

Section I

Table 1-1. 8553B/8552B Specifications

GENERAL SPECIFICATIONS

¹**Input Impedance:** 50 ohm nominal. Reflection coefficient <0.13 (1.3 SWR), input attenuator ≥ 10 dB.

¹**Maximum Input Level:** Peak or average power ± 13 dBm (1.4V ac peak), ± 50 V dc.

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 Time Accuracy:

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

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

Scan Mode:

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

Single: Single scan with reset actuated by front panel pushbutton.

Ext: Scan determined by 0 to ± 8 volt external signal; scan input impedance > 10 k Ω ,

Blanking: -1.5V external blanking signal required.

Manual: Scan determined by front panel control; continuously variable across CRT in either direction.

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.) trigger signal (polarity selected by internally located switch in Model 8552B IF Section).

Video: Scan internally synchronized to envelope of RF input signal (signal amplitude of 1.5 major divisions peak-to-peak (required on display section CRT).

Auxiliary Outputs:

Vertical Output: Approximately 0 to -0.8 V for 8 division deflection on CRT display; approx. 100 Ω output impedance.

Scan Output: Approx. -5 to ± 5 V for 10 div CRT deflection, 5 k Ω output impedance.

Pen Lift Output: 0 to 14V (0V, pen down).

Output available in Int and Single Scan modes and Auto, Line, and Video scan trigger.

Power Requirements: 115 or 230 volts $\pm 10\%$, 50 to 60 Hz, normally less than 225 watts.

Dimensions:

Model 140T or 141T Display Section: 9-1/5 in. high (incl. height of feet) x 163/4 in wide x 18-3/8 in. deep (229 x 425 x 467 mm).

Model 143S Display Section: 21 in. high (incl. height of feet) x 163/4 in. wide x 18-3/8 in. deep (533 x 425 x 467 mm).

Weight:

¹Model 8553B RF Section: Net 12 lb (5,5 kg).

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 μ V/div to 100 mV/div in a 1, 2 sequence on an 8-division display.

¹**Dynamic Range:**

Average Noise Level: < -100 dBm with 10 kHz IF bandwidth.

Spurious Responses: For -40 dBm signal level at the input mixer. 2 Image responses, out-of-band mixing responses, harmonic and intermodulation distortion are all more than 70 dB below the signal level at input mixer 2, 2 MHz to 110 MHz; 60 dB, 1 KHz. to 2 MHz.

Third Order Intermodulation Products: For -40 dBm total signal level at input mixer, 2 third order intermodulation products are more than 70 dB down for input signals of 100 kHz to 110 MHz; signal separation > 300 Hz.

¹**Residual Responses:** 200 kHz 100 MHz < -110 dBm, 20 kHz 200 kHz < -95 dBm.

Amplitude Accuracy:

	Log	Linear
¹ Frequency Response (Flatness: attenuator settings ≥ 10 dB)		
1 kHz to 110 MHz	± 0.5 dB	$\pm 5.8\%$
Switching between Bandwidths (at 20°C)		
0.1-300 kHz	± 0.5 dB	$\pm 5.8\%$
0.03-300 kHz	± 1.0 dB	$\pm 12\%$
0.01-300 kHz	± 1.5 dB	$\pm 19\%$
Amplitude Display	± 0.25 dB/dB but not more than ± 1.5 dB over the full 70 dB display	$\pm 2.8\%$ of full 8 div deflection

Calibrator Output: range

Amplitude: -30 dBm, ± 0.3 dB.

Frequency: 30 MHz, ± 3 kHz.

¹Applies to 8553B

²Signal level at input mixer = Signal level at RF INPUT - INPUT ATTENUATION

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Table 1-1. 8553B/8552B Specifications (cont'd)

FREQUENCY SPECIFICATIONS

¹**Frequency Range:** 1 kHz -110 MHz (0-11 MHz and 0-110 MHz tuning ranges).

¹**Scan Width:** (on 10 division CRT horizontal axis).

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

Preset: 0-100 MHz.

Zero: Analyzer is fixed tuned receiver.

¹**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 to 30 degrees 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 provided in a 1, 3 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: <11 : 1 for IF bandwidths 10 Hz to 3 kHz, <20 : 1 for IF bandwidths from 10 kHz to 300 kHz, 60 dB points separated by <100 Hz for 10 Hz bandwidth.

¹**Stability:**

Residual FM:

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

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.

H01/H02 SPECIFICATIONS**NOTE**

All specifications for the 75-ohm 8553B/8553B are identical to the 50-ohm 8553B/8552B except for the following.

¹**Input Impedance:** 75 ohms nominal. Reflection Coefficient ≤ 0.13 ($6 \leq 1.30$ SWR, 18 dB return loss).

¹**Maximum Input Level:** Peak or average power to RF Input $< \pm 23$ dBm³ (4V rms, 5.6V peak, ± 50 Vdc).

Absolute Amplitude Calibration Range:

LOG: From -120 to ± 20 dBm, 10 dB/div on a 70 dB display, or 2 dB/div on a 16 dB display.

LINEAR: From 0.2 μ V/div to 200 mV/div in a 1, 2 sequence on an 8-division display.

¹**Dynamic Range:**

Average Noise Level:		Frequency ⁴
IF Bandwidth (kHz)	Avg. Noise Level (dBm) ³	Range (MHz)
1	-110	1-110
10	-100	1-110
100	90	1-110

Spurious Responses:

For -30 dBm Signal Level at Input Mixer:²

Image responses, out-of band mixing responses, harmonic and intermodulation distortion products, and IF feedthrough responses are all more than 70 dB below the Signal Level at Input Mixer. 2 (2 MHz to 110 MHz); 60 dB, 1 kHz to 2 MHz.

Third Order Intermodulation Products:

For -30 dBm Signal Level at Input Mixer 2 third order intermodulation products are more than 70 dB down for input signals of 100 kHz to 110 MHz.

Residual Responses:

(Referred to Signal Level at Input Mixer²):

200 KHz to 110 MHz: < -100 dBm

20 kHz to 200 kHz: < -85 dBm.

Calibrator Output:

Amplitude: -30 dBm³ ± 0.3 dB (8.66 mV into 75 ohms).

NOTE

RF INPUT and CAL OUTPUT connectors: Option H01, equivalent to Western Electric WE-560A; Option H02, standard BNC.

¹Applies to 8553B.

²Signal level at input mixer = Signal level at RF INPUT- INPUT ATTENUATION

¹Applies to 8553B.

²Signal level at input mixer = Signal level at RF INPUT (10 dB \pm INPUT ATTENUATION).

³0 dBm = 1 mW into 75 ohms.

⁴Typical sensitivity vs. input frequency curves for frequencies from 1 kHz to 1 MHz shown in Figure 1-4 must be derated by 10 dB.

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Table 1-2. Supplemental Performance Characteristics

These supplemental Performance Characteristics expand the 8553B/8552B Specifications, describe the instrument's unique features and characteristics, and provide other information useful in applying the instrument.

FREQUENCY CHARACTERISTICS

Frequency Range: For operation of the analyzer outside the 1 kHz to 110 MHz range, see Figure 1-4. Average Noise Level vs. Input Frequency Curve.

Scan Width:

Preset 0 100 MHz: Inverted marker identifies the frequency that becomes the center frequency for SCAN WIDTH PER DIVISION and ZERO scan modes.

Zero: Analyzer becomes fixed-tuned receiver with frequency set by FREQUENCY and FINE TUNE controls and selectable bandwidths set by BANDWIDTH control. Amplitude variations are displayed vs. time on the CRT.

Resolution: See Figure 1-3 for curves of typical 8553B/8552B Spectrum Analyzer resolution using different IF bandwidths.

Stability: First local oscillator can be automatically stabilized (phase-locked) to internal reference for scan widths of 20 kHz/div or less. Signal display shift with stabilization <10 kHz.

Long Term Drift: (At fixed center frequency, after 1 hr. warmup).

Stabilized: 100 Hz/10 min.

Unstabilized: 5 kHz/min; 20 kHz/10 min.

Temperature Drift:

Stabilized: 200 Hz/°C

Unstabilized: 10 kHz/°C.

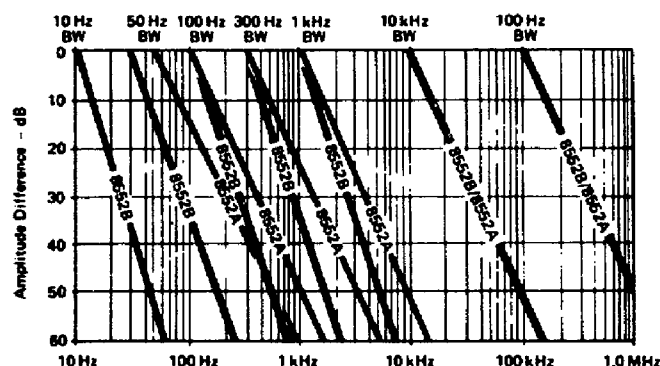


Figure 1-3. Typical Resolution

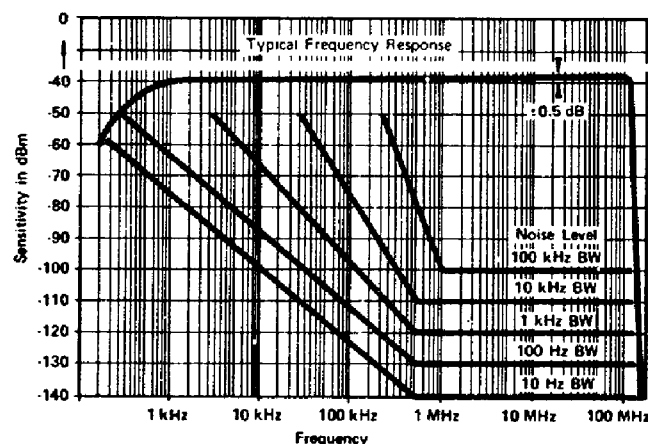


Figure 1-4. Typical Frequency Response

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Table 1-2. Supplemental Performance Characteristics (cont'd)

AMPLITUDE CHARACTERISTICS

The average noise level determines the maximum sensitivity of the analyzer. For typical noise level curves see Figure 1-4.

Dynamic Range: For operation from 200 kHz to 110 MHz with other than -40 dBm inputs, see Figure 1-5.

Gain Compression: For -10 dBm signal level to the input mixer* gain compression <1 dB.

Third Order Intermodulation Products: Typically ≥ 60 dB below input signals separated by ≤ 300 Hz.

Amplitude Accuracy:

Measurement Accuracy: Largely determined by frequency response (± 0.5 dB) and display accuracy (± 1.5 dB) for general use. This ± 2.0 dB can be improved using IF substitution techniques.

Frequency Response (flatness): See Figure 1-4.

Log Reference Level: Controls provide continuous log reference levels from ± 10 dBm to -72 dBm (-2 dBm below 200 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 ($\pm 2.8\%$).

Log Reference Level, Switching Between 10 dB/div and 2 dB/div log scales:

Amplitude Accuracy: ± 0.6 dB.

Temperature Stability: ± 0.07 dB/°C.

Amplitude Stability: ± 0.07 dB/°C in Log, ± 0.60 /°C in Linear.

Display Uncalibrated Light: Warns if a combination of control settings (IF or video bandwidth; scan width or scan time) degrades the absolute calibration for CW signals.

Video Filter: Averages displayed noise; 10 kHz, 100 Hz, and 10 Hz bandwidths.

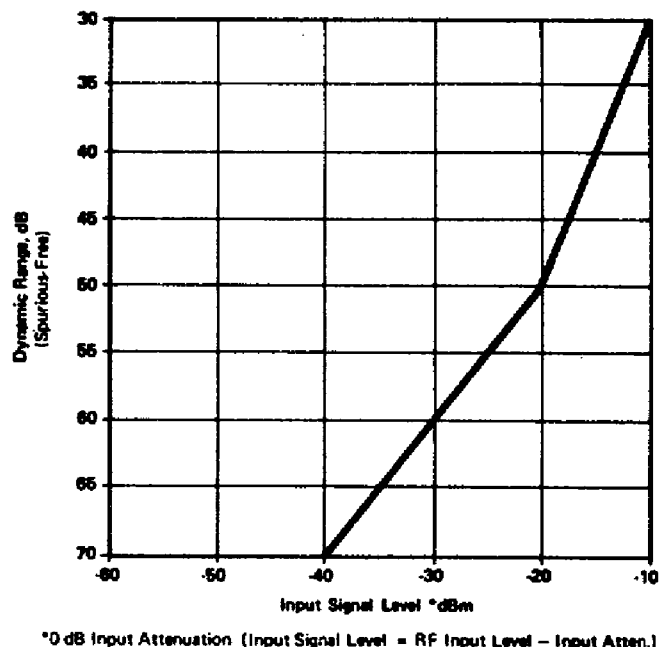


Figure 1-5. Typical Dynamic Range

RF INPUT CHARACTERISTICS

Impedance: 50 ohm nominal, BNC connector: For 75 ohm use matching transformer, such as Anzac TDN-5350.

Reflection Coefficient: When analyzer is tuned to input signal:

$p \leq 6.0.4$ (2.33 SWR) for input attenuation = 0 dB.

$p \leq 0.13$ (1.30 SWR) for input attenuation ≥ 10 dB.

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

*Signal level at input mixer =
Signal level at RF INPUT - INPUT ATTENUATION