Table 1-1. HP 8563A Specifications

FREQUENCY			
Frequency Range			
Internal Mixing	9 kHz to 22 GHz		
Option 026	9 kHz to 26.5 GHz		
Internal Mixing Bands	**Frequency Band**	**Harmonic Mixing Mode N***	
	9 kHz to 2.9 GHz	1−	
	2.75 GHz to 6.46 GHz	1−	
	5.86 GHz to 13.0 GHz	2−	
	12.4 GHz to 19.7 GHz	3−	
	19.1 GHz to 22.0 GHz	4−	
Option 026	19.1 GHz to 26.5 GHz	4−	
External Mixing	18 GHz to 325 GHz		
External Mixing Bands			
Frequency Band	**Frequency Range**	**Harmonic Mixing Mode (N*)**	
		Preselected	**Unpreselected**
K	18.0 to 26.5	n/a	6−
A	26.5 to 40.0	8+	8−
Q	33.0 to 50.0	10+	10
U	40.0 to 60.0	10+	10−
V	50.0 to 75.0	14+	14−
E	60.0 to 90.0	n/a	16−
W	75.0 to 110.0	18+	18−
F	90.0 to 140.0	n/a	24−
D	110.0 to 170.0	n/a	30−
G	140.0 to 220.0	n/a	36−
Y	170.0 to 260.0	n/a	44−
J	220.0 to 325.0	n/a	54−
Frequency Readout Accuracy (Accuracy of Start, Center, Stop, or Marker frequency)	<±(freq readout × freq ref accuracy† + 5% of freq span + 15% of resolution bandwidth + 10 Hz)		

* N is the harmonic mixing mode. The desired 1st LO harmonic is always higher than the tuned frequency by the 1st IF frequency (3.9197 GHz for the 10 kHz to 2.9 GHz band, and 310.7 MHz for all other bands). For preselected, external mixing mode, the desired 1st LO harmonic is always lower than the tuned frequency by 310.7 MHz.

† Frequency reference accuracy = (aging × period of time since adjustment) + internal achievable + temperature stability.

Table 1-1. HP 8563A Specifications (continued)

FREQUENCY (continued)	
Frequency Count Marker	
Frequency Count Marker Resolution	Selectable from 1 Hz to 1 MHz
Frequency Count Marker Accuracy (for signal-to-noise ratio ≥ 20 dB)	<±(marker frequency × frequency reference accuracy* + 50 Hz × N† + 1 LSD)
Delta Frequency Count Accuracy (for signal-to-noise ratio ≥ 20 dB)	<±(delta frequency × frequency reference accuracy* + 100 Hz × N† + 2 LSD)
Frequency Reference Accuracy	
Aging	<±0.5 × 10^{-9}/day (after 7 day warmup)
	<±1 × 10^{-7}/year
Temperature Stability	<±1 × 10^{-8}, −10°C to +55°C, referenced to 25°C.
Option 103	
Aging	<±2 × 10^{-6}/year
Settability	<±1 × 10^{-6}
Temperature Stability	<±1 × 10^{-6}, −10°C to +55°C, referenced to 25°C.
Stability	
Residual FM (Span ≤1 MHz, 10 Hz RES BW)	<10 Hz × N† peak-to-peak in 20 ms
Noise Sidebands	
10 kHz offset	<(−86 + 20 log N†) dBc/Hz
30 kHz offset	<(−100 + 20 log N†) dBc/Hz
100 kHz offset	<(−110 + 20 log N†) dBc/Hz
Frequency Span	
Range	
Internal Mixing	0 Hz, 100 Hz × N† to 19.25 GHz over the 10-division CRT horizontal axis, variable in approximately 1% increments, or in a 1, 2, 5 sequence.
External Mixing	Minimum span = 100 Hz × N†
Accuracy	<±5%

* Frequency reference accuracy = (aging × period of time since adjustment) + internal achievable + temperature stability.

† N is the harmonic mixing mode. The desired 1st LO harmonic is always higher than the tuned frequency by the 1st IF frequency (3.9107 GHz for the 10 kHz to 2.9 GHz band, and 310.7 MHz for all other bands). For preselected, external mixing mode, the desired 1st LO harmonic is always lower than the tuned frequency by 310.7 MHz.

Table 1-1. HP 8563A Specifications (continued)

FREQUENCY (continued)	
Resolution Bandwidths (−3 dB)	
Range	10 Hz to 1 MHz (selectable in a 1, 3, 10 sequence) and 2 MHz.*
Accuracy	
1 and 2 MHz RES BW	<±25%
300 kHz to 10 Hz RES BW	<±10%
Selectivity (60 dB/3 dB bandwidth ratio, RES BW ≥ 300 Hz)	<15:1
Bandwidth Shape	
1 and 2 MHz	Approximately Gaussian
300 Hz to 300 kHz	Synchronously tuned, four-pole filters
10 Hz to 100 Hz	Digital, approximately Gaussian
Video Bandwidth (Post-detection low-pass filter averages displayed noise for a smooth trace.)	
Range	1 Hz to 3 MHz in a 1, 3, 10 sequence
AMPLITUDE MEASUREMENT RANGE	
Maximum Safe Input Power	
Average Continuous Power (input attenuation ≥10 dB)	+30 dBm (1 W)
Peak Pulse Power (input attenuation ≥30 dB)	+50 dBm (100 W) for pulse widths <10 μs and <1% duty cycle.
DC Voltage	0 V
Gain Compression	
10 MHz to 2.9 GHz (≤−5 dBm at input mixer)†	<1.0 dB
2.75 GHz to 22.0 GHz (≤−3 dBm at input mixer)†	<1.0 dB
Option 026	
2.75 GHz to 26.5 GHz (≤ 3 dBm at input mixer)†	<1.0 dB

* Resolution bandwidths <100 Hz are not available in external mixing.
† Mixer level = input level − input attenuation

Table 1-1. HP 8563A Specifications (continued)

AMPLITUDE MEASUREMENT RANGE (continued)	
Displayed Average Noise Level (With no signal at input, 10 Hz RES BW, and 0 dB input attenuation	
Frequency Range	
10 kHz	<−103 dBm
100 kHz	<−110 dBm
1 MHz to 2.9 GHz	<−130 dBm
2.9 GHz to 6.46 GHz	<−131 dBm
6.46 GHz to 13.0 GHz	<−120 dBm
13.0 GHz to 19.7 GHz	<−115 dBm
19.7 GHz to 22.0 GHz	<−110 dBm
Option 026	
19.7 GHz to 26.5 GHz	<−110 dBm (≥1 kHz offset from carrier)
Spurious Responses (all input-related spurious responses, except as noted below, with ≤−40 dBm mixer level*) 10 MHz to 6.46 GHz	<−60 dBc
Second Harmonic Distortion	
Applied Signal Frequency Range	
9 kHz to 10 MHz	<−60 dBc
10 MHz to 1.45 GHz	<−72 dBc
	−40 dBm mixer level*
1.45 GHz to 11 GHz	<−100 dBc
	−10 dBm mixer level*
Third Order Intermodulation Distortion (with two −30 dBm input signals at the input mixer, spaced by ≥1 kHz)*	
Frequency Range	
9 kHz to 10 MHz	<−64 dBc
10 MHz to 2.9 GHz	<−70 dBc
2.75 GHz to 22.0 GHz (preselected)	<−75 dBc
Option 026	
2.75 GHz to 26.5 GHz (preselected)	<−75 dBc

* Mixer level = input level − input attenuation.

Table 1-1. HP 8563A Specifications (continued)

AMPLITUDE MEASUREMENT RANGE (continued)	
Spurious Responses (continued)	
Image, Multiple, and Out-of-Band Responses	
Frequency Range	
9 kHz to 18 GHz	<−70 dBc
9 kHz to 22.0 GHz	<−60 dBc
Option 026	
9 kHz to 26.5 GHz	<−60 dBc
Residual Responses (200 kHz to 6.46 GHz, with no signal at input, 0 dB input attenuation)	<−90 dBm
AMPLITUDE DISPLAY RANGE	
Amplitude Scale	10 vertical CRT divisions, with the reference level (0 dB) at the top graticule line
Calibration	
LOG	10 dB/DIV for 90 dB display from reference level*
	5 dB/DIV for 50 dB display expanded from reference level.†
	2 dB/DIV for 20 dB display expanded from reference level.
	1 dB/DIV for 10 dB display expanded from reference level.†
LINEAR	10% of reference level per division over the top nine divisions (top 10 divisions for RES BW ≤100 Hz) when calibrated in voltage.
Reference Level Range	
LOG, adjustable in 0.1 dB steps	
Frequency Band	Range
9 kHz to 2.9 GHz	−120 dBm to +30 dBm
2.75 GHz to 8.46 GHz	−120 dBm to +30 dBm
5.86 GHz to 13.0 GHz	−115 dBm to +30 dBm
12.4 GHz to 19.7 GHz	−105 dBm to +30 dBm
19.1 GHz to 22.0 GHz	−100 dBm to +30 dBm
Option 026	
19.1 GHz to 26.5 GHz	−100 dBm to +30 dBm

* 10 dB/DIV for 100 dB display from reference level for RES BW ≤100 Hz.

† These scales are available only in sweep times ≥30 ms (digital display mode).

Table 1-1. HP 8563A Specifications (continued)

AMPLITUDE DISPLAY RANGE (continued)	
LINEAR, settable in 1% steps	
9 kHz to 2.9 GHz	2.2 μV to 7.07 V
2.75 GHz to 6.46 GHz	2.2 μV to 7.07 V
5.86 GHz to 13.0 GHz	4.0 μV to 7.07 V
12.4 GHz to 19.7 GHz	12.6 μV to 7.07 V
19.1 GHz to 22.0 GHz	22.0 μV to 7.07 V
Option 026	
19.1 GHz to 26.5 GHz	22.0 μV to 7.07 V
AMPLITUDE ACCURACY	
Reference Level Uncertainty	
Frequency Response (with 10 dB input attenuation)	
In-Band	
Frequency Range	
9 kHz to 2.9 GHz	<±1.0 dB
2.9 GHz to 6.46 GHz	<±1.5 dB
6.46 GHz to 13.0 GHz	<±2.0 dB
13.0 GHz to 19.7 GHz	<±3.0 dB
19.7 GHz to 22.0 GHz	<±3.0 dB
Option 026	
19.7 GHz to 26.5 GHz	<±3.0 dB
Referenced to CAL OUTPUT (300 MHz)	
9 kHz to 2.9 GHz	<±1.5 dB
9 kHz to 6.46 GHz	<±2.5 dB
9 kHz to 13.0 GHz	<±3.0 dB
9 kHz to 19.7 GHz	<±4.0 dB
9 kHz to 22.0 GHz	<±4.0 dB
Option 026	
9 kHz to 26.5 GHz	<±4.0 dB
Band Switching Uncertainty (Additional uncertainty added to In-Band Frequency Response for measurements between any two bands)	<±1.0 dB
Calibrator Uncertainty (−10 dBm, 300 MHz)	<±0.3 dB
Input Attenuator Switching Uncertainty (20 to 70 dB settings, referenced to 10 dB attenuation)	
Frequency Range	
9 kHz to 2.9 GHz	<±0.6 dB/10 dB step, ±1.8 dB max.
IF Gain Uncertainty (0 dBm to −80 dBm reference levels with 10 dB input attenuation)	<±1.0 dB

Table 1-1. HP 8563A Specifications (continued)

AMPLITUDE ACCURACY (continued)	
Resolution Bandwidth Switching Uncertainty*	
Referenced to 300 kHz RES BW at the reference level.	<±0.5 dB
IF Alignment Uncertainty (additional uncertainty when using 300 Hz RES BW)	<+0.5 dB
Pulse Digitization Uncertainty (Pulse response mode, PRF >720/Sweep Time)	
LOG	<1.25 dB peak-to-peak for RES BW ≤1 MHz <3 dB peak-to-peak for RES BW of 2 MHz
LINEAR	<4% of reference level peak-to-peak for RES BW ≤1 MHz <12% of reference level peak to peak for RES BW of 2 MHz
Scale Fidelity	
LOG	
RES BW ≥300 Hz	<±0.4 dB/4 dB from reference level to a maximum of ±1.5 dB over 0 to −90 dB range
RES BW ≤100 Hz	<±0.4 dB/4 dB from reference level to a maximum of +1.5 dB over 0 to −100 dB range
LINEAR	<±3% of reference level
SWEEP	
Sweep Time	
Range	
Span = 0†	
RES BW ≥300 Hz (analog display)	50 μs to <30 ms
RES BW ≥300 Hz (digital display)	30 ms to 60 s
Span = ≥100 Hz × N‡	
RES BW >300 Hz (digital display)	50 ms to 100 s
RES BW ≤100Hz	67 ms to 100,000 s (auto coupled mode only)
Accuracy (Span = 0)†	
Sweep Time 30 ms to 60 s	<+1%
Sweep Time <30 ms	<±10%
Sweep Trigger	Free Run, Single, Line, External, or Video§

* Scale fidelity is not the same for RES BW ≤100 Hz as for RES BW ≥300 Hz. Therefore, signals not at the reference level will experience an additional amplitude difference when switching between these two sets of RES BW settings, due to differences in scale fidelity.

† Span = 0 is not available for RES BW ≤100 Hz.

‡ N is the harmonic mixing mode.

§ Video trigger is not available in RES BW settings ≤100 Hz.

Table 1-1. HP 8563A Specifications (continued)

INPUTS AND OUTPUTS	
IF INPUT	
Connector	SMA female, front panel
Input level for full-screen deflection (external mixing mode, 0 dBm reference level, 30 dB conversion loss)	30 dBm ±1.5 dB
HP-IB	
Connector	IEEE-488 bus connector
Interface Functions	SH1, AH1, T6, TE0, L4, LE0, SR1, RL1, PP1, DC1, DT1, C1, C28
Direct Plotter Output	Supports HP 7225A, HP 7440A, HP 7470A, HP 7475A, HP 7550A
Direct Printer Output	Supports HP 3630A PaintJet, HP 2225A ThinkJet
CAL OUTPUT	
Connector	BNC female, front panel
Frequency	300 MHz ±(300 MHz × frequency reference accuracy*)
Amplitude	−10 dBm ±0.3 dB
1ST LO OUTPUT	
Connector	SMA female, front panel
Amplitude	+16.5 dBm ±2.0 dB
10 MHz REF IN/OUT	
Connector	BNC female, rear panel
Frequency	10 MHz ±(10 MHz × frequency reference accuracy)

* Frequency Reference Accuracy = (aging × period of time since last adjustment) + initial achievable accuracy + temperature stability.

Table 1-1. HP 8563A Specifications (continued)

GENERAL SPECIFICATIONS	
Environmental Specifications	
Military Specification	MIL-T-28800C, Type III, Class 3, Style C, as follows:
Calibration Interval	1 year
Warmup	5 minutes from ambient conditions*
Temperature	
Operating	−10°C to +55°C
Non-operating	−62°C to +85°C
Humidity	95% at 40°C for 5 days
Altitude	
Operating	15,000 feet
Non-operating	50,000 feet
Rain Resistance	Drip-proof at 16 liters/hour/square foot
Vibration	
5 to 15 Hz	0.059 inch peak-to-peak excursion
15 to 25 Hz	0.039 inch peak-to-peak excursion
25 to 55 Hz	0.020 inch peak to peak excursion
Pulse Shock	
Half Sine	30 g for 11 ms duration
Transit Drop	8 inch drop on 6 faces and 8 corners
Electromagnetic Compatibility	Conducted and radiated interference is in compliance with CISPR, Publication 11 (1990).
	Meets the standards of MIL STD-461B, Part 4, with the exception shown below:
Conducted Emissions	
CE01 (Narrowband)	1 kHz to 15 kHz only
CE03 (Narrowband)	Full limits
CE03 (Broadband)	20 dB relaxation from 15 kHz to 100 kHz

* Two hours for conditions of internal condensation, 30 minutes to meet frequency response specifications without preselector peaking. When operating outside the 20°C to 30°C ambient temperature range, preselector peaking is always required to meet frequency response specifications.

Table 1-1. HP 8563A Specifications (continued)

GENERAL SPECIFICATIONS (continued)	
Electromagnetic Compatibility (continued)	
Conducted Susceptibility	
CS01	Full limits
CS02	Full limits
CS06	Full limits
Radiated Emissions	
RE01	15 dB relaxation of 30 kHz (exceptioned from 30 kHz to 50 kHz)
RE02	Full limits to 1 GHz
Radiated Susceptibility	
RS01	Full limits
RS02	Exceptioned
RS03	Limited to 1 V/m from 14 kHz to 1 GHz with 30 dB relaxation at IF frequencies.
Power Requirements	
115 V ac Operation	
Voltage	90 to 140 V rms
Current	3.2 A rms max.
Frequency	47 to 440 Hz
230 V ac Operation	
Voltage	180 to 250 V rms
Current	1.8 A rms max.
Frequency	47 to 66 Hz
Maximum Power Dissipation	180 W
Weight	20 kg (44 lb)

Table 1-2. HP 8563A Characteristics (continued)

NOTE:
These are not specifications.
Characteristics provide useful information about instrument performance.

AMPLITUDE (continued)

Radiated Immunity

When tested at 3 V/m according to IEC 801-3/1984, the displayed average noise level will be within specifications over the full immunity test frequency range of 27 MHz to 500 MHz, except at the immunity test frequency of 310.7 MHz ± selected resolution bandwidth. At these frequencies, the displayed average noise level may be up to −80 dBm. When the analyzer tuned frequency is identical to the immunity test signal frequency, there may be signals of up to −90 dBm displayed on the screen.

AMPLITUDE ACCURACY

Band-to-Band Frequency Response
(Frequency response uncertainty for measurements between any two bands. Equivalent to the sum of the two In-Band Frequency Response values plus Band Switching Uncertainty.)

Band-to-Band Frequency Response (dB)

	Band 0	Band 1	Band 2	Band 3	Band 4
Band 0	n/a	3.5 dB	4.0 dB	5.0 dB	5.0 dB
Band 1	3.5 dB	n/a	4.5 dB	5.5 dB	5.5 dB
Band 2	4.0 dB	4.5 dB	n/a	6.0 dB	6.0 dB
Band 3	5.0 dB	5.5 dB	6.0 dB	n/a	7.0 dB
Band 4	5.0 dB	5.5 dB	6.0 dB	7.0 dB	n/a

Input Attenuator	
Accuracy	
2.9 GHz to 18 GHz	<±1.5 dB/10 dB step, ±3.0 dB max.
18 GHz to 22 GHz	<±3.0 dB/10 dB step, ±6.0 dB max.
Repeatability	<±0.2 dB
Pulse Digitization Uncertainty (Pulse response mode, PRF >720/Sweep Time) Standard Deviation	0.2 dB

AMPLITUDE MEASUREMENT RANGE

Spurious Responses (all input related spurious responses <1 kHz offset from the carrier)	**Frequency Range** 10 MHz to 2.9 GHz	**Distortion** <−55 dBc

SWEEP

Sweep Time Accuracy	
Span ≥100 Hz × N*	<±20%

DEMODULATION

Spectrum Demodulation	
Modulation Type	AM and FM
Audio Output	Internal speaker and phone jack with volume control
Pause Time at Marker Frequency	100 ms to 60 s

* N is the harmonic mixing mode.

Caution Any electrostatic discharge to the center pins of any of the connectors may cause damage to the associated circuitry (according to IEC 801 2/1991).

Table 1-2. HP 8563A Characteristics (continued)

NOTE: These are not specifications. Characteristics provide useful information about instrument performance.	
INPUTS AND OUTPUTS	
INPUT 50Ω	
Connector Type	Precision Type N female, front panel
Impedance	50Ω
VSWR (at tuned frequency)	<1.5:1 for <2.9 GHz and ≥10 dB input attenuation <2.3:1 for > 2.9 GHz and ≥10 dB input attenuation <3.0:1 for 0 dB input attenuation
IF INPUT	
Connector Type	SMA female, front panel
Impedance	50Ω
Frequency	310.7 MHz
Noise Figure	7 dB
1 dB Gain Compression Level	−23 dBm
Full Screen Level	−30 dBm
(Gain-Compression and Full-Screen Levels apply with 30 dB conversion loss setting and 0 dBm reference level.)	
1ST LO OUTPUT	
Connector	SMA female, front panel
Impedance	50Ω
Frequency Range	3.0000 GHz to 6.8107 GHz
CAL OUTPUT	
Connector	BNC female, front panel
Impedance	50Ω
10 MHz REF IN/OUT	
Connector	BNC female, rear panel
Impedance	50Ω
Output Amplitude	0 dBm
Input Amplitude	−2 to +10 dBm

Table 1-2. HP 8563A Characteristics (continued)

NOTE: These are not specifications. Characteristics provide useful information about instrument performance.	
INPUTS AND OUTPUTS (continued)	
VIDEO OUTPUT*	
Connector	BNC female, rear panel
Impedance (dc coupled)	50Ω
Amplitude (into 50Ω load)	0 to +1 full scale
Scale, RES BW > 300 Hz	Linear or Log 100 dB/V
Scale, RES BW ≤ 100 Hz	IF signal at 4.8 kHz, autoranged level with dc offset
LO SWP/0.5 V/GHz OUTPUT	
Connector	BNC female, rear panel
Impedance (dc coupled)	2 kΩ
LO SWP OUTPUT (no load)	0 to + 10 V
0.5 V/GHz OUTPUT	
Internal mixer mode	0.5 V/GHz of tuned frequency (no load)
External mixer mode	([(1.5 V/GHz) × LO frequency)] − 0.2054 V) ±50 mV
BLANKING OUTPUT	
Connector	BNC female, rear panel
Amplitude	
During SWEEP	Low TTL Level (sink 150 mA max.)
During RETRACE	High TTL Level (source 0.5 mA max.)
Maximum input (high TTL state)	+40 V
EXT TRIG INPUT	
Connector	BNC female, rear panel
Impedance	10 kΩ
Trigger Level	Rising edge of TTL level
PROBE POWER (front panel)	
Voltage	+15 V dc, −12.6 V dc
Current	150 mA max., each

* The VIDEO OUTPUT is a video signal for RES BW ≥ 300 Hz with switching transients and IF ADJ signals between sweeps. For RES BW ≤ 100 Hz the output is an IF signal with transients and IF ADJ signals between and during sweeps.

Table 1-2. HP 8563A Characteristics (continued)

NOTE:
These are not specifications.
Characteristics provide useful information about instrument performance.

INPUTS AND OUTPUTS (continued)

EARPHONE			
Connector	1/8 inch miniature monophonic jack, rear panel		
Power Output	0.25 W into 4Ω		
2ND IF OUT			
Connector	SMA female, rear panel		
Impedance	50Ω		
Frequency	310.7 MHz		
Frequency Range	**3 dB BW**	**Noise Figure**	**Conversion Gain**
10 kHz to 2.9 GHz	>30 MHz	24 dB	0 dB
2.75 GHz to 6.46 GHz	>20 MHz	24 dB	0 dB
5.86 GHz to 13.0 GHz	>30 MHz	33.6 dB	−5 dB
12.4 GHz to 19.7 GHz	>30 MHz	39.8 dB	−10 dB
19.1 GHz to 26.5 GHz	>35 MHz	44.4 dB	−15 dB