

Table 1-1. 8566A Spectrum Analyzer Specifications (1 of 5)

Unless noted, all specifications are for AUTO COUPLED FUNCTION operation and are with the preselector tracking optimized using the MARKER PRESELECTOR PEAK function. Where specifications are subject to minimization with the error correction routine, corrected limits are given unless noted.

FREQUENCY

MEASUREMENT RANGE

100 Hz to 22 GHz, dc coupled input.

DISPLAYED VALUES

Frequency Reference Error

$< 1 \times 10^{-9}$ /day and $< 2 \times 10^{-7}$ /year.

Center Frequency

0 Hz to 22 GHz.

Readout Accuracy

Spans ≤ 5 MHz:

$\pm(2\%$ of frequency span + frequency reference error x center frequency + 10 Hz)

Spans > 5 MHz:

$\pm(2\%$ of frequency span + $n \times 100$ kHz + frequency reference error x center frequency) where n is the harmonic mixing number, depending upon center frequency:

n center frequency

1 100 Hz to 5.8 GHz

2 5.8 GHz to 12.5 GHz

3 12.5 GHz to 18.6 GHz

4 > 18.6 GHz

Zero Span

\pm frequency reference error x center frequency

Frequency Span

0 Hz, 100 Hz to 22 GHz over 10 divisions CRT horizontal axis; variable in approximately 1% increments.

Full Span

0 — 2.5 GHz and 2 — 22 GHz.

Readout Accuracy

Spans 100 Hz to 5 MHz: $\pm 1\%$ of indicated frequency separation.

Spans > 5 MHz: $\pm 3\%$ of indicated frequency separation.

Start/Stop Frequency

Readout Accuracy

Same as Center Frequency.

RESOLUTION

Resolution Bandwidth

3 dB bandwidths of 10 Hz to 3 MHz in a 1, 3, 10 sequence. Bandwidth may be selected manually or coupled to frequency span (AUTO mode).

Bandwidth Accuracy¹

3 dB bandwidths calibrated to

$\pm 20\%$, 10 Hz to 3 MHz filters

$\pm 10\%$, 3 kHz to 1 MHz filters

Bandwidth Selectivity

60 dB/3 dB bandwidth ratio:

$< 15:1$ 3 MHz to 100 kHz

$< 13:1$ 30 kHz to 10 kHz

$< 11:1$ 3 kHz to 30 Hz

60 dB points on 10 Hz bandwidth are separated by < 100 Hz.

Bandwidth Shape

Synchronously tuned, 5 pole filters for 10 Hz to 30 kHz bandwidths; 4 poles, 100 kHz to 3 MHz bandwidth. Approximate Gaussian shape optimized for minimum sweep time and smooth pulse response with calibrated display.

SPECTRAL PURITY

Noise Sidebands

For Frequency Span ≤ 25 kHz (except 100 kHz offset) and Center Frequency from 100 Hz to 5.8 GHz.

Offset From Carrier Sideband Level

320 Hz -80 dBc/Hz

1 kHz -85 dBc/Hz

10 kHz -90 dBc/Hz

100 kHz -105 dBc/Hz

Power Line Related Sidebands

For line conditions specified in Power Requirements section.

| Offset From Carrier | Center Frequency | |
|---------------------|------------------|------------------------|
| | ≤ 100 MHz | > 100 MHz to 5.8 GHz |
| < 360 Hz | -70 dBc | -60 dBc |
| 360 Hz to 2 kHz | -75 dBc | |

¹ 30 kHz and 100 kHz bandwidth accuracy figures only applicable $\leq 90\%$ relative humidity.

Table 1-1. 8566A Spectrum Analyzer Specifications (2 of 5)

AMPLITUDE

MEASUREMENT RANGE

Measurement range is the total amplitude range over which the analyzer can measure signal responses. The low value is determined by sensitivity (10 Hz resolution bandwidth and 0 dB RF input attenuation) and the high value by damage level.

| Range | Tuned Frequency non-preselected |
|-----------------------|------------------------------------|
| – 95 dBm to + 30 dBm | 100 Hz to 50 kHz |
| – 112 dBm to + 30 dBm | 50 kHz to 1 MHz |
| – 134 dBm to + 30 dBm | 1 MHz to 2.5 GHz |
| | preselected |
| – 132 dBm to + 30 dBm | 2.0 GHz to 5.8 GHz |
| – 125 dBm to + 30 dBm | 5.8 GHz to 12.5 GHz |
| – 119 dBm to + 30 dBm | 12.5 GHz to 18.6 GHz |
| – 114 dBm to + 30 dBm | 18.6 GHz to 22 GHz |

DISPLAYED VALUES

Scale

Over a 10 division CRT vertical axis 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
2 dB/div for 20 dB display Reference Level
1 dB/div for 10 dB display

Linear: 10% of Reference Level/div when calibrated in voltage.

Fidelity

Log:

| Incremental | Cumulative |
|--------------------|--------------------------|
| ± 0.1 dB/dB over | ≤ ± 1.0 dB max over 0 to |
| 0 to 80 dB display | 80 dB display, 20-30°C. |
| | ≤ ± 1.5 dB max over 0 to |
| | 90 dB display. |

Linear: ± 3% of Reference Level.

Reference Level

Range

Log: +30.0 to –99.9 dBm or equivalent in dBmV, dBμV, Volts.

Readout expandable to +60.0¹ to –119.9 dBm (–139.9 dBm for ≤1 kHz resolution bandwidth) using SHIFT I.

Linear: 7.07 volts to 2.2 μvolts full scale.

Readout expandable to 223.6¹ volts to 2.2 μvolts (0.22 μvolts for <1 kHz resolution bandwidth) using SHIFT I.

Accuracy

The sum of several factors, listed in Table 1-2 Log Uncertainty, determines the accuracy of the reference level readout. Refer to Table 1-2.

REFERENCE LINES

Accuracy

Equals the sum of reference level accuracy plus the scale fidelity between the reference level and the reference line level.

DYNAMIC RANGE

Spurious Responses (signals generated by the analyzer due to input signals). For total signal power ≤ –40 dBm all harmonic and intermodulation distortion > 70 dB below input signal.

Second Harmonic Distortion

For mixer levels ≤ –40 dBm:

< –80 dBc, 50 MHz to 700 MHz (non-preselected).

< –70 dBc, 100 Hz to 2.5 GHz (non-preselected).

For mixer levels ≤ –10 dBm:

< –100 dBc, 2 to 22 GHz (preselected).

Third Order Intermodulation Distortion²

Third order intercept (TOI)

> +7 dBm, 100 Hz to 5.8 GHz.

> +5 dBm, 5.8 to 18.6 GHz.

See Table 1-3 for typical second and third order distortion characteristics.

Image Responses (due to the mixing of signals two times the IF frequency, 2 x 321.4 MHz, above or below the tuned frequency.)

< –70 dBc, 100 Hz to 18.6 GHz.

< –60 dBc, 18.6 GHz to 20 GHz.

< –50 dBc, 20 GHz to 22 GHz

Multiple Responses (due to the input signal mixing with more than one local oscillator harmonic)

< –70 dBc, 100 Hz to 22 GHz.

Out-of-Band Responses (due to the mixing of input signals outside the preselector's frequency span):

< –60 dBc, 2 to 22 GHz.

¹Maximum total input power not to exceed +30 dBm damage level.

²Dynamic range due to TOI and noise level can be calculated from $2/3$ [TOI–displayed average noise level]. For example, at 18 GHz the analyzer's specified dynamic range when using the 10 Hz resolution BW is:

$$2/3 [+5 \text{ dBm} - (-120 \text{ dBm})] = 2/3 (125) = 83 \text{ dB.}$$

Table 1-1. 8566A Spectrum Analyzer Specifications (3 of 5)

AMPLITUDE (Cont'd)

Residual Responses (signals generated by the analyzer independent of input signals). With 0 dB input attenuation and no input signal:

- < -100 dBm, 100 Hz to 5.8 GHz.
- < -95 dBm, 5.8 GHz to 12.5 GHz.
- < -85 dBm, 12.5 GHz to 18.6 GHz.
- < -80 dBm, 18.6 GHz to 22 GHz.

Gain Compression

< 1.0 dB, 100 Hz to 22 GHz with ≤ -5 dBm at input mixer.

Two tone intermodulation distortion products can be calculated from

$$2 \text{ (TOI - signal level).}$$

For example, for two tones at -33 dBm, the IM products for a +5 dBm TOI will be

$$2 [+5 \text{ dBm} - (-33)] = 76 \text{ dB down.}$$

Displayed Average Noise Level (Sensitivity)

0 dB input attenuation and 10 Hz resolution bandwidth.

| Level | Tuning Range |
|--------|------------------------|
| | Non-Preselected |
| < -95 | 100 Hz to 50 kHz |
| < -112 | 50 kHz to 1.0 MHz |
| < -134 | 1.0 MHz to 2.5 GHz |
| | Preselected |
| < -132 | 2.0 GHz to 5.8 GHz |
| < -125 | 5.8 GHz to 12.5 GHz |
| < -119 | 12.5 GHz to 18.6 GHz |
| < -114 | 18.6 GHz to 22 GHz |

Figures 1 and 2 show sensitivity for various resolution bandwidths.

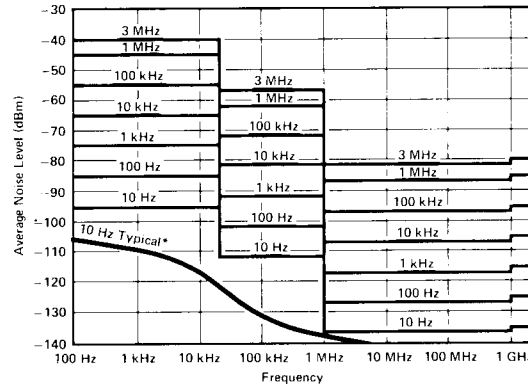


Figure 1. Specified Average Displayed Noise Level, 100 Hz to 2.5 GHz Non-Preselected Tuning Range.

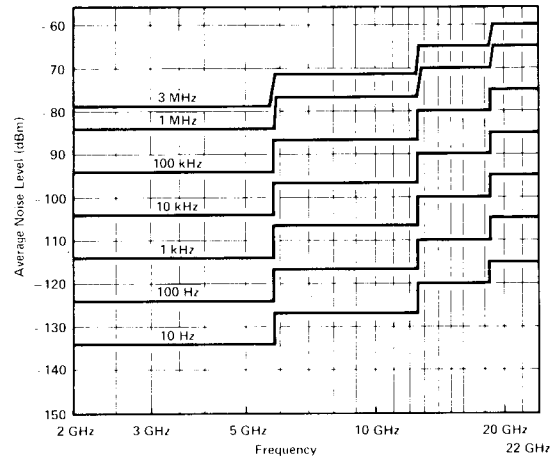


Figure 2. Specified Average Displayed Noise Level, 2.0 GHz to 22 GHz Preselected Tuning Range.

MARKER

The marker is a bright dot placed upon the display trace which is positioned horizontally by the DATA controls. The marker amplitude and frequency are read out continuously.

FREQUENCY Accuracy

- Normal:** same as center frequency accuracy.
- Δ : same as frequency span accuracy.

AMPLITUDE Accuracy

Normal: same as reference level accuracy plus scale fidelity between the reference level and marker position.

Δ : same as frequency response uncertainty and scale fidelity between two markers.

Table 1-1. 8566A Spectrum Analyzer Specifications (4 of 5)

SWEEP

SWEEP TIME

Accuracy

$\pm 10\%$ ≤ 200 sec sweeptimes.

$\pm 30\%$ > 200 sec sweeptimes.

INPUTS

RF INPUT

100 Hz to 22 GHz, precision female type N connector, dc coupled.

Input Attenuator

0 to 70 dB in 10 dB steps. +30 dBm (1 watt) input damage level.

Maximum Input Level

AC

Continuous power, +30 dBm (1 watt), from 50 ohm source. Mixer protected by diode limiter, 100 Hz to 2.5 GHz. ≤ 100 watts, 10 μ sec pulse with ≥ 50 dB RF attenuation (≤ 0 dBm peak to input mixer).

EXTERNAL SWEEP TRIGGER INPUT (rear panel)

Must be > 2.4 volt (10 volt max). 1 k Ω nominal input impedance.

EXTERNAL FREQUENCY REFERENCE INPUT (rear panel)

Must equal 5 MHz ± 50 Hz or 10 MHz ± 100 Hz, 0 to +10 dBm, 50 Ω nominal input impedance. Analyzer performance will be degraded unless frequency reference phase noise and spurious signals are < -140 dBc single sideband (1 Hz) referred to 10 MHz at a 100 Hz to 10 kHz offset.

DC

< 100 mA current damage level.

OUTPUTS

CAL OUTPUT

100 MHz \pm (frequency reference error).
-10 dBm ± 0.3 dB, 50 Ω impedance.

SWEEP + TUNE OUT (rear panel)

-1.0 volt per GHz of tune frequency, 10 k Ω minimum load.

1st LO OUTPUT

2.3 to 6.1 GHz, $> +5$ dBm,
50 Ω output impedance.

Accuracy

-1 V/GHz $\pm 2\%$ ± 10 mV.

GENERAL

ENVIRONMENTAL

Temperature

Operation 0°C to 55°C.

Increased internal temperatures may result if the rear panel air filters are not cleaned regularly.

POWER REQUIREMENTS

50 to 60 Hz; 100, 120, 220 or 240 volts (+5%, -10%); approximately 650 VA (40 VA in standby).

400 Hz operation is available as Option 400.

Table 1-1. 8566A Spectrum Analyzer Specifications (5 of 5)

GENERAL (Cont'd)

Humidity

Operating, < 95% relative humidity, 0°C to 40°C except as noted in electrical specifications.

WEIGHT

Total net 50 kg (112 lb): IF-Display Section, 21 kg (47 lb); RF Section, 29 kg (65 lb). Shipping: IF-Display Section, 27 kg (60 lb); RF Section, 35 kg (78 lb).

EMI

Conducted and radiated interference is within the requirements of CE 03 and RE 02 of MIL STD 461A, and within the requirements of VDE 0871 and CISPR publication 11.

DIMENSIONS

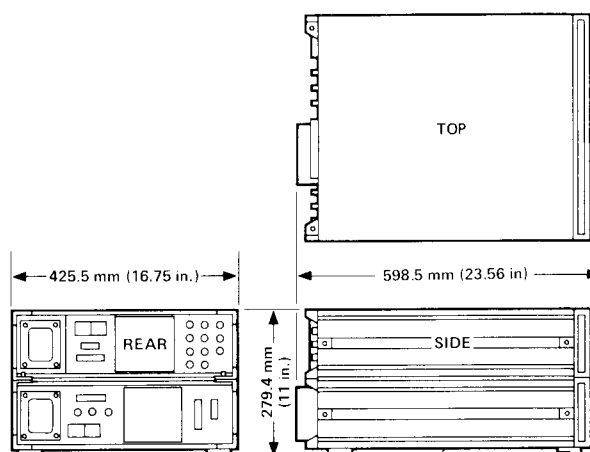
WARM-UP TIME

Operation

Requires 30 minute warm-up from cold start, 0° to 55°C. Internal temperature equilibrium is reached after 2 hr. warm-up at stabilized outside temperature.

Frequency Reference

Frequency reference aging rate attained after 24 hr. warm-up from cold start at 25°C. Frequency is within 1×10^{-8} of final stabilized frequency within 30 minutes.



OPTIONS

All specifications for options are identical to standard 8566A except as noted.

400 Hz POWER LINE FREQUENCY OPERATION — Option 400

Power Line Related Sidebands

For Center Frequency from 100 Hz to 5.7 GHz

| Offset From Carrier | Sideband Level |
|---------------------|----------------|
| ≤ 2 kHz | -55 dBc |
| 2 kHz to 5.5 kHz | -65 dBc |

Power Requirements

400 Hz \pm 10% line frequency.
100 or 120 volts (+5%, -10%) line voltage.

Operating Temperature Range

0° to 40°C, 50-60 Hz Power Line Frequency, service only, not for extended periods
0°C to 55°C, 400 Hz Power Line Frequency

HANDLE / MOUNTING KITS

Front Handle Kit (Option 907)

Recommended for portability and front panel protection.

Rack Flange Kit (Option 908)

Rack Flange and Front Handle Kit (Option 909)

Rack Mount Slide Kit (Special Order)

EXTRA MANUAL (Option 910)

Additional manual does not include Operation Verification tape cartridge.