

TABLE 1-1. HP MODEL 8558B SPECIFICATIONS (1 OF 4)

**FREQUENCY SPECIFICATIONS****FREQUENCY RANGE**

100 kHz to 1500 MHz

**FREQUENCY SPANS****Per Division (MHz/Div, kHz/Div)**

14 frequency scale calibrations in 1-2-5 sequence from 5 kHz/div to 100 MHz/div. Start or center frequency is set with the TUNING control and indicated by the FREQUENCY MHz readout.

**Zero Span (0)**

Analyzer functions as a manually tuned receiver, at the frequency indicated by the FREQUENCY MHz readout, for time-domain display of signal modulation.

**FREQUENCY ACCURACY****Tuning Accuracy**

Frequency MHz readout (start or center frequency), after zeroing on the LO feedthrough and operating the FREQUENCY CAL control, +10°C to +40°C: 0–195 MHz:  $\pm(1 \text{ MHz} + 20\% \text{ of frequency span per division})$

195–1500 MHz:  $\pm(5 \text{ MHz} + 20\% \text{ of frequency span per division})$

**Frequency Readout Resolution**

0–195 MHz: 100 kHz

195–1500 MHz: 1 MHz

**Frequency Span Accuracy** $\pm 5\%$  of displayed frequency separation**SPECTRAL RESOLUTION AND STABILITY****Resolution Bandwidths**

Eight selectable resolution (3-dB) bandwidths in 1-3 sequence from 1 kHz to 3 MHz. Bandwidth may be selected independently or coupled with frequency span. Optimum ratio of frequency span to resolution bandwidth is indicated by alignment of markers (  $>$   $<$  ) on the two controls.

**Resolution Bandwidth Accuracy:**

Individual resolution bandwidth 3-dB points:  $\pm 20\%$  (+10°C to +40°C)

**Selectivity:**60-dB: 3-dB resolution bandwidth ratio:  $< 15:1$ **Stability****Residual FM:** $< 1 \text{ kHz p-p}$  in 0.1 second**Noise Sidebands:**

$\geq 65 \text{ dB}$  down,  $> 50 \text{ kHz}$  from center of CW signal with 1 kHz resolution bandwidth and full video filtering.

**Video Filter**

Post-detection low-pass filter averages displayed noise for a smooth trace. The MAX (detent) position selects a video filter bandwidth of approximately 1.5 Hz for noise level measurement.

**AMPLITUDE SPECIFICATIONS****AMPLITUDE RANGE**

–117 dBm to +30 dBm

001:  $-110 \text{ dBm to } +30 \text{ dBm}$ 002:  $-63 \text{ dBmV to } +80 \text{ dBmV}$ **Maximum Input (Damage) Levels****Total Power:**

+30 dBm (1W, 7.1 Vrms)

001:  $+30 \text{ dBm (1W, 8.7 Vrms)}$ 002:  $+80 \text{ dBmV (1.3W, 10 Vrms)}$ **dc or ac ( $< 100 \text{ Hz}$ ):** $\pm 50 \text{ V}$ **Peak Pulse Power:**

+50 dBm (100W,  $< 10 \mu\text{sec}$  pulse width, 0.01% duty cycle) with input attenuation  $\geq 20 \text{ dB}$

002:  $+100 \text{ dBmV (130W)}$ **Average Noise Level**

The displayed average noise level determines sensitivity (minimum discernible signal). Signals at this input level peak approximately 3 dB above the displayed noise.

Maximum average noise level with 10 kHz resolution bandwidth, 0 dB input attenuation, and maximum (MAX) video filtering:

 $< -107 \text{ dBm (1–1500 MHz)}$ 001:  $< -100 \text{ dBm (1–1500 MHz)}$ 002:  $< -53 \text{ dBmV (1–1500 MHz)}$ **Calibrated Display Range****Log (from Reference Level):**

70 dB with 10 dB/DIV Amplitude Scale

8 dB with 1 dB/DIV Amplitude Scale

**Linear:**

8 divisions with LIN Amplitude Scale

**AMPLITUDE ACCURACY**

With AUTO sweep time selected, amplitude accuracy is determined by one or more of the following factors, depending on the measurement technique.

**Calibrator Output**–30 dBm  $\pm 1 \text{ dB}$  (into 50 $\Omega$ )280 MHz  $\pm 300 \text{ kHz}$ 001:  $-30 \text{ dBm } \pm 1 \text{ dB (into 75}\Omega\text{)}$ 002:  $+20 \text{ dBmV } \pm 1 \text{ dB (into 75}\Omega\text{)}$

TABLE 1-1. HP MODEL 8558B SPECIFICATIONS (2 OF 4)

**Reference Level**

10-dB steps and a 12-dB vernier for calibrated Reference Level adjustment from -112 dBm to +60 dBm.

(002: -62 dBmV to +110 dBmV)<sup>1</sup>

**Step Accuracy:**

Steps referenced with 0 dB input attenuation.

-10 dBm to -80 dBm:  $\pm 0.5$  dB

-10 dBm to -100 dBm:  $\pm 1.0$  dB

**Vernier Accuracy**

$\pm 0.5$  dB

**Frequency Response**

Frequency response includes input attenuator, limiter, and mixer flatness:

$\leq \pm 1.0$  dB with 10 dB input attenuation

**Input Attenuator**

0 dB to 70 dB of input attenuation selectable in 10-dB steps

**Step Accuracy:**

0 dB to 70 dB:  $< \pm 0.5$  dB per 10-dB step

**Maximum Cumulative Error:**

0 dB to 70 dB:  $< \pm 1.0$  dB

**Bandwidth Switching (Amplitude Variation)**

Bandwidths 3 MHz to 300 kHz:  $< \pm 0.5$  dB

Bandwidths 3 MHz to 1 kHz:  $< \pm 1.0$  dB<sup>2</sup>

**Display Fidelity**

CRT linearity and log or linear fidelity affect amplitude accuracy at levels other than Reference Level.

**Log Incremental Accuracy:**

$\pm 0.1$  dB per dB from Reference Level

**Log Maximum Cumulative Error:**

$\leq \pm 1.5$  dB over entire 70-dB range

**Linear Accuracy:**

$\pm 3\%$  of Reference Level

**SPURIOUS RESPONSES****Second Harmonic Distortion:**

$> 70$  dB<sup>3</sup> below a -40 dBm input signal with 0 dB input attenuation.

001: -35 dBm input signal

002: +15 dBmV input signal

**Third Order Intermodulation Distortion:**

$> 70$  dB<sup>3</sup> below two -30 dBm input signals, separated by  $\geq 50$  kHz, with 0 dB input attenuation.

001: two -25 dBm input signals

002: two +25 dBmV input signals

**Image and Multiple Responses:**

$> 70$  dB<sup>3</sup> below a -40 dBm input level with 0 dB input attenuation.

001: -35 dBm input level

002: +15 dBmV input level

**RESIDUAL RESPONSES**

$< -100$  dBm (1-1500 MHz) with 0 dB input attenuation and no signal present at input.

001:  $< -95$  dBm (1-1500 MHz)

002:  $< -50$  dBmV (1-1500 MHz)

**SWEEP SPECIFICATIONS****SWEEP TIME****Automatic (AUTO):**

Sweep time adjusted automatically to maintain absolute amplitude calibration for any combination of frequency span, resolution bandwidth, and video filter bandwidth.

**Calibrated Sweep Times (sec/Div, mSec/Div):**

16 selectable sweep times in 1-2-5 sequence from 0.1 msec/div to 10 sec/div, provided primarily for time-domain calibration in zero span (0).

**GENERAL SPECIFICATIONS****TEMPERATURE RANGE**

**Operating:** 0°C to +55°C

**Storage:** -40°C to +75°C.

**HUMIDITY RANGE**

Type-tested from 50% to 95% relative humidity ( $\leq +40^\circ\text{C}$ ) per requirements of MIL-STD-810C, Method 507.1, Procedure IV.

**EMI**

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

<sup>1</sup> Input level not to exceed +30 dBm (002: +80 dBmV) damage level.

<sup>2</sup> 100 kHz bandwidth limited to  $< 80\%$  relative humidity. Amplitude variation is  $< \pm 2.5$  at 95% relative humidity, +40°C.

<sup>3</sup>  $> 60$  dB for 100 kHz to 5 MHz input signals.

TABLE 1-1. HP MODEL 8558B SPECIFICATIONS (3 OF 4)

**POWER REQUIREMENTS****HP Model 853A Display with HP Model 8558B Spectrum Analyzer:**

100 or 120 Vac +5%–10%, 48 to 66 Hz, single-phase. Power consumption is less than 200 VA with plug-in installed.

**HP Model 182T/180TR Display with HP Model 8558B Spectrum Analyzer:**

115 or 230 Vac  $\pm 10\%$ , 48 to 440 Hz. Power consumption is less than 200 VA with plug-in installed, convection cooled.

**HP Model 181T/181TR Display with HP Model 8558B Spectrum Analyzer:**

115 or 230 Vac  $\pm 10\%$ , 48 to 440 Hz. Power consumption is less than 225 VA with plug-in installed, convection cooled.

**WEIGHT****HP Model 8558B Spectrum Analyzer:**

Net: 5.5 kg (12 lbs)

Shipping: 10.5 kg (23 lbs)

**HP Model 853A Display:**

Net: 15.9 kg (35 lbs)

Shipping: 18.6 kg (41 lbs)

**HP Model 853A Option 001 Display:**

Net: 14.5 kg (32 lbs)

Shipping: 17.3 kg (38 lbs)

**HP Model 182T Display:**

Net: 12.5 kg (27 lbs)

Shipping: 16.5 kg (36 lbs)

**HP Model 181T Display:**

Net: 11.0 kg (24 lbs)

Shipping: 15.5 kg (34 lbs)

**HP Model 181TR Display:**

Net: 12.0 kg (26 lbs)

Shipping: 17.5 kg (38 lbs)

**HP Model 180TR Display:**

Net: 12.0 kg (26 lbs)

Shipping: 17.5 kg (38 lbs)

TABLE 1-2. HP MODEL 8558B/180-SERIES SUPPLEMENTAL CHARACTERISTICS (1 OF 3)

## SUPPLEMENTAL CHARACTERISTICS

**NOTE:** Values in this table are not specifications. They are typical characteristics included for user information.

## FREQUENCY CHARACTERISTICS

## FREQUENCY ACCURACY

## FREQUENCY ZERO

Adjusts digital FREQUENCY MHz readout. FREQUENCY ZERO control may be used to calibrate the frequency readout on a known signal or on the LO feedthrough.

## FREQUENCY CAL

Removes tuning hysteresis from first LO (YIG oscillator). FREQUENCY CAL button should be pressed to maintain FREQUENCY MHz readout accuracy whenever TUNING is changed by more than 50 MHz.

## FREQUENCY RANGE

## OUT-OF-RANGE BLANKING

The CRT trace is automatically blanked whenever the spectrum analyzer is swept or tuned beyond its frequency range (approximately -50 MHz and 1600 MHz).

## SPECTRAL RESOLUTION AND STABILITY

## FREQUENCY DRIFT

At fixed start/center frequency, after 2-hour warmup: <50 kHz in 10 minutes.

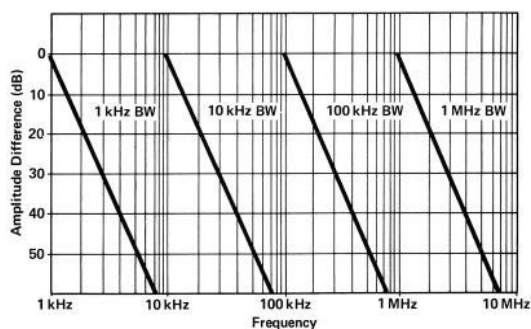
With temperature changes: <200 kHz/°C

## RESOLUTION BANDWIDTH SHAPE

Approximately gaussian (synchronously-tuned, 4-pole filter).

## SPECTRAL RESOLUTION

The following graph shows typical spectrum analyzer resolution for different resolution bandwidths.



Signal Resolution vs. Frequency Separation

## AMPLITUDE CHARACTERISTICS

## AMPLITUDE RANGE AND ACCURACY

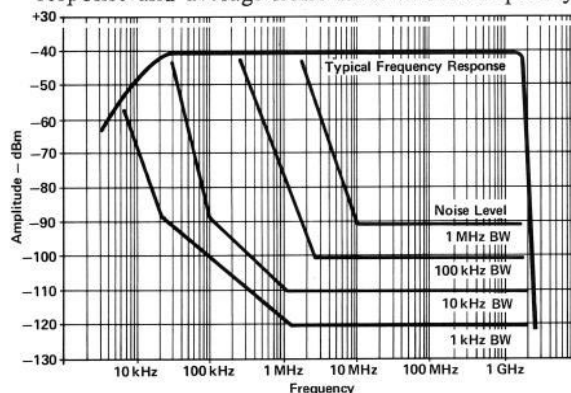
## DYNAMIC RANGE

Maximum power ratio of two signals simultaneously

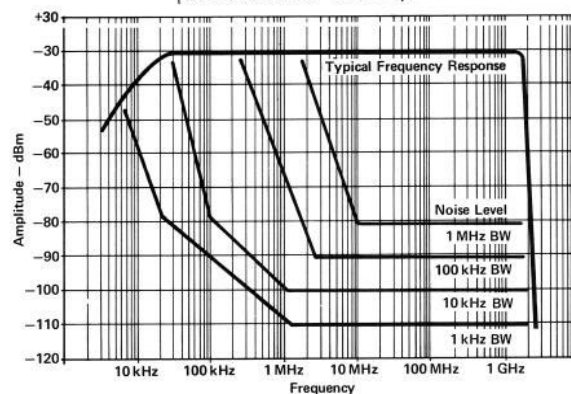
present at the input that may be measured within the limits of specified accuracy, sensitivity, and distortion (i.e. spurious responses): >70 dB

## FREQUENCY RESPONSE AND AVERAGE NOISE LEVEL

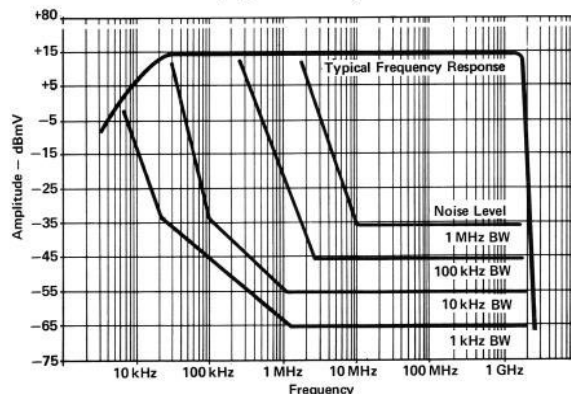
The following graphs show typical frequency response and average noise level versus frequency.



(Standard HP 8558B)



(Option 001)



(Option 002)

Average Noise Level and Frequency Response

TABLE 1-2. HP MODEL 8558B/180-SERIES SUPPLEMENTAL CHARACTERISTICS (2 OF 3)

## SUPPLEMENTAL CHARACTERISTICS

**NOTE:** Values in this table are not specifications. They are typical characteristics included for user information.

**GAIN COMPRESSION**

Gain compression is typically less than 1 dB for a -10 dBm input level with 0 dB input attenuation.

001: -5 dBm input level

002: +45 dBmV input level

**AMPLITUDE SCALE SWITCHING**

Reference Level variation is typically less than  $\pm 1$  dB for any change in Amplitude Scale.

**SPURIOUS RESPONSES****SECOND HARMONIC AND THIRD ORDER INTERMODULATION DISTORTION**

The graphs below illustrate typical second harmonic and third order intermodulation distortion.

**SWEEP CHARACTERISTICS****SWEEP TIME****CALIBRATED SWEEP TIME ACCURACY**  
(Sec/DIV, mSec/DIV)

Sweep times are typically  $\pm 10\%$  of indicated value.

**MANUAL**

Spectrum analyzer may be swept manually, in either direction, with front panel control.

**SWEEP TRIGGER****FREE RUN**

End of each sweep triggers new sweep.

**LINE**

Sweep triggered at ac line frequency.

**VIDEO**

Sweep triggered on post-detection video waveform. One-half major division of vertical deflection required to trigger sweep.

**SINGLE**

Single sweep started or reset by turning SWEEP TRIGGER clockwise momentarily.

**FRONT PANEL INPUT AND OUTPUT CHARACTERISTICS****SIGNAL INPUT****INPUT IMPEDANCE**

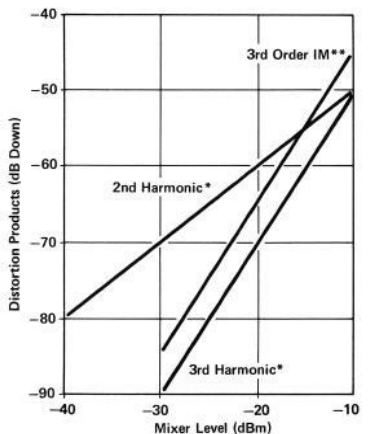
50 ohms nominal; Precision Type N female connector.

001 and 002: 75 ohms nominal; 75-ohm BNC female connector.

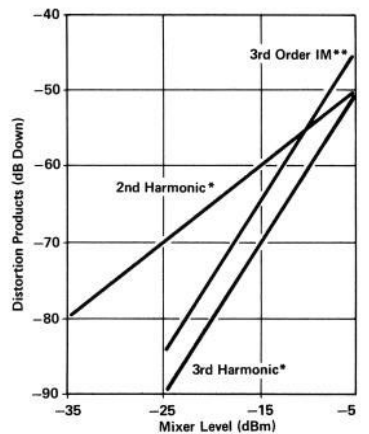
**INPUT SWR**

$< 1.5$  SWR with  $\geq 10$  dB input attenuation

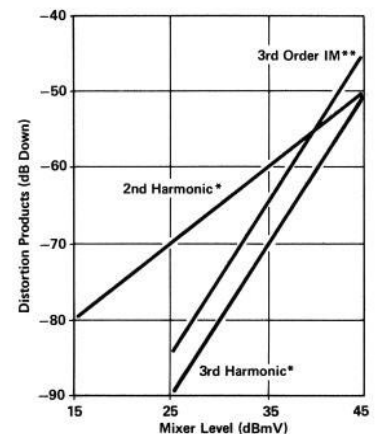
001 and 002:  $< 1.5$  SWR



(Standard HP 8558B)



(Option 001)



(Option 002)

Distortion vs. Mixer Level

TABLE 1-2. HP MODEL 8558B/180-SERIES SUPPLEMENTAL CHARACTERISTICS (3 OF 3)

**SUPPLEMENTAL CHARACTERISTICS**

**NOTE:** Values in this table are not specifications. They are typical characteristics included for user information.

**CAL OUTPUT**

−30 dBm at 280 MHz with second through fourth harmonics greater than −70 dBm (into 50 ohms).

001: −30 dBm at 280 MHz (into 75 ohms)

002: +20 dBmV at 280 MHz (into 75 ohms)

**1ST LO OUTPUT**

+10 dBm nominal into 50 ohms, 2.05–3.55 GHz.  
Terminate with a 50-ohm load when not in use.

**PROBE POWER**

+15V, −12.6V, and GND (150 mA maximum) for use with HP High-Impedance Probes (i.e. HP 1120A, 1121A, 1123A, 1124A). The HP 1121A is recommended for its low noise characteristics.<sup>1</sup>

**REAR PANEL OUTPUT CHARACTERISTICS<sup>2</sup>****VERTICAL, PENLIFT/BLANKING, AND HORIZONTAL OUTPUTS (AUX A, B, D)**

These outputs are compatible with and may be used to drive HP X-Y Recorders (using positive pencoils or TTL penlift input) and CRT monitors.

<sup>1</sup> See Section II for details regarding use with 001 and 002 75-ohm inputs.

<sup>2</sup> Rear panel outputs refer to 180T-series display mainframes and other 180-series mainframes with Option 807 installed. Horizontal, vertical, and blanking outputs, attenuated and shifted in dc level, are available on other 180-series mainframes at the MAIN SWEEP, MAIN GATE, and DELAYED GATE outputs, respectively. DO NOT connect an X-Y recorder to the DELAYED GATE OUTPUT, or damage will result.

**AUX A VERTICAL OUTPUT**

BNC output provides detected video signal from a 50-ohm output impedance. Typical 0–800 mV range corresponds to full 8-division CRT vertical deflection.

**AUX B PENLIFT/BLANKING OUTPUT**

BNC output provides a +15V penlift/blanking signal from a 10K-ohm output impedance when CRT trace is blanked. Otherwise, output is low at 0V (low impedance, 150 mA max.) for an unblanked trace.

**AUX C 21.4 MHz IF OUTPUT**

BNC output provides 21.4 MHz IF signal (linearly related to spectrum analyzer RF input) from a 50-ohm output impedance. Output bandwidth controlled by spectrum analyzer RESOLUTION BW setting; output amplitude controlled by INPUT ATTEN, REFERENCE LEVEL FINE, and first six REFERENCE LEVEL positions (i.e. −10 through −60 dBm with 0 dB input attenuation). Output level is approximately −10 dBm into 50 ohms with a signal displayed at Reference Level. 002: (i.e. +40 to −10 dBmV with 0 dB input attenuation).

**AUX D HORIZONTAL OUTPUT**

BNC output provides horizontal sweep voltage from a 5K-ohm output impedance. −5V to +5V range corresponds to full 10-division CRT horizontal deflection.