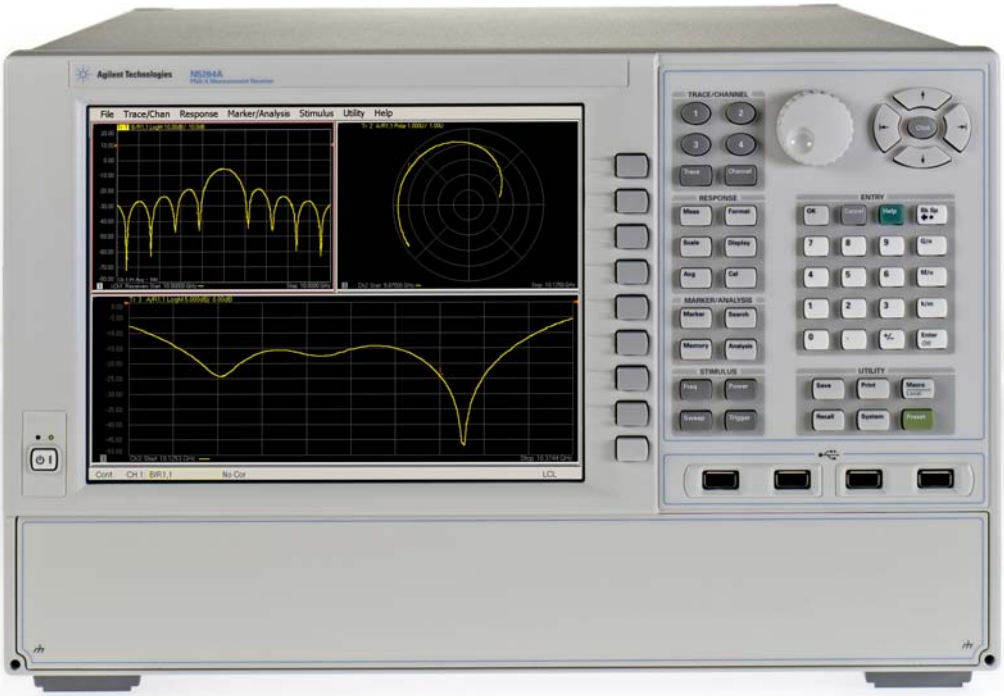
Agilent PNA-X
Measurement Receiver

N5264A
Data Sheet and
Technical Specifications



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Definitions

All specifications and characteristics apply over a 25 °C ±5 °C range (unless otherwise stated) and 90 minutes after the instrument has been turned on.

Specification (spec.): Warranted performance. Specifications include guardbands to account for the expected statistical performance distribution, measurement uncertainties, and changes in performance due to environmental conditions.

Characteristic (char.): A performance parameter that the product is expected to meet before it leaves the factory, but that is not verified in the field and is not covered by the product warranty. A characteristic includes the same guardbands as a specification.

Typical (typ.): Expected performance of an average unit which does not include guardbands. It is not covered by the product warranty.

Nominal (nom.): A general, descriptive term that does not imply a level of performance. It is not covered by the product warranty.

Calibration: The process of measuring known standards to characterize a network analyzer's systematic (repeatable) errors.

Corrected (residual): Indicates performance after error correction (calibration). It is determined by the quality of calibration standards and how well "known" they are, plus system repeatability, stability, and noise.

Uncorrected (raw): Indicates instrument performance without error correction. The uncorrected performance affects the stability of a calibration.

Standard: When referring to the analyzer, this includes no options unless noted otherwise.

Table 1. Key Specifications

Description	Specifications
Measurement Speed (max) points/sec @ 600 KHz IFBW, CW frequency	400,000 points/sec[1]
Receiver Inputs	5 (simultaneously)
Measurement Receivers	5 (simultaneously)
Data Buffer Size	4 billion bytes
Data Buffer size (max. points for single cut)	500 million points[2]
IF Bandwidth	1 Hz to 5 MHz
Frequency Source Control Interface	TLL hand shake
Trigger In / Out	Three pairs
Host Computer Interface	Ethernet, USB and GPIB
Security	Hard drive removable

[1] Fast CW mode - no point triggering.

[2] For single parameter; two parameters are 250 million points each.

Table 2. Measurement Throughput Summary

Typical Cycle Time[1, 2] (ms) for Measurement Completion

Description	Typical Performance (time/point in millisecond)			
Number of Points	**CW 10 GHz (no band crossings), 801 points**			
Trigger Mode	**Hardware**			
IF Bandwidth	**600 kHz**	**100 kHz**	**10 kHz**	**1 kHz**
RF = MXG, N5183A opt. UNZ, Fast switching LO = MXG, N5183A opt. UNZ, Fast switching	0.070	0.075	0.185	1.00
RF = MXG, N5183A opt. UNZ, Fast switching LO = N5264A opt. 108[3]	0.070	0.075	0.185	1.00
RF = MXG, N5183A opt. UNZ, Fast switching LO = PSG	0.350	0.350	0.450	0.250
RF = MXG, N5183A opt. UNZ, Fast switching LO = 83623B	0.900	0.900	1.00	1.800

Typical Cycle Time[1, 2] (ms) for Measurement Completion (Cont.)

Description	Typical Performance (time/point in millisecond)		
Number of Points	801	1601	
Trigger Mode	**Hardware**		**Sensitivity(dBm)[4]**
Start 2 GHz, Stop 18 GHz, 1 MHz IF bandwidth (with band crossings)			
RF = MXG, N5183A opt. UNZ, Fast switching LO = MXG, N5183A opt. UNZ, Fast switching	0.580	0.580	-90.5 dBm, 2 – 3 GHz - 94.5 dBm, 3 – 12.5 GHz - 83 dBm, 12.5 – 18 GHz
RF = MXG, N5183A opt. UNZ, Fast switching LO = N5264A opt. 108[3]	0.580	0.580	-85.5 dBm, 2 – 3 GHz - 90.5 dBm, 3 – 12.5 GHz - 81 dBm, 12.5 – 18 GHz
Start 2 GHz, Stop 18 GHz, 600 kHz IF bandwidth (with band crossings)			
RF = MXG, N5183A opt. UNZ, Fast switching LO = MXG, N5183A opt. UNZ, Fast switching	0.580	0.580	-92.5 dBm, 2 – 3 GHz - 96.5 dBm, 3 – 12.5 GHz - 85 dBm, 12.5 – 18 GHz
RF = MXG, N5183A opt. UNZ, Fast switching LO = N5264A opt. 108[3]	0.580	0.580	-85.5 dBm, 2 – 3 GHz - 92.5 dBm, 3 – 12.5 GHz - 83 dBm, 12.5 – 18 GHz

Typical Cycle Time[1, 2] (ms) for Measurement Completion (Cont.)

Description	Typical Performance (time/point in millisecond)		
Number of Points	801	1601	
Trigger Mode	**Hardware**		**Sensitivity(dBm)[2]**
Start 2 GHz, Stop 18 GHz, 10 kHz IF bandwidth (with band crossings)			
RF = MXG, N5183A opt. UNZ, Fast switching LO = MXG, N5183A opt. UNZ, Fast switching	0.730	0.730	-110.5 dBm, 2 – 3 GHz - 114.5 dBm, 3 –12.5 GHz - 103 dBm, 12.5 – 18 GHz
RF = MXG, N5183A opt. UNZ, Fast switching LO = N5264A opt. 108[3]	0.730	0.730	-103.5 dBm, 2 – 3 GHz - 110.5 dBm, 3 –12.5 GHz - 101 dBm, 12.5 –18 GHz
RF = MXG, N5183A opt. UNZ, Fast switching LO = PSG E8267D opt. 520, UNX	9.50	9.50	-110.25 dBm, 2 – 3 GHz - 112.50 dBm, 3 –12.5 GHz - 96.50 dBm, 12.5 – 18 GHz
RF = MXG, N5183A opt. UNZ, Fast switching LO = 83623B	7.80	--	-108.5 dBm, 2 – 3 GHz - 113.0 dBm, 3 –12.5 GHz - 96.0 dBm, 12.5 –18 GHz
Start 2 GHz, Stop 18 GHz, 1 kHz IF bandwidth (with band crossings)			
RF = MXG, N5183A opt. UNZ, Fast switching LO = MXG, N5183A opt. UNZ, Fast switching	1.5	1.5	-120.5 dBm, 2 – 3 GHz - 124.5 dBm, 3 –12.5 GHz - 113 dBm, 12.5 – 18 GHz
RF = MXG, N5183A opt. UNZ, Fast switching LO = N5264A opt. 108[3]	1.5	1.5	-113.5 dBm, 2 – 3 GHz - 120.5 dBm, 3 –12.5 GHz - 111 dBm, 12.5 – 18 GHz
Option 118 Fast-CW mode (CW frequency)			
	Number of Points per Second (#pt/Sec)		**External Trigger**
C.W, 7.0 GHz, ≥1 MHz IF bandwidth	--		400,000
C.W, 7.0 GHz, 600 KHz IF bandwidth	Up to 400,000		240,000
C.W, 7.0 GHz, 10 KHz IF bandwidth	Up to 8,200		7,000
C.W, 7.0 GHz, 1 KHz IF bandwidth	Up to 1,000		1,000

Data Transfer Time (ms)

Description	Typical Performance			
	Number of Points			
	201	401	1601	16,001
SCPI over GPIB				
Program executed on external PC[5]				
32-bit floating point	5.6	10.5	39.9	400
64-bit floating point	10.5	20.3	79.2	788
ASCII	46	92.5	370	3702
SCPI over SICL/LAN or TCP/IP Socket				
Program executed in the analyzer				
32-bit floating point	0.18	0.21	0.5	3.6
64-bit floating point	0.22	0.28	0.62	5.3
ASCII	6.3	12.3	47.3	470
COM[6]				
Program executed in the analyzer				
32-bit floating point	<0.15	0.15	0.2	0.7
Variant type	0.75	1.2	4.5	50
DCOM over LAN[6]				
Program executed on external PC				
32-bit floating point	<1.0	1.2	2.1	13
Variant type	2.7	4.5	15	150

[1] Includes sweep time, retrace time and band-crossing time. Analyzer display turned on. Minus 21 ms from total time for display off with DISPLAY:ENABLE OFF. Data for two traces (A & B receiver) per measurement.

[2] After first complete sweep.

[3] When configuring the N5264A Option 108 as the LO source, you may improve system measurement sensitivity by using a method of AM noise suppression.

[4] Performance Characteristics when connected with 85309A and 85320A/B mixers - system noise floor + conversion gain.

[5] Measured when using the SCPI command DISPlay: VISible OFF.

[6] Values are for real and imaginary pairs, with the analyzer display off.

Table 3. Rear Panel Information

External IF Inputs	
Description	**Typical Performance**
Function	Allows use of external IF signals from remote mixers or frequency converters
Connectors	SMA (female); A, B, C, D, R
Input Frequency	7.605634 MHz
Input Impedance	50 Ω
RF Damage Level	+23 dBm
DC Damage Level	1 VDC
0.1 dB Compression Point	-9.0 dBm
Compression @ -10 dBm	
Magnitude	0.03 dB
Phase	0.23°
Noise Floor	
10 Hz IF BW	-143 dBm
10KHz IF BW	-113 dBm
Crosstalk	-134 dB[1]
Dynamic Range @ 10 Hz	134 dB @ 0.1dB compression to noise floor
Dynamic Accuracy	
-40 dBm reference, over range set by compression and noise floor @ IF Frequencies	
-10dBm	0.037 dB
-20dBm	0.024 dB
-30dBm	0.016 dB
-40dBm	0.010 dB
-50dBm	0.013 dB
-60dBm	0.021 dB
-70dBm	0.032 dB

External IF Inputs (Cont.)	
Description	**Typical Performance**
Dynamic Accuracy (Cont.)	
-40 dBm reference, over range set by compression and noise floor @ IF Frequencies	
-80dBm	0.041 dB
-90dBm	0.049 dB
-100dBm	0.057 dB
-110dBm	0.072 dB
-120dBm	0.188 dB

LO output [2] (Option 108)	
Description	**Specification**
Frequency Stability	+/- 0.05 ppm, -10 to 70C, +/- 0.1ppm/yr max
Frequency Accuracy	+/- 1 ppm
Description	**Typical Performance**
Frequency Range	10 MHz to 26.5 GHz
Frequency Switching Speed[3]	< 100 microsecond/point
Frequency Resolution	1 Hz
Power Flatness	+/- 1.0 dB
Power Output	+10 dBm
2nd Harmonics[4]	
20 MHz to 2.0 GHz	-23 dBc
2.0 GHz to 5.0 GHz	-28 dBc
5.0 GHz to 23.0 GHz	-35 dBc
23.0 GHz to 26.5 GHz	-27 dBc

LO output [2] (Option 108)

Description	Typical Performance			
3rd Harmonics[3]				
30 MHz to 8.0 GHz	-32 dBc			
8.0 GHz to 15.0 GHz	-38 dBc			
15.0 GHz to 26.5.0 GHz	-48 dBc			
Phase Noise				
	1 KHz Offset	**10 KHz Offset**	**100 KHz Offset**	**1 MHz Offset**
10 MHz to 500 MHz	-80 dBc/Hz	-85 dBc/Hz	-76 dBc/Hz	-113 dBc/Hz
500 MHz to 1 GHz	-90 dBc/Hz	-110 dBc/Hz	-106 dBc/Hz	-115 dBc/Hz
1 GHz to 2 GHz	-85 dBc/Hz	-105 dBc/Hz	-101 dBc/Hz	-110 dBc/Hz
2 GHz to 4 GHz	-80 dBc/Hz	-100 dBc/Hz	-96 dBc/Hz	-105 dBc/Hz
4 GHz to 8 GHz	-74 dBc/Hz	-94 dBc/Hz	-90 dBc/Hz	-99 dBc/Hz
8 GHz to 16 GHz	-68 dBc/Hz	-88 dBc/Hz	-84 dBc/Hz	-93 dBc/Hz
16 GHz to 26.5 GHz	-62 dBc/Hz	-82 dBc/Hz	-78 dBc/Hz	-87 dBc/Hz

10 MHz Reference

10 MHz Reference In	
Connector	BNC, female
Input Frequency	10 MHz ± 10 ppm, typical
Input Level	-15 dBm to +20 dBm, typical
Input Impedance	200 Ω, nom.
10 MHz Reference Out	
Connector	BNC, female
Output Frequency	10 MHz ± 1 ppm, typical
Signal Type	Sine Wave, typical
Output Level	+10 dBm ± 4 dB into 50 Ω
Output Impedance	50 Ω, nominal
Harmonics	<-40 dBc, typical

External Monitor Information

Description	Typical Performance
VGA Video Output	
Connector	15-pin mini D-Sub; Drives VGA compatible monitors
Devices Supported:	**Resolutions:**
Flat Panel (TFT)	1024 X 768, 800 X 600, 640 X 480
Flat Panel (DSTN)	800 X 600, 640 X 480
CRT Monitor	1280 X 1024, 1024 X 768, 800 X 600, 640 X 480
--	Simultaneous operation of the internal and external displays is allowed, but with 640 X 480 resolution only. If you change resolution, you can only view the external display (internal display will "white out").
Test Set IO	25-pin D-Sub connector, available for external test set control.
Power IO	9-pin D-Sub, female; analog and digital IO
Handler IO	36-pin parallel I/O port; all input/output signals are default set to negative logic; can be reset to positive logic via GPIB command.

Trigger Information

Description	Typical Performance
Trigger In/Meas Trigger	
Nominal Input Impedance	5K Ohms
Minimum Pulse Width	1 us
DC Damage Level	5.5 volts
Drive Voltage	TTL (0, +5.0) Volts

Trigger Information (Cont.)

Description	Typical Performance
Trigger out/Meas Trigger Ready	
Nominal Input Impedance	5K Ohm
Pulse Width	= Data acquisition
Polarity	Selectable with sweep or point mode
Drive Voltage	TTL (0, +5.0) Volts
Trigger Inputs/Outputs (Aux. 1 & 2)	BNC(f), TTL/CMOS compatible
GPIB (two ports - dedicated controller and dedicated talker/listener)	24-pin D-sub (Type D-24), female; compatible with IEEE-488.
Parallel Port (LPT1)	25-pin D-Sub miniature connector, female; provides connection to printers or any other parallel port peripherals
Serial Port (COM 1)	9-pin D-Sub, male; compatible with RS-232
USB Port	Four ports on front panel (all Host) and five ports (four hosts and one Device) on rear panel. Type A configuration (eight hosts) and Type B configuration (one Device), USB 2.0 compatible.
LAN	10/100BaseT Ethernet, 8-pin configuration; auto selects between the two data rates

Line Power

Description	Typical Performance
Power supply is auto switching	
Frequency, Voltage	50/60 Hz for 100 240 VAC
Max	450 watts

[1] Measurement conditions: normalized to -10 dBm, 10 Hz IFBW, averaging factor of 8.

[2] Absolute LO frequency is Front Panel set frequency plus 1 IF.

[3] No band crossings; IFBW ≥ 100 kHz with 801 measurement points.

[4] Listed frequency is the harmonic frequency setting entered with front panel (frequency setting entered with front panel plus {IF frequency} * {harmonic number}) at typical power.

Table 4. Front Panel Information

Description	Typical Performance
USB 2.0 Ports	
Number of ports	4
Standard	Compatible with USB 2.0
Connector	USB Type-A female
Display	
Size	26.3 cm (10.4 in) diagonal color active matrix LCD; 1024 (horizontal) X 768 (vertical) resolution
Refresh Rate	Vertical 60 Hz; Horizontal 46.08 kHz
Pixels	A display is considered faulty if: o More than 0.002% of the total pixels have a constant blue, green, red, or black appearance that will not change. o Three or more consecutive pixels have a constant blue, green, red, or black appearance that will not change.
Display Range	
Magnitude	+/-2500 dB (at 500 dB/div), max
Phase	+/-2500° (at 500 °/div), max
Polar	10 pUnits, min 10,000 Units, max
Display Resolution	
Magnitude	0.001 dB/div, min
Phase	0.01°/div, min
Marker Resolution	
Magnitude	0.001 dB, min
Phase	0.01°, min
Polar	10 pUnit, min

Table 5. Analyzer Dimensions and Weight

Cabinet Dimensions	Height	Width	Depth
Excluding front and rear panel hardware and feet	267 mm 10.5 in	426 mm 16.75 in	533 mm 20.97 in
Excluding front and rear panel hardware and feet. Including rack-mount flanges.	266 mm 10.5 in EIA RU[1] = 6	426 mm 16.75 in	558 mm 21.95 in
As shipped - including front panel connectors, rear panel bumpers, and feet.	280 mm 11.0 in	435 mm 17.1 in	558 mm 21.95 in
As shipped including rack-mount flanges	280 mm 11.0 in	483 mm 19.00 in	558 mm 21.95 in
Weight			
	Standard	**Option 108**	--
Net	21 kg (45 lb), nominal	22 kg (48 lb), nominal	--
Shipping	37 kg (82 lb), nominal	38 kg (85 lb), nominal	--

[1] Feet removed from the N5264A.

NOTE For Regulatory and Environmental information, refer to the PNA Series Installation and Quick Start Guide, located online at http://cp.literature.agilent.com/litweb/pdf/E8356-90001.pdf.

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