401A	±0.30 dB	±0.10 dB
Preamp on[16]	±0.37 dB	±0.14 dB
Overall amplitude accuracy[9]	±(0.54 dB + absolute frequency response)	

RF input VSWR[6] (at tuned frequency, 10 dB attenuation)

E7401A	
1 MHz to 1.5 GHz	1.35:1
E7402A	
100 Hz to 100 kHz	1.1:1 (Option UKB)
9 kHz to 100 kHz	2:1
100 kHz to 3 GHz	1.4:1
E7403A/04A	
100 Hz to 100 kHz	1.1:1 (Option UKB)
9 kHz to 100 kHz	2:1
100 kHz to 6.7 GHz	1.3:1
6.7 kHz to13.2 GHz	1.5:1
E7405A	
100 Hz to 100 kHz	1.1:1 (Option UKB)
9 kHz to 6.7 GHz	1.3:1
6.7 GHz to 13.2 GHz	1.5:1
13.2 GHz to 22 GHz	2:1
22 GHz to 26.5 GHz	2.2:1

Resolution bandwidth switching uncertainty
(Referenced to 1 kHz RBW, at reference level)

10 Hz to 3 MHz RBW	±0.3 dB
5 MHz RBW	±0.6 dB
10 Hz to 300 Hz RBW	±0.3 dB

Reference level

Range	-149 dBm to maximum mixer level + attenuator setting
Resolution	
Log scale	±0.1 dB
Linear scale	±0.12% of reference level
Accuracy (reference level	±0.3 dB (-10 dBm to –60 dBm)
-attenuator setting	±0.5 dB (-60 dBm to –85 dBm)
+ preamp gain)	±0.7 dB (-85 dBm to –90 dBm)

Display scale fidelity
Log maximum cumulative
RBW ≥ 1 kHz

dB below reference level		Typical
0 dB (reference)	±0.00 dB	±0.00 dB
> 0 dB to 10 dB	±0.3 dB	±0.08 dB
> 10 dB to 20 dB	±0.4 dB	±0.09 dB
> 20 dB to 30 dB	±0.5 dB	±0.10 dB
> 30 dB to 40 dB	±0.6 dB	±0.23 dB
> 40 dB to 50 dB	±0.7 dB	±0.35 dB
> 50 dB to 60 dB	±0.7 dB	±0.35 dB
> 60 dB to 70 dB	±0.8 dB	±0.39 dB
> 70 dB to 80 dB	±0.8 dB	±0.46 dB
> 80 dB to 85 dB	±1.15 dB	±0.79 dB

RBW ≤ 300 Hz (Span >0 Hz)

0 dB to 98 dB	±(0.3 dB + 0.01 x dB from reference level)
≥ 98 dB to 120 dB	±(2.0 dB from reference level)[6]
Log incremental accuracy	
0 dB to 80 dB	±0.4 dB/4 dB from reference level
Linear accuracy	± 2% of reference level
Linear to log switching	±0.15 dB at reference level

Spurious responses
Second harmonic distortion

E7401A	
2 MHz to 750 MHz	< -75 dBc for -40 dBm tone at input mixer[5]
E7402A/03A/04A/05A	
10 MHz to 500 MHz	< -65 dBc for -30 dBm tone at input mixer[5]
500 MHz to 1.5 GHz	< -75 dBc for -30 dBm tone at input mixer[2]
1.5 GHz to 2.0 GHz	< -85 dBc for -10 dBm tone at input mixer[2]
> 2.0 GHz	< -100 dBc for -10 dBm tone at input mixer[5] (or below displayed average noise level)

Third order intermodulation distortion

E7401A	
100 MHz to 1.5 GHz	< -87 dBc for two -30 dBm tones at input mixer[5] and > 50 kHz separation
E7402A/03A/04A/05A	
100 MHz to 6.7 GHz	< -85 dBc for two -30 dBm tones at input mixer[5] and > 50 kHz separation
> 6.7 GHz	< -75 dBc for two -30 dBm tones at input mixer[5] and > 50 kHz separation
Other input related spurious	
	< -65 dBc, for -20 dBm tone at input mixer[5]

Residual responses (input terminated and 0 dB attenuation)

150 kHz to 6.7 GHz	< -90 dBm

Amplitude ref. output

E7402A,03A,04A,05A	
Amplitude	-20 dBm (nominal)

FM demodulation[6]

Input level	-60 dBm + attenuator setting
Signal level	0 to -30 dB below reference level

Quasi-peak detector specifications
The EMC analyzer displays the quasi-peak amplitude of a pulse radio frequency on continuous wave signals. Amplitude response conforms with Publication 16 of Comite International Special des Perturbations Radioelectrique (CISPR) Section 1, Clause 2.

Relative quasi-peak response to a CISPR pulse (dB)

Pulse repetition frequency (Hz)	120 kHz EMI BW .03 to 1 GHz	9 kHz EMI BW 0.150 to 30 MHz	200 Hz EMI BW 9 kHz to 150 kHz
1000	+8.0 ±1.0	+4.5 ±1.0	——
100	0 dB reference*	0 dB reference*	+4.0 ±1.0
60	——	——	+3.0 ±1.0
25	——	——	0 dB reference*
20	-9.0 ±1.0	-6.5 ±1.0	——
10	-14 ±1.5	-10.0 ±1.5	-4.0 ±1.0
5	——	——	-7.5 ±1.5
2	-26 ±2.0	-20.5 ±2.0	-13.0 ±2.0
1	——	-22.5 ±2.0	-17.0 ±2.0
Isolated Pulse	——	-23.5 ±2.0	-19.0 ±2.0

* Reference pulse amplitude accuracy relative a 66 µV CW signal < 1.5 dB as specified in CISPR Pub 16 CISPR reference pulse: 0.44 µVs for 30 MHz to 1 GHz, 0.316 µVs for 150 kHz to 30 MHz, 13.5 µVs for 9 kHz to 150 kHz

General specifications

Temperature range

Operating	0° C to +55° C
Storage	-40° C to +75° C

EMI compatibility — Conducted and radiated emissions is in compliance with CISPR Pub. 11/1990 Group 1 Class B[14]

Audible noise — < 40 dBa pressure and < 4.6 Bels power (ISODP7779)

Military specification — Type tested to the environmental specifications of MIL-PRF-28800F, class 3

Power requirements

ON (line1)	90 to 132 V rms, 47 to 440 Hz 195 to 250 V rms, 47 to 66 Hz Power consumption < 300 W
Standby (line 0)	Power consumption < 5 W
DC operation	
Voltage	12 to 20 Vdc
Power consumption	< 200 W

Measurement speed

	E7401A	E7402A	E7403A/04A/05A
Local measurement rate[10]	≥ 50/sec	≥ 45/sec	≥ 40/sec
Remote measurement as GPIB transfer rate[11]	≥ 45/sec	≥ 45/sec	≥ 40/sec
RF center frequency tuning time[18]	≥ 75/ms	≥ 75/ms	≥ 75/ms

Data storage (nominal)

Internal	200 traces[17] or states
External (floppy)	200 traces[17] or states

Weight (without options)

E7401A	12.6 kg	(27.7 lbs.)
E7402A	14.9 kg	(32.9 lbs.)
E7403A/04A/05A	17.1 kg	(37.7 lbs.)

Dimensions

without handle	222 mm(H) x 409 mm(D) x 373 mm(W)
with handle (max.)	222 mm(H) x 516 mm(D) x 416 mm(W)

Inputs/outputs

Front panel connectors

Input	50 Ω type N (f) Option BAB 50 Ω APC 3.5 (m)
RF Out	50 Ω type N (f)

Probe power — +15 Vdc, -12.6 Vdc at 150 mA max. characteristic

Ext. keyboard — 6-pin mini-DIN, PC keyboards (for entering screen titles and file names)

Speaker — front-panel knob controls volume

Headphone — 3.5 mm (1/8 inch) miniature audio jack

Power output — 0.2 W into 4 Ω[6]

Amptd ref. output — 50 Ω, BNC (f) E7402A/03A/04A/05A

Rear panel connectors

10 MHz ref out — 50 Ω, BNC (f), > 0 dBm[6]

10 MHz ref in — 50 Ω, BNC (f), -15 to +10 dBm[6]

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 D-SUB, (31.5 kHz horizontal, 60 Hz vertical sync rates, non-interlaced) Analog RGB 640 x 480

Option AJ4 (IF and Sweep Ports) or Option AYX

Aux IF output	BNC (f), 21.4 MHz, nominal -10 to -70 dBm[6] (uncorrected)
Aux video out	BNC (f), 0 to 1 V[6] (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[6] ramp

GPIB interface

Standard (Option AH4)	IEEE-488 bus connector

Serial interface

(Option 1AX)	RS-232, 9-pin D-SUB (m)

Parallel interface

Standard	25-pin D-SUB (f), printer port only

Option specifications

Option 1DN tracking generator

Frequency range

E7401A	
Option 1DN	9 kHz to 1.5 GHz
E7402A/03A/04A/05A	
Option 1DN	9 kHz to 3.0 GHz

Output power level range

Range	
E7401A	
Option 1DN	0 to -70 dBm
E7402A/03A/04A/05A	
Option 1DN	-2 to -66 dBm
Resolution	0.1 dB
Absolute Accuracy (at 50 MHz)	
Option 1DN	±0.75 dB

Output vernier range

E7401A	10 dB
E7402A/03A/04A/05A	8 dB

Output attenuator range

E7401A	0 to 60 dB, 10 dB steps
E7402A/03A/04A/05A	0 to 56 dB, 8 dB steps

Output flatness

E7401A	
Option 1DN	
9 kHz to 10 MHz	±2.0 dB
10 MHz to 1.5 GHz	±1.5 dB
E7402A/03A/04A/05A	
Option 1DN	
9 kHz to 10 MHz	±3.0 dB
10 MHz to 3.0 GHz	±2.0 dB

Effective source match (characteristic)

E7401A	< 2.5:1
E7402A/03A/04A/05A	< 2.0:1 (0 dB Atten.)
	< 1.5:1 (≥ 8 dB Atten.)

Spurious output

Harmonic spurs	
E7401A	
(0 dBm output)	
9 kHz to 20 MHz	<-20 dBc
20 MHz to 1.5 GHz	<-25 dBc
E7402A/03A/04A/05A	
(-1 dBm output)	
9 kHz to 3 GHz	<-25 dBc
Non-harmonic spurs	
E7401A	<-35 dBc
E7402A/03A/04A/05A	
9 kHz to 2 GHz	<-27 dBc
2 GHz to 3 GHz	<-23 dBc

Dynamic range

Maximum output power – displayed average noise level

Power sweep range

E7401A	
Option 1DN	(-15 dBm to 0 dBm) – (source attenuator setting)
E7402A/03A/04A/05A	
Option 1DN	(-10 dBm to -1 dBm) – (source attenuator setting)

Preamplifier (standard)

E7401A	100 kHz to 1.5 GHz
E7402A/03A/04A/05A	1 MHz to 3 GHz
(nominal gain 20 dB)	

1. Frequency reference error = (aging rate x period of time since adjustment + settability + temperature stability)
2. Not available in RBW < 1kHz
3. Marker level to DANL > 25 dB, Span ≤ 1.5 GHz, RBW/Span ≥ 0.002
4. N = LO harmonic mixing mode
5. Mixer power level (dBm) = input power (dBm) – input attenuator (dB)
6. Characteristic
7. Referenced to 50 MHz amplitude reference (20° C – 30° C)
8. Reference to midpoint between highest and lowest frequency response deviations. (20° C – 30° C)
9. For reference levels 0 to 50 dBm; input attenuation 10 dB; dc coupled; RFW 1 kHz; VBW 1 kHz; scale loge range 0 to -50 dB from reference level; sweeptime coupled; signal input 0 to 50 dB; spsn ≤ 20 kHz.
10. Characteristic; factory preset, fixed center frequency, sweep points = 101 auto align off, RBW = 1 MHz, stop frequency ≤ 3 GHz, span > 10 MHz and ≤ 600 MHz (E4401, span > 102 MHz and ≤ 400 MHz).
11. Characteristic; factory preset, fixed center frequency, sweep points = 101 auto align off, RBW = 1 MHz, stop frequency ≤ 3 GHz, span = 20 MHz, GPIB interface, display and markers off, fixed center frequency, single sweep
12. In time domain sweeps
13. Reference level -25 dBm (E7401A) or -20 dBm (E7402A/03A/04A/05A); input attenuation 10 dB; center frequency 50 MHz; RBW 1 kHz; VBW 1 kHz; scale linear or log; span 2 kHz; sweep time coupled, sample director, signal at reference level.
14. Meets Class A performance during dc operation or serial number US41110000 or lower.
15. RBW ≥1 kHz, 2 sweep points
16. 10 Hz to 300 Hz are only available in spans of ≤ 5 MHz and are not usable with tracking generator Option 1DN.
17. When storing a 401-point trace plus the instrument state

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