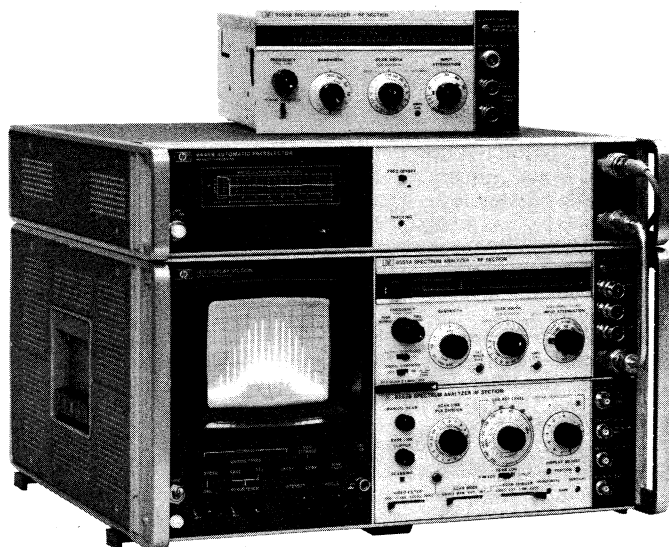


SIGNAL ANALYZERS

HP 141T Spectrum Analyzer System, 20 Hz to 40 GHz

Model 141T System

- 20 Hz to 18 GHz, external mixing to 40 GHz
- Absolute amplitude calibration
- Tracking generators for component test
- Tracking preselector simplifies measurements



Hewlett Packard's 141T Spectrum Analyzer system permits measurements at frequencies ranging from 20 Hz to 18 GHz with four plug-in tuning sections. For measurements in the 18 to 40 GHz region, an accessory external mixer may be used with the microwave tuning section. The modularity of the system allows you to keep pace with changing measurement requirements.

An HP 141T Spectrum Analyzer system is comprised of a main-frame/display, one tuning section, and one IF section. Each tuning section covers a different frequency range permitting purchase of those which best meet current requirements. The HP 8556A covers from 20 Hz to 300 kHz, the HP 8553B from 1 kHz to 110 MHz, the HP 8554B from 100 kHz to 1250 MHz, and the HP 8555A from 10 MHz to 18 GHz. The IF sections, the HP 8552A or HP 8552B, provide bandwidth/gain selection and detection. Unless otherwise noted, the specifications shown here apply to a spectrum analyzer which contains an HP 8552B IF section.

For swept frequency testing of components, the HP 8443A or HP 8444A Tracking Generator can function as a swept signal source which, through locking, accurately tracks the frequency to which the analyzer is tuned. A microwave tracking preselector, the HP 8445B, simplifies measurements and improves the dynamic range of the HP 8555A Tuning Section for dense signal environments.

The spectrum analyzer displays amplitude and frequency accurately with a large dynamic range.

The following pages contain detailed performance specifications for each configuration of the spectrum analyzer, preselector, and tracking generators.

Absolute Amplitude Calibration

Calibrated frequency and amplitude measurements may be made over the entire frequency range. Logarithmic or linear scaling allow display of amplitude in dBm or voltage respectively. A warning light is provided to indicate uncalibrated conditions due to improper control settings.

Frequency Calibration

Three scan modes allow simple, accurate measurements. In the FULL SCAN mode the entire tuning section band is displayed. A marker is provided to identify and select signals of interest.

After a signal is selected in the FULL SCAN mode, switching to PER DIVISION mode allows analysis of the signal in narrow scans. Noise sidebands and low deviation FM are examples of measurements that might be made in this mode.

The analyzer can be used as a fixed tuned receiver by selecting the ZERO SCAN mode. In this mode the analyzer provides a time domain display with a calibrated time base, controlled by the scan time setting. Demodulating AM radio is a simple example of a ZERO SCAN measurement.

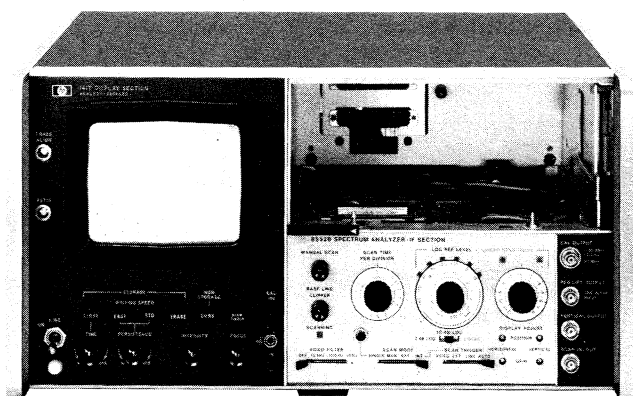
High Resolution

In frequency domain analysis it is often necessary to resolve close-in sidebands, such as line related modulation. Bandwidths as narrow as 10 Hz are provided in the HP 8553B to obtain this resolution. Use of such narrow bandwidths is made possible by frequency stabilization.

High Sensitivity, Low Distortion

For best measurement accuracy, a wide dynamic range is essential. Wide dynamic range requires both high sensitivity and low internal distortion.

Signals as low as -142 dBm can be measured using the HP 8553B tuning section. For most measurements the HP 141T system offers in excess of 70 dB distortion free dynamic range. For many measurements with the HP 8555A Tuning section, the HP 8445B Preselector can increase dynamic range to greater than 100 dB.



HP 141T, 8552B

Mainframe/Storage Display

The HP 141T Mainframe provides variable persistence and storage. When narrow bandwidths are selected, sweep time must be reduced to maintain amplitude calibration. Variable persistence permits displayed traces of constant intensity even for long sweep-times. The storage feature allows traces to be held for comparison or photographing.

IF Section Features

In addition to providing calibrated bandpass filtering the IF Section offers several user convenience features. Selectable video filters improve signal discernibility when S/N is low and permit display of average noise level. Recorder outputs, compatible with analog XY recorders, are provided. Amplitude and frequency calibration from the front panel are possible using the internal calibration source.

Tracking Generators for Component Test

Tracking generators—leveled sources which track the tuned frequency of the analyzer—allow precise frequency measurements on two port devices with high dynamic range. Three tracking generators permit characterization of device performance up to 1500 MHz with a nominal dynamic range of 100 dB. The HP 8556B includes a tracking generator and the HP 8443A and HP 8444A may be used with the HP 8553B and HP 8554B Tuning Sections respectively.

HP 8750A Storage-Normalizer

Digital trace storage and display with the HP 141T System is possible with the HP 8750A (Opt. 001) and an external oscilloscope. Digital storage provides a flicker-free display for any sweep speed and allows comparison of two traces. When a tracking generator is used, the normalization feature of the HP 8750A reduces the effect of system frequency response on the measurement.

General Specifications

HP 141T Spectrum Analyzer System

Input impedance: 50 Ω nominal. Reflection coefficient <0.30 (1.85 SWR), input attenuator ≥ 10 dB.

Maximum input level: peak or average power +13 dBm (1.4 V ac peak), ± 50 V dc.

Attenuator: 0 to 50 dB in 10 dB steps.

Scan time: 16 internal scan rates from 0.1 ms/div to 10 sec/div in a 1, 2, 5 sequence, and manual scan (8552B only).

Scan Time Accuracy

0.1 ms/div to 20 ms/div: $\pm 10\%$.

50 ms/div to 10 s/div: $\pm 20\%$.

Scan Mode

Int: analyzer repetitively scanned by internally generated ramp; synchronization selected by scan trigger

Single: single scan with front panel reset.

Ext: scan determined by 0 to +8 volt external signal.

Manual: scan determined by front panel control.

Scan trigger: for internal scan mode, select between

Auto: scan free-runs.

Line: scan synchronized with power line frequency.

Ext: scan synchronized with >2 volt (20 volt max.) signal.

Video: scan internally synchronized to envelope of RF input.

Auxiliary Outputs

Vertical output: 0 to -0.8 V for full deflection.

Scan output: -5 V to $+5$ V for 10 div CRT deflection.

Pen lift output: 0 to 14 V (0 V, pen down).

Display Characteristics

HP 141T

Plug-ins: accepts Models 8552A/B, 8553B, 8554B, 8555A and 8556A.

Cathode-Ray Tube Type

Post-accelerator storage tube, 9000 volt accelerating potential; aluminumized P31 phosphor.

Cathode-Ray Tube Graticule

8 $\times$ 10 division (approx, 7.1 cm $\times$ 8.9 cm) parallax-free internal graticule.

Persistence

Normal: normal persistence of P31 phosphor (0.1 second).

Variable

Normal writing rate mode: continuously variable from less than 0.2 second to more than one minute.

Maximum writing rate mode: from 0.2 second to 15 seconds.

Erase: manual; erasure takes approximately 350 ms.

Storage time: normal writing rate; more than 2 hours at reduced brightness (typically 4 hours).

Fast writing speed: more than 15 minutes.

EMI: conducted and radiated interference is in compliance with MIL-STD 461A Methods CEO3 and REO2, CISPR publication 11 (1975), and Messempefaenger-Postverfuegung 526/527/79 (Kennzeichnung Mit F-Nummer/Funkschutzzeichen).

Temperature range: operating, 0°C to $+55^{\circ}\text{C}$; storage, -40°C to $+75^{\circ}\text{C}$.

Power requirements: 100, 120, 220, or 240 V $\pm 5\%$. -10% . 50 to 60 Hz, normally less than 225 watts (includes plug-ins used).

Weight

Model 8552A or 8552B IF section: net, 4.1 kg (9 lb). Shipping 6.4 kg (14 lb).

Model 141T display section: net, 19.2 kg (43 lb). Shipping, 26 kg (57 lb).

Tuning section: see following pages.

Size: model 141T with plug-ins: 221 H $\times$ 425 W $\times$ 416 mm D (8.8" $\times$ 16.8" $\times$ 16.4").

Special order: chassis slides and adapter kit.

Ordering Information

HP 141T Variable Persistence Display

Opt 908: Rack Flange Kit

HP 8552A Economy IF Section

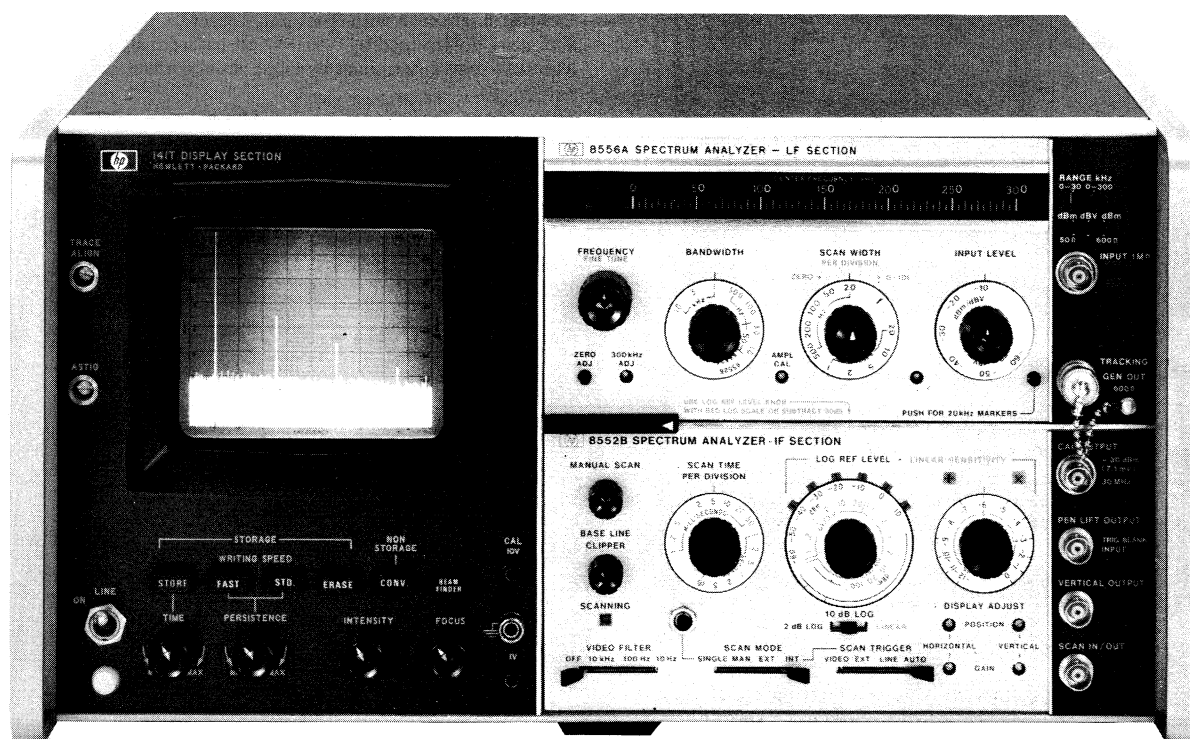
HP 8552B High Resolution IF Section

SIGNAL ANALYZERS

HP 141T Spectrum Analyzer System: 20 Hz to 300 kHz

Model 8556A

- Accurate signal level measurements (± 0.95 dB)
- Accurate frequency measurements (± 3 Hz)
- High sensitivity (-152 dBV)
- Built-in tracking generator



HP 8556A (141T, 8552B)

Measurement Flexibility

The HP 8556A offers a frequency range of 20 Hz to 300 kHz. It is compatible with impedances normally encountered at audio frequencies. The input may be either balanced or unbalanced and measurement units may be dBV, dBm or Volts.

Frequency Range

In addition to the 300 kHz tuning scale, a 30 kHz tuning scale is provided for greater tuning resolution at low frequencies. The HP 8556A may be swept about the tuned frequency, from 0 Hz to a selectable stop frequency, or fixed tuned to any frequency in its tuning range. Crystal markers with 20 kHz spacing may be selected to ensure accurate frequency measurements.

Amplitude Calibration

The HP 8556A is calibrated for dBm in 600 and 50 ohms, as well as dBV and volts. Accurate reference level control (± 0.2 dB) and vernier (± 0.25 dB) allow accurate amplitude measurements when using the IF substitution method.

Resolution—Sensitivity

Bandwidths of from 10 Hz to 10 kHz are provided with the HP 8556A. The 10 Hz bandwidth is useful for measurements close to the carrier such as power line sidebands. The 10 Hz bandwidth together with the low noise figure of the HP 8556A, allow signals as low as -152 dBV (25 nV) to be measured.

Isolated Input

The isolated input prevents spurious signal pickup due to ground currents between the analyzer and the signal source. The high input impedance permits the use of an oscilloscope probe. An optional balanced input is transformer coupled to provide isolation and high common mode rejection.

Tracking Generator

The frequency of low level signals can be measured to ± 3 Hz accuracy with a frequency counter connected to the output of the built-in tracking generator. Swept insertion loss measurements with 140 dB dynamic range and return loss measurements are also possible using the tracking generator.

Specifications—with HP 8552B IF Section

Frequency Specifications

Frequency range: 20 Hz to 300 kHz. Tuning dial ranges of 0–30 kHz and 0–300 kHz.

Scan width: (on a 10-division CRT horizontal axis)

Per division: 10 calibrated scan widths from 20 Hz/div to 20 kHz/div in a 1, 2, 5 sequence.

0–10 f: 10 calibrated preset scans, from 200 Hz to 200 kHz in a 1, 2, 5 sequence. Analyzer scans from zero frequency to ten times the scan width per division setting.

Zero: analyzer is a fixed tuned receiver.

Frequency Accuracy

Center frequency accuracy: 0–30 kHz Range: ± 500 Hz; 0–300 kHz Range: ± 3 kHz.

Marker accuracy: RF markers every 20 kHz accurate to within $\pm 0.01\%$. Markers controlled by front panel on/off switch.

Scan width accuracy: frequency error between any two points on the display is less than $\pm 3\%$ of the indicated frequency separation.



Stability

Residual FM: sidebands >60 dB down 50 Hz or more from CW signal, scan time ≥ 1 sec/div, 10 Hz bandwidth.

Noise sidebands: more than 90 dB below CW signal, 3 kHz away from signal, with a 100 Hz IF bandwidth.

Frequency drift: less than 200 Hz/10 min.

Resolution

Bandwidth ranges: IF bandwidths of 10 Hz to 10 kHz are provided in a 1, 3, 10 sequence.

Bandwidth accuracy: individual IF bandwidth 3 dB points calibrated to $\pm 20\%$ (10 kHz bandwidth $\pm 5\%$).

Bandwidth selectivity: 60 dB/3 dB IF bandwidth ratios, with IF section: <11:1 for IF bandwidths from 10 Hz to 3 kHz; <20:1 for 10 kHz bandwidth. For 10 Hz bandwidth, 60 dB points are separated by less than 100 Hz.

Amplitude Specifications

Absolute Amplitude Calibration

Log Calibration Modes

dBV	0 dBV = 1 V rms
dBm-600 Ω	0 dBm = 1 mW-600 Ω
dBm-50 Ω	0 dBm = 1 mW-50 Ω

Input impedance is 1 M Ω . dBm ranges are referenced with input properly terminated externally.

Log calibration range: from -150 dBm/dBV to +10 dBm/dBV.

Log display range: 10 dB/div on a 70 dB display, or 2 dB/div on a 16 dB display.

Linear sensitivity: from 0.1 μ V/div to 1 V/div in a 1, 2, 10 sequence. Linear sensitivity vernier X1 to X0.25 continuously.

Dynamic Range

INPUT LEVEL control: -10 to -60 dBm/dBV in 10 dB steps. Accuracy ± 0.2 dB. Marking indicates maximum input levels for 70 dB spurious-free dynamic range.

Average noise level: (specified with a 600 Ω or less source impedance and INPUT LEVEL at -60 dBm/dBV)

Mode	1 kHz IF Bandwidth	10 Hz IF Bandwidth
dBm-50 Ω	<-122 dBm (180 nV)	<-142 dBm (18 nV)
dBm-600 Ω	<-130 dBm (250 nV)	<-150 dBm (25 nV)
dBV	<-132 dBV (250 nV)	<-152 dBV (25 nV)
Linear	<400 nV	<40 nV

Video filter: averages displayed noise; bandwidth of 10 kHz, 100 Hz, and 10 Hz. Bandwidth accuracy $\pm 20\%$.

Spurious responses: input signal level $\leq$ INPUT LEVEL setting; out of band mixing responses, harmonic and intermodulation distortion products are all more than 70 dB below the input signal level 5 kHz to 300 kHz; 60 dB, 20 Hz to 5 kHz. Third order intermodulation products are more than 70 dB below the input signal level, 5 kHz to 300 kHz with signal separation >300 Hz.

Residual responses (no signal present at input): with the -INPUT LEVEL at -60 dBm/dBV and the input terminated with 600 Ω or less, all line related residual responses from 0 to 500 Hz are below -120 dBm/dBV. All other residual responses are below -130 dBm/dBV.

Amplitude Accuracy	Log	Linear
Frequency response	± 0.2 dB	$\pm 2.3\%$
Amplitude display	± 0.25 dB/dB but not more than ± 1.5 dB over 70 dB display range	$\pm 2.8\%$ of full 8 div display

Log reference level control: provides 90 dB IF gain control in 10 dB steps. Accurate to ± 0.2 dB ($\pm 2.3\%$).

Log reference level vernier: provides continuous 12 dB range. Accurate to ± 0.1 dB ($\pm 1.2\%$) in 0, -6, -12 dB positions; otherwise ± 0.25 dB ($\pm 2.8\%$).

Amplitude measurement accuracy: ± 0.95 dB with proper technique.

General

Scan time: 16 internal scan rates from 0.1 ms/div to 10 sec/div in a 1, 2, 5 sequence.

Scan Mode

Int: analyzer repetitively scanned internally.

Ext: scan determined by 0 to +8 volt external signal.

Single: single scan actuated by front panel button.

Manual: scan determined by front panel control.

Input level: provides 50 dB control of input preamplification and attenuation to prevent input overload. INPUT LEVEL markings of -60 dBm/dBV to -10 dBm/dBV indicate maximum input level for a minimum of 70 dB spurious-free dynamic range. Accuracy ± 0.2 dB (2.3%).

Input impedance: 1 M Ω shunted by ≈ 32 pF.

Maximum input level: 10 V rms, ± 200 V dc. Ground terminals of BNC input connectors are isolated from the analyzer chassis ground to minimize ground loop pickup at low frequencies.

Maximum voltage, isolated ground to chassis ground: ± 100 V dc.

Isolated ground to chassis ground impedance: 100 k Ω shunted by approximately 0.3 μ F.

Gain compression: for input signal level 20 dB above INPUT LEVEL setting, gain compression is less than 1 dB.

Tracking Generator Specifications

Frequency range: tracks the analyzer tuning, 20 Hz to 300 kHz.

Amplitude range: continuously variable from 100 mV rms to greater than 3 V rms into an open circuit.

Amplitude accuracy: with TRACKING GEN LEVEL in CAL position and 20 kHz markers off, output level at 100 kHz is 100 mV ± 0.3 dB into an open circuit.

Frequency response: ± 0.25 dB 50 Hz to 300 kHz.

Output impedance: 600 Ω .

Residual FM: <1 Hz peak-to-peak.

Power requirements: 100, 120, 200, or 240 V $\pm 5\%$, -10%, 50 to 60 Hz, normally less than 225 watts.

Weight: Model 8556A LF section: net, 3.7 kg (8 lb). Shipping, 5.3 kg (12 lb).

Size: 102 H x 226 W x 344 mm D (4" x 8.9" x 13.5").

Specifications with HP 8556A Options 001, 002-Balanced Input

Amplitude

Log Calibration Modes-Balanced (bridged) Input

dBm-135 Ω (Option 001)	0 dBm = 1 mW-135 Ω
dBm-150 Ω (Option 002)	0 dBm = 1 mW-150 Ω
dBm-600 Ω (Option 001 or 002)	0 dBm = 1 mW-600 Ω
dBm-900 Ω (Option 001 or 002)	0 dBm = 1 mW-900 Ω

Input impedance is typically 15 k Ω . dBm ranges are referenced with input properly terminated externally.

Input

Maximum input levels: normal Mode, ± 20 V rms or ± 150 V dc for normal mode (symmetrical) signals between input signal connectors; Common Mode, 200 V rms at 60 Hz or ± 500 V dc for common mode (asymmetrical) voltages between input signal connectors and GUARD or instrument chassis; GUARD, ± 100 V dc from GUARD to instrument chassis. (GUARD to chassis impedance is approximately 100 k Ω shunted by 0.3 μ F.)

Balance (symmetry): 0 -30 kHz Range, greater than 80 dB, 50 Hz to 1 kHz; 1 -300 kHz range, greater than 60 dB, 1 kHz to 20 kHz.

Ordering Information

HP 8556A RF Section

Opt 001: Balanced input

Opt 002: Balanced input



SIGNAL ANALYZERS

HP 141T Spectrum Analyzer System: 1 kHz to 110 MHz

Models 8553B & 8443A

- 10 Hz resolution bandwidth
- High sensitivity (-140 dBm)

- Accurate amplitude measurements (± 1.25 dB)
- 10 Hz frequency accuracy with tracking generator



HP 8553B (141T, 8552B) 8443A

The HP 8553B covers the frequency range 1 kHz to 110 MHz. This frequency range includes audio, video, navigation aids, communications basebands, broadcast AM and FM, and TV. This analyzer features high sensitivity, stability and resolution. The HP 8443A Tracking Generator improves frequency measurement accuracy and provides a tracking source for swept frequency testing of components.

Frequency Range

The frequency range of the HP 8553B extends from audio through the FM broadcast band. In the PER DIVISION mode, scan widths from 200 Hz to 100 MHz can be selected. ZERO SCAN mode allows operation as a fixed tuned receiver with a time domain display. In addition to the full range dial scale, a 0-11 MHz dial scale provides better tuning resolution at low frequencies.

Resolution-Stability

Bandwidths ranging from 10 Hz to 300 kHz may be selected when using an HP 8553B. Wide bandwidths are useful for measurement of FM or other broadband spectra. The 10 Hz bandwidth allows measurement of 60 Hz sidebands which are greater than 60 dB down from the carrier. Low residual FM due to phase-lock stabilization makes this resolution possible. This low residual FM also permits characterization of oscillator stability.

Amplitude Calibration

The HP 8553B is calibrated for either dBm or Volts over the range -142 dBm (18 nV) to $+10$ dBm (0.7 V). An accurate amplitude reference is provided by the internal calibrator. This reference together with low frequency response variations (± 0.5 dB) make possible accurate measurements of absolute amplitude. Calibrated in-circuit made measurements may be made at frequencies from 100 kHz to 110 MHz when using the HP1121A Active Probe with the HP 8553B.

Sensitivity

Low noise figure and 10 Hz bandwidth result in high sensitivity for the HP 8553B. In a 10 Hz bandwidth signal levels of -140 dBm may be measured. With the addition of a low noise preamp, such as the HP 8447, sensitivity can be improved by at least 15 dB.

HP 8443A Tracking Generator-Counter

To complement the HP 8553B, the HP 8443A Tracking Generator provides a tracking source with a frequency range of 100 kHz to 110 MHz. A built-in counter permits precision frequency measurements and RF attenuators allow precise control of output amplitude.

Frequency Accuracy

Frequency measurements with an accuracy of ± 10 Hz are possible when using an HP 8443A. In the TRACK ANALYZER mode, the HP 8443A displays the counted frequency of a tunable marker. The RESTORE mode allows individual signals to be counted in a wide scan without fine tuning.

Swept Frequency Measurements

With the HP 8443A, the HP 8553B can be used to measure both insertion and return loss over the 100 kHz to 110 MHz frequency range. The excellent stability of the HP 8443A permits use of the 10 Hz bandwidth, providing a 130 dB dynamic range for swept frequency response measurements. A system (HP 8553B/8443A) frequency response of ± 1.0 dB insures accurate characterization of DUT frequency response.



Specifications—with HP 8552B IF Section

Frequency Specifications

Frequency range: 1 kHz–110 MHz (0–11 MHz and 0–110 MHz tuning ranges).

Scan Width (on 10-division CRT horizontal axis)

Per division: 18 calibrated scan widths from 20 Hz/div to 10 MHz/div in a 1, 2, 5 sequence.

Preset: 0–100 MHz, automatically selects 300 kHz bandwidth IF Filter.

Zero: analyzer is fixed tuned receiver with selectable bandwidth.

Frequency Accuracy

Center frequency accuracy: the dial indicates the display center frequency within ± 1 MHz on the 0–110 MHz tuning range; ± 200 kHz on the 0–11 MHz tuning range with FINE TUNE centered, and temperature range of 20°C to 30°C.

Scan width accuracy: scan widths 10 MHz/div to 2 MHz/div and 20 kHz/div to 20 Hz/div. Frequency error between two points on the display is less than $\pm 3\%$ of the indicated frequency separation between the two points. Scan widths 1 MHz/div to 50 kHz/div: Frequency error between two points on the display is less than $\pm 10\%$ of the indicated frequency separation.

Resolution

Bandwidth: IF Bandwidths of 10 Hz to 300 kHz are provided in a 1, 3, 10 sequence.

Bandwidth accuracy: individual IF bandwidths' 3 dB points calibrated $\pm 20\%$ (10 kHz bandwidth $\pm 5\%$).

Bandwidth selectivity: 60 dB/3 dB IF bandwidth ratios: 10 Hz to 3 kHz bandwidths, $< 11:1$; 10 kHz to 300 kHz bandwidths, $< 20:1$; 60 dB points on 10 Hz bandwidth separated by < 100 Hz.

Stability

Residual FM stabilized: sidebands > 60 dB down 50 Hz or more from CW signal, scan time ≥ 1 sec/div, 10 Hz bandwidth (typically less than 1 Hz peak-to-peak).

Residual FM unstabilized: < 1 kHz peak-to-peak.

Noise sidebands: more than 70 dB below CW signal, 50 kHz or more away from signal, with 1 kHz IF bandwidth.

Long term drift (after 1-hour warm-up), stabilized: 100 Hz/10 min; unstabilized: 5 kHz/min, 20 kHz/10 min.

Amplitude Specifications

Absolute Amplitude Calibration Range

Log: from -130 to $+10$ dBm, 10 dB/div on a 70 dB display or 2 dB/div on a 16 dB display.

Linear: from $0.1 \mu\text{V/div}$ to 100 mV/div in a 1, 2 sequence on an 8-division display.

Dynamic Range

Average noise level: < -110 dBm with 10 kHz IF bandwidth.

Video filter: averages displayed noise; 10 kHz, 100 Hz, and 10 Hz bandwidths.

Spurious responses: are below a -40 dBm signal at the input mixer as follows: All image and out-of-band mixing responses, -harmonic and intermodulation distortion more than 70 dB down, 2 MHz to 110 MHz; more than 60 dB down, 1 kHz to 2 MHz. Third order intermodulation products more than 70 dB down, 1 kHz to 110 MHz (Signal separation > 300 Hz).

Residual responses (no signal present at input): with input attenuation at 0 dB: < -110 dBm (200 kHz to 110 MHz); < -95 dBm (20 kHz to 200 kHz).

Amplitude Accuracy

Frequency response
(Flatness: attenuator settings > 10 dB):

1 kHz to 110 MHz

Amplitude Display

Log

± 0.5 dB
 ± 0.25 dB/dB
but not more than ± 1.5
dB over the full
70 dB display range

Linear

$\pm 5.8\%$
 $\pm 2.8\%$ of
full 8 div
deflection

Calibrator amplitude: -30 dBm, ± 0.3 dB

Calibrator frequency: 30 MHz, ± 3 kHz.

Log reference level control: provides 70 dB range (60 dB below 200 kHz), in 10 dB steps. Accurate to ± 0.2 dB ($\pm 2.3\%$, Linear Sensitivity).

Log reference level vernier: provides continuous 12 dB range. Accurate to ± 0.1 dB ($\pm 1.2\%$) in 0, -6 , and -12 dB positions; otherwise ± 0.25 dB ($\pm 2.8\%$).

Amplitude measurement accuracy: ± 1.25 dB with proper technique.

General Characteristics

Input impedance: 50 Ω nominal, BNC connector. Reflection coefficient < 0.13 (1.3 SWR), input attenuator ≥ 10 dB. A special 75 Ω version of the HP 8553B/8552B is available, as is a 75 Ω matching transformer, the HP 11694A.

Maximum input level: peak or average power $+13$ dBm (1.4 V ac peak), ± 50 V dc, 1 dB compression point, -10 dBm.

Scan time: 16 internal scan rates from 0.1 ms/div to 10 sec/div in a 1, 2, 5 sequence, or manual scan.

Scan Mode

Int: analyzer repetitively scanned internally.

Ext: scan determined by 0 to $+8$ -volt external signal.

Manual: scan determined by front panel control.

Attenuator: 0 to 50 dB, in 10 dB increments, coupled to Log Reference Level indicator; automatically maintains absolute calibration. Attenuator accuracy ± 0.2 dB.

Power requirements: 100, 120, 220, or 240 V $\pm 5\%$, -10% , 50 to 60 Hz, normally less than 225 watts.

Weight: Model 8553B RF Section: net, 5.5 kg (12 lb). Shipping, 7.8 kg (17 lb).

Size: 102 H x 226 W x 334 mm D (4" x 8.9" x 13.5").

Tracking Generator-Counter (HP 8443A)

Frequency range: 100 kHz to 110 MHz.

Amplitude range: < -120 dBm to $+10$ dBm in 10 and 1 dB steps with a continuous 1.2 dB vernier.

Amplitude Accuracy

Frequency response (flatness): ± 0.5 dB.

Absolute: 0 dBm at 30 MHz: ± 0.3 dB.

Output impedance: 50 Ω , BNC connector, ac coupled, reflection coefficient ≤ 0.09 (1.2 SWR) with output < 0 dBm.

Counter

Display: 7 digits with 1 digit over-range. Reads to ± 10 Hz increments.

Resolution (gate time): 1 kHz (1 ms), 100 Hz (10 ms), 10 Hz (100 ms).

Accuracy: ± 1 count $\pm$ time base accuracy.

Time base aging rate: $< 3 \times 10^{-9}$ /day (0.3 Hz/day) after warm-up.

External counter inputs: 10 kHz to 120 MHz, 50 Ω , -10 dBm min.

Power: 100, 120, 220, or 240 V $\pm 5\%$, -10% , 48 to 440 Hz 75 watts.

Weight: Model 8443A: net, 11.04 kg (24.3 lb). Shipping, 14.47 kg (31.9 lb).

Size: 88.2 H x 425 W x 467 mm D (3.5" x 16.8" x 18.4").

Ordering Information

HP 8553B RF Section

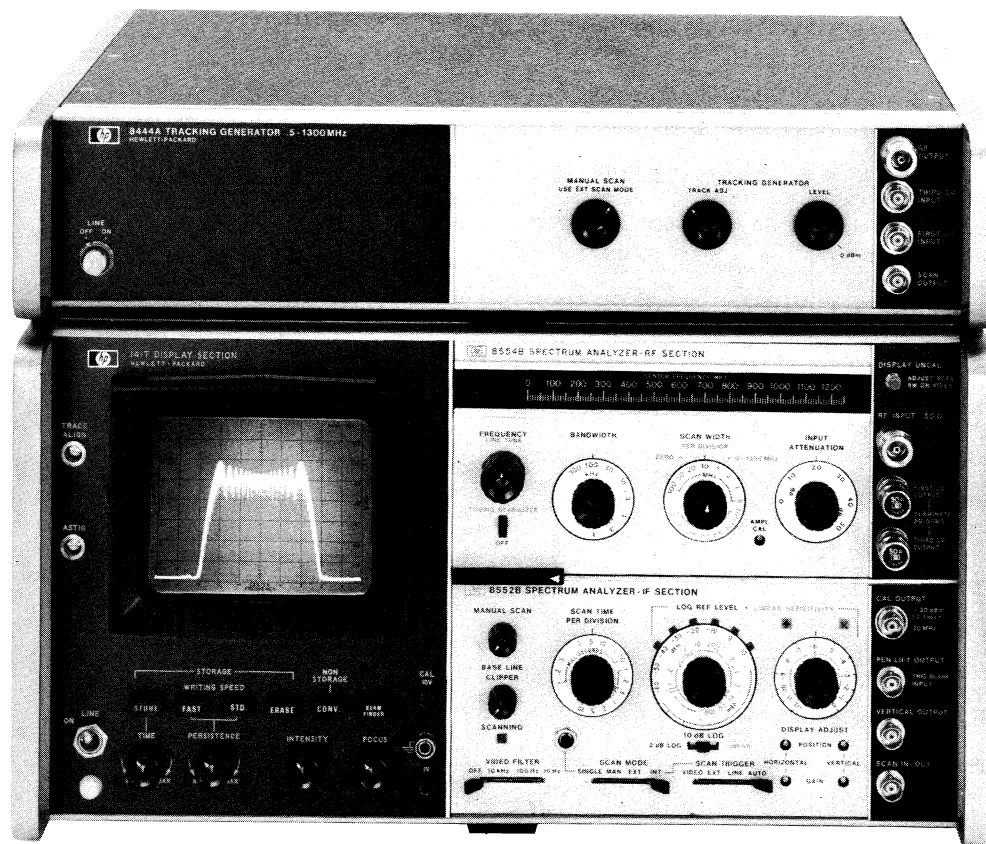
HP 8443A Tracking Generator-Counter

SIGNAL ANALYZERS

HP 141T Spectrum Analyzer System: 100 kHz to 1250 MHz

Models 8554B & 8444A

- High resolution (100 Hz)
- Frequency response ± 1 dB
- Companion tracking generator
- Optional internal limiter



HP 8554B (141T, 8552B) 8444A

The HP 8554B RF Section covers the frequency range from 100 kHz to 1250 MHz. This band includes baseband, AM/FM Broadcast, VHF/UHF TV, mobile communications, and VHF/UHF navigation systems. Typical measurements include modulation, intermodulation, harmonics and spurious. Noise power density and carrier to noise ratio can also be measured. The frequency response of filters, amplifiers, mixers or modulators can be measured and displayed when a companion tracking generator is used.

Absolute Calibration

Amplitude measurements can be made with an accuracy of ± 2.8 dB over the range +10 to -122 dBm. This accuracy can be improved to ± 1.75 dB with IF substitution techniques. The log display mode (dBm) provides a 70 dB calibrated range, while the linear display mode (volts) provides maximum resolution of 1 μ V per division. The calibrated reference level (top graticule line) can be set with IF gain to values from +10 to -72 dBm. An UNCAL light warns of control settings which may cause loss of amplitude calibration.

Frequency Response

Excellent flatness (± 1 dB) insures high accuracies for relative amplitude measurements such as harmonic distortion. Full band sweep allows display of the entire tuning range, 100 kHz to 1250 MHz.

Frequency Resolution

Low residual FM allows selection of bandwidths as narrow as 100 Hz. This bandwidth provides the resolution needed to measure close-in sidebands such as those due to power line harmonics or third order

intermodulation distortion. Available bandwidths range from 100 Hz to 300 kHz in a 1, 3, 10 sequence. The filters used are synchronously-tuned which have an excellent response to pulsed signals and permit the lowest sweep time for a given bandwidth.

Sensitivity

High sensitivity (-122 dBm/100 Hz) and low spurious levels (-65 dBc) allow accurate measurements of low level signals such as might be encountered in EMI applications. The sensitivity/spurious performance also provides the dynamic range required for signals with large amplitude separation such as intermodulation distortion or incidental AM.

Frequency Stabilization

Frequency stabilization reduces residual FM to less than 100 Hz peak-to-peak for scans of 200 kHz or less. The stabilization in narrow scans is implemented by phase-locking the local oscillators to a crystal reference.

HP 8444A Tracking Generator

The HP 8444A Tracking Generator utilizes the LO's of the HP 8554B to generate an output signal whose frequency equals the tuned frequency of the HP 8554B. The tracking generator can provide a swept source for frequency response measurements. The HP 8444A also provides control of output signal amplitude to prevent overdriving the DUT.

For precise frequency measurements of low level signals, the tracking generator provides a constant amplitude auxiliary output signal, which can be used to drive a frequency counter.



HP 8554B Specifications—with HP 8552B IF Section

Frequency Specifications

Frequency range: 100 kHz to 1250 MHz.

Scan Width (on 10-division CRT horizontal axis)

Per division: 15 calibrated scan widths from 100 MHz/div to 2 kHz/div in a 1, 2, 5 sequence.

Preset: 0-1250 MHz, automatically selects 300 kHz bandwidth IF filter.

Zero: analyzer is fixed-tuned receiver.

Frequency Accuracy

Center frequency accuracy: the dial indicates the display center frequency within 10 MHz.

Scan width accuracy: frequency error between two points on the display is less than 10% of the indicated separation.

Resolution

Bandwidth: IF bandwidths of 0.1 to 300 kHz provided in a 1, 3, 10 sequence.

Bandwidth accuracy: individual IF bandwidth 3 dB points calibrated to $\pm 20\%$ (10 kHz bandwidth $\pm 5\%$).

Bandwidth selectivity: 60 dB/3 dB IF bandwidth ratio $< 20:1$ for IF bandwidths from 10 kHz to 200 kHz. 60 dB/3 dB bandwidth ratio $< 11:1$ for IF bandwidths 100 Hz to 3 kHz.

Stability (residual FM)

Stabilized: < 100 Hz peak-to-peak.

Unstabilized: < 10 kHz peak-to-peak.

Noise sidebands: more than 70 dB below CW signal, 50 kHz or more away from signal, with 1 kHz IF bandwidth.

Amplitude Specifications

Absolute Amplitude Calibration Range

Log: from -122 to $+10$ dBm. 10 dB/div on a 70 dB display, or 2 dB/div on a 16 dB display.

Linear: from $0.1 \mu\text{V/div}$ to 100 mV/div in a 1, 2 sequence on an 8-division display.

Dynamic Range

Average noise level: < -102 dBm with 10 kHz IF bandwidth.

Spurious responses: all image and out-of-band mixing responses, harmonic and intermodulation distortion products are more than 65 dB below a -40 dBm signal at the input mixer.

Residual responses (no signal present at input): with input attenuation at 0 dB: < -100 dBm.

Amplitude Accuracy

	Log	Linear
Frequency response (flatness)		
100 kHz to 1250 MHz	± 1 dB	$\pm 12\%$
Switching between bandwidths (at 25°C)	± 0.5 dB	$\pm 5.8\%$
Amplitude display	± 0.25 dB/dB but not more than ± 1.5 dB over the full 70 dB display range.	2.8% of full 8 div deflection

Calibrator Output

Amplitude: -30 dBm, ± 0.3 dB.

Frequency: 30 MHz, ± 3 kHz.

Log reference level control: provides 70 dB range (60 dB below 200 kHz), in 10 dB steps. Accurate to ± 0.2 dB ($\pm 2.3\%$, Linear Sensitivity).

Log reference level vernier: provides continuous 12 dB range. Accurate to ± 0.1 dB ($\pm 1.2\%$) in 0, -6 , and -12 dB positions; otherwise ± 0.25 dB ($\pm 2.8\%$).

Amplitude measurement accuracy: ± 1.75 dB with proper technique.

RF Input Specifications

Input impedance: 50 Ω nominal. Typical reflection coefficient < 0.30 (1.85 SWR), input attenuator ≥ 10 dB.

Maximum input level: peak or average power $+13$ dBm (1.4 V ac peak), ± 50 V dc.

General

Scan time: 16 internal scan rates from 0.1 ms/div to 10 sec/div in a 1, 2, 5 sequence, and manual scan.

Scan Time Accuracy

0.1 ms/div to 20 ms/div: $\pm 10\%$.

50 ms/div to 10 s/div: $\pm 20\%$.

Weight

Model 8554B RF section: net, 4.7 kg (10.3 lb). Shipping 7.8 kg (17 lb).

Size: 102 H x 226 W x 344 mm D (4" x 8.9" x 13.5").

HP 8444A Specifications

Specifications for Swept Frequency Response Measurements

Dynamic range: > 90 dB from spectrum analyzer 1 dB gain compression point to average noise level (approximately -10 dBm to -100 dBm). Spurious responses not displayed.

Gain compression: for -10 dBm signal level at the input mixer, gain compression < 1 dB.

Absolute Amplitude Calibration Range

Tracking generator (drive level to test device: 0 to -10 dBm continuously variable. 0 dBm absolutely calibrated to ± 0.5 dB at 30 MHz).

Frequency range: 500 kHz to 1250 MHz.

Frequency resolution: 1 kHz.

Stability

Residual FM (peak-to-peak): stabilized, < 200 Hz; unstabilized, < 10 kHz.

Amplitude Accuracy

System frequency response: ± 1.50 dB.

Tracking generator calibration: 0 dBm at 30 MHz to ± 0.5 dB.

Specifications for Precision Frequency Measurements

Frequency accuracy: for unknown signals ± 10 kHz. (Tracking drift typically 50 kHz/10 min after 2-hour warm-up). For points on frequency response curve, counter accuracy $\pm$ Residual FM (200 Hz).

Counter Mode of Operation

Manual scan: scan determined either by front panel control of HP 8552B IF Section or by external scan signal provided by the HP 8444A.

Zero scan: analyzer is fixed-tuned receiver. Counter reads center frequency to accuracy of tracking drift.

Counter output level: typically 0.1 V rms.

Specifications for Sweep/CW Generator

Frequency: controlled by spectrum analyzer. Range 500 kHz to 1250 MHz with HP 8554B. Scan widths are as enumerated on this page.

Frequency accuracy: ± 10 MHz using spectrum analyzer tuning dial. Can be substantially improved using external counter outout.

Flatness: ± 0.5 dB.

Spectral Purity

Residual FM (peak-to-peak): 200 Hz.

Harmonic distortion: 25 dB below output level (typical).

Nonharmonic (spurious) signals: > 35 dB below output level.

Long term stability: drift typically less than 30 kHz/hour when stabilized after 2-hour warm-up.

Sweep width: 20 kHz to 1000 MHz.

Sweep rates: selected by Scan Time per Division on spectrum analyzer.

General

Temperature range: operation, 0°C to 55°C , storage -40°C to 75°C .

EMI: conducted and radiated interference is in compliance with MIL-STD 461A Methods CE03 and RE02, CISPR publication 11 (1975), and Messemppaenger-Postverfuegung 526/527/79 (Kennzeichnung Mit F-Nummer/Funkschutzzeichen).

Power: 115 V and 230 V, 48 to 440 Hz, 12 watts max.

Weight: net, 7.1 kg (15.6 lb). Shipping, 9.5 kg (21 lb).

Size: 88.2 H x 425 W x 467 mm D (3.5" x 16.8" x 18.4").

Ordering Information

HP 8554B RF Section

Opt 003: Internal Limiter

HP 8444A Tracking Generator

SIGNAL ANALYZERS

HP 141T Spectrum Analyzer System: 10 MHz to 40 GHz

Models 8555A, 8444A Option 059 & 8445B

- 10 MHz to 18 GHz, external mixing to 40 GHz
- High sensitivity (-125 dBm)
- 100 Hz resolution
- Companion tracking generator to 1.5 GHz



HP 8555A (141T, 8552B) 8444A Opt 059, 8445B

The HP 8555A Tuning Section offers multiband coverage from 10 MHz to 18 GHz. The range can be extended to 40 GHz with the HP 11517A external waveguide mixer (see page 621). The HP 8555A provides high sensitivity (-125 dBm), high resolution (100 Hz) and frequency scans as wide as 8 GHz. The HP 8555A is well suited for measurements necessary during both the design and production phases of microwave devices and systems.

Amplitude Calibration

Absolute amplitude calibration permits accurate amplitude measurements over the range from $+10$ to -125 dBm. The exceptional flatness of the HP 8555A, which is ± 2 dB out to 18 GHz, enhances the accuracy of relative power measurements.

High Sensitivity

With the 100 Hz bandwidth selected, the sensitivity of the HP 8555A is -125 dBm in the fundamental mixing band and -100 dBm in the 4th harmonic band. This sensitivity permits measurements of low level signals. When these signals are close to the noise floor, a video filter of 10 kHz, 100 Hz or 10 Hz can be selected to improve discernability of the signal.

High Resolution/Stability

The low residual FM of the HP 8555A (<100 Hz p-p) allows a 100 Hz bandwidth to be selected which permits the user to resolve sidebands due to low frequency modulations. The stability of the HP 8555A also allows measurement of the spectral purity of a DUT.

HP 8445B Tracking Preselector

The HP 8445B Tracking Preselector contains a YIG filter which tracks the tuned frequency of the analyzer over the range 1.8 to 18 GHz. The preselector suppresses the image and multiple responses which result from harmonic mixing. The preselector can also reduce distortion and increase dynamic range when signal separation exceeds the preselector bandwidth. For tuned frequencies below 1.8 GHz, a low pass filter prevents image and multiple responses.

An optional LED display provides a readout of marker frequency with 1 MHz resolution.

HP 8444A Option 059 Tracking Generator

The tracking generator provides a leveled, calibrated signal output with a frequency equal to the tuned frequency of the HP 8555A. This enables swept frequency tests such as insertion loss and return loss at frequencies up to 1500 MHz. With the addition of an external frequency counter, precise measurement of frequency is possible.

HP 8555A Specifications—with HP 8552B IF Section

Frequency Specifications

Frequency range: 0.01–40 GHz.

Tuning Range

With internal mixer: 0.01–18.0 GHz.

With external mixer: 12.4–40 GHz.

Harmonic Mixing Mode

Signal identification: not required when preselector is used. The signal identifier allows positive identification of all responses.

Scan Width

Full scan: the width of the scan depends on mixing mode. Scan width = $n \times 2000$ MHz, where n is the mixing mode; e.g. for $n = 2$, scan width is 4 GHz. Maximum scan width full screen is 8 GHz with coaxial mixer. Preselector necessary to make wide scans usable.

Per division: 16 calibrated scan widths from 2 kHz/div to 200 MHz/div in a 2, 5, 10 sequence.

Zero scan: analyzer becomes fixed-tuned receiver.

Frequency Accuracy

Dial accuracy: $n \times (\pm 15 \text{ MHz})$ where n is the mixing mode.

Scan accuracy: frequency error between two points on the display is less than $\pm 10\%$ of the indicated separation.

Stability: residual FM stabilized < 100 Hz peak-to-peak (fundamental mixing).

Noise sidebands: for fundamental mixing. More than 70 dB below CW signal 50 kHz or more away from signal, with 1 kHz IF bandwidth and 100 Hz video filter.

Frequency Drift

Long term drift: at fixed center frequency after 2-hour warm-up (Typical).

Stabilized: ± 3.0 kHz/10 min.

Unstabilized: ± 25 kHz/10 min.

Stabilization range: first LO can be automatically stabilized to internal crystal reference for scan widths of 100 kHz/div or less.

Resolution

Bandwidth range: selectable 3 dB bandwidths from 100 Hz to 300 kHz in a 1, 3, 10 sequence.

Bandwidth shape: approximately gaussian.

Bandwidth selectivity: 11:1 to 20:1 (60 dB/3 dB).

Bandwidth accuracy: individual IF bandwidth 3 dB points calibrated to $\pm 20\%$ (10 kHz bandwidth, $\pm 5\%$).

Amplitude Specifications

Measurement Range

Log reference level: from -60 dBm to $+10$ dBm.

Linear sensitivity: from $0.1 \mu\text{V/div}$ to 100 mV/div .

Sensitivity and frequency response with internal coaxial mixer noise level: specified for 1 kHz bandwidth.

Frequency Response with 10 dB Input Attenuator Setting

Frequency Range (GHz)	Mixing Mode (n)	Average Noise Level (dBm max.)	Frequency Response* (dB max.)
0.01–2.05	1–	–115	± 1.0
1.50–3.55	1–	–117	± 1.0
2.07–6.15	2–	–108	± 1.3
2.60–4.65	1+	–117	± 1.0
4.11–6.15	1+	–115	± 1.0
4.13–10.25	3–	–103	± 1.5
6.17–10.25	2+	–105	± 1.5
6.19–14.35	4–	–95	± 2.0
8.23–14.35	3+	–100	± 2.0
10.29–18.00	4+	–90	± 2.0

*Includes mixer frequency response, RF attenuator frequency response, mixing mode gain variation, RF input VSWR.

Sensitivity and Frequency Response with HP 11517A External Wave-guide Mixer and Appropriate Waveguide Tapers

Average Noise Level 10 kHz Bandwidth (dBm typical)

Frequency Range (GHz)	Mixing Mode (n)	Average Noise Level (dBm)
12.4–18.0	6–	–90
18.0–26.5	6+	–85
26.5–40.0	10+	–75

Frequency response: typically ± 3 dB over 1 GHz frequency scans.

Residual responses: referred to input on fundamental mixing: < -90 dBm.

Display Range

Log: 70 dB, 10 dB/div and 2 dB/div, expanded on a 16 dB display.

Linear: from $0.1 \mu\text{V/div}$ to 100 mV/div in a 1, 2, sequence on an 8-division display.

Spurious Responses Due to Second Harmonic Distortion with Preselector

Frequency Range	Power Incident on Input Mixer	2nd Harmonic Distortion
0.01–1.85 GHz	–40 dBm	–63 dB
1.85–18.0 GHz	0 dBm	–100 dB

Spurious Responses Due to Third Order Intermodulation Distortion with Preselector

Frequency Range	Signal Separation	Power Incident on Input Mixer	Third Order Intermodulation Distortion
0.01–18.0 GHz	> 1 MHz < 20 MHz	–30 dBm	–70 dB
0.01–1.85 GHz	> 70 MHz	–30 dBm	–70 dB
1.85–18.0 GHz	> 70 MHz	0 dBm	–100 dB

Video filter: post detection filter used to average displayed noise. Nominal bandwidths: 10 kHz, 100 Hz, and 10 Hz.

Gain compression: for internal mixer gain compression < 1 dB for -10 dBm peak or average signal level to input mixer. 11517A External Mixer (12.4–40 GHz) gain compression < 1 dB for -15 dBm peak or average signal level to input mixer.

Amplitude Accuracy

IF gain variation with different bandwidth settings: (at 20°C .)

Log: ± 0.5 dB.

Linear: $\pm 5.8\%$



SIGNAL ANALYZERS

HP 141T Spectrum Analyzer System: 10 MHz to 40 GHz

Models 8555A, 8444A & 8445B (cont.)

Amplitude Display

Log: ± 0.25 dB/dB, but not more than ± 1.5 dB over the full 70 dB display range.

Linear: $\pm 2.8\%$ of full 8-division deflection.

Log reference level: accurate to ± 0.2 dB ($\pm 2.3\%$ linear sensitivity).

Log reference level vernier: accurate to ± 0.1 dB (1.2%) in 0, -6, and -12 dB positions; otherwise, ± 0.25 dB ($\pm 2.8\%$).

Input attenuator range: 0-50 dB in 10 dB steps, manual safety lockout for 0 dB position.

Frequency response: typically ± 0.6 dB from 10 MHz to 18 GHz.

Calibrator output: amplitude -30 dBm, ± 0.3 dB. Frequency 30 MHz ± 3 kHz.

Absolute calibration accuracy: overall accuracy is a function of measurement technique. With the appropriate technique, absolute accuracy of ± 1.6 dB (fundamental mixing) and ± 2.6 dB (4th harmonic mixing) is achievable.

Input Characteristics

Input impedance: 50 ohms nominal (0.01-18 GHz).

Reflection coefficient: < 0.13 (1.30 SWR) for 0.01-7.5 GHz; < 0.23 (1.6 SWR) for 7.5-18 GHz.

Maximum input level: peak or average power +13 dBm (1.0 V ac rms) incident on mixer (+30 dBm with Opt 002), +33 dBm incident on input attenuator.

RF input connector: type N female.

LO emission: -10 dBm without preselector, -80 dBm with preselector over recommended operating ranges (10 dB input attenuator setting).

General

Scan time: 16 internal scan rates from 0.1 ms/div to 10 sec/div in a 1, 2, 5 sequence.

Power requirements: 100, 120, 220 240 V $\pm 5\%$, -10%, 50-60 Hz, normally less than 225 watts (varies with plug-in units used).

Weight: net, 16.8 kg (14.9 lb). Shipping, 8.7 kg (19 lb).

Size: 102 H x 226 W x 344 mm D (4" x 8.9" x 13.5").

Specifications with Option 002;

Internal Limiter Installed

All specifications are the same as for the standard unit except the following:

Frequency range: 0.1-12.4 GHz, usable over 0.01-18 GHz range.

Maximum Input Level

Continuous: 1 W (+30 dBm).

Pulse: 75 watts peak, pulse width ≤ 1 μ s, 0.001 duty cycle.

Reflection coefficient: < 0.33 (2.0 SWR).

Frequency response (flatness): $< \pm 0.5$ dB degradation in response, 0.1-12.4 GHz.

HP 8445B Tracking Preselector

Frequency Specifications

Frequency range: dc-1.8 GHz low-pass filter. 1.8-18 GHz tracking filter.

Tracking filter 3 dB bandwidth: typically 20-45 MHz.

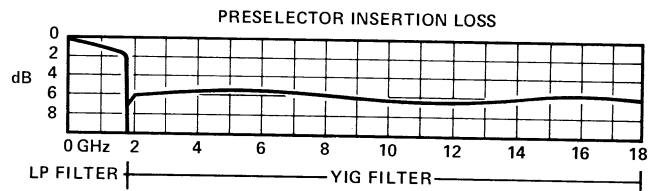
Tracking filter skirt roll-off: characteristics of a three-pole filter. (Nominal: 18 dB/octave.)

Insertion Loss

	Frequency	Insertion Loss (Except Opt. 004)	Insertion Loss (Opt. 004)
Low-Pass Filter	D-1.8 GHz	< 2.5 dB	*
	@2.05 GHz	> 50 dB	*
Tracking Filter	1.8-12 GHz	< 8 dB	< 7 dB
	12-18 GHz	< 10 dB	< 8 dB

*Low-Pass Filter deleted with Opt 004.

Typical Preselector Minimum Insertion Loss at 25°C.



Out-of-band rejection: for YIG filter 1 GHz from center of pass-band > 70 dB.

Digital Frequency Readout (option 003)

Function

Full scan mode: displays frequency at inverted marker.

Per division scan: displays center frequency.

Manual or remote operation of preselector: displays tuned frequency of filter.

Resolution: 1 MHz.

Accuracy: 0.01-1.0 GHz: ± 6 MHz.

1.0-4.0 GHz: ± 8 MHz.

4.0-18 GHz: $\pm 0.2\%$

Input Specifications

Input connector: precision Type N female.

Input VSWR: typically < 2.0 (1.8-18 GHz).

Limiting level: (maximum input level for < 1 dB signal compression), $> +5$ dBm.

Damage level: $> +20$ dBm.

General

Remote function: YIG filter frequency can be set by externally supplied voltage.

Power requirements: 100, 120, 220, or 240 V $\pm 5\%$, -10%, 48 to 440 Hz, less than 110 watts.

Weight: net, 8.8 kg (19.5 lb). Shipping, 11.9 kg (26 lb).

Size: 88.2 H x 425 W x 467 mm D (3.5" x 16.8" x 18.4").

HP 8444A Opt 059 Tracking Generator

Frequency range: 0.5 MHz to 1500 MHz.

Frequency resolution: 1 kHz.

Residual FM (peak-to-peak): 200 Hz (stabilized).

Amplitude Range

Spectrum analyzer display: from -130 dBm to +10 dBm, 10 dB/div on a 70 dB display or 2 dB/div on a 16 dB display (HP 8552B only).

Tracking generator (drive level to test device): 0 to -10 dBm continuously variable.

Amplitude Accuracy

System frequency response: ± 2.7 dB.

Tracking generator calibration: 0 dBm at 30 MHz to ± 0.5 dB.

Dynamic range: > 90 dB.

Counter output: typically 0.1 V rms.

General

Power: 115 V and 230 V, 48 to 440 Hz, 12 watts max.

Weight: net, 7.1 kg (15.6 lb). Shipping, 9.5 kg (21 lb).

Size: 85.2 H x 425 W x 467 mm D (3.5" x 16.8" x 18.4").

Ordering Information

HP 8555A Tuning Section

Opt 001: APC-7 connectors

Opt 002: Internal limiter

Opt 005: Video tape

HP 8445B Tracking Preselector, dc -18GHz

Opt 001: APC-7 connectors

Opt 002: Add manual controls

Opt 003: Add digital frequency readout

Opt 004: Delete low-pass filter

Opt 005: Delete interconnect rigid coax

HP 8444A Opt 059 Tracking Generator

HP 11517A External Mixer (taper section req'd)

HP 11518A Taper Section, 12.4 to 18 GHz

HP 11519A Taper Section, 18 to 26.5 GHz

HP 11520A Taper Section, 26.5 to 40 GHz