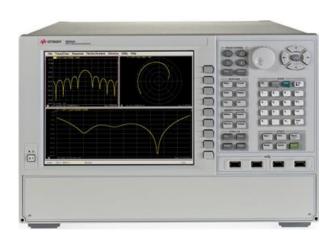
Keysight N5264A

Measurement Receiver



Technical Specifications and Data Sheet



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Definitions

All specifications and characteristics apply over a 25 $^{\circ}$ C $^{\pm}5$ $^{\circ}$ 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 Per (time/point		cond)	
Number of Points	CW 10 GHz (r	no band cros	sings), 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
RF = UXG, N5193A opt. SS1, 1 μ s switching speed LO = UXG, N5193A opt. SS1, 1 μ s switching speed	.020	.027	.140	.940

Description	7 1	l Performan point in milli	
	Standar	d	
Number of Points	801	1601	
Trigger Mode	Hardwa	re	Sensitivity(dBm) ⁴
Start 2 GHz, Stop 18 GHz, 1 MHz IF bandwidth (v	with band c	rossings)	
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
RF = UXG, N5193A opt. SS1, 1 μ s switching speed LO = UXG, N5193A opt. SS1, 1 μ s switching speed	0.039	0.034	-90.5 dBm, 2 - 3 GHz - 94.5 dBm, 3 - 12.5 GHz - 83 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
RF = UXG, N5193A opt. SS1, 1 μ s switching speed LO = UXG, N5193A opt. SS1, 1 μ s switching speed	0.045	0.039	-92.5 dBm, 2 - 3 GHz - 96.5 dBm, 3 - 12.5 GHz - 85 dBm, 12.5 - 18 GHz

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
RF = UXG, N5193A opt. SS1, 1 μ s switching speed LO = UXG, N5193A opt. SS1, 1 μ s switching speed	0.170	0.167	-110.5 dBm, 2 - 3 GHz - 114.5 dBm, 3 -12.5 GHz - 103 dBm, 12.5 - 18 GHz

Start 2 GHz, Stop 18 GHz, 1 kHz IF bandwidth (w	ith band cr	ossings)	
RF = MXG, N5183A opt. UNZ, Fast switching	1.5	1.5	-120.5 dBm, 2 – 3 GHz
LO = MXG, N5183A opt. UNZ, Fast switching			- 124.5 dBm, 3 -12.5 GHz
			- 113 dBm, 12.5 – 18 GHz
RF = MXG, N5183A opt. UNZ, Fast switching	1.5	1.5	-113.5 dBm, 2 - 3 GHz
LO = N5264A opt. 108 ³			- 120.5 dBm, 3 -12.5 GHz
			- 111 dBm, 12.5 – 18 GHz
RF = UXG, N5193A opt. SS1, 1 μs switching speed	0.970	0.970	-120.5 dBm, 2 - 3 GHz
LO = UXG, N5193A opt. SS1, 1 μ s switching speed			- 124.5 dBm, 3 -12.5 GHz
			- 113 dBm, 12.5 – 18 GHz
Start 2 GHz, Stop 18 GHz, 500 Hz IF bandwidth (with band o	crossings)	
RF = UXG, N5193A opt. SS1, 1 μs switching speed	1.85	1.85	-120.5 dBm, 2 – 3 GHz
LO = UXG, N5193A opt. SS1, 1 μ s switching speed			- 124.5 dBm, 3 -12.5 GHz
			- 113 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		

Time/Point (ms)

Description	Typical Performance					
Start 2 GHz, Stop 18 GHz, 801 points (with band crossings), hardware trigger						
IF Bandwidth	1 MHz	600 kHz	100 kHz	10 kHz	1 kHz	500 Hz
RF = UXG, N5193A opt. SS1, 1 μs switching speed	.032	.035	.047	.165	.965	1.85
LO = UXG, N5193A opt. SS1, 1 μ s switching speed						

Data Transfer Time (ms)

Description	Typical P	erformance		
	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	7.438017 MHz (See IF Input Frequencies below.)
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 ^T
Dynamic Range @ 10 Hz	134 dB @ 0.1dB compression to noise floor
Dynamic Accuracy	
-40 dBm reference, over range set	t by compression and noise floor @ IF Frequencies
-10 dBm	0.037 dB
-20 dBm	0.024 dB
-30 dBm	0.016 dB
-40 dBm	0.010 dB
-50 dBm	0.013 dB
-60 dBm	0.021 dB
-70 dBm	0.032 dB

IF Input Frequencies

The IF Input frequencies are different depending on the DSP Version.

With DSP Version 4:

- RF or Transmitting frequency < 53 MHz: IF = 2.535211 MHz [3 x (60e6 / 71)]
- RF or Transmitting frequency \geq 53 MHz: IF = 7.605634 MHz [9 x (60e6 / 71)]

With DSP Version 5, the IF frequency is dependent on the RF or Transmitting frequency AND the current IFBW setting:

All RF or Transmitting frequency; IF Bandwidth >= 1MHz

IFBW Setting	IF Frequency
1 MHz	7.692 MHz
1.5 MHz	7.368 MHz
2 MHz	8.450 MHz
3 MHz	8.163 MHz
5 MHz	6.897 MHz
7 MHz	10.53 MHz
10 MHz	15.38 MHz
15 MHz	22.22 MHZ

- IF Bandwidth <= 600 kHz:
 - RF or Transmitting frequency < 53 MHz; IF = 2.479339 MHz [(3 x (100e6 / 121)]
 - RF or Transmitting frequency >= 53 MHz; IF = 7.438017 MHz [(9 x (100e6 / 121))]

Manually change the IF frequency

The IF frequency can be changed to any value between +14.9999 MHz and -14.9999 MHz using SENS:IF:FREQ (SCPI) or IFFrequency (COM) commands.

- With DSP Version 4 34 and above, min and max IF frequencies up to +/- 20.1 MHz are available.
- With DSP Version 5, min and max IF frequencies up to +/- 38 MHz are available.
- Performance is degraded drastically above +/- 14.9999 MHz.

External IF Inputs (Cont.)			
Description	Typical Performance		
Dynamic Accuracy (Cont.)			
-40 dBm reference, over range set by compression and noise floor @ IF Frequencies			
-80 dBm	0.041 dB		
-90 dBm	0.049 dB		
-100 dBm	0.057 dB		
-110 dBm	0.072 dB		
-120 dBm	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		
2 nd 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 Description	Typical Perfor	rmance			
3 rd 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	BNC, female			
Input Frequency	10 MHz ± 10 ppr	10 MHz ± 10 ppm, typical			
Input Level	-15 dBm to +20	-15 dBm to +20 dBm, typical			
Input Impedance	$200~\Omega,$ nom.	200 Ω, nom.			
10 MHz Reference Out					
Connector	BNC, female	BNC, female			
Output Frequency	10 MHz ± 1 ppm	10 MHz ± 1 ppm, typical			
Signal Type	Sine Wave, typic	Sine Wave, typical			
Output Level	+10 dBm ± 4 dB	+10 dBm \pm 4 dB into 50 Ω			
Output Impedance	50 Ω, nominal	50 Ω, nominal			
Harmonics	<-40 dBc, typica	<-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			

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 connectio 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
Measurement conditions: normalized to -10 of Absolute LO frequency is Front Panel set freq	uency 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:
	 More than 0.002% of the total pixels have a constant blue, green, red, or black appearance that will not change.
	 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

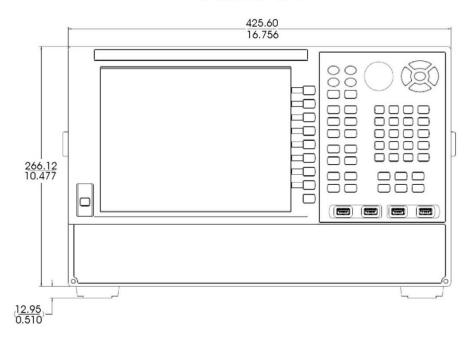
Cabinet Dimensions	Height	Width	Depth
Excluding front and rear panel hardware	267 mm	426 mm	533 mm
and feet	10.5 in	16.75 in	20.97 in
Excluding front and rear panel hardware	266 mm	426 mm	558 mm
and feet. Including rack-mount flanges.	10.5 in EIA RU ¹ = 6	16.75 in	21.95 in
As shipped - including front 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	483 mm	558 mm
	11.0 in	19.00 in	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://literature.cdn.keysight.com/litweb/pdf/E8356-90001.pdf.

N5264A





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