Hewlett Packard 3577A 5Hz - 200 MHz Network Analyzer Specifications

SOURCE			
Frequency			
Range	5 Hz - 200 MHz		
Resolution	0.001 Hz		
Amplitude	± 5 X 10^{-8} /day, 0 to 55°C		
Range	+15 to -49 dBm (1.26 Vrms to 793m Vrms: 2dBV to -62 dBV) into a 50Ω load		
Resolution	0.1 dB		
Accuracy	± 1 dB at +15 dBm and 100 kHz. Below +15 dBm, add the greater of ± 0.02 dB/dB or 0.2 dB		
Flatness	1.5 dBp-p from 5 Hz to 200 MHz		
Impedance	50Ω; > 20 dB return loss at all levels		
RF Output Connector	50Ω Type N female		
Sweep Types	Linear, alternate, cw and log frequency; log amplitude		
Sweep Time	100 ms/span to 200 ms/span for frequency sweep; 1 ms/step to 16 s/step for amplitude sweep		
Sweep Modes	Continuous, single, manual		
Trigger Modes	Free run, immediate, line, external		
RECEIVER			
Full Scale Input Level	-13 dBV from 10 kHz to 200 MHz with internal 20 dB attenuators ON (0dBm at 50Ω)		
INPUT CHARACTERISTICS			
Frequency Range	5 Hz - 200 MHz		
Inputs	3 (A, B, R)		
Input Impedance	Selectable 50Ω with > 25 dB return loss, or 1 MΩ in parallel with approximately 30 pF		
Input Connectors	50Ω Type N female		
Resolution Bandwidth	Selectable 1 kHz, 100 Hz, 10 Hz, or 1 Hz		
Sensitivity (Due to noise and internal crosstalk between source and receiver inputs)	**Resolution Bandwidth**	30 kHz - 200 MHz (50Ω) 30 kHz - 20 MHz (1 MΩ)	
		Internal 20 dB Attenuator ON	**Internal 20 dB Attenuator OFF**

	1 Hz 10 Hz 100 Hz 1 kHz	-110 dBm -110 dBm -105 dBm -95 dBm	-130 dBm -130 dBm -125 dBm -115 dBm
Crosstalk	> 100 dB isolation between inputs		
Electrical Length/Reference Plane Extension	Provides equivalent electrical line length, or delay at inputs A, B, and R. Range: -3 X 10^8 m to +3 X 10^8 m or +1 to -1 s		
Resolution	5 digits or 0.1 cm (3.3 Ps) whichever is greater		
Accuracy	± 0.1 cm or ± 0.02% whichever is greater		
MAGNITUDE CHARACTERISTICS			
Range	Full Scale Input to Sensitivity		
Resolution	Marker: 0.002 dB (log); 5 digits (linear) Display: 0.01 dB/div to 20 dB/div (log absolute); 0.01 dB/div to 200 dB/div (log ratio); 0.1 NV/div to 10 V/div (linear absolute); 10^{-10}/div to 10^{20}/div (linear ratio)		
Display Units	dB, DBMS, div, V, and linear ratio		
Accuracy (at 100 kHz, 25°C, and Full Scale Input)			
Absolute (A, B, R)	± 0.2 dB		
Ratio (A/R, B/R, A/B)	± 0.15 dB (50Ω); ± 0.2 dB (1 MΩ)		
Dynamic Accuracy	**Error** **Resolution Bandwidth**		**Input Level Relative to Full Scale Input**
	1 kHz, 100 Hz, 10 Hz	1 Hz	
	± .04 dB ± .02 dB ± .05 dB ± .15 dB ± .75 dB ± .75 dB	± .04 dB ± .02 dB ± .05 dB ± .25 dB ± .75 dB ± 3.00 dB	0 dB to -10 dB -10 dB to -50 dB -50 dB to -60 dB -60 dB to -80 dB -80 dB to -90 dB -90 dB to -100 dB
Frequency Response (when driven from a 50Ω source and with a 50Ω receiver input impedance)			
Absolute (A, B, R)	0.3 dBpp from 20 Hz to 20 MHz; 0.6 dBpp from 5 Hz to 200 MHz		
Ratio (A/R, B/R, A/B)	0.3 dBpp from 20 Hz to 20 MHz; 0.4 dB from 5 Hz to 200 MHz		
Reference Level	Range: -207 DBMS to +33 DBMS (-220 div to +20 div) (Log absolute); -400 dB to +400 dB (log ratio); 0 V to 10 V (linear absolute); 0 to 10^{20} (linear ratio)		
Stability	Temperature: Typically <± 0.02 dB/°C Time: Typically <± 0.05 dB/hour at 25°C		
PHASE CHARACTERISTICS			
Range	± 180 degrees		
Resolution	Marker: 0.005 deg (0.001 rad)		

	Display: 0.01 deg/div to 200 deg/div (0.00018 rad/div to 3.49 rad/div)	
Accuracy (at 100 kHz, 25°C, and Full Scale Input)	± 2.0°	
Dynamic Accuracy	**Error**	**Input Level Relative to Full Scale Input**
	± .4 deg ± .2 deg ± .5 deg ± 1.5 deg ± 7.5 deg	0 dB to -10 dB -10 dB to -50 dB -50 dB to -60 dB -60 dB to -80 dB -80 dB to -100 dB
Reference Level Resolution	0.01°	
Temperature Stability	Typically <± 0.05 deg/°C	
Time Stability	Typically <± 0.05°/hour at 25°C	
POLAR DISPLAY CHARACTERISTICS	Range, Resolution, Display Units, Dynamic Accuracy, Frequency Response, Uncertainty, Crosstalk, Reference Level, and Stability specifications are the same as the corresponding magnitude and phase characteristics.	
Full Scale Magnitude Range	Absolute (A, B, R): 0.1 nV to 10 V Ratio (A/R, B/R, A/B): 10^{-10} to 10^{20}	
REAL, IMAGINARY DISPLAY CHARACTERISTICS	Range, Dynamic Accuracy, Frequency Response, Uncertainty, Crosstalk, Stability specifications are the same as the corresponding magnitude and phase characteristics.	
DELAY CHARACTERISTICS		
Range	1 ps to 20,00s	
Resolution	.01ns/div to 1000s/div	
Normalized Accuracy	$\frac{\text{Dynamic Phase Accuracy}}{360 \times \text{Aperture [Hz]}}$ +2nS	
Aperture Range	0.5% to 16% of frequency span	
Reference Level	± 10^3 S	
GENERAL DISPLAY CHARACTERISTICS		
Traces		
No. Traces	Two simultaneous traces may be present with a rectangular graticule. One trace with polar or Smith graticules. Markers: Each trace has one main marker and an offset marker. Markers indicate data at corresponding trace coordinates in the same units as used to set the Reference Level. Markers can be used to modify certain display parameters. Marker resolution is the same as horizontal display function.	
Graticules		
Rectangular Graticule	0% to 100% full scale deflection on 0.05% increments.	

	Logarithmic and Linear.
Polar/Smith Chart Graticule	± 500 deg in 0.001 deg increments
Noise Averaging	
Type	Exponentially weighted vector averaging on successive sweep data
Averaging Factor	Selectable 1 (off), 4, 8, 16, 32, 64, 128, 256
Linear Phase Slope Compensation	Provides linear phase slope offset of -72,000 deg/span to +72,000 deg/span
Calibration	
Transmission	Both traces can be normalized to measured data with full accuracy and resolution.
Reflection	Corrects for directivity, frequency response and source match errors
PROGRAMMING CHARACTERISTICS	
Capability	Remote programming via the Hewlett-Packard Interface Bus (HP-IB). The HP 3677A/B S-Parameter Test Sets are programmable through the HP 3577A interface only.
Interface Functions	SH1, AH1, T5, TE0, L4, LE0, SR1, RL1, PP1, DC1, DT1, C0, E1
Output Data Transfer Time	401 data points (single parameter) can be transferred directly to an HP 200 series computer in Basic language as follows: **ASCII mode:** Typically 1500 ms **Binary-floating point mode:** Typically 160 ms
Graphics Capabilities	12 lines of text with 40 alphanumeric characters per line, and high resolution line vectors can be displayed through HP-IB commands
GENERAL CHARACTERISTICS	
External Reference Frequency Input	
Frequency	10 MHz/N. N is an integer from 1 to 100.
Level	0 dBm ± 10 dB, nominal
Impedance	50Ω, nominal
Connector	BNC female, rear panel
Reference Frequency Output	
Frequency	10 MHz
Level	Typically 0 dBm
Impedance	50Ω, nominal
Connector	BNC female, rear panel
External Trigger	Triggers on negative TTL transition or contact closure to ground
Connector	BNC female, rear panel
Plotter Control	Directly compatible with HP-IB graphics plotters that use Hewlett-Packard Graphics Language (HP-GL) with listen only capability: HP 7470A, HP 7475A, HP 7550A, HP 7090A.

Save/Recall	Front-panel setups can be stored in non-volatile memory locations 1 through 5. Last state is saved when power is removed.
Operating Conditions	
Temperature	0 °C to +55 °C
Relative Humidity	<95% at 40 °C
Altitude	<4,572 m (15,000 ft)
Non-Operating Conditions	
Temperature	-40 °C to +75 °C
Altitude	<15,240 m (50,000 ft)
Power	115V + 10%, -25% (47 Hz to 440 Hz), or 230 V + 10%, -15%
Weight	31 kg (67 lb) net; 41 kg (90 lb) shipping
Dimensions	222 mm H X 426 mm W X 578 mm D (8.75 in. X 16.75 in. X 22.75 in.)