

# Agilent 8560 E-Series Spectrum Analyzers

Data Sheet

**8560E 30 Hz to 2.9 GHz**

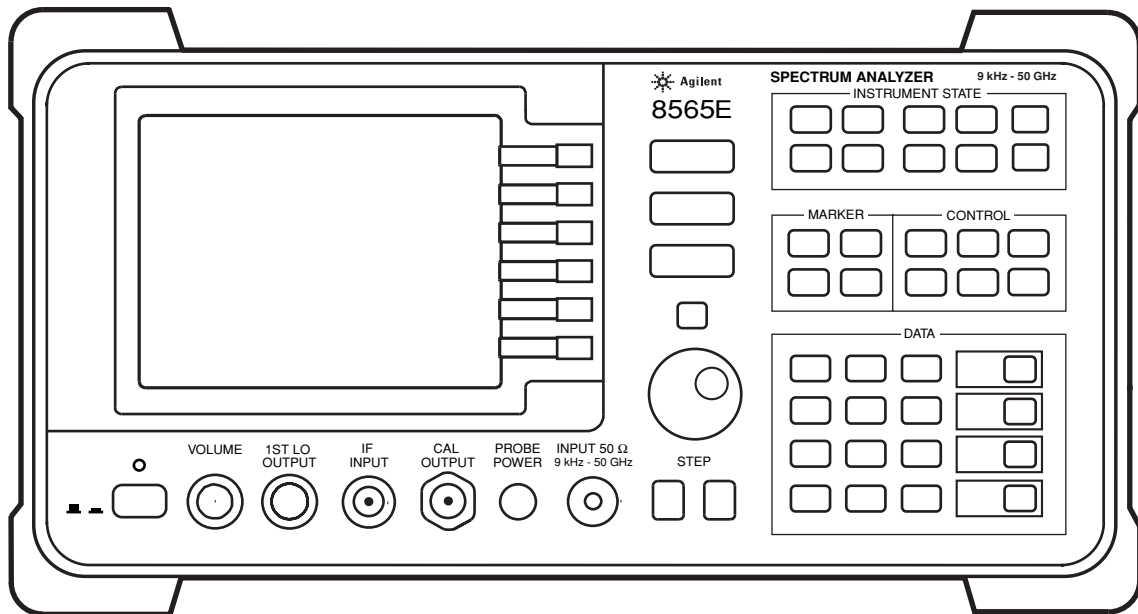
**8561E 30 Hz to 6.5 GHz**

**8562E 30 Hz to 13.2 GHz**

**8563E 30 Hz to 26.5 GHz**

**8564E 30 Hz to 40 GHz**

**8565E 30 Hz to 50 GHz**



Unless noted, all specifications describe the instruments' warranted performance under the following conditions: 5-minute warm-up from ambient conditions, autocoupled controls, digital display, IF ADJ ON, REF LVL CAL adjusted, SECOND IF OUTPUT and 1ST LO OUTPUT terminated in 50  $\Omega$ . After a 30-minute warm-up, and over a temperature range of 20  $^{\circ}\text{C}$  to 30  $^{\circ}\text{C}$ , the preselector does not have to

be peaked at each signal of interest; under these conditions factory preselector peak values are sufficient to meet all specifications. Typical performance is nonwarranted. Supplemental characteristics are denoted by "nominal" and "approximately"; these constitute nonwarranted functional performance information derived during the design process and are not tested on a continuing basis.



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# Frequency Specifications, Agilent 8560 E-Series

## Frequency Range

	8560E	8561E	8562E	8563E	8564E	8565E
<b>Internal Mixing</b>	30 Hz** to 2.9 GHz	30 Hz** to 6.5 GHz	30 Hz** to 13.2 GHz	30 Hz* to 26.5 GHz	30 Hz* to 40 GHz	30 Hz* to 50 GHz
<b>External Mixing</b>	18 GHz to 325 GHz	18 GHz to 325 GHz	18 GHz to 325 GHz	18 GHz to 325 GHz	18 GHz to 325 GHz	18 GHz to 325 GHz

\* 8563E, 8564E, 8565E require Option 006 for operation below 9 kHz.

\*\* 8560E, 8561E, 8562E minimum frequency in AC coupled mode is 100 kHz. In DC coupled mode minimum frequency is 30 Hz.

## Frequency Band

30 Hz to 2.9 GHz	1
2.75 GHz to 6.46 GHz	1
5.86 GHz to 13.2 GHz	2
12.4 GHz to 26.8 GHz	4
26.4 GHz to 31.15 GHz	4
31.0 GHz to 50 GHz	8

## Harmonic Mixing Mode (N)

### Opt. 103

<b>Temperature Stability*</b>	$\pm 1 \times 10^{-8}$	$\pm 1 \times 10^{-6}$
<b>Aging (per year)</b>	$\pm 1 \times 10^{-7}$	$\pm 2 \times 10^{-6}$
(per day nom.)	$\pm 5 \times 10^{-10}^{**}$	
<b>Initial Achievable Accuracy</b>	$\pm 2.2 \times 10^{-8}$	$\pm 1 \times 10^{-6}$
<b>Short-term warmup accuracy factors (nominal)</b>		
5 minute	$\pm 1 \times 10^{-7}$	
15 minute	$\pm 1 \times 10^{-8}$	

\* -10 °C to +55 °C, referenced to 25 °C

\*\* after 7-day warmup

## Frequency Readout Accuracy

(Start, Stop, Center, and Marker frequency functions)

Span > 2 MHz x N*	$\pm(\text{freq readout} \times \text{freq ref accuracy}^{**} + 5\% \times \text{span} + 15\% \times \text{RBW} + 10 \text{ Hz})$
Span ≤ 2 MHz x N*	$\pm(\text{freq readout} \times \text{freq ref accuracy}^{**} + 1\% \times \text{span} + 15\% \times \text{RBW} + 10 \text{ Hz})$

\* N = harmonic mixing mode number

\*\* Frequency reference accuracy = aging x time since last adjustment + initial achievable accuracy + temperature stability

## Frequency Counter Accuracy

<b>Marker Count Accuracy</b> (S/N ≥ 25 dB)	$\pm(\text{marker freq} \times \text{freq ref accuracy}^* + 2 \text{ Hz} \times \text{N}^{***} + 1 \text{ LSD of counter})$
<b>Accuracy at 1 GHz</b> (25 °C, 1 yr aging, marker resolution = 1 Hz)	$\pm 225 \text{ Hz (5 minute warmup)}^{**}$ $\pm 135 \text{ Hz (15 minute warmup)}^{**}$ $\pm 3003 \text{ Hz (Option 103)}$
<b>Delta Count Accuracy</b> (S/N ≥ 25 dB)	$\pm(\text{delta freq} \times \text{freq ref accuracy}^* + 4 \text{ Hz} \times \text{N}^{***} + 2 \text{ LSD})$
<b>Counter Resolution</b>	Selectable from 1 Hz to 1 MHz

\* Frequency reference accuracy = aging x time since last adjustment + initial achievable accuracy + temperature stability

\*\* Short term warmup accuracy factors have been included in this calculation.

\*\*\* N = harmonic mixing mode number

## Frequency Span

<b>Range</b>	0, 100 Hz to full span (100 Hz x N* when using external mixers)
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## Accuracy

Span > 2 MHz x N*	±5%
Span ≤ 2 MHz x N*	±1%

\* N = harmonic mixing mode number

\*\* Frequency reference accuracy = aging x time since last adjustment + initial achievable accuracy + temperature stability

# Frequency Specifications, continued

## Sweep Time

### Range

Span = 0 Hz	50 $\mu$ s to 6000 s
Span $\pm$ 100 Hz	
RBW $\geq$ 300 Hz	50 ms to 2000 s
RBW $\leq$ 100 Hz	50 ms to 100 ks

### Accuracy (Span = 0 Hz)

Sweep time $\geq$ 30 ms	$\pm$ 1% (digitized trace data)
Sweep time < 30 ms (non-Option 007)	$\pm$ 10% (analog trace data)
Sweep time < 30 ms (Option 007*)	$\pm$ 0.1% (digitized trace data)

### Sweep Trigger

delayed, free run, single, line, video, external

\* Option 007 extends digitized trace data capability to sweep times < 30 ms.

## Resolution Bandwidth

<b>Range</b> (–3 dB)	1 Hz to 1 MHz in a 1, 3, 10 sequence and 2 MHz (3 MHz at –6 dB)
Option 103	10 Hz to 1 MHz in a 1, 3, 10 sequence and 2 MHz (3 MHz at –6 dB)

<b>Accuracy</b>	1 Hz to 300 kHz	$\pm$ 10%
	1 MHz	$\pm$ 25%
	2 MHz	+50%, –25%

### Selectivity (–60 dB/–3 dB BW ratio)

RBW $\geq$ 300 Hz	< 15:1
RBW $\leq$ 100 Hz	< 5:1

<b>Video Bandwidth Range</b>	1 Hz to 3 MHz in a 1, 3, 10 sequence
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## Noise Sidebands (see figure 1)

Center Frequency  $\leq$  1 GHz

### Offset

100 Hz	$\leq$ 88 dBc/Hz*	<b>Opt. 103</b> $\leq$ 70 dBc/Hz*
1 kHz	$\leq$ 97 dBc/Hz*	$\leq$ 90 dBc/Hz*
10 kHz <sup>#</sup>	$\leq$ 113 dBc/Hz**	$\leq$ 113 dBc/Hz**
30 kHz <sup>###</sup>	$\leq$ 113 dBc/Hz***	$\leq$ 113 dBc/Hz***
100 kHz <sup>###</sup>	$\leq$ 117 dBc/Hz****	$\leq$ 117 dBc/Hz****

\* Add 5.2 x ((f/1 GHz)–1) for f > 1 GHz and f  $\leq$  2.9 GHz

\*\* Add 2.5 x ((f/1 GHz)–1) for f > 1 GHz and f  $\leq$  2.9 GHz

\*\*\* Add 3.0 dB x ((f/1 GHz)–1) for f > 1 GHz and f  $\leq$  2.9 GHz

\*\*\*\* Add 2 dB for f > 1 GHz and f  $\leq$  2.9 GHz

# RBW  $\leq$  1k or Span  $\leq$  745 kHz

## RBW  $\geq$  3k or Span > 745 kHz

### Not specified at 30 kHz offset for 8564E and 8565E

## Residual FM

(zero span, 10 Hz RBW))	< 1 Hz pk-pk x N* in 20 ms
	< 0.25 Hz pk-pk x N* in 20 ms (typical)
Option 103	< 10 Hz pk-pk x N* in 20 ms

\* N = harmonic mixing mode number

\*\* Frequency reference accuracy = aging x time since last adjustment + initial achievable accuracy + temperature stability

# Amplitude Specifications, Agilent 8560 E-Series

**Range**      Displayed Average Noise Level to +30 dBm

## Maximum Safe Input Level

**Average Continuous Power**      +30 dBm (1 W,  
input attn ≥ 10 dB)

**Peak Pulse Power**      +50 dBm (100 W,  
input attn ≥ 30 dB)  
(≤ 10 μs pulse width,  
< 1% duty cycle)

## Maximum DC Input Voltage

DC coupled      ±0.2 Vdc  
AC coupled      ±50 Vdc

## 1 dB Gain Compression

Maximum power at mixer =  
input power (dBm) – input attenuation (dB)  
10 MHz to 2.9 GHz      –5 dBm  
2.9 GHz to 6.46 GHz      +0 dBm\*  
6.46 GHz to 26.8 GHz      –3 dBm  
26.8 GHz to 50 GHz      +0 dBm (nominal)

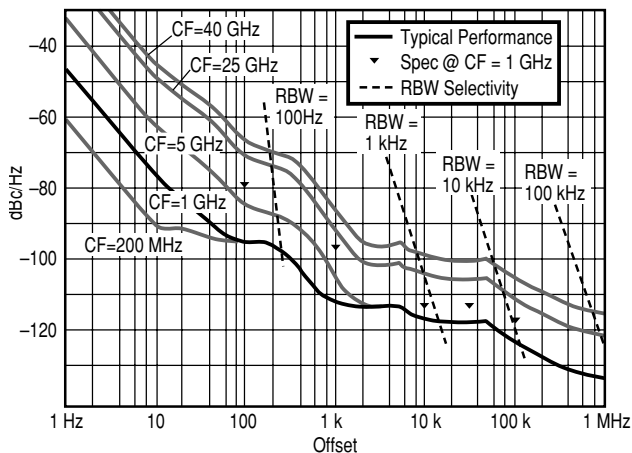
\* 8561E: -3 dBm

## Displayed Average Noise Level (DANL) (see figure 2) (0 dB attenuation, 1 Hz resolution bandwidth\*)

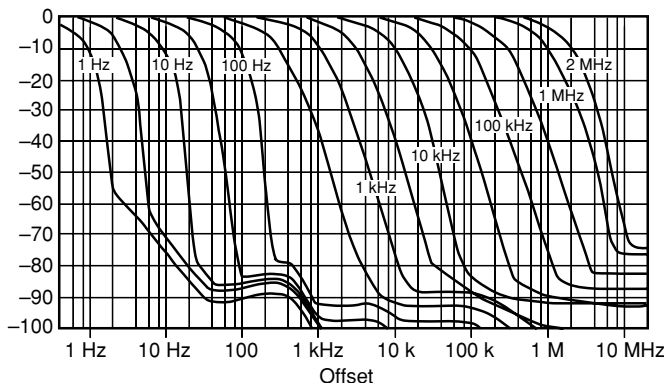
	8560E	8561E	8562E	8563E	8564E, 8565E
30 Hz**	≤ 90 dBm	≤ 90 dBm	≤ 90 dBm	≤ 90 dBm	≤ 90 dBm
1 kHz**	≤ 105 dBm	≤ 105 dBm	≤ 105 dBm	≤ 105 dBm	≤ 105 dBm
10 kHz	≤ 120 dBm	≤ 120 dBm	≤ 120 dBm	≤ 120 dBm	≤ 120 dBm
100 kHz	≤ 120 dBm	≤ 120 dBm	≤ 120 dBm	≤ 120 dBm	≤ 120 dBm
1 MHz to 10 MHz	≤ 140 dBm	≤ 140 dBm	≤ 140 dBm	≤ 140 dBm	≤ 140 dBm
10 MHz to 2.9 GHz	≤ 149 dBm	≤ 145 dBm	≤ 151 dBm	≤ 151 dBm	≤ 145 dBm
2.9 GHz to 6.46 GHz		≤ 145 dBm	≤ 148 dBm	≤ 148 dBm	≤ 147 dBm
6.46 GHz to 13.2 GHz			≤ 145 dBm	≤ 145 dBm	≤ 143 dBm
13.2 GHz to 22.0 GHz				≤ 140 dBm	≤ 140 dBm
22.0 GHz to 26.8 GHz				≤ 139 dBm	≤ 136 dBm
26.8 GHz to 31.15 GHz					≤ 139 dBm
31.15 GHz to 40 GHz					≤ 130 dBm
40 GHz to 50 GHz					≤ 127 dBm

\* For Option 103, degrade DANL by 10 dB

\*\* 8563E, 8564E, 8565E require Option 006 for operation below 9 kHz.



**Figure 1. Noise sidebands normalized to 1 Hz BW versus offset from carrier.**



**Figure 2. Typical on-screen dynamic range versus offset from 1 GHz center frequency for all RBWs (mixer level = -10 dBm).**

# Amplitude Specifications, continued

## Dynamic Range (see figure 3)

Compression to Noise*	8560E	8561E	8562E	8563E	8564E, 8565E
10 MHz to 2.9 GHz	> 146 dB	> 140 dB	> 146 dB	> 144 dB	> 145 dB
2.9 GHz to 6.46 GHz		> 142 dB	> 148 dB	> 148 dB	> 147 dB
6.46 GHz to 13.2 GHz			> 142 dB	> 142 dB	> 140 dB
13.2 GHz to 22.0 GHz				> 137 dB	> 137 dB
22.0 GHz to 26.8 GHz				> 136 dB	> 133 dB
26.8 GHz to 31.15 GHz					> 139 dB
31.15 GHz to 40 GHz					> 130 dB
40 GHz to 50 GHz					> 127 dB

\* (1dB compression - DANL) For Option 103, degrade compression to noise dynamic range by 10 dB.

## Signal to Distortion

Harmonic*	8560E	8561E	8562E	8563E	8564E, 8565E
20 MHz to 1.45 GHz	> 95 dB	> 88.5 dB	> 95 dB	> 94 dB	> 92 dB
1.45 GHz to 2 GHz		> 98.5 dB	> 111.5 dB	> 111.5 dB	> 111 dB
2 GHz to 3.25 GHz		> 119 dB	> 119 dB	> 119 dB	> 113.5 dB
3.25 GHz to 6.6 GHz			> 117.5 dB	> 117.5 dB	> 111.5 dB
6.6 GHz to 11 GHz				> 115 dB	> 110 dB
11 GHz to 13.4 GHz				> 114.5 dB	> 108 dB
13.4 GHz to 15.6 GHz					> 109.5 dB
15.6 GHz to 20 GHz					> 105 dB
20 GHz to 25 GHz					> 103.5 dB

\* 0.5 x (SHI - DANL at 2 x input frequency) For Option 103, degrade harmonic (SHI) dynamic range by 5 dB.

Intermodulation*	8560E	8561E	8562E	8563E	8564E, 8565E
10 MHz to 2.9 GHz	> 108 dB	> 103 dB	> 108 dB	> 107 dB	> 104 dB
2.9 GHz to 6.46 GHz		> 107 dB	> 108.5 dB	> 108.5 dB	> 108 dB
6.46 GHz to 13.2 GHz			> 101.5 dB	> 101.5 dB	> 100 dB
13.2 GHz to 22.0 GHz				> 98 dB	> 98 dB
22.0 GHz to 26.8 GHz				> 97.5 dB	> 95.5 dB
26.8 GHz to 31.15 GHz					> 101 dB (nominal)
31.15 GHz to 40 GHz					> 95 dB (nominal)
40 GHz to 50 GHz					> 93 dB (nominal)

\* 0.67 x (TOI - DANL) For Option 103, degrade intermodulation (TOI) dynamic range by 6.67 dB.

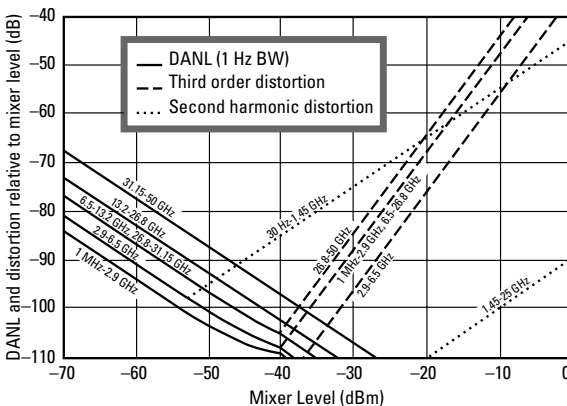


Figure 3. Agilent 8560E family nominal dynamic range

# Amplitude Specifications, continued

## Spurious Responses

### General Spurious Responses

(Mixer level -40 dBm)  $< (-75 + 20 \times \log N)$  dBc

### Second Harmonic Distortion

Input Signal	Mixer Level	Distortion	SHI
20 MHz to 1.45 GHz	-40 dBm	$\leq 79$ dBc*	+39 dBm*
1.45 GHz to 2 GHz	-10 dBm**	$\leq 85$ dBc**	+75 dBm**
2 GHz to 13.25 GHz			
8562E, 8563E	-10 dBm	$\leq 100$ dBc	+90 dBm
8564E, 8565E	-10 dBm	$\leq 90$ dBc	+80 dBm
13.25 GHz to 25 GHz	-10 dBm	$\leq 90$ dBc	+80 dBm

\* 8561E: distortion -72 dBc, SHI +32 dBm

\*\* 8561E: mixer level -20 dBm, distortion -72 dBc, SHI +52 dBm

### Third Order Intermodulation Distortion

(Two -30 dBm signals,  $\geq 1$  kHz apart)

Mixer Level	Distortion	TOI
-30 dBm each	$\leq 82$ dBc*	+11 dBm
-30 dBm each	$\leq 90$ dBc	+15 dBm
-30 dBm each	$\leq 75$ dBc	+7.5 dBm
-30 dBm each	$\leq 85$ dBc (nominal)	+12.5 dBm (nominal)

\* 8561E -78 dB distortion with two -30 dBm signals, 9 dBm TOI

### Image Responses

Mixer Level	Distortion
-10 dBm	-80 dBc
-30 dBm	-60 dBc

### Multiple and Out-of-band Responses

Mixer Level	Distortion
-10 dBm	-80 dBc
-30 dBm	-55 dBc

## Residual Responses

$\leq 90$  dBm, for the range from 200 kHz to 6.46 GHz, no input signal, 0 dB input attenuation

## Display Range

<b>Viewing Area</b>	approximately 7 cm (V) x 9 cm (H)
<b>Scale Calibration</b>	10 x 10 divisions
<b>Log Scale</b>	10, 5, 2, 1 dB per division
<b>Linear Scale</b>	10% of reference level per division

## Scale Fidelity

	Incremental	Maximum
<b>Log Range</b>	0 to -90 dB	0 to -90 dB
RBW $\geq 300$ Hz	$\pm 0.1$ dB/dB	$\pm 0.85$ dB
RBW $\leq 100$ Hz	$\pm 0.2$ dB/2dB	$\pm 0.85$ dB*
<b>Linear Range</b>	$\pm 3\%$ of reference level	

\* maximum for 0 to -100 dB is  $\pm 1.5$  dB

# Amplitude Specifications, continued

## Reference Level Range

Log, adjustable in 0.1 dB steps

30 Hz to 31.15 GHz	-120 to +30 dBm
31.15 GHz to 50 GHz	-115 to +30 dBm

Linear, adjustable in 1% steps

30 Hz to 31.15 GHz	2.2 $\mu$ V to 7.07 V
31.15 GHz to 50 GHz	3.98 $\mu$ V to 7.07 V

**Frequency Response** in dB, 10 dB input attenuation, dc coupled  
relative/typical relative/absolute\*\*/typical absolute\*\*\*

	8560E	8561E	8562E	8563E	8564E, 8565E
100 MHz to 2 GHz	0.7/0.7/--/--		0.9/0.8/--/--	1.0/0.8/--/--	0.9/0.8/--/--
30 Hz* to 2.9 GHz	1/0.8/1.5/1.0	1.0/0.7/1.75/1.0	1.25/0.8/1.8/1.0	1.25/0.8/1.8/1.0	1.0/0.8/1.5/1.0
2.9 GHz to 6.46 GHz		1.5/1.1/2.5/1.5	1.5/1.1/2.5/1.5	1.5/1.0/2.4/1.5	1.7/1.4/2.6/1.8
6.46 to 13.2 GHz			2.2/1.5/2.9/2.0	2.2/1.5/2.9/2.0	2.6/2.2/3.0/2.8
13.2 to 22 GHz				2.5/1.5/4.0/2.5	2.5/2.5/4.0/3.5
22 to 26.8 GHz				3.3/2.2/4.0/2.5	3.3/2.2/4.5/4.0
26.8 to 31.15 GHz					3.1/2.9/4.0/3.0
31.15 GHz to 40 GHz (8564E)					2.6/2.4/4.0/3.2
31.15 GHz to 50 GHz (8565E)					3.2/3.0/4.0/4.0

\* Operation below 9 kHz requires Option 006.  
 \*\* Absolute flatness values referenced to 300 MHz CAL OUT  
 \*\*\* Typical values at 25° C

## Band Switching Uncertainty

±1 dB (added to relative frequency response for between-band measurements)

## Calibrator Output

300 MHz x (1 ±frequency reference accuracy\*) at -10 dBm  
 ±0.3 dB

\* Frequency reference accuracy = aging x time since last adjustment + initial achievable accuracy + temperature stability

## Input Attenuator

**Switching Uncertainty** (referenced to 10 dB attenuation)  
 30 Hz to 2.9 GHz for 20 to 70 dB settings of input attenuator:  
 ±.6 dB/10 dB step, 1.8 dB maximum  
 Repeatability ±0.1 dB (nominal)

## IF Gain Uncertainty

±1 dB (0 to -80 dBm reference levels with 10 dB input attenuation)

## IF Alignment Uncertainty

±0.5 dB (additional uncertainty only when using 300 Hz RBW)

## Resolution Bandwidth Switching Uncertainty

±0.5 dB (relative to 300 kHz RBW)

# Amplitude Specifications, continued

## Pulse Digitization Uncertainty

(pulse response mode, PRF >720/sweep time)

	Log	Linear
RBW ≤ 1 MHz	< 1.25 dB pk-pk	< 4% of ref level
RBW = 2 MHz	< 3 dB pk-pk	< 12% of ref level
Standard Deviation (RBW < 1 MHz)		< 0.2 dB (nominal)

## Time-gated Spectrum Analysis

Gate Delay*	Edge Mode	Level Mode
Range	3 μs to 65.535 ms	≤ 0.5 μs
Resolution	1 μs	
Accuracy	±1 μs	

(From GATE TRIGGER INPUT to positive edge of GATE OUTPUT)

Gate Length	
Range	1 μs to 65.535 ms
Resolution	1 μs
Accuracy	±1 μs

(From positive edge to negative edge of GATE OUTPUT)

\* Up to 1 μs jitter due to 1 μs resolution of gate delay clock

## Delayed Sweep

<b>Trigger Modes</b>	Free Run, Line, External, Video
<b>Range</b>	
Non-Option 007*	+2 μs to +65.535 ms
Option 007, sweep time < 30 ms	-9.9 ms to +65.535 ms
sweep time ≥ 30 ms	+2 μs to +65.535 ms
<b>Resolution</b>	1 μs
<b>Accuracy</b>	±1 μs

\* Up to 1 μs jitter due to 1 μs resolution of gate delay clock

## Demodulation

Spectrum Demodulation	
Modulation type	AM and FM
Audio output	Speaker and phone jack with volume control
Marker Pause Time	100 ms to 60 s (nominal)

# Inputs/Outputs, Agilent 8560 E-Series

(All values are nominal)

## Front Panel Connectors

### RF Input

8560E, 8561E, 8562E, 8563E (Option 026, 8563E only)  
8564E, 8565E

Type N female, 50  $\Omega$   
APC 3.5 mm male, 50  $\Omega$   
APC 2.4 mm male, 50  $\Omega$

VSWR ( $\geq 10$  dB atten)  
30 Hz to 2.9 GHz < 1.5:1 dB  
2.9 GHz to 50 GHz < 2.3:1 dB

LO Emission Level (average with 10 dB atten)  $\leq 80$  dBm  
SMA female, 50  $\Omega$

IF Input  
Frequency 310.7 MHz  
Full Screen Level  $-30$  dBm  
Gain Compression  $-23$  dB

First LO Output  
SMA female, 50  $\Omega$   
Frequency 3.000 - 6.8107 GHz\*  
Amplitude  $+16.5$  dBm  $\pm 2.0$  dB\*

\* Option 002: 3.9107 to 6.8107 GHz,  $+14.5$  dBm  $\pm 3.0$  dB

Cal Output BNC female, 50  $\Omega$   
Probe Power  $+15$  Vdc,  $-12.6$  Vdc, and Gnd (150 mA max each)

## Rear Panel Connectors

### Earphone

Subminiature mono jack,  
0.2 W into 4  $\Omega$

### 10 MHz REF In/Out

Output Freq Accuracy Shared BNC female, 50  $\Omega$   
 $\pm(10$  MHz x freq ref accuracy)

Output Amplitude 0 dBm  
Input Amplitude  $-2$  to  $+10$  dBm

### Video Output

BNC, 50  $\Omega$   
Amplitude (RBW  $\geq 300$  Hz) 0 to  $+1$  V full scale

### LO Sweep Frequency Analog Voltage Output

(LO Sweep or V/GHz function selectable from the front panel, BNC female, 120  $\Omega$ )

LO Sweep Output 0 to 10 V (no load)

Frequency Analog Voltage Output (internal mixer mode)

Output ramp voltage proportional to start and stop frequencies.

Transfer Function: 0.5 V/GHz

0.5 V/GHz Output (external mixer mode)

Output ramp voltage proportional to LO frequency:  
(LO = 3 to 6.8107 GHz)

Transfer Function:  $(1.5$  V/GHz x LO frequency (GHz)  $-0.2054)$   $\pm 50$  mV (typ)

### Blanking/Gate

Output Shared BNC female, 50  $\Omega$

Blanking Mode

During Sweep Low TTL Level

During Retrace High TTL level

Gate Mode

Gate On High TTL level

Gate Off Low TTL level

### External/Gate

#### Trigger Input

Shared BNC female,  $> 10$  k $\Omega$   
Settable to high TTL or low TTL  
IEEE-488 bus connector  
SH1, AH1, T6, L4, LE0, RL1, PP1,  
DC1, DT1, C1, C28, TE0, SR1  
Supports HP 3630A PaintJet  
printer, HP 2225A ThinkJet printer  
Supports HP 7225A/7440A/  
7470A/7475A/7550A

### GPIB

Interface Functions

Direct Printer Output

Direct Plotter Output

# Options

## Option 001 Second IF output, Agilent 8560 Series

(all values are nominal)

3 dB bandwidth NF conversion gain	8560E	8561E	8562E	8563E	8564E,8565E
30 Hz to 2.9 GHz*	> 25 MHz 24 dB 1.2 dB	> 25 MHz 25 dB -6.5 dB	> 25 dB 20 dB -1.2 dB	> 25 MHz 25 dB -1.2 dB	>25 MHz 28 dB -1.2 dB
2.9 GHz to 6.5 GHz		> 30 MHz 26 dB -1 dB	> 30 MHz 22 dB -3 dB	> 30 MHz 22 dB -1 dB	>30 MHz 23 dB -1 dB
6.5 GHz to 13.2 GHz			> 37 MHz 26 dB -5.7 dB	> 37 MHz 26 dB -5.7 dB	>37 MHz 28 dB -5.7 dB
13.2 GHz to 22 GHz				> 45 MHz 30 dB -8 dB	> 45 MHz 32 dB -8 dB
22 GHz to 26.8 GHz				> 45 MHz 32 dB -8 dB	> 45 MHz 35 dB -8 dB
26.8 GHz to 31.15 GHz					> 25 MHz 28 dB -9 dB
31.15 GHz to 40 GHz					> 25 MHz 38 dB -19 dB
40 GHz to 50 GHz					> 25 MHz 42 dB -23 dB

\* DC coupled for frequencies below 100 kHz. Option 006 required for operation below 9 kHz in 8563E, 8564E, 8565E.

## Options, continued

### Option 002 Built-in Tracking Generator\* (8560E only)

#### Frequency Specifications

<b>Frequency Range</b>	300 kHz to 2.9 GHz
<b>Accuracy</b>	
After Peaking	±(frequency reference accuracy x tuned frequency +5% x span + 295 Hz)

<b>Tracking Drift</b> (nominal)	Usable in 1 kHz RBW after 5-minute warm-up, usable in 300 Hz RBW after 30-minute warm-up.
<b>Minimum RBW</b>	300 Hz**

#### Amplitude Specifications

Output Level (10 dBm to +2.8 dBm typical)	-10 dBm to +1 dBm
Resolution	0.1 dB
<b>Accuracy</b>	
Vernier	±0.20 dB/dB, ±0.5 dBm max (25 °C ±10 °C)
Absolute	±0.75 dB
Level Flatness	±2.0 dB
Effective Source Match	1.92:1 (nominal)
Total Absolute Accuracy	±3.25 dB

#### Spurious Output (at +1 dBm output power)

Harmonic Spurious	-25 dBc
Non-harmonic Spurious	
300 kHz to 2.0 GHz	-27 dBc
2.0 GHz to 2.9 GHz	-23 dBc
LO Feedthrough	-16 dBm (3.9 GHz to 6.8 GHz)
Residuals (RF-Power-Off)	-78 dBm (300 kHz to 2.9 GHz)

#### Dynamic Range

TG Feedthrough***	
300 kHz to 1 MHz	-95 dBm
1 MHz to 2.7 GHz	-115 dBm
2.7 GHz to 2.9 GHz	-110 dBm

#### Dynamic Range\*\*\*\*

300 kHz to 1 MHz	96 dB
1 MHz to 2.7 GHz	116 dB
2.7 to 2.9 GHz	111 dB
<b>Power Sweep</b>	10 dB range, 0.1 dB resolution

#### Inputs/Outputs

<b>RF Output</b> (front panel)	Type-N female, 50 W (nominal)
Maximum Safe Reverse Level	+30 dBm, ±30 Vdc

<b>External ALC Input</b> (rear panel)	BNC female, use with negative detector
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\* Option 002 deletes millimeter external mixer capability (Second IF input is deleted)

\*\* Tracking generator not usable with resolution bandwidths ≤100 Hz

\*\*\* Leakage measured with maximum power into 50 Ω and with 50 W on RF input

\*\*\*\* Difference between maximum power output and tracking generator feedthrough

# Environmental Specifications, Agilent 8560 E-Series

Per MIL-T-28800, Type III, Class 3\*, Style C

## Calibration Interval

8560E, 8561E, 8562E, 8563E 2 years  
8564E, 8565E 1 year

## Warm-up Time

5-minutes in ambient conditions

## Temperature

-10 °C to +55 °C (operating); -51 °C to +71 °C (not operating)

## Humidity

95% @ 40 °C for 5 days

## Rain Resistance

Drip-proof at 16 liters/hour/sq. ft.

## Altitude

15,000 ft. (operating),  
50,000 ft. (non-operating)

## Pulse Shock (half sine)

30 g for 11ms duration

## Transit Drop

8-inch drop on six faces and eight corners

## Electromagnetic Compatibility

Conducted and radiated interference in compliance with CISPR Pub. 11 (1990). Meets Mil-STD-461C, part 2, with certain exceptions.

## Power Requirements

115 VAC operation:  
90 to 140 V rms,  
3.2 A rms max,  
47 to 440 Hz  
230 VAC operation:  
180 to 250 V rms,  
1.8 A rms max,  
47 to 66 Hz

## Maximum Power Dissipation

8560E, 8561E, 8562E, 8563E 180 W  
8564E, 8565E 260 W

## Audible Noise (nominal)

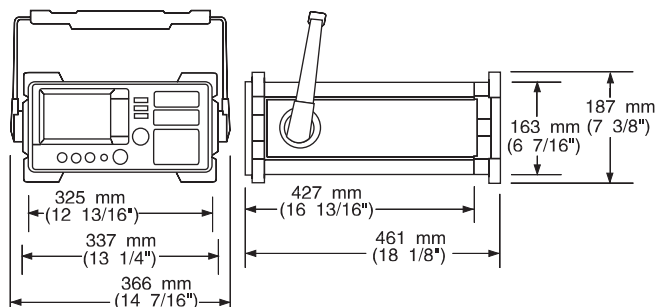
< 5.0 Bels power at room temp (ISO DP7779)  
337 mm W x 187 mm H x 461 mm D

## Dimensions (w/o handle, cover)

## Weight (nominal)

8560E, 8561E, 8562E, 8563E 20 kg (44 lbs)  
8564E, 8565E 21 kg (46 lbs)

\* 8564E, 8565E: Class 5



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