

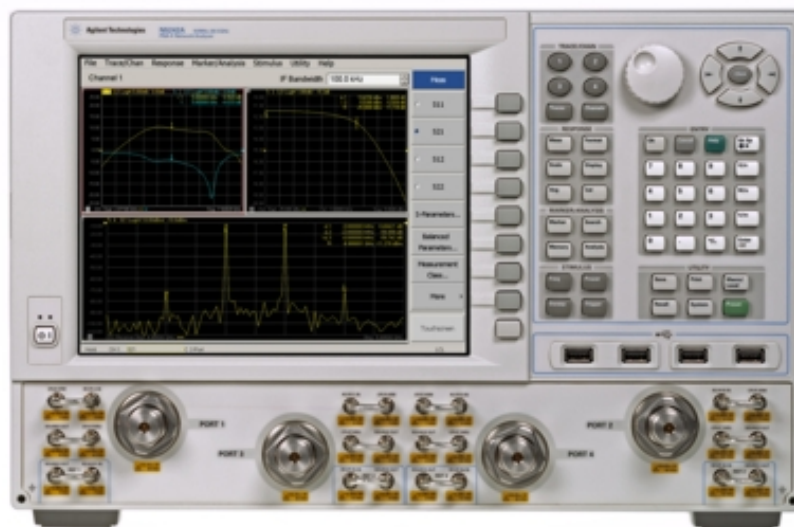
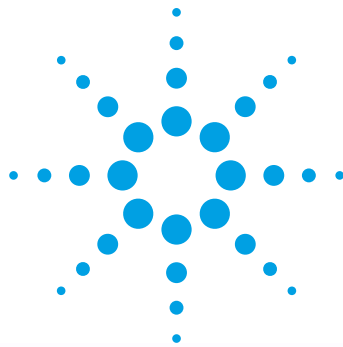
# Agilent 2-Port and 4-Port PNA-X Network Analyzer

**N5242A**

**10 MHz to 26.5 GHz**

Data Sheet and

Technical Specifications



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This is a complete list of the technical specifications for the N5242A PNA-X network analyzer with the following options:

**Option 029**, adds hardware and firmware for high-accuracy noise figure measurements, utilizing source correction techniques. It requires one of the following options: 219, 224, 419, or 423. It also requires an N4691B ECal module for use as an impedance tuner, and a 346-series noise source for calibration. [See the block diagram.](#)

**Option 200**, 2-port standard test set (includes six front-panel access loops) and power range. [See the block diagram.](#)

**Option 219**, adds 2-port extended power range, source and receiver attenuators, and bias-tees (requires Option 200). [See the block diagram.](#)

**Option 224**, adds an internal second source, a combiner, and mechanical switches to the 2-port analyzer (requires Option 200, 219, and 080). [See the block diagram.](#)

**Option 400**, 4-port standard test set (includes twelve front-panel access loops), power range, and an internal second source (Option 080 recommended). [See the block diagram.](#)

**Option 419**, adds 4-port extended power range, source and receiver attenuators, and bias-tees (requires Option 400). [See the block diagram.](#)

**Option 423**, adds an internal combiner, and mechanical switches to the 4-port analyzer (requires Option 400, 419, and 080). [See the block diagram.](#)

#### Note

This document provides technical specifications for the 85052B calibration kit, the N4433A 4-Port ECal module, and the N4691B 2-Port ECal module. Please download our free Uncertainty Calculator from [http://www.agilent.com/find/na\\_calculator](http://www.agilent.com/find/na_calculator) to generate the curves for your calibration kit and PNA setup.

## 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.

## Corrected System Performance

The specifications in this section apply for measurements made with the N5242A analyzer with the following conditions:

- 10 Hz IF bandwidth
- No averaging applied to data
- Isolation calibration with an averaging factor of 8

**Table 1a. System Dynamic Range at Test Port <sup>1</sup>**

**Option 200 or 400**

Description	Specification (dB) at Test Port		Typical (dB) at Test Port	
	Port 1 or 3 <sup>2</sup>	Port 2 or 4 <sup>2</sup>	Port 1 or 3 <sup>2</sup>	Port 2 or 4 <sup>2</sup>
10 MHz to 50 MHz <sup>3</sup>	93	93	106	104
50 MHz to 100 MHz <sup>3</sup>	103	103	116	115
100 MHz to 500 MHz <sup>3</sup>	117	117	131	130
500 MHz to 3.2 GHz	124	127	130	135
3.2 GHz to 10 GHz	127	127	137	136
10 GHz to 16 GHz	127	127	134	133
16 GHz to 20 GHz	127	124	133	129
20 GHz to 24 GHz	122	117	130	126
24 GHz to 26.5 GHz	112	109	124	120

1. The system dynamic range is calculated as the difference between the noise floor and the specified source maximum output power. The effective dynamic range must take measurement uncertainties and interfering signals into account.
2. Either port can be used as the source port. Any other port can be used as the receiver port.
3. May typically be degraded at particular frequencies below 500 MHz due to spurious receiver residuals.



**Table 1b. System Dynamic Range at Test Port<sup>1</sup>****Option 219 or 419**

Description	Specification (dB) at Test Port		Typical (dB) at Test Port	
	Port 1 or 3 <sup>2</sup>	Port 2 or 4 <sup>2</sup>	Port 1 or 3 <sup>2</sup>	Port 2 or 4 <sup>2</sup>
10 MHz to 50 MHz <sup>3</sup>	93	93	106	104
50 MHz to 100 MHz <sup>3</sup>	103	103	115	114
100 MHz to 500 MHz <sup>3</sup>	117	117	130	129
500 MHz to 3.2 GHz	124	127	130	135
3.2 GHz to 10 GHz	127	127	135	134
10 GHz to 16 GHz	126	125	132	131
16 GHz to 20 GHz	124	122	130	127
20 GHz to 24 GHz	118	117	127	124
24 GHz to 26.5 GHz	110	106	121	117

<sup>1</sup> The system dynamic range is calculated as the difference between the noise floor and the specified source maximum output power. The effective dynamic range must take measurement uncertainties and interfering signals into account.

<sup>2</sup> Either port can be used as the source port. Any other port can be used as the receiver port.

<sup>3</sup> May typically be degraded at particular frequencies below 500 MHz due to spurious receiver residuals.

**Table 1c. System Dynamic Range at Test Port <sup>1</sup>****Option 224**

Description	Specification (dB) at Test Port		Typical (dB) at Test Port	
	Source 2, Out 1	Source 2, Out 2	Source 2, Out 1	Source 2, Out 2
10 MHz to 50 MHz <sup>2</sup>	98	93	108	105
50 MHz to 100 MHz <sup>2</sup>	108	107	117	116
100 MHz to 500 MHz <sup>2</sup>	122	121	132	131
500 MHz to 3.2 GHz	128	128	134	136
3.2 GHz to 10 GHz	132	132	139	139
10 GHz to 16 GHz	130	130	138	137
16 GHz to 20 GHz	129	127	136	134
20 GHz to 24 GHz	123	122	133	132
24 GHz to 26.5 GHz	114	112	127	124

<sup>1</sup> The system dynamic range is calculated as the difference between the noise floor and the specified source maximum output power. The effective dynamic range must take measurement uncertainties and interfering signals into account.

<sup>2</sup> May typically be degraded at particular frequencies below 500 MHz due to spurious receiver residuals.

**Table 1d. System Dynamic Range at Test Port <sup>1</sup>****Option 224 or 423**

Description	Specification (dB) at Test Port		Typical (dB) at Test Port			
	Port 1 or 3 <sup>2</sup>	Port 2 or 4 <sup>2</sup>	Port 1 or 3 <sup>2</sup>	Port 2 or 4 <sup>2</sup>	Source 1, Port 1 Combine Mode	Source 2, Port 1 Combine Mode
10 MHz to 50 MHz <sup>3</sup>	93	93	106	104	104	80
50 MHz to 100 MHz <sup>3</sup>	103	103	115	115	112	90
100 MHz to 500 MHz <sup>3</sup>	117	117	130	130	121	99
500 MHz to 3.2 GHz	124	127	130	134	127	112
3.2 GHz to 10 GHz	127	127	136	134	132	119
10 GHz to 16 GHz	126	124	132	131	128	115
16 GHz to 20 GHz	124	121	130	127	125	113
20 GHz to 24 GHz	117	115	127	124	121	109
24 GHz to 26.5 GHz	107	105	121	117	115	102

<sup>1</sup> The system dynamic range is calculated as the difference between the noise floor and the specified source maximum output power. The effective dynamic range must take measurement uncertainties and interfering signals into account.

<sup>2</sup> Either port can be used as the source port. Any other port can be used as the receiver port.

<sup>3</sup> May typically be degraded at particular frequencies below 500 MHz due to spurious receiver residuals.

**Table 2a. Extended Dynamic Range at Direct Receiver Access Input<sup>1</sup>****Option 200 or 400**

Description	Typical (dB) at Direct Receiver Access Input	
	Port 1 or 3 <sup>2</sup>	Port 2 or 4 <sup>2</sup>
10 MHz to 50 MHz <sup>3</sup>	128	128
50 MHz to 100 MHz <sup>3</sup>	115	115
100 MHz to 500MHz <sup>3</sup>	129	129
500 MHz to 3.2 GHz	136	139
3.2 GHz to 10 GHz	139	139
10 GHz to 16 GHz	139	139
16 GHz to 20 GHz	139	136
20 GHz to 24 GHz	134	129
24 GHz to 26.5 GHz	124	121

<sup>1</sup> The direct receiver access input extended dynamic range is calculated as the difference between the direct receiver access input noise floor and the source maximum output power. The effective dynamic range must take measurement uncertainties and interfering signals into account. This set-up should only be used when the receiver input will never exceed its maximum receiver input. When the analyzer is in segment sweep mode, it can have predefined frequency segments which will output a higher power level when the extended dynamic range is required (i.e. devices with high insertion loss), and reduced power when the maximum receiver input level will occur (i.e. devices with low insertion loss). The extended range is only available in one-path transmission measurements.

<sup>2</sup> Either port can be used as the source port. Any other port can be used as the receiver port.

<sup>3</sup> May typically be degraded at particular frequencies below 500 MHz due to spurious receiver residuals.

**Table 2b. Extended Dynamic Range at Direct Receiver Access Input<sup>1</sup>****Option 219 or 419**

Description	Typical (dB) at Direct Receiver Access Input	
	Port 1 or 3 <sup>2</sup>	Port 2 or 4 <sup>2</sup>
10 MHz to 50 MHz <sup>3</sup>	128	128
50 MHz to 100 MHz <sup>3</sup>	115	115
100 MHz to 500MHz <sup>3</sup>	129	129
500 MHz to 3.2 GHz	136	139
3.2 GHz to 10 GHz	139	139
10 GHz to 16 GHz	138	137
16 GHz to 20 GHz	136	134
20 GHz to 24 GHz	130	129
24 GHz to 26.5 GHz	122	118

<sup>1</sup> The direct receiver access input extended dynamic range is calculated as the difference between the direct receiver access input noise floor and the source maximum output power. The effective dynamic range must take measurement uncertainties and interfering signals into account. This set-up should only be used when the receiver input will never exceed its maximum receiver input. When the analyzer is in segment sweep mode, it can have predefined frequency segments which will output a higher power level when the extended dynamic range is required (i.e. devices with high insertion loss), and reduced power when the maximum receiver input level will occur (i.e. devices with low insertion loss). The extended range is only available in one-path transmission measurements.

<sup>2</sup> Either port can be used as the source port. Any other port can be used as the receiver port.

<sup>3</sup> May typically be degraded at particular frequencies below 500 MHz due to spurious receiver residuals.

**Table 2c. Extended Dynamic Range at Direct Receiver Access Input<sup>1</sup>****Option 224**

Description	Typical (dB) at Direct Receiver Access Input	
	Source 2, Out 1	Source 2, Out 2
10 MHz to 50 MHz <sup>2</sup>	133	128
50 MHz to 100 MHz <sup>2</sup>	120	119
100 MHz to 500MHz <sup>2</sup>	134	133
500 MHz to 3.2 GHz	140	140
3.2 GHz to 10 GHz	144	144
10 GHz to 16 GHz	142	142
16 GHz to 20 GHz	141	139
20 GHz to 24 GHz	135	134
24 GHz to 26.5 GHz	126	124

<sup>1</sup> The direct receiver access input extended dynamic range is calculated as the difference between the direct receiver access input noise floor and the source maximum output power. The effective dynamic range must take measurement uncertainties and interfering signals into account. This set-up should only be used when the receiver input will never exceed its compression or damage level. When the analyzer is in segment sweep mode, it can have predefined frequency segments which will output a higher power level when the extended dynamic range is required (i.e. devices with high insertion loss), and reduced power when receiver compression or damage may occur (i.e. devices with low insertion loss). The extended range is only available in one-path transmission measurements.

<sup>2</sup> May typically be degraded at particular frequencies below 500 MHz due to spurious receiver residuals.

**Table 2d. Extended Dynamic Range at Direct Receiver Access Input<sup>1</sup>****Option 224 or 423**

Description	Typical (dB) at Direct Receiver Access Input			
	Port 1 or 3 <sup>2</sup>	Port 2 or 4 <sup>2</sup>	Source 1, Port 1 Combine Mode	Source 2, Port 1 Combine Mode
10 MHz to 50 MHz <sup>3</sup>	128	128	139	115
50 MHz to 100 MHz <sup>3</sup>	115	115	124	102
100 MHz to 500MHz <sup>3</sup>	129	129	133	111
500 MHz to 3.2 GHz	136	139	139	124
3.2 GHz to 10 GHz	139	139	144	131
10 GHz to 16 GHz	138	136	140	127
16 GHz to 20 GHz	136	133	137	125
20 GHz to 24 GHz	129	127	133	121
24 GHz to 26.5 GHz	119	121	127	114

<sup>1</sup> The direct receiver access input extended dynamic range is calculated as the difference between the direct receiver access input noise floor and the source maximum output power. The effective dynamic range must take measurement uncertainties and interfering signals into account. This set-up should only be used when the receiver input will never exceed its compression or damage level. When the analyzer is in segment sweep mode, it can have predefined frequency segments which will output a higher power level when the extended dynamic range is required (i.e. devices with high insertion loss), and reduced power when receiver compression or damage may occur (i.e. devices with low insertion loss). The extended range is only available in one-path transmission measurements.

<sup>2</sup> Either port can be used as the source port. Any other port can be used as the receiver port.

<sup>3</sup> May typically be degraded at particular frequencies below 500 MHz due to spurious receiver residuals.

Receiver Dynamic Range technical specifications are not provided in this N5242A specs document.

## N5242A Corrected System Performance with 3.5mm Connectors

### All Options

Note: For any  $S_{ii}$  reflection measurement:

- $S_{jj} = 0$ .

For any  $S_{ij}$  transmission measurement:

- $S_{ji} = S_{ij}$  when  $S_{ij} \leq 1$
- $S_{ji} = 1/S_{ij}$  when  $S_{ij} > 1$
- $S_{kk} = 0$  for all  $k$

**Table 3. 85052B Calibration Kit**

### N5242A All Options

Applies to the N5242A Option 200 or 219 or 224 or 400 or 419 or 423 analyzers, 85052B (3.5mm) calibration kit, 85131F flexible test port cable set, and a full 2-port calibration. Also applies to the following condition:

Environmental temperature  $23^\circ \pm 3^\circ \text{C}$ , with  $< 1^\circ \text{C}$  deviation from calibration temperature

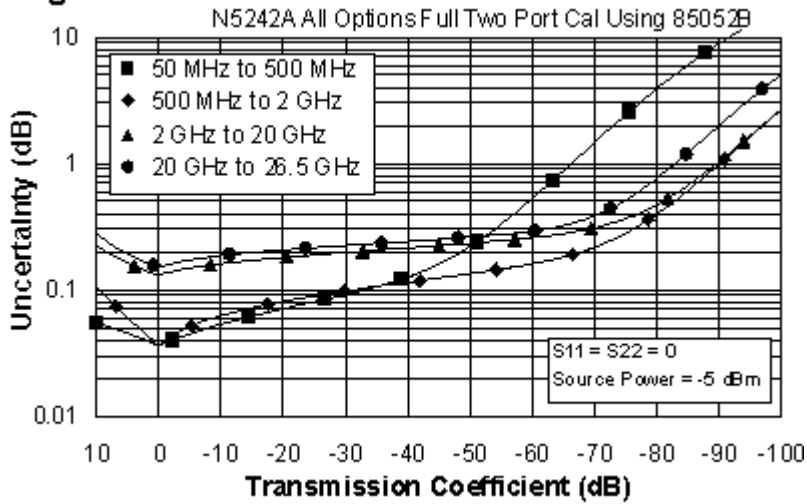
Description	Specification (dB)			
	50 MHz to 500 MHz	500 MHz to 2 GHz	2 to 20 GHz	20 to 26.5 GHz
Directivity	48	48	44	44
Source Match	40	40	31	31
Load Match	48	48	44	44
Reflection Tracking <sup>1</sup>	$\pm 0.003$ $+0.010/^\circ\text{C}$	$\pm 0.003$ $+0.010/^\circ\text{C}$	$\pm 0.006$ $+0.020/^\circ\text{C}$	$\pm 0.006$ $+0.030/^\circ\text{C}$
Transmission Tracking <sup>1</sup>	$\pm 0.017$ $+0.010/^\circ\text{C}$	$\pm 0.017$ $+0.010/^\circ\text{C}$	$\pm 0.104$ $+0.020/^\circ\text{C}$	$\pm 0.119$ $+0.030/^\circ\text{C}$

<sup>1</sup>Temperature deviation is a characteristic value.

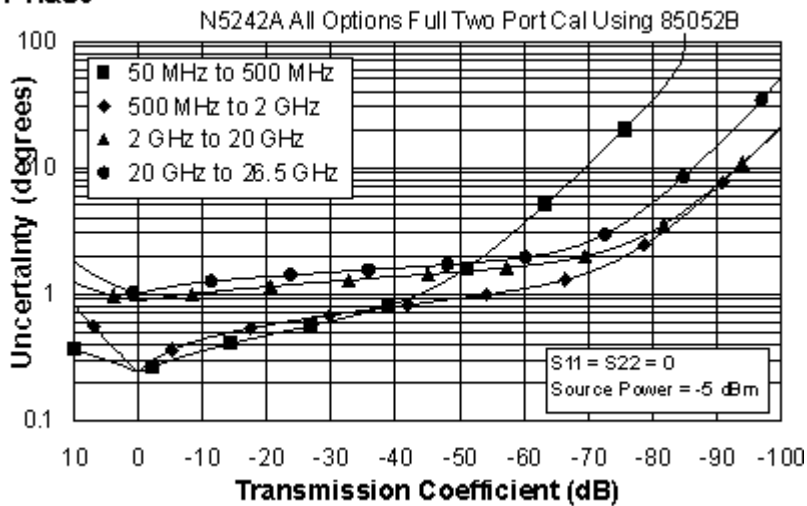


## Transmission Uncertainty (Specifications)

### Magnitude

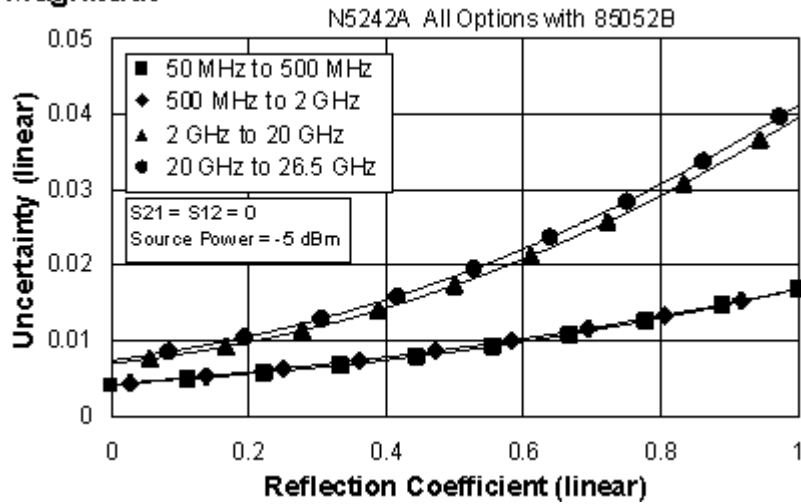


### Phase

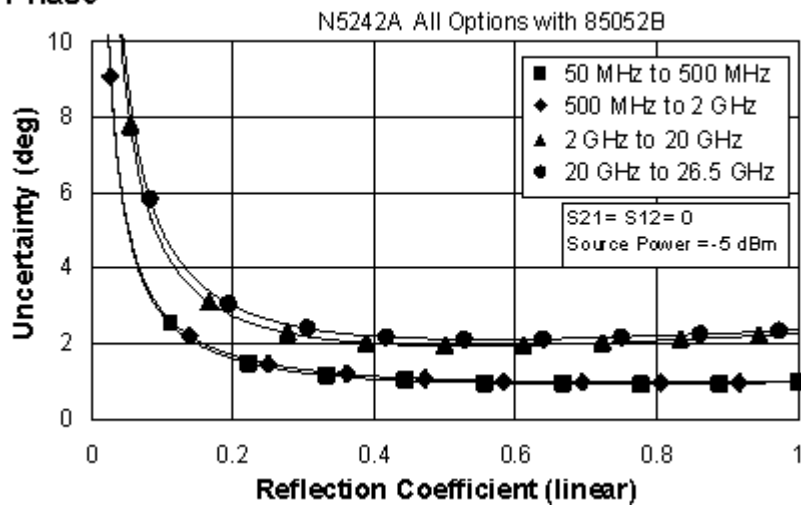


## Reflection Uncertainty (Specifications)

### Magnitude



### Phase



**Table 4. N4433A 4-Port Electronic Calibration Module**

**N5242A All Options**

**Note:** Uncertainty curves for the N4433A are created using a 2-port calibration. Multiport uncertainties are not supported at this time.

Applies to the N5242A Option 200 or 219 or 224 or 400 or 419 or 423 analyzers, N4433A (3.5mm) electronic calibration module, 85131F flexible test port cable set, and a full 2-port calibration. Also applies to the following condition:

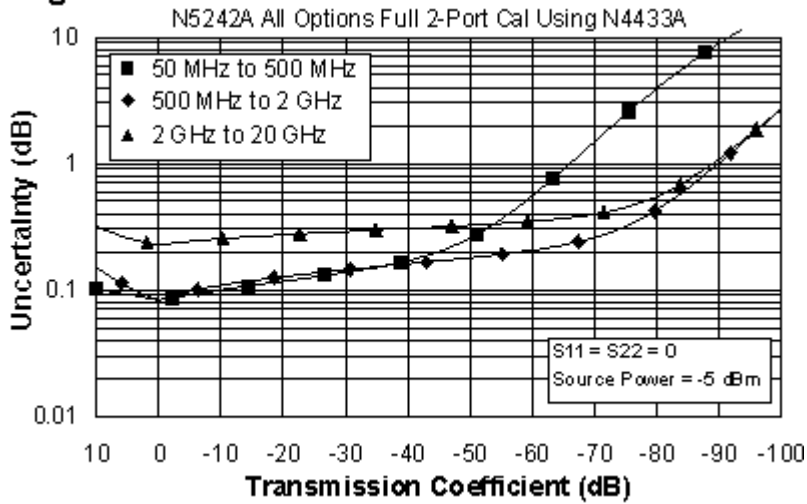
Environmental temperature 23° ±3 °C, with < 1 °C deviation from calibration temperature

Description	Specification (dB)		
	50 MHz to 500 MHz	500 MHz to 2 GHz	2 to 20 GHz
Directivity	52	52	45
Source Match	42	42	31
Load Match	41	41	29
Reflection Tracking <sup>1</sup>	±0.060 +0.010/°C	±0.060 +0.010/°C	±0.180 +0.020/°C
Transmission Tracking <sup>1</sup>	±0.063 +0.010/°C	±0.063 +0.010/°C	±0.197 +0.020/°C

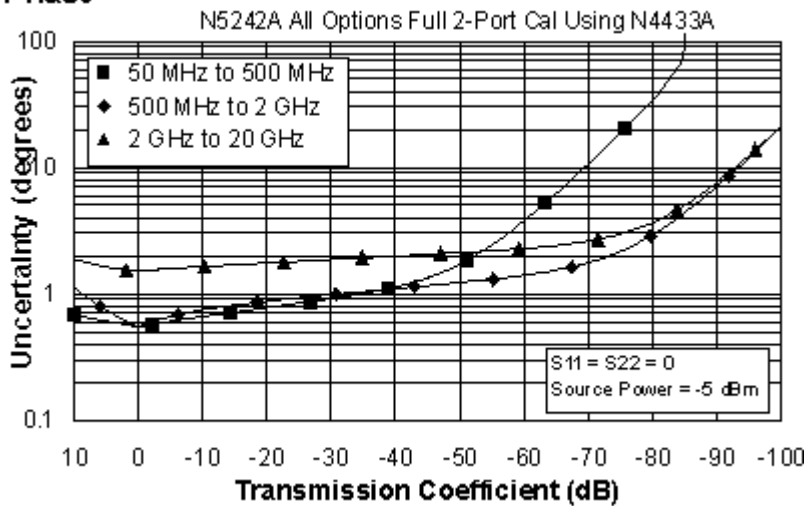
<sup>1</sup>Temperature deviation is a characteristic value.

**Transmission Uncertainty (Specifications)**

**Magnitude**

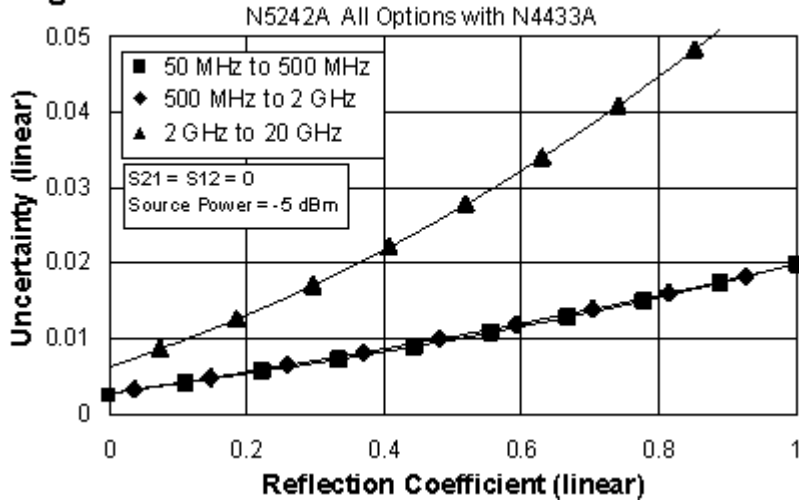


**Phase**

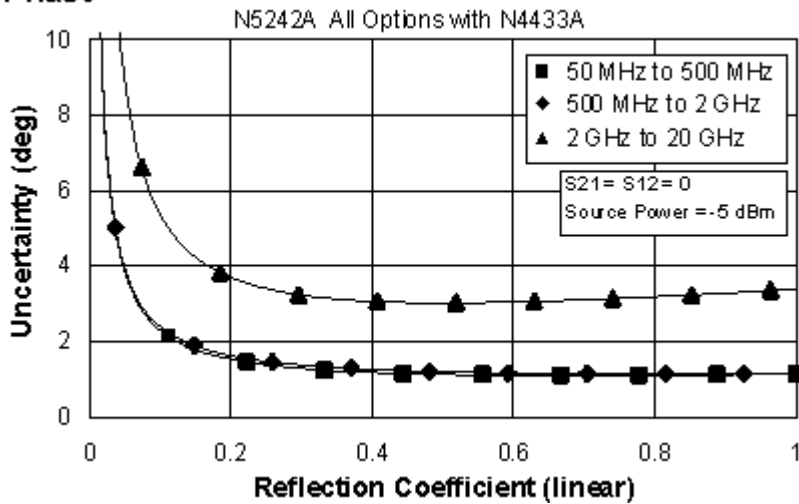


## Reflection Uncertainty (Specifications)

### Magnitude



### Phase



**Table 5. N4691B 2- Port Electronic Calibration Module****N5242A All Options**

Applies to the N5242A Option 200 or 219 or 224 or 400 or 419 or 423 analyzers, N4691B (3.5mm) electronic calibration module, 85131F flexible test port cable set, and a full 2-port calibration. Also applies to the following condition:

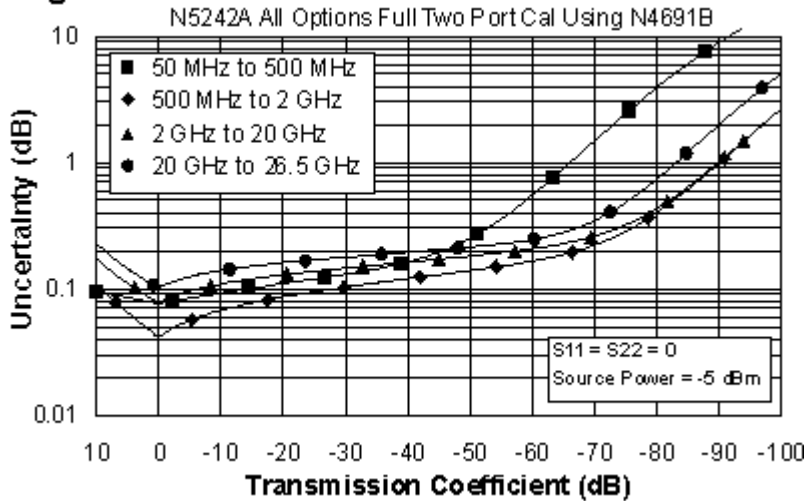
Environmental temperature  $23^{\circ} \pm 3^{\circ} \text{C}$ , with  $< 1^{\circ} \text{C}$  deviation from calibration temperature

Description	Specification (dB)			
	50 MHz to 500 MHz	500 MHz to 2 GHz	2 to 20 GHz	20 to 26.5 GHz
Directivity	46	56	48	44
Source Match	41	47	44	40
Load Match	40	46	42	38
Reflection Tracking <sup>1</sup>	$\pm 0.050$ $+0.010/^{\circ}\text{C}$	$\pm 0.020$ $+0.010/^{\circ}\text{C}$	$\pm 0.040$ $+0.020/^{\circ}\text{C}$	$\pm 0.050$ $+0.030/^{\circ}\text{C}$
Transmission Tracking <sup>1</sup>	$\pm 0.056$ $+0.010/^{\circ}\text{C}$	$\pm 0.022$ $+0.010/^{\circ}\text{C}$	$\pm 0.052$ $+0.020/^{\circ}\text{C}$	$\pm 0.072$ $+0.030/^{\circ}\text{C}$

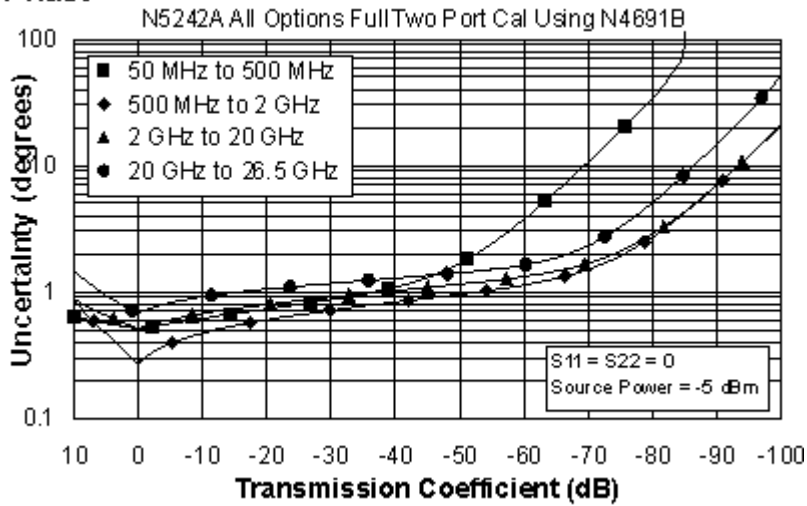
<sup>1</sup> Temperature deviation is a characteristic value.

**Transmission Uncertainty (Specifications)**

**Magnitude**

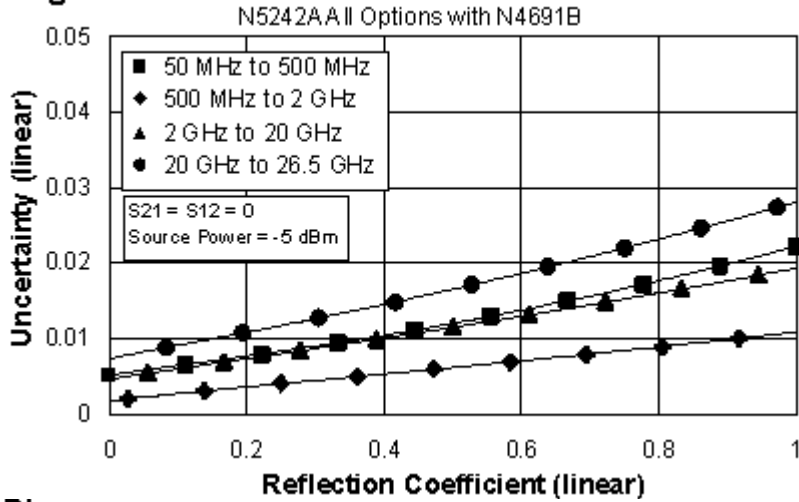


**Phase**

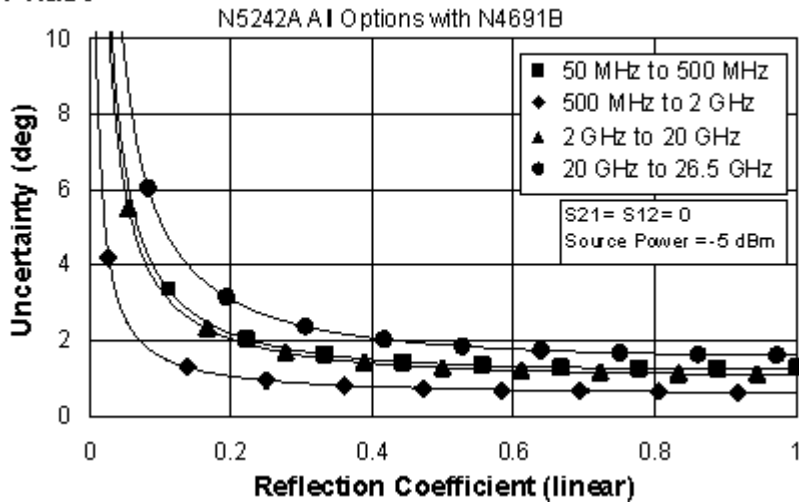


## Reflection Uncertainty (Specifications)

### Magnitude



### Phase



This N5242A document does not present specifications for the 85052C or 85052D Calibration Kit. Please download our free Uncertainty Calculator from [http://www.agilent.com/find/na\\_calculator](http://www.agilent.com/find/na_calculator) to generate the data and curves for the 85052C or the 85052D Calibration Kit.



## Uncorrected System Performance

**Table 6. Error Terms<sup>1</sup>**

Ports 1, 2, 3, 4. All Options. If Option 029 is included, see section [Specifications: N5242A Option 029](#).

Description	Specification	Typical
<b>Directivity (dB)</b>		
10 MHz to 50 MHz	16	23
50 MHz to 500 MHz	24	28
500 MHz to 3.2 GHz	24	32
3.2 GHz to 10 GHz	23	25
10 GHz to 16 GHz	16	22
16 GHz to 20 GHz	16	22
20 GHz to 24 GHz	16	22
24 GHz to 26.5 GHz	16	22
<b>Source Match (dB)</b>		
10 MHz to 50 MHz	11	14
50 MHz to 500 MHz	18	28
500 MHz to 3.2 GHz	18	22
3.2 GHz to 10 GHz	14	18
10 GHz to 16 GHz	12	16
16 GHz to 20 GHz	10	15
20 GHz to 24 GHz	10	14
24 GHz to 26.5 GHz	8	12

**Table 6. (Continued) Error Terms<sup>1</sup>**

<b>Load Match (dB)</b>		
10 MHz to 50 MHz	11	18
50 MHz to 500 MHz	17	25
500 MHz to 3.2 GHz	17	22
3.2 GHz to 10 GHz	13	17
10 GHz to 16 GHz	10	15
16 GHz to 20 GHz	9	14
20 GHz to 24 GHz	9	14
24 GHz to 26.5 GHz	8	13
<b>Transmission Tracking<sup>3</sup> (dB)</b>		
10 MHz to 50 MHz	--	+/-1.5
50 MHz to 500 MHz		
500 MHz to 3.2 GHz		
3.2 GHz to 10 GHz		
10 GHz to 16 GHz		
16 GHz to 20 GHz		
20 GHz to 24 GHz		
24 GHz to 26.5 GHz		
<b>Reflection Tracking (dB)</b>		
10 MHz to 50 MHz	--	+/-1.5
50 MHz to 500 MHz		
500 MHz to 3.2 GHz		
3.2 GHz to 10 GHz		
10 GHz to 16 GHz		
16 GHz to 20 GHz		
20 GHz to 24 GHz		
24 GHz to 26.5 GHz		

**Table 6. (Continued) Error Terms<sup>1</sup>**

<b>Crosstalk<sup>4</sup> (dB)</b>		
10 MHz to 50 MHz	--	-84
50 MHz to 100 MHz		-90
100 MHz to 500 MHz		-110
500 MHz to 3.2 GHz		-120
3.2 GHz to 20 GHz		-122
20 GHz to 24 GHz		-117
24 GHz to 26.5 GHz		-114

<sup>1</sup> Specifications apply over environmental temperature of 25 °C ±5 °C, with less than 1°C variation from the calibration temperature.

<sup>3</sup> Cable loss not included.

<sup>4</sup> Measurement conditions: normalized to a thru, measured with shorts on all ports, 10 Hz IF bandwidth, averaging factor of 8, alternate mode, source power set to the lesser of the maximum power-out or the maximum receiver power.

## Test Port Output

**Table 7. Frequency Information**

**All Options**

Description	Specification (dB)	Typical (dB)
Frequency Range	10 MHz to 26.5 GHz	--
Frequency Resolution	1 Hz	--
Frequency Accuracy	+/- 1 ppm	--
Frequency Stability	--	+/-0.05 ppm, -10° to 70° C <sup>1</sup> +/-0.1 ppm/yr maximum <sup>2</sup>

<sup>1</sup> Assumes no variation in time.

<sup>2</sup> Assumes no variation in temperature.

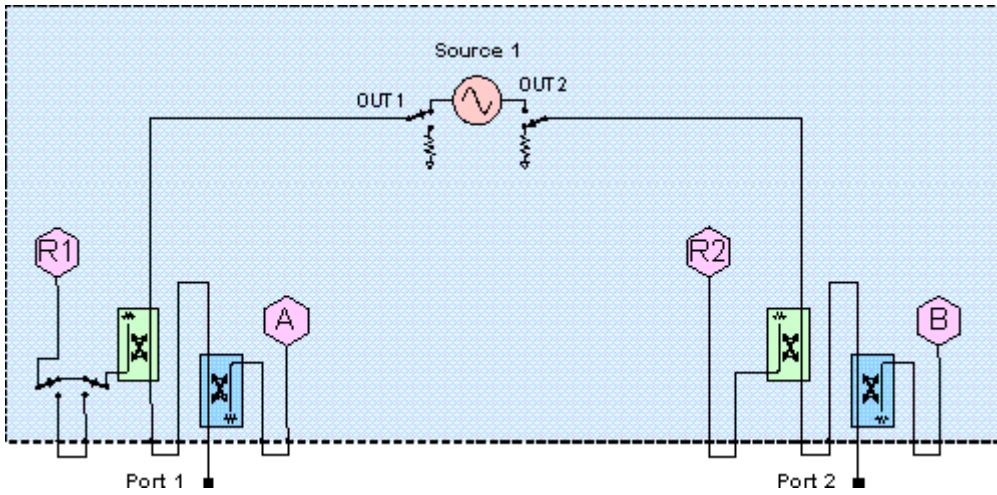
**Table 8a. Maximum Leveled Power, Option 200 or 400**

Description	Specification (dBm)			Typical (dBm)		
	Port 1 or 3 <sup>1</sup> Filtered Mode <sup>2</sup> See Figure 2 (Opt 200) or Figure 5 (Opt 400)	Port 1 or 3 <sup>1</sup> Hi Pwr Mode <sup>2</sup> See Figure 3 (Opt 200) or Figure 6 (Opt 400)	Port 2 or 4 <sup>1</sup>	Port 1 or 3 <sup>1</sup> Filtered Mode <sup>2</sup> See Figure 2 (Opt 200) or Figure 5 (Opt 400)	Port 1 or 3 <sup>1</sup> Hi Pwr Mode <sup>2</sup> See Figure 3 (Opt 200) or Figure 6 (Opt 400)	Port 2 or 4 <sup>1</sup>
10 MHz to 50 MHz	8	13	13	10	19	17
50 MHz to 500 MHz	10	13	13	11	21	20
500 MHz to 3.2 GHz	10	10	13	12	13	18
3.2 GHz to 10 GHz	13	13	13	20	20	19
10 GHz to 16 GHz	13	13	13	17	17	16
16 GHz to 20 GHz	13	13	10	16	16	12
20 GHz to 24 GHz	12	12	7	15	15	11
24 GHz to 26.5 GHz	5	5	2	11	11	7

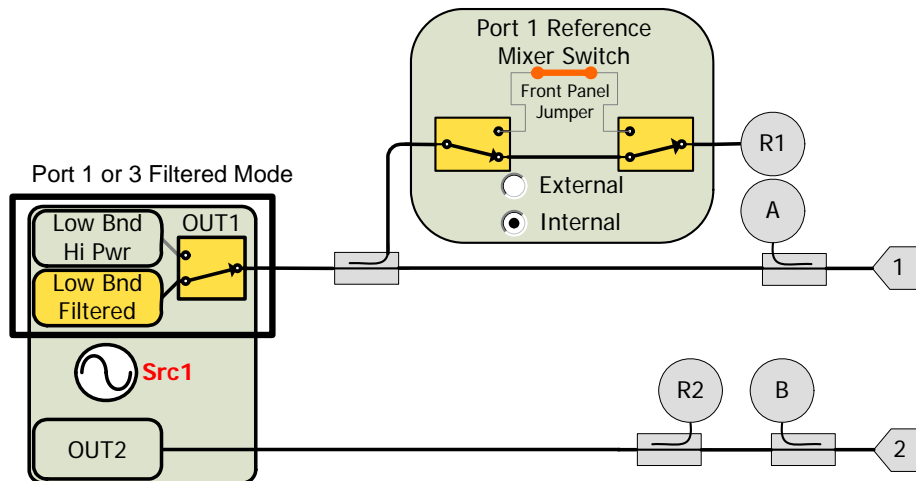
<sup>1</sup> Either port can be used as the source port.

<sup>2</sup> In Filtered Mode, the signal path goes through filters to minimize harmonics below 3.2 GHz. In Hi Pwr Mode, the signal bypasses the filters to maximize output power.

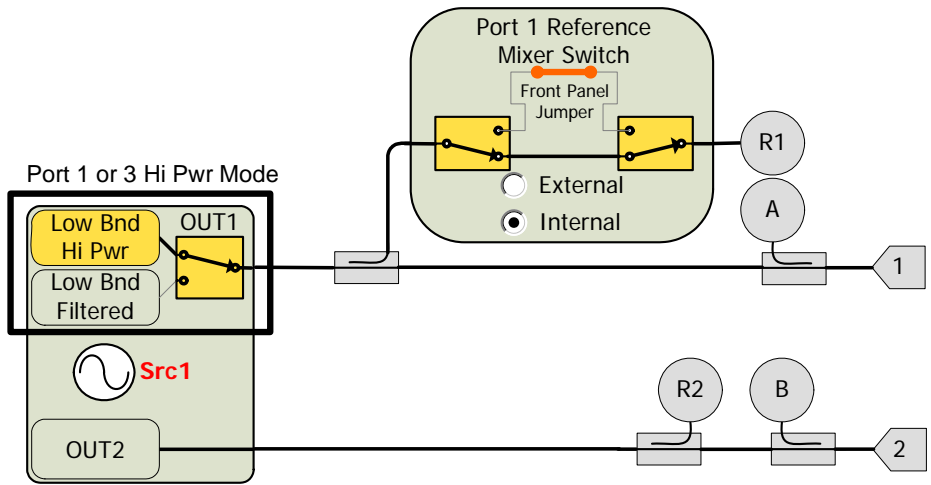
**Figure 1. Block Diagram, N5242A Option 200**



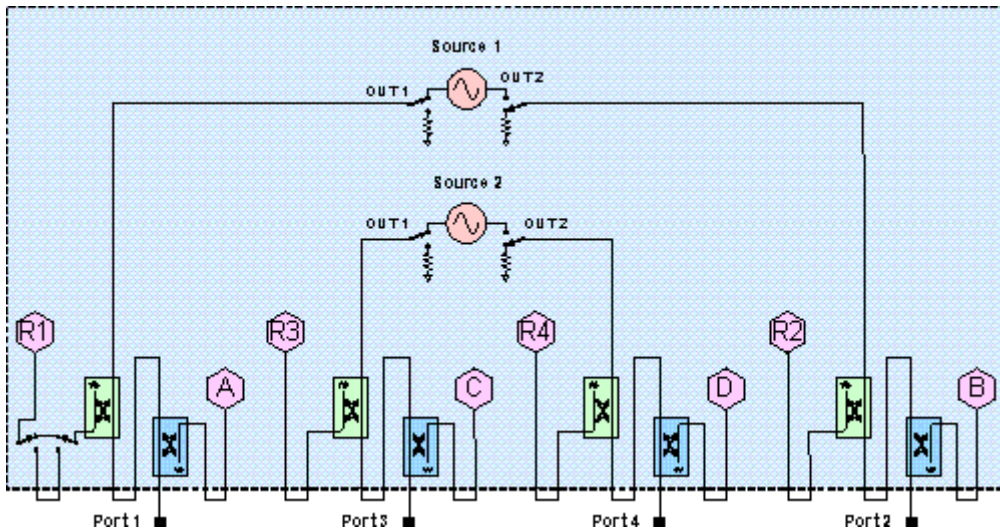
**Figure 2. Path Configuration Diagram, N5242A Option 200, Port 1 Filtered Mode**



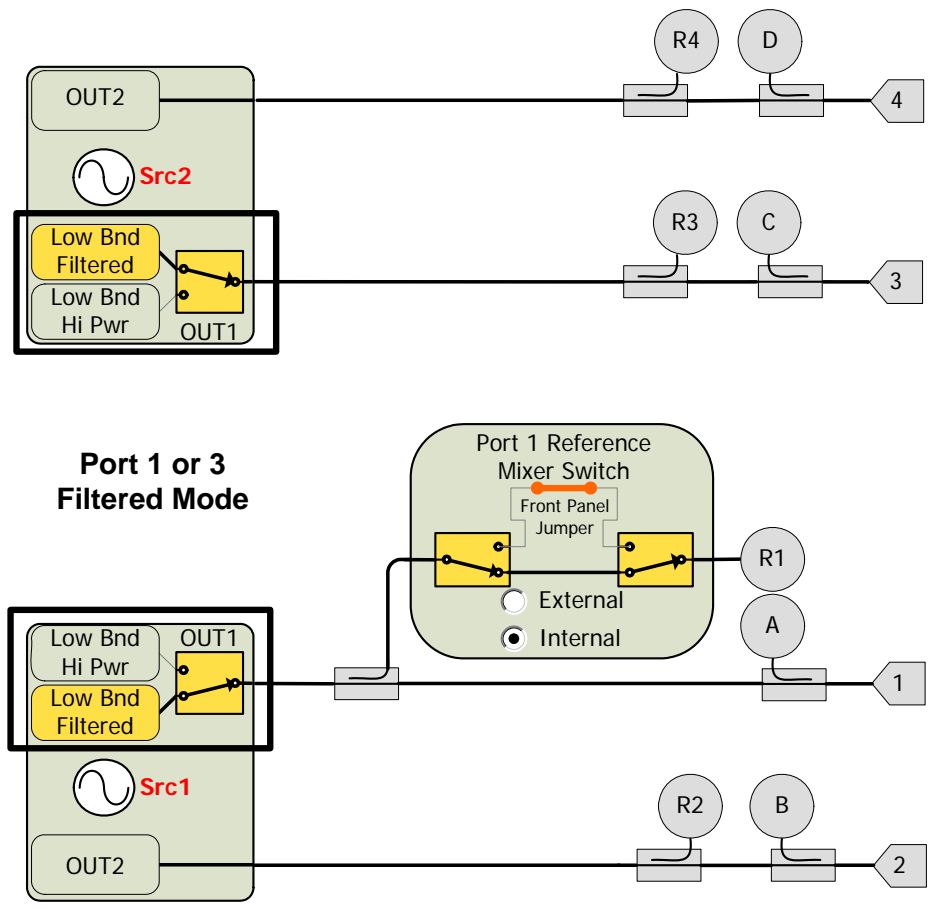
**Figure 3. Path Configuration Diagram, N5242A Option 200, Port 1 Hi Pwr Mode**



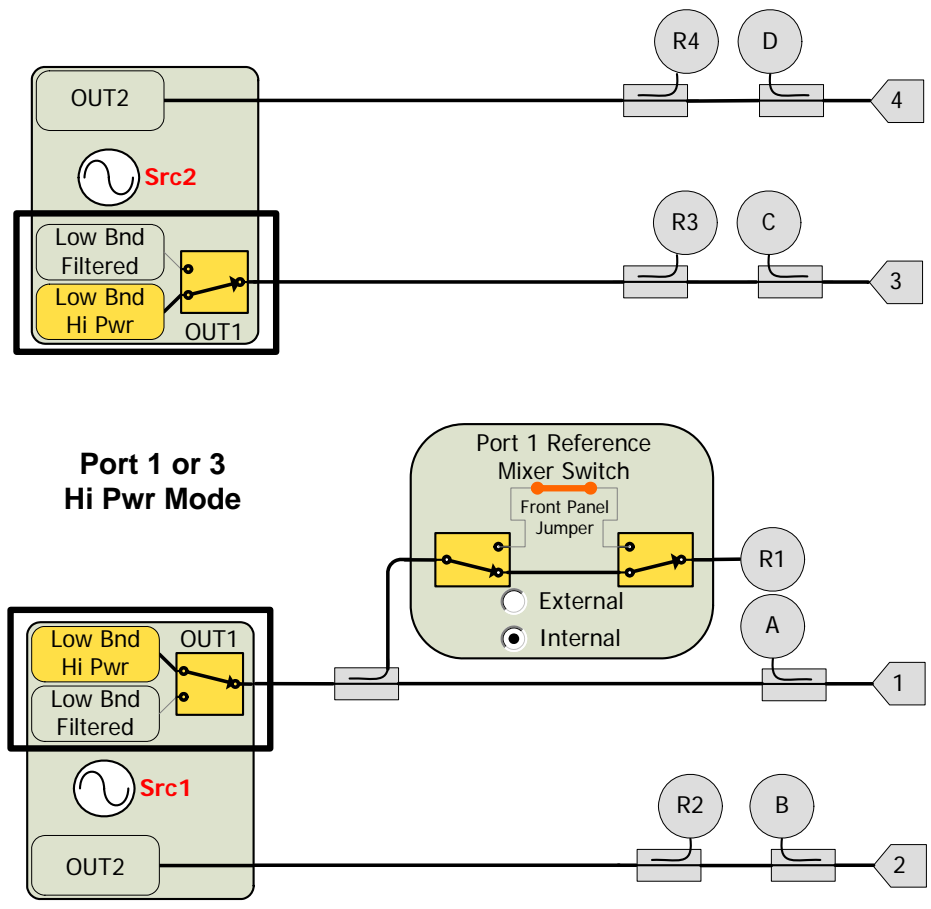
**Figure 4. Block Diagram, N5242A Option 400**



**Figure 5. Path Configuration Diagram, N5242A Option 400, Port 1 or 3 Filtered Mode**



**Figure 6. Path Configuration Diagram, N5242A Option 400, Port 1 or 3 Hi Pwr Mode**





**Table 8b. Maximum Leveled Power, Option 219 or 419**

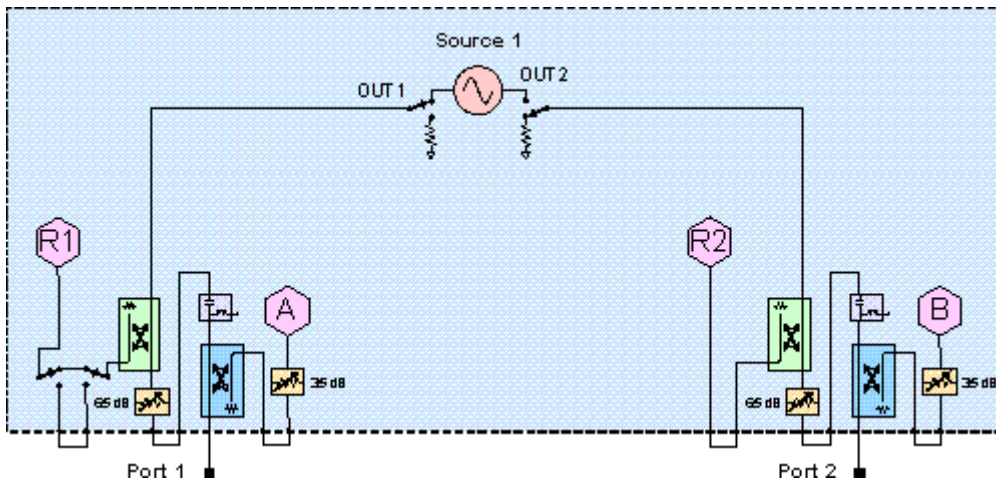
If Option 029 is included, see section [Specifications: N5242A Option 029](#).

Description	Specification (dBm)			Typical (dBm)		
	Port 1 or 3 <sup>1</sup> Filtered Mode <sup>2</sup>	Port 1 or 3 <sup>1</sup> Hi Pwr Mode <sup>2</sup>	Port 2 or 4 <sup>1</sup>	Port 1 or 3 <sup>1</sup> Filtered Mode <sup>2</sup>	Port 1 or 3 <sup>1</sup> Hi Pwr Mode <sup>2</sup>	Port 2 or 4 <sup>1</sup>
10 MHz to 50 MHz	8	13	13	10	19	17
50 MHz to 500 MHz	10	13	13	11	20	19
500 MHz to 3.2 GHz	10	10	13	11	13	18
3.2 GHz to 10 GHz	13	13	13	18	18	17
10 GHz to 16 GHz	12	12	11	15	15	14
16 GHz to 20 GHz	10	10	8	13	13	10
20 GHz to 24 GHz	8	8	7	12	12	9
24 GHz to 26.5 GHz	3	3	-1	8	8	4

<sup>1</sup> Either port can be used as the source port.

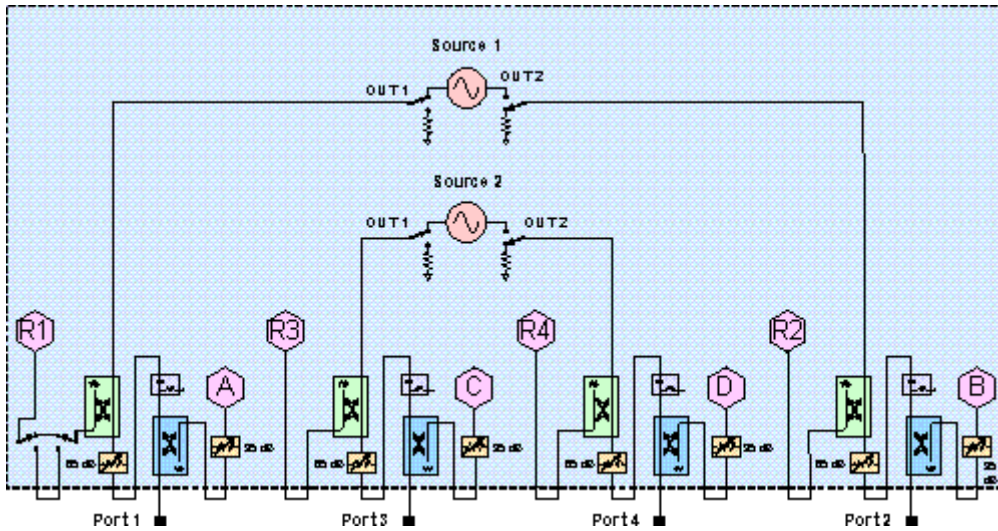
<sup>2</sup> In Filtered Mode, the signal path goes through filters to minimize harmonics below 3.2 GHz. In Hi Pwr Mode, the signal bypasses the filters to maximize output power.

**Figure 7. Block Diagram, N5242A Option 219**



**Note:** The path configuration drawing for Option 219 is identical to the path configuration drawings for Option 200, which are shown in Figure 2 and Figure 3.

**Figure 8. Block Diagram, N5242A Option 419**



**Note:** The path configuration drawing for Option 419 is identical to the path configuration drawings for Option 400, which are shown in Figure 5 and Figure 6.

**Table 8c. Maximum Leveled Power, Option 224**

If Option 029 is included, see section [Specifications: N5242A Option 029](#).

Description	Specification (dBm)			Typical (dBm)		
	Port 1 Filtered Mode <sup>1</sup>	Port 1 Hi Pwr Mode <sup>1</sup>	Port 2	Port 1 Filtered Mode <sup>1</sup>	Port 1 Hi Pwr Mode <sup>1</sup>	Port 2
10 MHz to 50 MHz	7	13	13	9	19	17
50 MHz to 500 MHz	8	13	13	11	20	20
500 MHz to 3.2 GHz	8	10	13	11	13	17
3.2 GHz to 10 GHz	13	13	13	19	19	17
10 GHz to 16 GHz	12	12	10	15	15	14
16 GHz to 20 GHz	10	10	7	13	13	10
20 GHz to 24 GHz	7	7	5	12	12	9
24 GHz to 26.5 GHz	0	0	-2	8	8	4

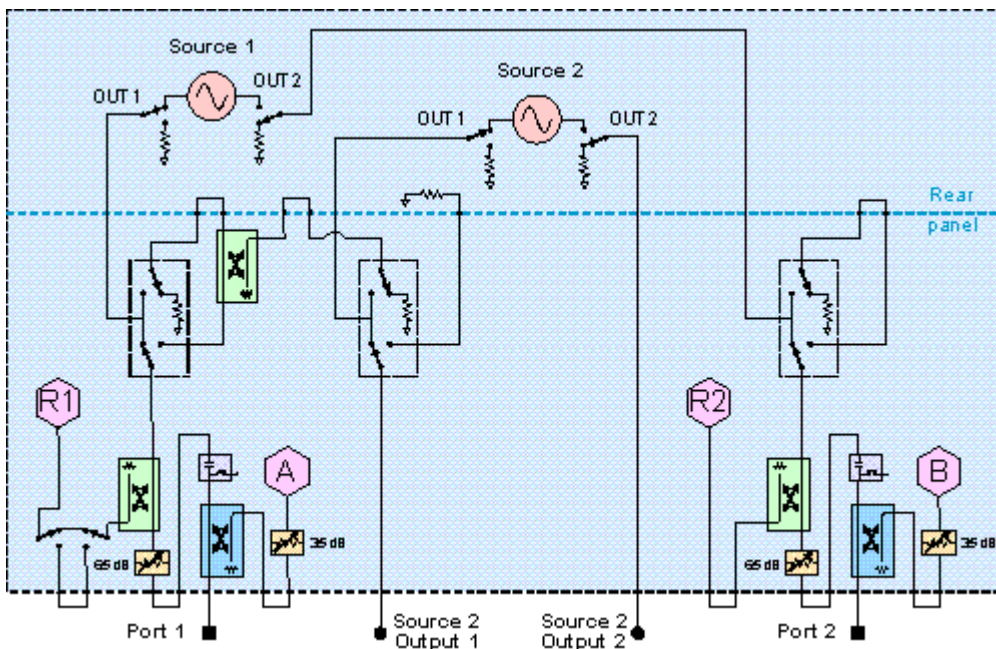
<sup>1</sup> In Filtered Mode, the signal path goes through filters to minimize harmonics below 3.2 GHz. In Hi Pwr Mode, the signal bypasses the filters to maximize output power.

**Table 8d. Maximum Leveled Power, Option 224**

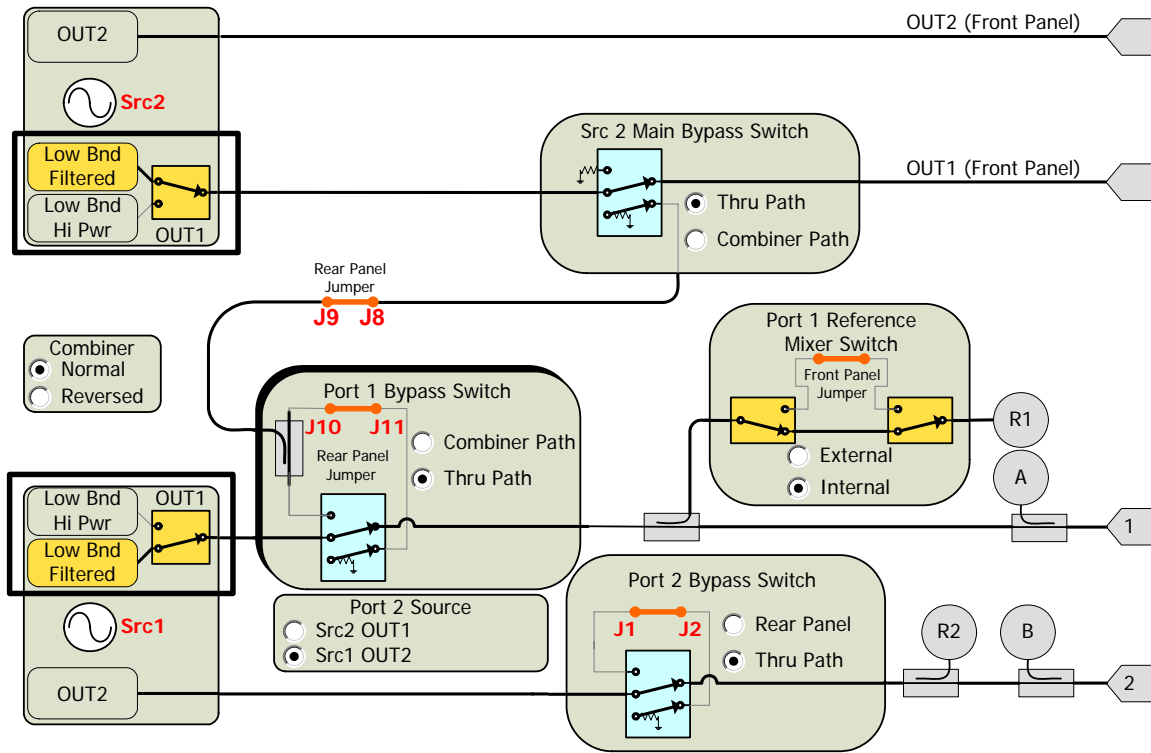
Description	Specification (dBm)			Typical (dBm)		
	Source 2, Out 1 Filtered Mode <sup>1</sup>	Source 2, Out 1 Hi Pwr Mode <sup>1</sup>	Source 2, Out 2	Source 2, Out 1 Filtered Mode <sup>1</sup>	Source 2, Out 1 Hi Pwr Mode <sup>1</sup>	Source 2, Out 2
10 MHz to 50 MHz	9	18	13	12	21	18
50 MHz to 500 MHz	11	18	17	13	22	21
500 MHz to 3.2 GHz	10	14	14	13	17	19
3.2 GHz to 10 GHz	18	18	18	22	22	22
10 GHz to 16 GHz	16	16	16	21	21	20
16 GHz to 20 GHz	15	15	13	19	19	17
20 GHz to 24 GHz	13	13	12	18	18	17
24 GHz to 26.5 GHz	7	7	5	14	14	11

<sup>1</sup>In Filtered Mode, the signal path goes through filters to minimize harmonics below 3.2 GHz. In Hi Pwr Mode, the signal bypasses the filters to maximize output power.

**Figure 9. Block Diagram: N5242A Option 224**



**Figure 10. Path Configuration Diagram, N5242A Option 224**



**Table 8e. Maximum Levelled Power, Option 423**

If Option 029 is included, see section [Specifications: N5242A Option 029](#).

Description	Specification (dBm)			Typical (dBm)		
	Port 1 or 3 Filtered Mode <sup>1</sup>	Port 1 or 3 Hi Pwr Mode <sup>1</sup>	Port 2 or 4	Port 1 or 3 Filtered Mode <sup>1</sup>	Port 1 or 3 Hi Pwr Mode <sup>1</sup>	Port 2 or 4
10 MHz to 50 MHz	7	13	13	9	19	17
50 MHz to 500 MHz	8	13	13	11	20	20
500 MHz to 3.2 GHz	8	10	13	11	13	17
3.2 GHz to 10 GHz	13	13	13	19	19	17
10 GHz to 16 GHz	12	12	10	15	15	14
16 GHz to 20 GHz	10	10	7	13	13	10
20 GHz to 24 GHz	7	7	5	12	12	9
24 GHz to 26.5 GHz	0	0	-2	8	8	4

<sup>1</sup> In Filtered Mode, the signal path goes through filters to minimize harmonics below 3.2 GHz. In Hi Pwr Mode, the signal bypasses the filters to maximize output power.

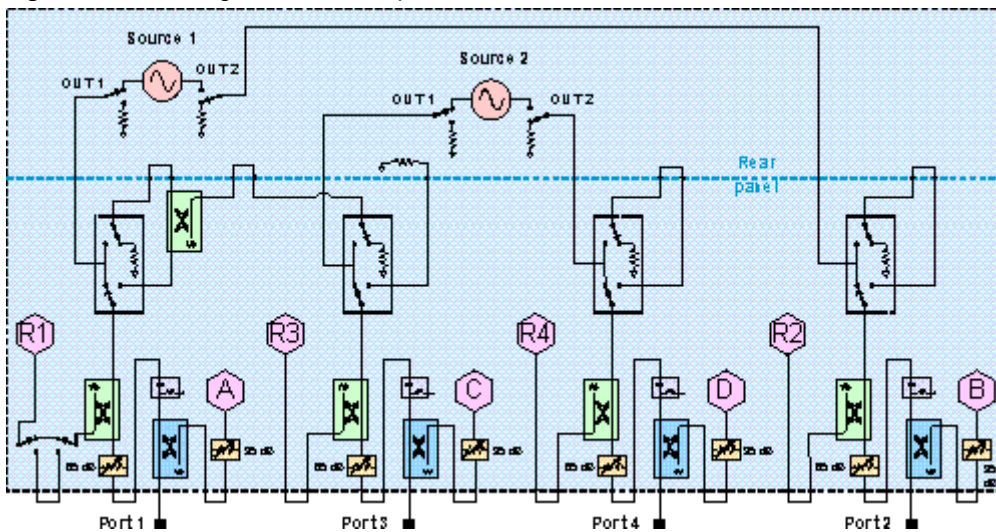
**Table 8f. Maximum Leveled Power, Option 224 or 423**

If Option 029 is included, see section [Specifications: N5242A Option 029](#).

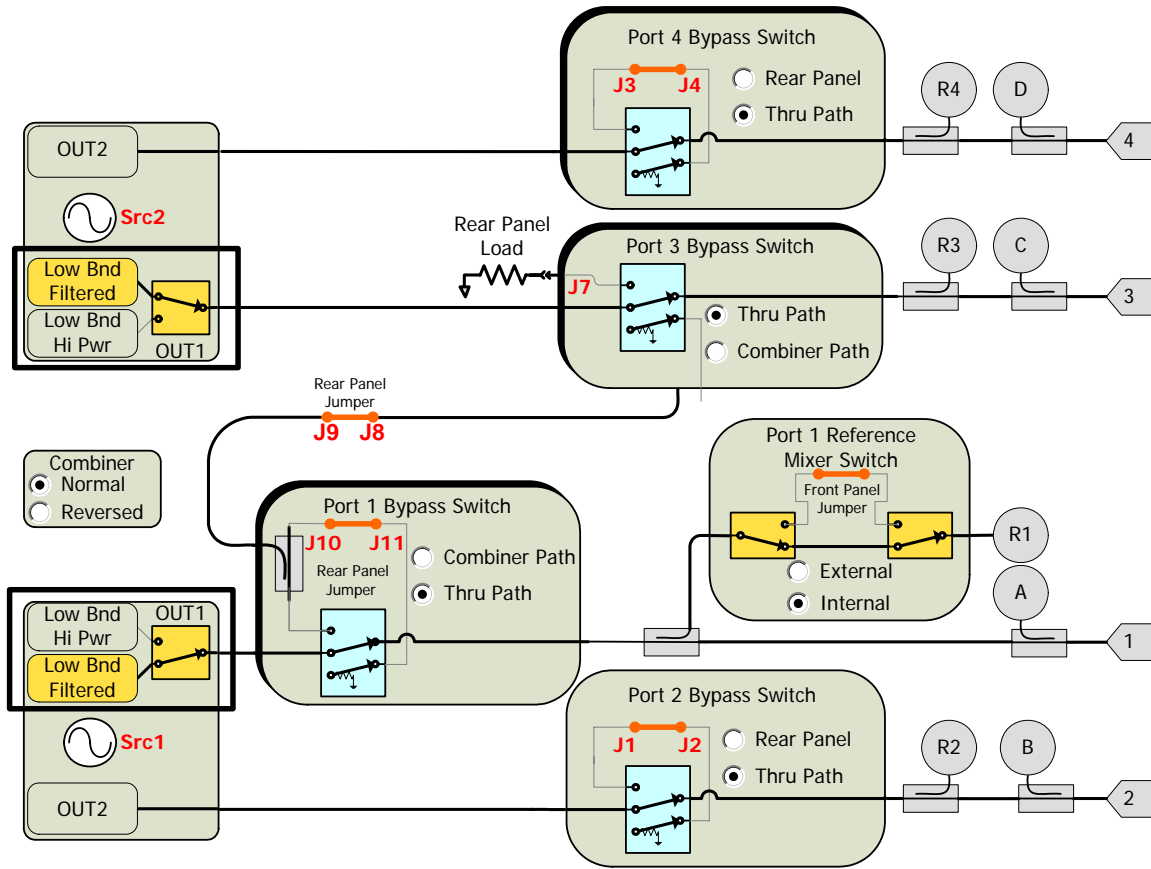
Description	Typical (dBm)			
	Source 1, Port 1 Combine Mode Filtered Mode <sup>1</sup>	Source 1, Port 1 Combine Mode Hi Pwr Mode <sup>1</sup>	Source 2, Port 1 Combine Mode Filtered Mode <sup>1</sup>	Source 2, Port 1 Combine Mode Hi Pwr Mode <sup>1</sup>
10 MHz to 50 MHz	7	17	-7	3
50 MHz to 500 MHz	9	17	-5	4
500 MHz to 3.2 GHz	9	10	-5	-4
3.2 GHz to 10 GHz	15	15	2	2
10 GHz to 16 GHz	11	11	-2	-2
16 GHz to 20 GHz	8	8	-4	-4
20 GHz to 24 GHz	6	6	-6	-6
24 GHz to 26.5 GHz	2	2	-11	-11

<sup>1</sup> In Filtered Mode, the signal path goes through filters to minimize harmonics below 3.2 GHz. In Hi Pwr Mode, the signal bypasses the filters to maximize output power.

**Figure 11. Block Diagram: N5242A Option 423**



**Figure 12. Path Configuration Diagram, N5242A Option 423**



**Table 9a. Power Level Accuracy**

**All Options**

Description	Specification (dB)		Typical (dB)	
	Ports 1, 2, 3, 4 <sup>1</sup>	Source 2, Out 1 Source 2, Out 2	Ports 1, 2, 3, 4 <sup>1</sup>	Source 2, Out 1 Source 2, Out 2
10 MHz to 50 MHz	+/-1.0	+/-2.0	+/-0.40	+/-0.55
50 MHz to 500 MHz	+/-1.0	+/-2.0	+/-0.20	+/-0.25
500 MHz to 3.2 GHz	+/-1.0	+/-2.0	+/-0.25	+/-0.25
3.2 GHz to 10 GHz	+/-1.0	+/-2.0	+/-0.40	+/-0.25
10 GHz to 13 GHz	+/-1.2	+/-2.0	+/-0.60	+/-0.25
13 GHz to 18 GHz	+/-2.0	+/-2.5	+/-0.60	+/-1.00
18 GHz to 26.5 GHz	+/-2.5	+/-2.5	+/-0.80	+/-0.90

<sup>1</sup>Any port can be used as the source port. Source in filtered mode where applicable.

**Table 9b. Power Level Linearity****All Options**

Description	Specification (dB)		
	Port 1 or 3 <sup>1</sup> -25dBm ≤ P < -20dBm	Port 1 or 3 <sup>1</sup> -20dBm ≤ P < -15dBm	Port 1 or 3 <sup>1</sup> P ≥ -15dBm
10 MHz to 50 MHz	+/-2.0	+/-1.5	+/-1.0
50 MHz to 500 MHz	+/-1.5	+/-1.0	+/-1.0
500 MHz to 3.2 GHz	+/-1.0	+/-1.0	+/-1.0
3.2 GHz to 10 GHz	+/-1.0	+/-1.0	+/-1.0
10 GHz to 16 GHz	+/-1.0	+/-1.0	+/-1.0
16 GHz to 20 GHz	+/-1.0	+/-1.0	+/-1.0
20 GHz to 24 GHz	+/-1.0	+/-1.0	+/-1.0
24 GHz to 26.5 GHz	+/-1.0	+/-1.0	+/-1.0

<sup>1</sup> Either port can be used as the source port. Source in filtered mode.**Table 9c. (Continued) Power Level Linearity****All Options**

Description	Specification (dB)		
	Port 2 or 4 <sup>1</sup> -25dBm ≤ P < -20dBm	Port 2 or 4 <sup>1</sup> -20dBm ≤ P < -15dBm	Port 2 or 4 <sup>1</sup> P ≥ -15dBm
10 MHz to 50 MHz	+/-5.0	+/-2.0	+/-1.5
50 MHz to 500 MHz	+/-4.0	+/-2.0	+/-1.5
500 MHz to 3.2 GHz	+/-2.5	+/-1.0	+/-1.0
3.2 GHz to 10 GHz	+/-2.0	+/-1.0	+/-1.0
10 GHz to 16 GHz	+/-1.5	+/-1.5	+/-1.5
16 GHz to 20 GHz	+/-1.0	+/-1.0	+/-1.0
20 GHz to 24 GHz	+/-1.0	+/-1.0	+/-1.0
24 GHz to 26.5 GHz	+/-1.0	+/-1.0	+/-1.0

<sup>1</sup> Either port can be used as the source port.

**Table 9d. Power Level Linearity****Option 224**

Description	Specification (dB)		
	Source 2, Out 1 <sup>1</sup> P ≥ -15dBm	Source 2, Out 2 -15dBm ≤ P < -10dBm	Source 2, Out 2 P ≥ -10dBm
10 MHz to 50 MHz	+/-1.0	+/-1.5	+/-1.0
50 MHz to 500 MHz	+/-1.0	+/-1.5	+/-1.0
500 MHz to 3.2 GHz	+/-1.0	+/-1.0	+/-1.0
3.2 GHz to 10 GHz	+/-1.0	+/-1.0	+/-1.0
10 GHz to 16 GHz	+/-1.0	+/-1.0	+/-1.0
16 GHz to 20 GHz	+/-1.0	+/-1.0	+/-1.0
20 GHz to 24 GHz	+/-1.0	+/-1.0	+/-1.0
24 GHz to 26.5 GHz	+/-1.0	+/-1.0	+/-1.0

<sup>1</sup>Source in filtered mode.

**Table 10a. Power Sweep Range****Option 200 or 400**

Description	Specification (dB)		Typical (dB)	
	Port 1 or 3 <sup>1</sup>	Port 2 or 4 <sup>1</sup>	Port 1 or 3 <sup>1</sup>	Port 2 or 4 <sup>1</sup>
10 MHz to 50 MHz	38	38	46	44
50 MHz to 500 MHz	38	38	48	47
500 MHz to 3.2 GHz	35	38	40	45
3.2 GHz to 10 GHz	38	38	47	46
10 GHz to 16 GHz	38	38	44	43
16 GHz to 20 GHz	38	35	43	39
20 GHz to 24 GHz	37	32	42	38
24 GHz to 26.5 GHz	30	27	38	34

<sup>1</sup> Either port can be used as the source port. Source in filtered mode where applicable.



**Table 10b. Power Sweep Range****Option 219 or 419**

Description	Specification (dB)		Typical (dB)	
	Port 1 or 3 <sup>1</sup>	Port 2 or 4 <sup>1</sup>	Port 1 or 3 <sup>1</sup>	Port 2 or 4 <sup>1</sup>
10 MHz to 50 MHz	38	38	46	44
50 MHz to 500 MHz	38	38	47	46
500 MHz to 3.2 GHz	35	38	40	45
3.2 GHz to 10 GHz	38	38	45	44
10 GHz to 16 GHz	37	36	42	41
16 GHz to 20 GHz	35	33	40	37
20 GHz to 24 GHz	33	32	39	36
24 GHz to 26.5 GHz	28	24	35	31

<sup>1</sup> Either port can be used as the source port. Source in filtered mode where applicable.**Table 10c. Power Sweep Range****Option 224 or 423**

Description	Specification (dB)		Typical (dB)	
	Port 1 or 3 <sup>1</sup>	Port 2 or 4 <sup>1</sup>	Port 1 or 3 <sup>1</sup>	Port 2 or 4 <sup>1</sup>
10 MHz to 50 MHz	38	38	46	44
50 MHz to 500 MHz	38	38	47	47
500 MHz to 3.2 GHz	35	38	40	44
3.2 GHz to 10 GHz	38	38	46	44
10 GHz to 16 GHz	37	35	42	41
16 GHz to 20 GHz	35	32	40	37
20 GHz to 24 GHz	32	30	39	36
24 GHz to 26.5 GHz	25	23	35	31

<sup>1</sup> Either port can be used as the source port. Source in filtered mode where applicable.

**Table 10d. Power Sweep Range****Option 224**

Description	Specification (dB)		Typical (dB)	
	Source 2 <sup>1</sup> Out 1	Source 2 Out 2	Source 2 <sup>1</sup> Out 1	Source 2 Out 2
10 MHz to 50 MHz	33	28	38	35
50 MHz to 500 MHz	33	32	39	38
500 MHz to 3.2 GHz	29	29	34	36
3.2 GHz to 10 GHz	33	33	39	39
10 GHz to 16 GHz	31	31	38	37
16 GHz to 20 GHz	30	28	36	34
20 GHz to 24 GHz	28	27	35	34
24 GHz to 26.5 GHz	22	20	31	28

<sup>1</sup>Source in filtered mode where applicable.**Table 11. Nominal Power (Preset Power)**

Description	Specification (dBm)				Typical (dBm)	
	Option 200 or 400	Option 219 or 224 or 419 or 423	Option 224		Option 224 or 423	
	Ports 1, 2, 3, 4 <sup>1</sup>	Source 2, Out 1	Source 2, Out 2	Source 1, Port 1 Combine Mode	Source 2, Port 1 Combine Mode	
10 MHz to 26.5 GHz	0	-5	5	5	-10	-15

<sup>1</sup> Any port can be used as the source port. Any other port can be used as the receiver port.

**Table 12. Power Resolution and Maximum/Minimum Settable Power**

Description	Specification at Test Port		Typical at Test Port	
	All Options	All Options	Option 200 or 400	Option 219 or 419
	<b>Ports 1, 2, 3, 4<sup>1</sup></b>			
Power Resolution	0.01 dB	--	--	--
Maximum Settable Power	--	30 dBm	--	--
Minimum Settable Power	--	--	-30 dBm	-95 dBm

<sup>1</sup> Any port can be used as the source port.

**Table 13. Harmonics at Max Specified Power****All Options****(See Tables 8a - 8f Maximum Leveled Power)**

Description	Typical (dBc)	
	Port 1 or 3 <sup>1,2</sup> Source 2 Out 1 <sup>3</sup>	Port 2 or 4 <sup>1</sup> Source 2 Out 2
<b>2nd Harmonics<sup>4</sup></b>		
10 MHz to 50 MHz	-51	-13
50 MHz to 2 GHz	-51	-13
2 GHz to 3.2 GHz	-60	-21
3.2 GHz to 10 GHz	-60	-21
10 GHz to 16 GHz	-60	-21
16 GHz to 20 GHz	-60	-21
20 GHz to 24 GHz	-60	-21
24 GHz to 26.5 GHz	-60	-21
<b>3rd Harmonics<sup>4</sup></b>		
10 MHz to 50 MHz	-51	-13
50 MHz to 2 GHz	-51	-13
2 GHz to 3.2 GHz	-60	-21
3.2 GHz to 10 GHz	-60	-21
10 GHz to 16 GHz	-60	-21
16 GHz to 20 GHz	-60	-21
20 GHz to 24 GHz	-60	-21
24 GHz to 26.5 GHz	-60	-21

**Table 13. Harmonics at Max Specified Power (continued)**

<b>1/2 and 1/4 Sub-Harmonics<sup>1</sup></b>		
10 MHz to 50 MHz	-73	-73
50 MHz to 2 GHz	-73	-73
2 GHz to 3.2 GHz	-73	-73
3.2 GHz to 10 GHz	-66	-63
10 GHz to 16 GHz	-66	-63
16 GHz to 20 GHz	-66	-63
20 GHz to 24 GHz	-61	-52
24 GHz to 26.5 GHz	-61	-52

<sup>1</sup> Any port can be used as the source port.

<sup>2</sup> < 3.2 GHz Filtered Mode

<sup>3</sup> At port 1 max specified power.

<sup>4</sup> Listed frequency is fundamental frequency; test at max specified power

**Table 14. Non-Harmonic Spurs at nominal power**

<b>Description</b>	<b>Typical (dBc) at Test Port</b>
	<b>Ports 1, 2, 3, 4 Source 2 Out 1, Source 2 Out 2</b>
Offset frequency = 30 kHz to 5 MHz	
10 MHz to 500 MHz	-50
500 MHz to 1 GHz	-60
1 GHz to 2 GHz	-60
2 GHz to 4 GHz	-57
4 GHz to 8 GHz	-51
8 GHz to 16 GHz	-45
16 GHz to 24 GHz	-39
24 GHz to 26.5 GHz	-33

**Table 15. Phase Noise****All Options**

Description	Typical (dBc/Hz)			
	Ports 1, 2, 3, 4, Source 2 Out 1, Source 2 Out 2			
	1 kHz Offset	10 kHz Offset	100 kHz Offset	1 MHz Offset
10 MHz to 500 MHz	-85	-85	-85	-120
500 MHz to 1 GHz	-105	-115	-110	-127
1 GHz to 2 GHz	-100	-110	-105	-121
2 GHz to 4 GHz	-95	-105	-100	-115
4 GHz to 8 GHz	-89	-100	-94	-110
8 GHz to 16 GHz	-83	-94	-88	-105
16 GHz to 26.5 GHz	-78	-89	-82	-100

## Test Port Input

Ports 1, 2, 3, 4. All Options. If Option 029 is included, see section [Specifications: N5242A Option 029](#).

**Table 16. Test Port Noise Floor<sup>1</sup> (dBm)**

Description	Specification	Typical
10 Hz IFBW		
10 MHz to 50 MHz <sup>2</sup>	-80	-87
50 MHz to 100 MHz <sup>2</sup>	-90	-95
100 MHz to 500 MHz <sup>2</sup>	-104	-110
500 MHz to 2 GHz	-114	-117
2 GHz to 20 GHz	-114	-117
20 GHz to 24 GHz	-110	-115
24 GHz to 26.5 GHz	-107	-113

<sup>1</sup>Total average (rms) noise power calculated as the mean value of a linear magnitude trace expressed in dBm.

<sup>2</sup>May typically be degraded at particular frequencies below 500 MHz due to spurious receiver residuals.

**Table 17. Direct Receiver Access Input Noise Floor<sup>1</sup> (dBm)**

Description	Specification	Typical
10 MHz to 50 MHz <sup>2</sup>	--	-130
50 MHz to 100 MHz <sup>2</sup>	--	-128
100 MHz to 500 MHz <sup>2</sup>	--	-132
500 MHz to 2 GHz	--	-133
2 GHz to 20 GHz	--	-129
20 GHz to 24 GHz	--	-122
24 GHz to 26.5 GHz	--	-119

<sup>1</sup>Total average (rms) noise power calculated as the mean value of a linear magnitude trace expressed in dBm.

<sup>2</sup>May typically be degraded at particular frequencies below 500 MHz due to spurious receiver residuals.

**Table 18. Test Port Compression at 0.1 dB (dBm)**

<b>Description</b>	<b>Specification</b>	<b>Typical</b>
10 MHz to 50 MHz	--	--
50 MHz to 500 MHz	--	--
500 MHz to 3.2 GHz	--	13
3.2 GHz to 10 GHz	--	13
10 GHz to 16 GHz	--	13
16 GHz to 20 GHz	--	12
20 GHz to 24 GHz	--	10.5
24 GHz to 26.5 GHz	--	10

**Table 19. Test Port Compression @ 8 dBm Test Port Power (dB)**

<b>Description</b>	<b>Specification</b>	<b>Typical</b>
10 MHz to 50 MHz <sup>1</sup>	--	--
50 MHz to 500 MHz <sup>1</sup>	--	--
500 MHz to 3.2 GHz	<0.17	--
3.2 GHz to 10 GHz	<0.17	--
10 GHz to 16 GHz	<0.17	--
16 GHz to 20 GHz	<0.23	--
20 GHz to 24 GHz	<0.23	--
24 GHz to 26.5 GHz	<0.29	--

<sup>1</sup>Test port receiver compression at specified input levels below 500 MHz is negligible due to coupler roll off in this frequency range.



**Table 20. Trace Noise Magnitude (dB rms)**

Description	Specification	Typical
Ratioed measurement, nominal power at test port.		
<b>1 kHz IFBW</b>		
10 MHz to 100 MHz	0.007	0.0039
100 MHz to 13.5 GHz	0.002	0.0005
13.5 GHz to 16 GHz	0.002	0.0005
16 GHz to 22.5 GHz	0.002	0.0006
22.5 GHz to 24 GHz	0.003	0.0014
24 GHz to 26.5 GHz	0.005	0.0020
<b>100 kHz IFBW</b>		
10 MHz to 100 MHz	--	0.040
100 MHz to 13.5 GHz	--	0.005
13.5 GHz to 16 GHz	--	0.005
16 GHz to 22.5 GHz	--	0.005
22.5 GHz to 24 GHz	--	0.008
24 GHz to 26.5 GHz	--	0.008
<b>600 kHz IFBW</b>		
10 MHz to 100 MHz	--	0.140
100 MHz to 13.5 GHz	--	0.011
13.5 GHz to 16 GHz	--	0.011
16 GHz to 22.5 GHz	--	0.012
22.5 GHz to 24 GHz	--	0.020
24 GHz to 26.5 GHz	--	0.020

**Table 21. Trace Noise Phase (deg rms)**

Description	Specification	Typical
Ratioed measurement, nominal power at test port.		
<b>1 kHz IFBW</b>		
10 MHz to 100 MHz	0.051	0.0261
100 MHz to 13.5 GHz	0.015	0.0041
13.5 GHz to 16 GHz	0.042	0.0124
16 GHz to 22.5 GHz	0.042	0.0135
22.5 GHz to 26.5 GHz	0.054	0.0225
<b>100 kHz IFBW</b>		
10 MHz to 100 MHz	--	0.266
100 MHz to 13.5 GHz	--	0.030
13.5 GHz to 16 GHz	--	0.030
16 GHz to 22.5 GHz	--	0.033
22.5 GHz to 26.5 GHz	--	0.057
<b>600 kHz IFBW</b>		
10 MHz to 100 MHz	--	1.053
100 MHz to 13.5 GHz	--	0.075
13.5 GHz to 16 GHz	--	0.075
16 GHz to 22.5 GHz	--	0.082
22.5 GHz to 26.5 GHz	--	0.139

**Table 22. Reference Level Magnitude**

Description	Specification	Typical
Range	+/-500 dB	--
Resolution	0.001 dB	--

**Table 23. Reference Level Phase**

<b>Description</b>	<b>Specification</b>	<b>Typical</b>
Range	+/-500°	--
Resolution	0.01°	--

**Table 24. Stability Magnitude (dB/°C)**

<b>Description</b>	<b>Specification</b>	<b>Typical</b>
Stability is defined as a ratio measurement made at the test port.		
10 MHz to 50 MHz	--	0.01
50 MHz to 500 MHz	--	0.01
500 MHz to 3.2 GHz	--	0.01
3.2 GHz to 10 GHz	--	0.02
10 GHz to 16 GHz	--	0.02
16 GHz to 20 GHz	--	0.03
20 GHz to 24 GHz	--	0.03
24 GHz to 26.5 GHz	--	0.04

**Table 25. Stability Phase (°/°C)**

<b>Description</b>	<b>Specification</b>	<b>Typical</b>
Stability is defined as a ratio measurement made at the test port.		
10 MHz to 50 MHz	--	0.29
50 MHz to 500 MHz	--	0.06
500 MHz to 3.2 GHz	--	0.07
3.2 GHz to 10 GHz	--	0.13
10 GHz to 16 GHz	--	0.13
16 GHz to 20 GHz	--	0.40
20 GHz to 24 GHz	--	0.54
24 GHz to 26.5 GHz	--	0.56

**Table 26. Damage Input Level**

<b>Description</b>	<b>Specification</b>	<b>Typical</b>
Test Port 1 or 2 or 3 or 4	> +30 dBm RF, 40 VDC	Test Port 1 or 2 or 3 or 4
(Option 224 only) Source 2 Out 1 or Source 2 Out 2	> +30 dBm RF, 0 VDC	(Option 224 only) Source 2 Out 1 or Source 2 Out 2

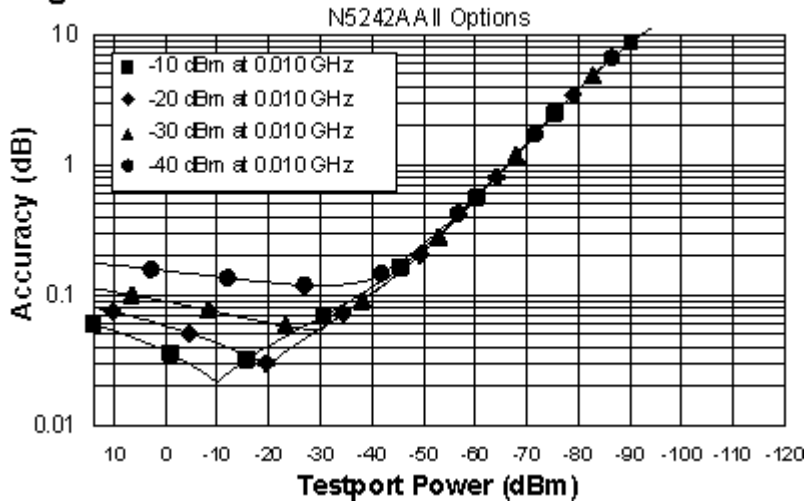
## Dynamic Accuracy

**Table 27. Dynamic Accuracy (Specification)**

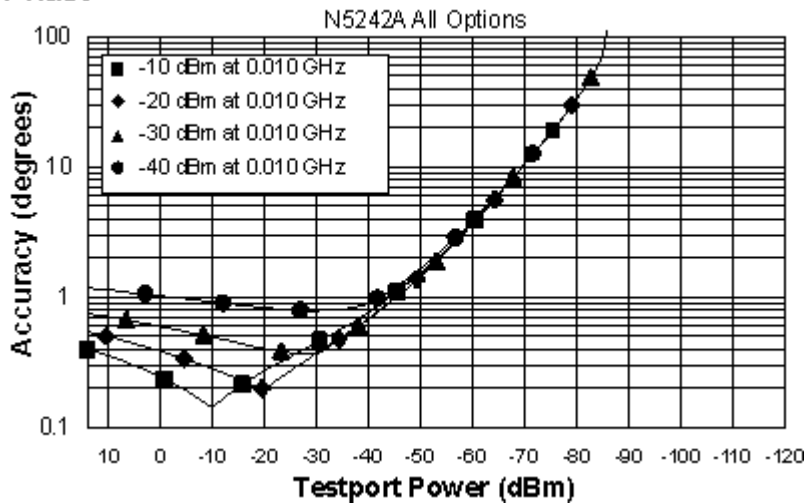
Accuracy of the test port input power reading relative to the reference input power level.

### Dynamic Accuracy, 0.010 GHz

#### Magnitude

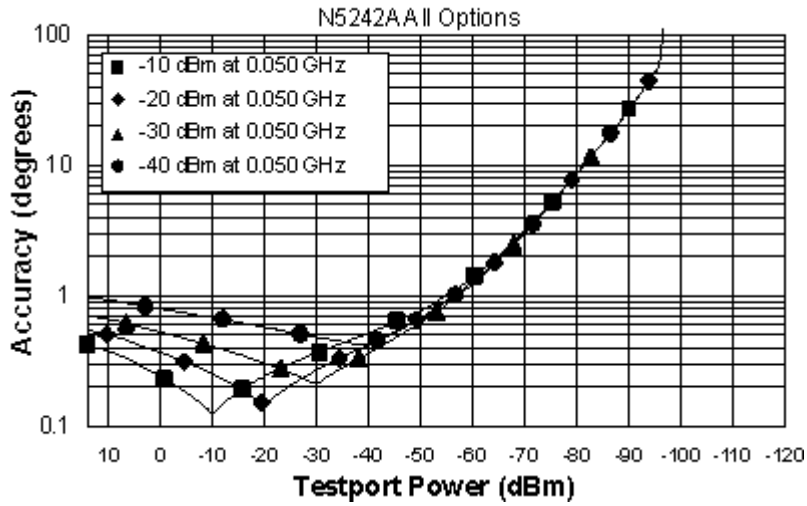


#### Phase

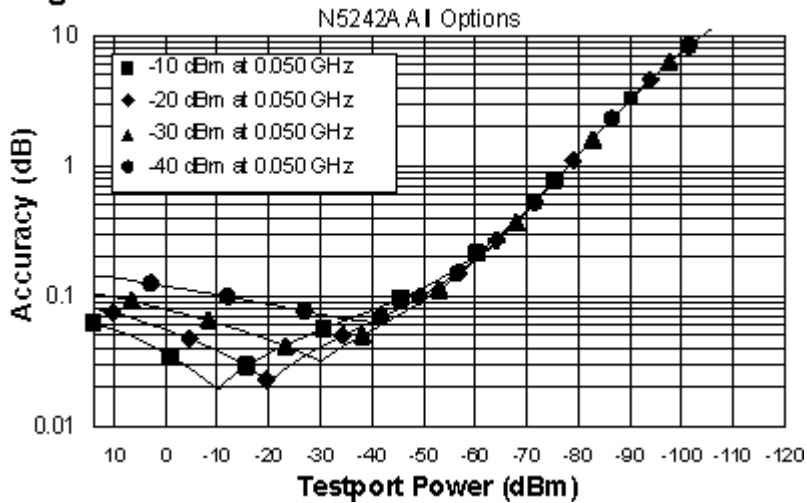


## Dynamic Accuracy, 0.050 GHz

### Phase

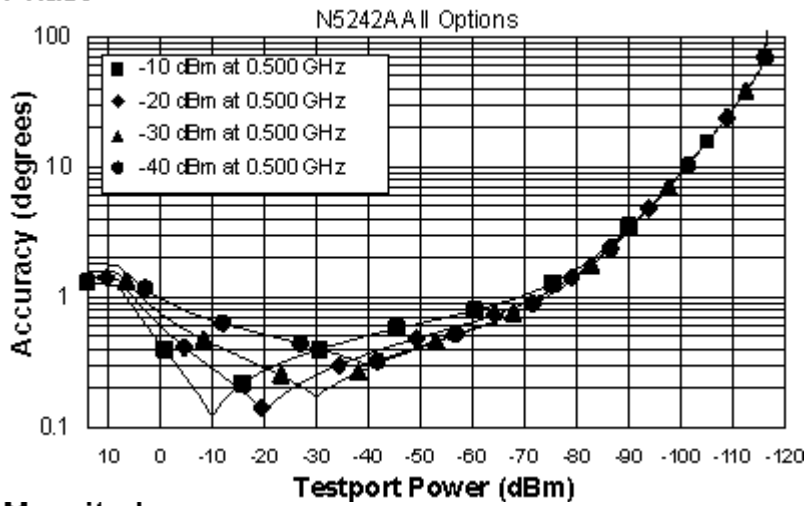


### Magnitude

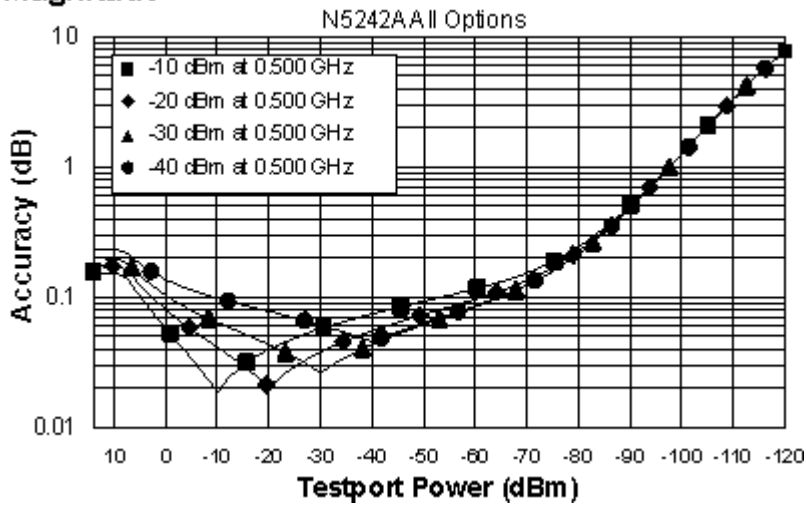


**Dynamic Accuracy, 0.500 GHz**

**Phase**

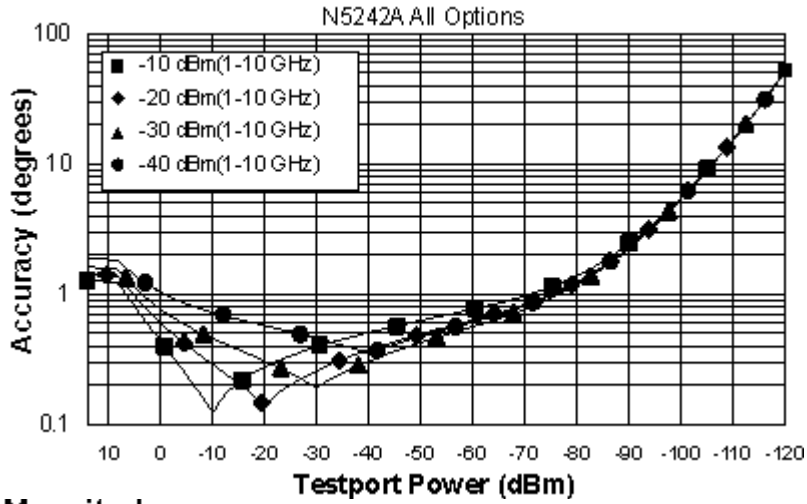


**Magnitude**

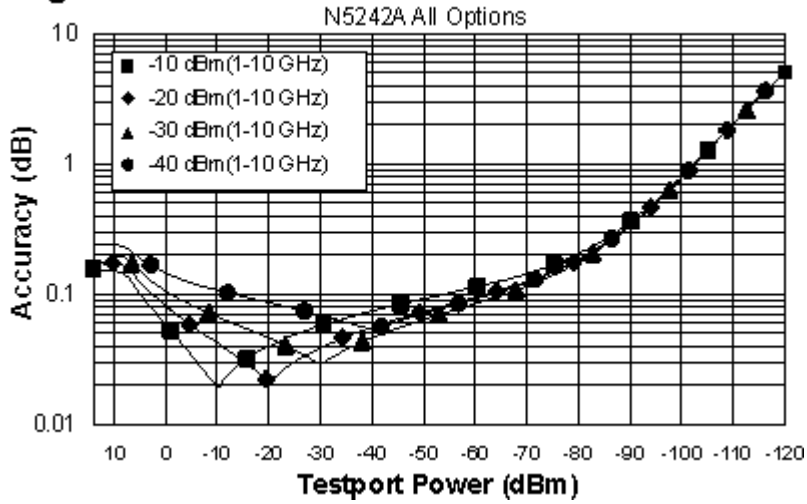


## Dynamic Accuracy, 1- 10 GHz

### Phase



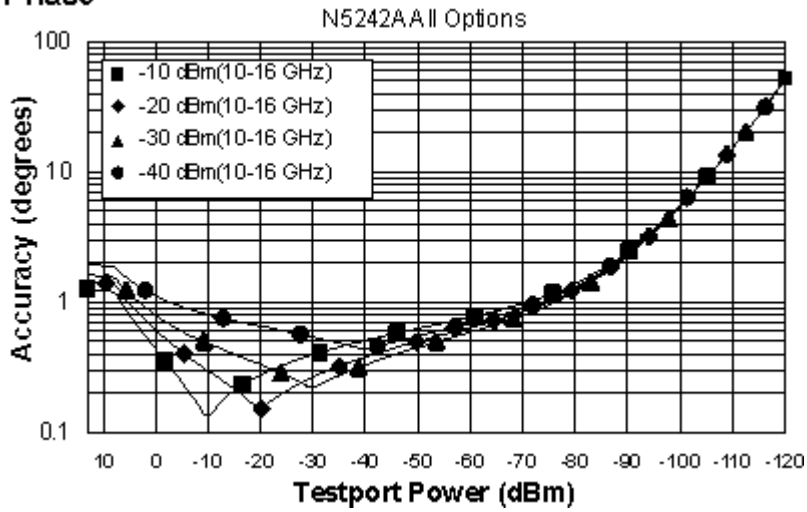
### Magnitude



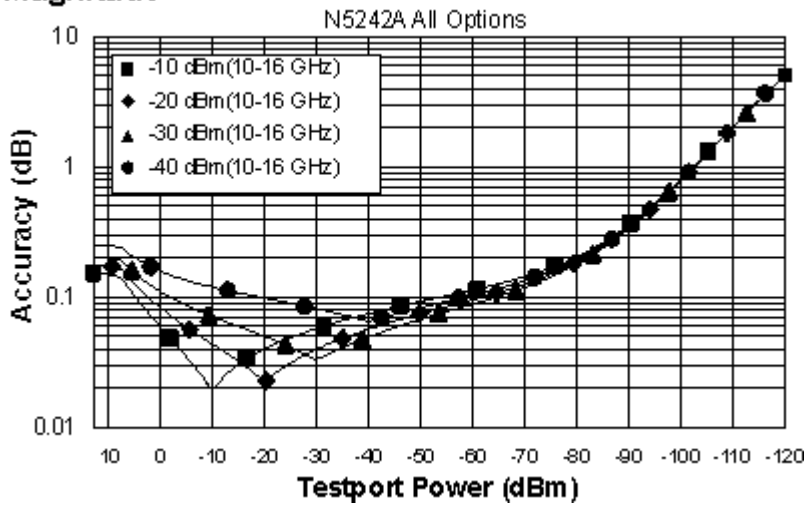


## Dynamic Accuracy, 10 - 16 GHz

### Phase

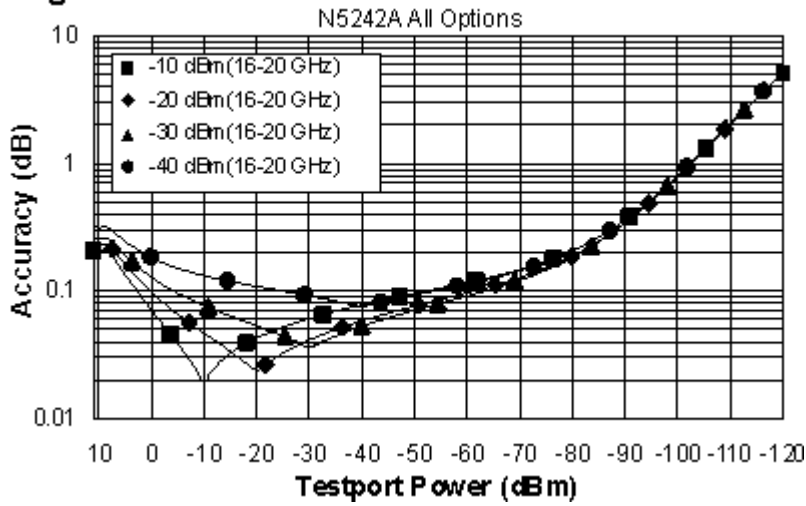


### Magnitude

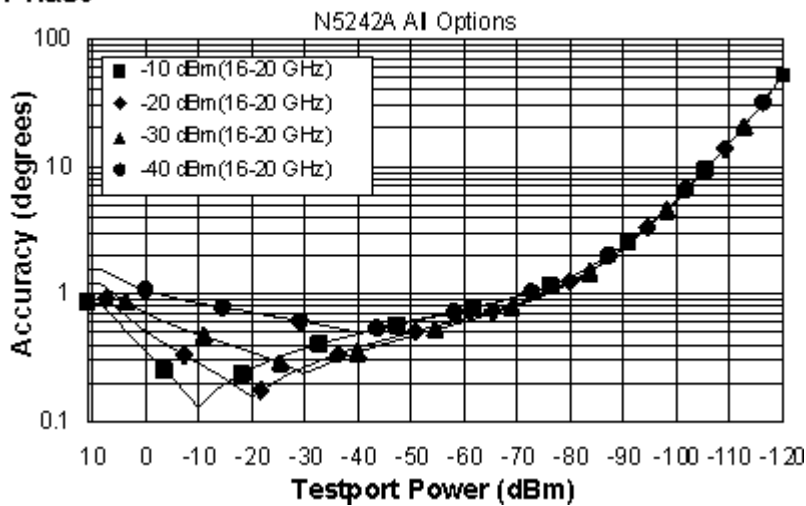


**Dynamic Accuracy, 16 - 20 GHz**

**Magnitude**

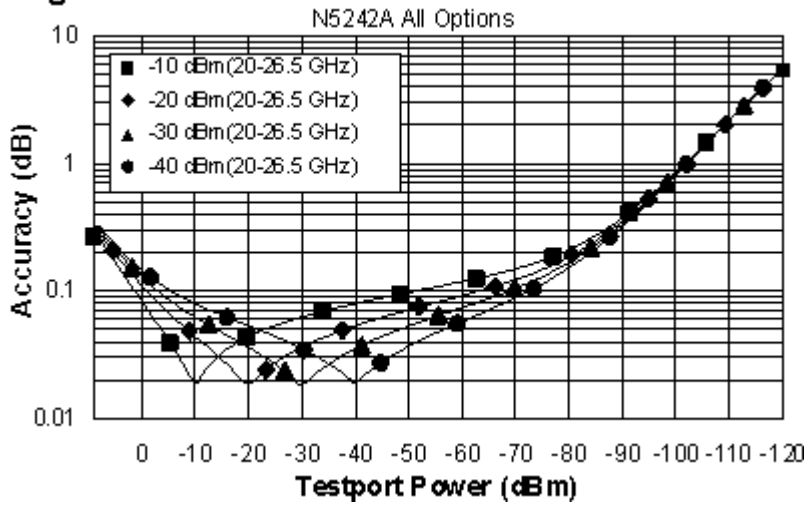


**Phase**

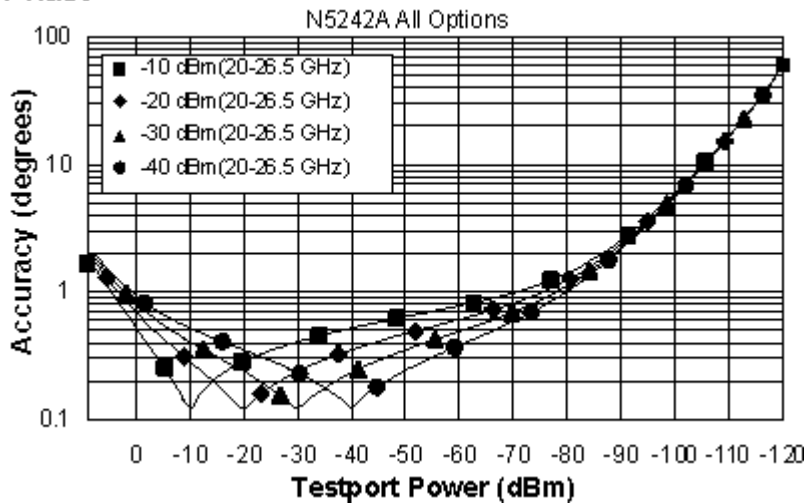


## Dynamic Accuracy, 20 - 26.5 GHz

### Magnitude



### Phase



<sup>2</sup>Dynamic accuracy is verified with the following measurements:

Compression over frequency

IF linearity at a single frequency of 1.195 GHz using a reference level of -20 dBm for an input power range of 0 to -120 dBm.

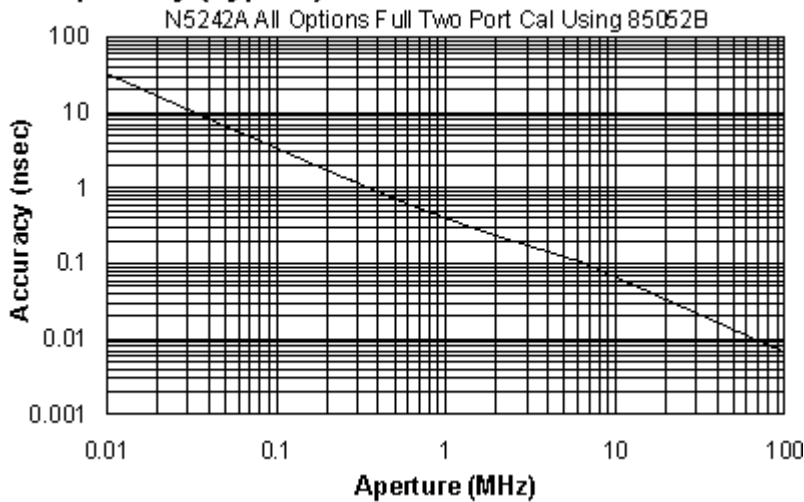
**Table 28. Test Port Input (Group Delay)<sup>a</sup>**

Description	Typical Performance
Aperture (selectable)	(frequency span)/(number of points -1)
Maximum Aperture	20% of frequency span
Range	0.5 x (1/minimum aperture)
Maximum Delay	Limited to measuring no more than 180° of phase change within the minimum aperture.)
Accuracy	See graph below. Char.

The following graph shows characteristic group delay accuracy with full 2-port calibration and a 10 Hz IF bandwidth. Insertion loss is assumed to be < 2 dB and electrical length to be ten meters.

For any  $S_{ij}$  Group Delay measurement,  $S_{ii} = 0$ ,  $S_{ij} = 1$ ,  $S_{ji} = 0$ ,  $S_{kl} = 0$  for all  $kl \neq ij$

**Group Delay (Typical)**



In general, the following formula can be used to determine the accuracy, in seconds, of specific group delay measurement:

$$\pm \text{Phase Accuracy (deg)} / [360 \times \text{Aperture (Hz)}]$$

Depending on the aperture and device length, the phase accuracy used is either incremental phase accuracy or worst-case phase accuracy.

<sup>a</sup> Group delay is computed by measuring the phase change within a specified frequency step (determined by the frequency span and the number of points per sweep).

## General Information

- [Miscellaneous Information](#)
- [Front Panel](#)
- [Rear Panel](#)
- [Environment and Dimensions](#)

**Table 29. Miscellaneous Information**

Description	Supplemental Information
System IF Bandwidth Range	1 Hz to 5 MHz, nominal
CPU	Intel® 1.6 GHz Pentium® M with 1 GByte RAM
LXI	Class C (only applies to N5242A models that are shipped with firmware revision A.08.20 and higher)

**Table 30. Front Panel Information**

### All Options

Description	Typical Performance
<b>RF Connectors</b>	
Type	Option 200 or 219 or 224 or 400 or 419 or 423: 3.5 mm (male), 50 ohm, (nominal)
Center Pin Recession	0.002 in. (characteristic)
<b>USB 2.0 Ports</b>	
<b>Master (4 ports)</b>	
Standard	Compatible with USB 2.0
Connector	USB Type-A female
<b>Display</b>	
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: <ul style="list-style-type: none"><li>• A complete row or column consists of “stuck” or “dark” pixels.</li><li>• More than six “stuck on” pixels (but not more than three green) or more than 0.002% of the total pixels are within the LCD specifications.</li><li>• More than twelve “dark” pixels (but no more than seven of the same color) or more than 0.004% of the total pixels are within the LCD specifications.</li></ul>

- Two or more consecutive "stuck on" pixels or three or more consecutive "dark" pixel (but no more than one set of two consecutive dark pixels)
- "Stuck on" "dark" pixels are less than 6.5 mm apart (excluding consecutive pixels)

**Table 30. (Continued) Front Panel Information**

<b>Display Range</b>	
Magnitude	+/-2500 dB (at 500 dB/div), max
Phase	+/-2500° (at 500 dB/div), max
Polar	10 pUnits, min 10,000 Units, max
<b>Display Resolution</b>	
Magnitude	0.001 dB/div, min
Phase	0.01°/div, min
<b>Marker Resolution</b>	
Magnitude	0.001 dB, min
Phase	0.01°, min
Polar	10 pUnit, min

**Table 31. Rear Panel Information****All Options**

<b>Description</b>	<b>Typical Performance</b>
<b>10 MHz Reference In</b>	
Connector	BNC, female
Input Frequency	10 MHz $\pm$ 10 ppm, typical
Input Level	-15 dBm to +20 dBm, typical
Input Impedance	200 $\Omega$ , nom.
<b>10 MHz Reference Out</b>	
Connector	BNC, female
Output Frequency	10 MHz $\pm$ 1 ppm, typical
Signal Type	Sine Wave, typical
Output Level	+10 dBm $\pm$ 4 dB into 50 $\Omega$
Output Impedance	50 $\Omega$ , nominal
Harmonics	<-40 dBc, typical
<b>External IF Inputs</b>	
Function	Allows use of external IF signals from remote mixers, bypassing the PNA's first converters
Connectors	SMA (female); A, B, C, D, R (4-port); A, B, R1, R2 (2-port)
Input Frequency	
Normal IF path:	RF < 53 MHz: IF = 2.535 MHz RF $\geq$ 53 MHz: IF = 7.606 MHz
Narrowband IF path:	IF = 10.70 MHz
Input Impedance	50 $\Omega$
RF Damage Level	
DC Damage Level	5.5 VDC
0.1 dB Compression Point	

**Table 31. (Continued) Rear Panel Information**

<b>Pulse Inputs (IF Gates)</b>	
Function	Internal receiver gates used for point-in-pulse and pulse-profile measurements
Connectors	15-pin mini D-sub
Input Impedance	1 K Ohm
Minimum Pulse Width, Source Modulators	33 ns
Minimum Pulse Width, Receiver Gates	20 ns
DC Damage Level	5.5 VDC
Drive Voltage	0 V (off), +3.3 V (on), nominal
<b>RF Pulse Modulator Input (Source Modulator)</b>	
<b>On/Off Ratio</b>	
10 MHz to 3.2 GHz	-64
3.2 GHz to 26.5 GHz	-80
<b>Pulse Period</b>	
Minimum	33 ns
Maximum	70 s
<b>External Test Set Driver</b>	
Function	Used for driving remote mixers
Connections	SMA (female)
RF, LO Output Frequency Range	1.7 to 26.5 GHz



**Table 31. (Continued) Rear Panel Information**

Description	Typical (dBm)	
	Upper Limit (dBm)	Lower Limit (dBm)
<b>Test Set Drivers (Continued)</b>		
<b>Rear Panel LO Power</b>		
1.7 GHz to 18 GHz	0	-10
18 GHz to 22.5 GHz	2	-8
22.5 GHz to 26.5 GHz <sup>1</sup>	6	-5
<b>Rear Panel RF Power</b>		
3.2 GHz to 20 GHz	-3	-8
20 GHz to 26.5 GHz	-8	-14

<sup>1</sup> Full LO frequency range is 12.535 MHz to 26.5 GHz.

**Table 31. (Continued) Rear Panel Information**

<b>Description</b>	<b>Typical Performance</b>
<b>VGA Video Output</b>	
Connector	15-pin mini D-Sub; Drives VGA compatible monitors
<b>Devices Supported:</b>	
	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").
<b>Bias Tee Inputs</b>	
Connectors	BNC(f) for ports 1, 2, 3 and 4
Fuse	500 mA, bi-pin style
Maximum Bias Current	+/-200 mA with no degradation of RF specifications
Maximum Bias Voltage	+/-40 VDC
Trigger Inputs/Outputs	BNC(f), TTL/CMOS compatible
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.

**Table 31. (Continued) Rear Panel Information**

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
USB Port	Four ports on front panel (all Host) and five ports (four Host and one Device) on rear panel. Type A configuration (eight Host) and Type B configuration (one Device), USB 2.0 compatible.
LAN	10/100BaseT Ethernet, 8-pin configuration; auto selects between the two data rates
<b>Line Power</b>	
Frequency, Voltage	50/60 Hz for 100 240 VAC
	Power supply is auto switching
Max	450 watts

**Note:** Option H11 is not available with the N5242A network analyzer.

**Table 32. Analyzer Dimensions and Weight**

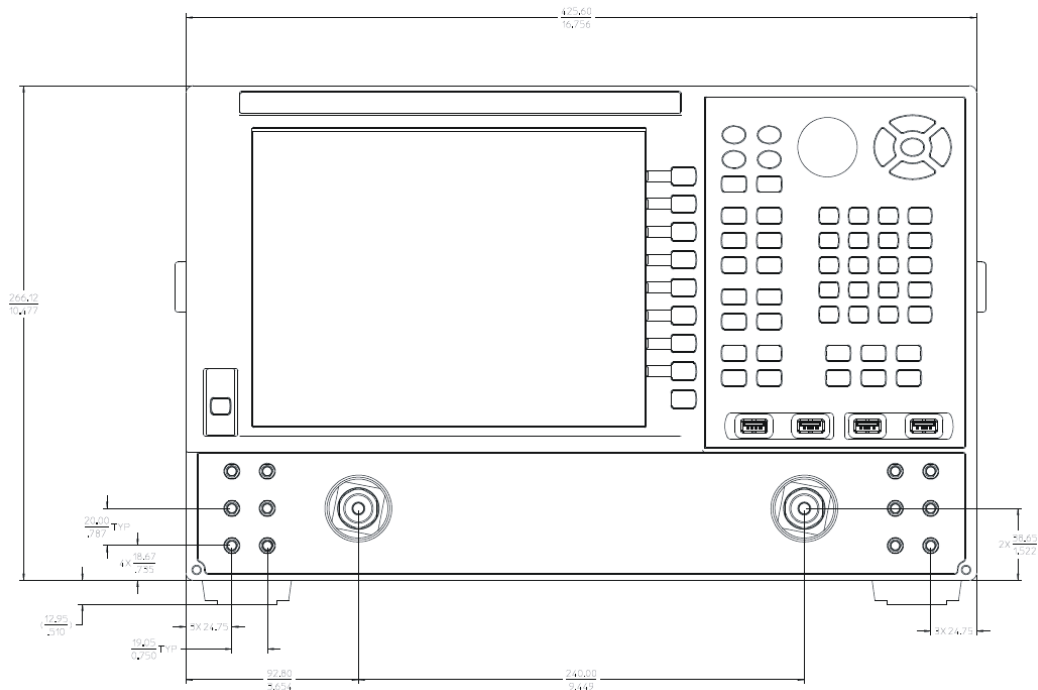
<b>Cabinet Dimensions</b>	<b>Height</b>	<b>Width</b>	<b>Depth</b>
Excluding front and rear panel hardware and feet	267 mm 10.5 in	426 mm 16.75 in	533 mm 20.97 in
Excluding front and rear panel hardware and feet. Including rack-mount flanges.	266 mm 10.5 in EIA RU <sup>1</sup> = 6	426 mm 16.75 in	558 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 handles	280 mm 11.0 in	457 mm 17.98 in	578 mm 22.74 in
As shipped including rack-mount flanges	280 mm 11.0 in	483 mm 19.00 in	558 mm 21.95 in
As shipped including handles and rack-mount flanges	280 mm 11.0 in	483 mm 19.00 in	578 mm 22.74 in
<b>Weight</b>			
	Option 200 or 219 or 224	Option 400 or 419 or 423	--
Net	27 kg (60 lb), nominal	37 kg (82 lb), nominal	--
Shipping	43 kg (95 lb), nominal	53 kg (117 lb), nominal	--

<sup>1</sup>Network analyzer feet removed.

**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>.

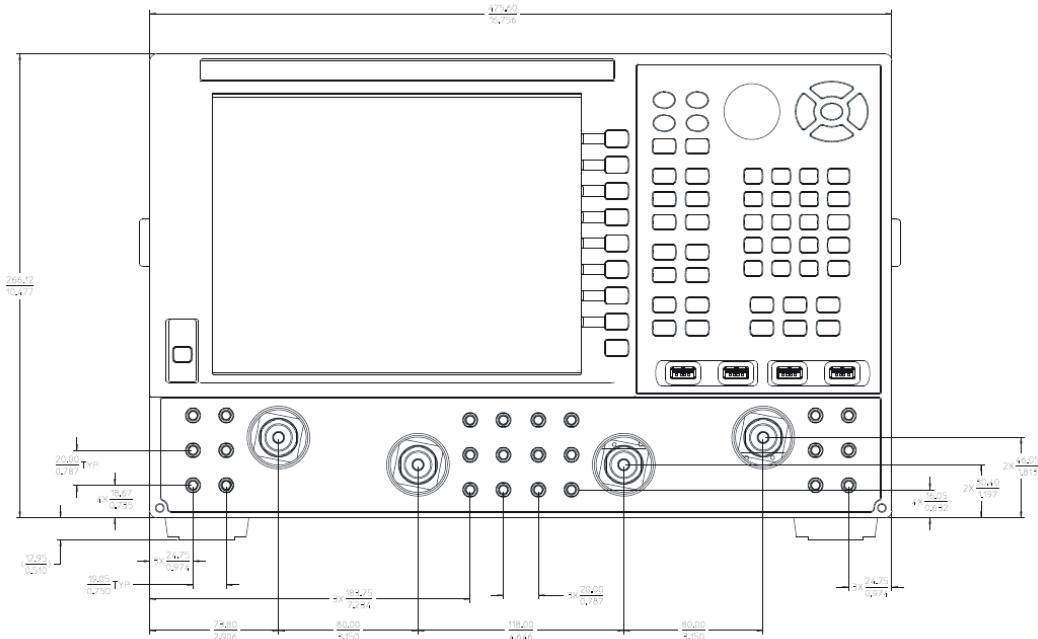
**Figure 13. Front Panel Dimensions : N5242A 2-Port Options**

N5242A OPT200/OPT219



**Figure 14. Front Panel Dimensions : N5242A 4-Port Options**

N5242A 4 PORT OPTIONS



## Measurement Throughput Summary

- [Typical Cycle Time for Measurement Completion](#)
- [Cycle Time vs. IF Bandwidth](#)
- [Cycle Time vs. Number of Points](#)
- [Data Transfer Time](#)

**Table 33. Typical Cycle Time<sup>a</sup> (ms) for Measurement Completion**

### All Options

Description	Typical Performance			
	Number of Points			
	201	401	1601	16001
<b>Start 9 GHz, Stop 10 GHz, 600 kHz IF bandwidth</b>				
Uncorrected	6	6.3	9.6	56
2-Port cal	20	21	28	134
<b>Start 9 GHz, Stop 10 GHz, 10 kHz IF bandwidth</b>				
Uncorrected	36	53	200	1945
2-Port cal	80	115	405	3900
<b>Start 9 GHz, Stop 10 GHz, 1 kHz IF bandwidth</b>				
Uncorrected	227	444	1740	17000
2-Port cal	460	900	3484	34000
<b>Start 10 GHz, Stop 20 GHz, 600 kHz IF bandwidth</b>				
Uncorrected	26	33	54	85
2-Port cal	62	77	121	190
<b>Start 10 GHz, Stop 20 GHz, 10 kHz IF bandwidth</b>				
Uncorrected	70	118	273	1958
2-Port cal	149	245	553	3922
<b>Start 10 GHz, Stop 20 GHz, 1 kHz IF bandwidth</b>				
Uncorrected	236	459	1780	17300
<i>2-Port Cal</i>	400	926	3565	34600

**Table 33. (Continued) Typical Cycle Time<sup>a</sup> (ms) for Measurement Completion**

<b>Start 10 MHz, Stop 26.5 GHz, 600 kHz IF bandwidth</b>				
Uncorrected	59	69	118	350
2-Port cal	125	147	244	707
<b>Start 10 MHz, Stop 26.5 GHz, 10 kHz IF bandwidth</b>				
Uncorrected	94	156	480	2333
2-Port cal	196	320	968	4674
<b>Start 10 MHz, Stop 26.5 GHz, 1 kHz IF bandwidth</b>				
Uncorrected	277	504	1873	17950
2-Port cal	561	1015	3756	35900

<sup>a</sup> Includes sweep time, retrace time and band-crossing time. Analyzer display turned off with DISPLAY:ENABLE OFF. Add 21 ms for display on. Data for one trace (S<sub>11</sub>) measurement.

Note: Option H08 and Option H11 are not available with the N5242A network analyzer.

**Table 34. Cycle Time vs. IF Bandwidth**

Applies to the Preset condition (201 points, correction off) except for the following changes:

- CF = 10 GHz
- Span = 100 MHz
- Display off (add 21 ms for display on)

<b>Description</b>	<b>Typical Performance</b>	
IF Bandwidth (Hz)	Cycle Time (ms) <sup>1</sup>	Trace Noise
600,000	5.00	0.009
100,000	6.84	0.003
30,000	11.6	0.002
10,000	29.0	0.001
3,000	71.8	0.0007
1,000	222	0.0004
300	640	0.0003
100	1826	0.0002
30	5982	<0.0002
10	17830	<0.0002
3	60000	<0.0002

<sup>a</sup> Cycle time includes sweep and retrace time.



**Table 35. Cycle Time vs. Number of Points**

Applies to the Preset condition (correction off) except for the following changes:

- CF = 10 GHz
- Span = 100 MHz
- Display off (add 21 ms for display on)

Description	Typical Performance	
IF Bandwidth (Hz)	Number of Points	Cycle Time (ms) <sup>1</sup>
1,000	3	7.7
	11	16.6
	51	60
	101	115
	201	222
	401	436
	801	860
	1,601	1,700
	6,401	6,700
	16,001	16,000
10,000	3	5.44
	11	7.90
	51	10.7
	101	16.8
	201	29.0
	401	53.0
	801	102
	1,601	199
	6,401	780
	16,001	1950

**Table 35. (Continued) Cycle Time Vs. Number of Points**

<b>Description</b>	<b>Typical Performance</b>	
IF Bandwidth (Hz)	Number of Points	Cycle Time (ms) <sup>1</sup>
30,000	3	5.7
	11	5.9
	51	6.5
	101	8.2
	201	11.8
	401	18.8
	801	32.8
	1,601	60.5
	6,401	228
	16,001	566
600,000	3	5.4
	11	5.4
	51	5.5
	101	5.6
	201	5.9
	401	6.3
	801	7.2
	1,601	9.6
	6,401	25
	16,001	56

<sup>a</sup> Cycle time includes sweep and retrace time.

**Table 36. Data Transfer Time (ms)**

Description	Typical Performance			
	Number of Points			
	201	401	1601	16,001
<b>SCPI over GPIB</b>				
(Program executed on external PC <sup>2</sup> )				
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
<b>SCPI over SICL/LAN or TCP/IP Socket</b>				
(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
<b>COM<sup>3</sup></b>				
(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
<b>DCOM over LAN<sup>3</sup></b>				
(Program executed on external PC)				
32-bit floating point	<1.0	1.2	2.1	13
Variant type	2.7	4.5	15	150

<sup>1</sup> Measured with the analyzer display off. Values will increase slightly if the analyzer display is on.

<sup>2</sup> Measured when using the SCPI command DISPlay: VISible OFF.

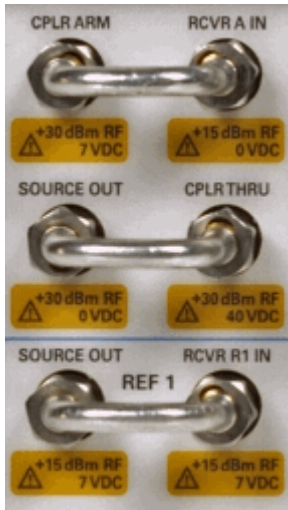
<sup>3</sup> Values are for real and imaginary pairs, with the analyzer display off.

**Note:** Specifications for Recall & Sweep Speed are not provided for the N5242A analyzers.

## Specifications: Front-Panel Jumpers

Model N5242A (PNA-X)

**Note:** All PNA-X options have the following front-panel jumpers for each port.



- [Measurement Receiver Inputs](#)
  - [Reference Receiver Inputs](#)
  - [Reference Outputs \(Source Out\)](#)
  - [Source Outputs](#)
  - [Coupler Inputs](#)
-

**Table 37. Measurement Receiver Inputs****(Rcvr A IN, Rcvr B IN, Rcvr C IN, Rcvr D IN) @ 0.1dB Typical Compression**

<b>Description</b>	<b>Typical</b>
	All Options
<b>Maximum Input Level</b>	
10 MHz to 50 MHz <sup>1</sup>	--
50 MHz to 500 MHz <sup>1</sup>	--
500 MHz to 3.2 GHz	-2 dBm
3.2 GHz to 10 GHz	-2 dBm
10 GHz to 16 GHz	-2 dBm
16 GHz to 20 GHz	-2.5 dBm
20 GHz to 24 GHz	-4 dBm
24 GHz to 26.5 GHz	-4 dBm
<b>Damage Level</b>	
N5242A	+15 dBm
<b>Maximum DC Level</b>	
N5242A	0 V

<sup>1</sup>Test port receiver compression at specified input levels below 500 MHz is negligible due to coupler roll off in this frequency range.

**Table 38. Reference Receiver Input**  
**(RCVR R1 IN) @ Max Specified Output Power**

Description	Typical					
	Option 200 or 400 Filtered Mode	Option 200 or 400 Hi Pwr Mode	Option 224 or 423 Filtered Mode	Option 219 or 419 Filtered Mode	Option 219 or 419 Hi Pwr Mode	Option 224 or 423 Hi Pwr Mode
<b>Maximum Input Level</b>						
10 MHz to 50 MHz	-8 dBm	-3 dBm	-9 dBm	-8 dBm	-3 dBm	-6 dBm
50 MHz to 500 MHz	-6 dBm	-3 dBm	-7 dBm	-6 dBm	-3 dBm	-5 dBm
500 MHz to 3.2 GHz	-6 dBm	-6 dBm	-7 dBm	-5 dBm	-5 dBm	-5 dBm
3.2 GHz to 10 GHz	-3 dBm	-3 dBm	-2 dBm	-2 dBm	-2 dBm	-2 dBm
10 GHz to 16 GHz	-4 dBm	-4 dBm	-3 dBm	-3 dBm	-3 dBm	-3 dBm
16 GHz to 20 GHz	-5 dBm	-5 dBm	-6 dBm	-6 dBm	-6 dBm	-6 dBm
20 GHz to 24 GHz	-7 dBm	-7 dBm	-9 dBm	-8 dBm	-8 dBm	-9 dBm
24 GHz to 26.5 GHz	-16 dBm	-16 dBm	-18 dBm	-15 dBm	-15 dBm	-18 dBm
<b>Damage Level</b>						
+15 dBm						
<b>Maximum DC Level</b>						
+/-7 V						

**Table 39. Reference Receiver Input**

(RCVR R2 IN, RCVR R3 IN, RCVR R4 IN) @ Max Specified Output Power

Description	Typical					
	Option 400 RCVR R3 IN Filtered Mode	Option 400 RCVR R3 IN Hi Pwr Mode	Option 200 or 400 RCVR R2 IN RCVR R4 IN	Option 419 RCVR R3 IN Filtered Mode	Option 419 RCVR R3 IN Hi Pwr Mode	Option 219 or 419 RCVR R2 IN RCVR R4 IN
<b>Maximum Input Level</b>						
10 MHz to 50 MHz	-6 dBm	-1 dBm	-1 dBm	-6 dBm	-1 dBm	-1 dBm
50 MHz to 500 MHz	-4 dBm	-1 dBm	-1 dBm	-4 dBm	-1 dBm	-1 dBm
500 MHz to 3.2 GHz	-4 dBm	-4 dBm	0 dBm	-3 dBm	-3 dBm	-1 dBm
3.2 GHz to 10 GHz	0 dBm	0 dBm	0 dBm	1 dBm	1 dBm	0 dBm
10 GHz to 16 GHz	1 dBm	1 dBm	0 dBm	1 dBm	1 dBm	1 dBm
16 GHz to 20 GHz	1 dBm	1 dBm	-3 dBm	0 dBm	0 dBm	-3 dBm
20 GHz to 24 GHz	0 dBm	0 dBm	-6 dBm	-1 dBm	-1 dBm	-4 dBm
24 GHz to 26.5 GHz	-8 dBm	-8 dBm	-12 dBm	-7 dBm	-7 dBm	-13 dBm
<b>Damage Level</b>						
	+15 dBm					
<b>Maximum DC Level</b>						
	+/-15 V					

**Table 39. (Continued) Reference Receiver Input**  
**(RCVR R2 IN, RCVR R3 IN, RCVR R4 IN) @ Max Specified Output Power**

Description	Typical		
	Option 423 RCVR R3 IN Filtered Mode	Option 423 RCVR R3 IN Hi Pwr Mode	Option 224 or 423 RCVR R2 IN RCVR R4 IN Filtered Mode  Note: No filtered mode for ports 2 & 4
<b>Maximum Input Level</b>			
10 MHz to 50 MHz	-7 dBm	-4 dBm	-1 dBm
50 MHz to 500 MHz	-6 dBm	-4 dBm	-1 dBm
500 MHz to 3.2 GHz	-5 dBm	-3 dBm	-1 dBm
3.2 GHz to 10 GHz	1 dBm	1 dBm	0 dBm
10 GHz to 16 GHz	1 dBm	1 dBm	-2 dBm
16 GHz to 20 GHz	0 dBm	0 dBm	-4 dBm
20 GHz to 24 GHz	-2 dBm	-2 dBm	-6 dBm
24 GHz to 26.5 GHz	-10 dBm	-10 dBm	-10 dBm
<b>Damage Level</b>			
	+15 dBm		
<b>Maximum DC Level</b>			
	+/-15 V		



**Table 40. Reference Output****(REF 1 SOURCE OUT) @ Max Specified Output Power**

Description	Typical					
	Option 200 or 400 Filtered Mode	Option 200 or 400 Hi Pwr Mode	Option 219 or 419 Filtered Mode	Option 219 or 419 Hi Pwr Mode	Option 224 or 423 Filtered Mode	Option 224 or 423 Hi Pwr Mode
<b>Maximum Input Level</b>						
10 MHz to 50 MHz	-8 dBm	-3 dBm	-8 dBm	-3 dBm	-9 dBm	-6 dBm
50 MHz to 500 MHz	-6 dBm	-3 dBm	-6 dBm	-3 dBm	-7 dBm	-5 dBm
500 MHz to 3.2 GHz	-6 dBm	-6 dBm	-5 dBm	-5 dBm	-7 dBm	-5 dBm
3.2 GHz to 10 GHz	-3 dBm	-3 dBm	-2 dBm	-2 dBm	-2 dBm	-2 dBm
10 GHz to 16 GHz	-4 dBm	-4 dBm	-3 dBm	-3 dBm	-3 dBm	-3 dBm
16 GHz to 20 GHz	-5 dBm	-5 dBm	-6 dBm	-6 dBm	-6 dBm	-6 dBm
20 GHz to 24 GHz	-7 dBm	-7 dBm	-8 dBm	-8 dBm	-9 dBm	-9 dBm
24 GHz to 26.5 GHz	-16 dBm	-16 dBm	-15 dBm	-15 dBm	-18 dBm	-18 dBm
<b>Damage Level</b>						
	+15 dBm					
<b>Maximum DC Level</b>						
	+/-7 V					

**Table 41. Reference Output**

(REF 2 SOURCE OUT, REF 3 SOURCE OUT, REF 4 SOURCE OUT) @ Max Specified Output Power

Description	Typical					
	Option 400 REF 3 Source Out Filtered Mode	Option 400 REF 3 Source Out Hi Pwr Mode	Option 200 or 400 REF 2 Source Out REF 4 Source Out Filtered Mode	Option 419 REF 3 Source Out Filtered Mode	Option 419 REF 3 Source Out Hi Pwr Mode	Option 219 or 419 REF 2 Source Out REF 4 Source Out Filtered Mode
<b>Maximum Input Level</b>						
10 MHz to 50 MHz	-6 dBm	-1 dBm	-1 dBm	-6 dBm	-1 dBm	-1 dBm
50 MHz to 500 MHz	-4 dBm	-1 dBm	-1 dBm	-4 dBm	-1 dBm	-1 dBm
500 MHz to 3.2 GHz	-4 dBm	-4 dBm	0 dBm	-3 dBm	-3 dBm	-1 dBm
3.2 GHz to 10 GHz	0 dBm	0 dBm	0 dBm	1 dBm	1 dBm	0 dBm
10 GHz to 16 GHz	1 dBm	1 dBm	0 dBm	1 dBm	1 dBm	1 dBm
16 GHz to 20 GHz	1 dBm	1 dBm	-3 dBm	0 dBm	0 dBm	-3 dBm
20 GHz to 24 GHz	0 dBm	0 dBm	-6 dBm	-1 dBm	-1 dBm	-4 dBm
24 GHz to 26.5 GHz	-8 dBm	-8 dBm	-12 dBm	-7 dBm	-7 dBm	-13 dBm
<b>Damage Level</b>						
	+15 dBm					
<b>Maximum DC Level</b>						
	0 V					

**Table 41. (Continued) Reference Output****(REF 2 SOURCE OUT, REF 3 SOURCE OUT, REF 4 SOURCE OUT) @ Max Specified Output Power**

Description	Typical		
	Option423 REF 3 Source Out Filtered Mode	Options 423 REF 3 Source Out Hi Pwr Mode	Option 224 or 423 REF 2 Source Out REF 4 Source Out
<b>Maximum Input Level</b>			
10 MHz to 50 MHz	-7 dBm	-4 dBm	-1 dBm
50 MHz to 500 MHz	-6 dBm	-4 dBm	-1 dBm
500 MHz to 3.2 GHz	-5 dBm	-3 dBm	-1 dBm
3.2 GHz to 10 GHz	1 dBm	1 dBm	0 dBm
10 GHz to 16 GHz	1 dBm	1 dBm	-2 dBm
16 GHz to 20 GHz	0 dBm	0 dBm	-4 dBm
20 GHz to 24 GHz	-2 dBm	-2 dBm	-6 dBm
24 GHz to 26.5 GHz	-10 dBm	-10 dBm	-10 dBm
<b>Damage Level</b>			
	+15 dBm		
<b>Maximum DC Level</b>			
	0 V		

**Table 42. Source Outputs**

**(PORT 1 SOURCE OUT, PORT 2 SOURCE OUT, PORT 3 SOURCE OUT, PORT 4 SOURCE OUT) @ Max Specified Output Power**

Description	Typical					
	Option 200 or 400 Port 1 Source Out Port 3 Source Out Filtered Mode	Option 200 or 400 Port 1 Source Out Port 3 Source Out Hi Pwr Mode	Option 200 or 400 Port 2 Source Out Port 4 Source Out	Option 219 or 419 Port 1 Source Out Port 3 Source Out Filtered Mode	Option 219 or 419 Port 1 Source Out Port 3 Source Out Hi Pwr Mode	Option 219 or 419 Port 2 Source Out Port 4 Source Out
<b>Maximum Input Level</b>						
10 MHz to 50 MHz	8 dBm	13 dBm	13 dBm	8 dBm	13 dBm	13 dBm
50 MHz to 500 MHz	10 dBm	13 dBm	13 dBm	10 dBm	13 dBm	13 dBm
500 MHz to 3.2 GHz	11 dBm	11 dBm	13 dBm	11 dBm	11 dBm	14 dBm
3.2 GHz to 10 GHz	14 dBm	14 dBm	14 dBm	14 dBm	14 dBm	14 dBm
10 GHz to 16 GHz	14 dBm	14 dBm	14 dBm	14 dBm	14 dBm	13 dBm
16 GHz to 20 GHz	14 dBm	14 dBm	11 dBm	12 dBm	12 dBm	10 dBm
20 GHz to 24 GHz	13 dBm	13 dBm	9 dBm	10 dBm	10 dBm	9 dBm
24 GHz to 26.5 GHz	7 dBm	7 dBm	4 dBm	5 dBm	5 dBm	2 dBm
<b>Damage Level</b>						
	+30 dBm					
<b>Maximum DC Level</b>						
	0 V					

**Table 42. (Continued) Source Outputs****(PORT 1 SOURCE OUT, PORT 2 SOURCE OUT, PORT 3 SOURCE OUT, PORT 4 SOURCE OUT) @ Max Specified Output Power**

Description	Typical		
	Option 224 or 423 Port 1 Source Out Port 3 Source Out Filtered Mode	Option 224 or 423 Port 1 Source Out Port 3 Source Out Hi Pwr Mode	Option 224 or 423 Port 2 Source Out Port 4 Source Out
<b>Maximum Input Level</b>			
10 MHz to 50 MHz	7 dBm	10 dBm	13 dBm
50 MHz to 500 MHz	8 dBm	10 dBm	13 dBm
500 MHz to 3.2 GHz	9 dBm	11 dBm	14 dBm
3.2 GHz to 10 GHz	14 dBm	14 dBm	14 dBm
10 GHz to 16 GHz	14 dBm	14 dBm	12 dBm
16 GHz to 20 GHz	12 dBm	12 dBm	9 dBm
20 GHz to 24 GHz	9 dBm	9 dBm	7 dBm
24 GHz to 26.5 GHz	2 dBm	2 dBm	4 dBm
<b>Damage Level</b>			
	+30 dBm		
<b>Maximum DC Level</b>			
	0 V		

**Table 43. Coupler Inputs****(PORT 1 CPLR THRU, PORT 2 CPLR THRU, PORT 3 CPLR THRU, PORT 4 CPLR THRU) Insertion Loss of Coupler Thru**

Description	Typical	
	Option 200 or 400	Option 219 or 419 or 224, or 423
<b>Maximum Input Level</b>		
10 MHz to 50 MHz	0 dB	-0.5 dB
50 MHz to 500 MHz	-0.25 dB	-0.75 dB
500 MHz to 3.2 GHz	-0.5 dB	-1.0 dB
3.2 GHz to 10 GHz	-0.75 dB	-1.25 dB
10 GHz to 16 GHz	-1.0 dB	-1.75 dB
16 GHz to 20 GHz	-1.5 dB	-2.25 dB
20 GHz to 24 GHz	-1.5 dB	-2.5 dB
24 GHz to 26.5 GHz	-1.75 dB	-2.5 dB
<b>Damage Level</b>		
N5242A	+30 dBm	
<b>Maximum DC Level</b>		
N5242A	+/-40 V	

## Specifications: N5242A Option 029

General specifications apply to Option 029 with the port 1 noise tuner switch set to the internal position except as stated below. By default, the switch is set to the external position to ensure functional compatibility with existing PNA instruments. Refer to the Help System topic “Noise Figure Application” for information on setting the switch position.

### Corrected System Performance with 3.5mm Connectors

Note: For any  $S_{ii}$  reflection measurement:

- $S_{jj} = 0$ .

For any  $S_{ij}$  transmission measurement:

- $S_{ji} = S_{ij}$  when  $S_{ij} \leq 1$
- $S_{ji} = 1/S_{ij}$  when  $S_{ij} > 1$
- $S_{kk} = 0$  for all  $k$

**Table 44. 85052B Calibration Kit**

#### N5242A Option 029

Applies to the N5242A analyzer with Option 029, an 85052B (3.5mm) calibration kit, an 85131F flexible test port cable set, and a full 2-port calibration. S-parameter measurements were made with the analyzer in the noise figure configuration. Environmental temperature  $23^\circ \pm 3^\circ \text{C}$ , with  $< 1^\circ \text{C}$  deviation from calibration temperature

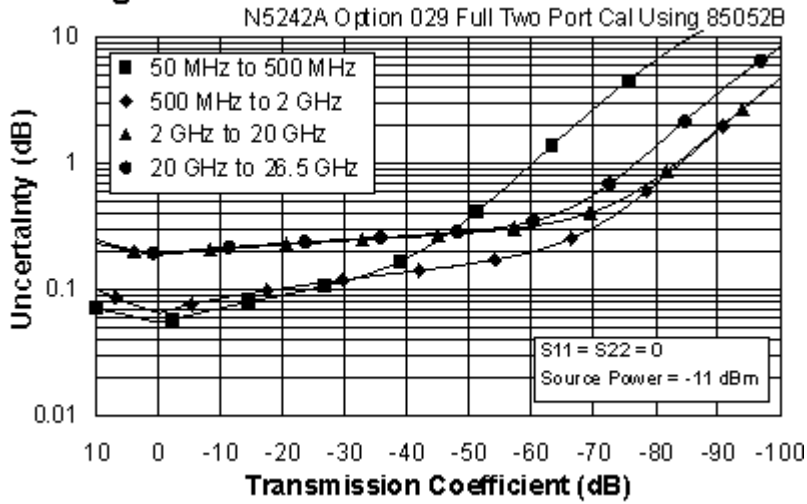
Description	Specification (dB)			
	50 MHz to 500 MHz	500 MHz to 2 GHz	2 to 20 GHz	20 to 26.5 GHz
Directivity	48	48	44	44
Source Match	40	40	31	31
Load Match	48	48	44	44
Reflection Tracking <sup>1</sup>	$\pm 0.003$ $+0.010/^\circ\text{C}$	$\pm 0.003$ $+0.010/^\circ\text{C}$	$\pm 0.006$ $+0.020/^\circ\text{C}$	$\pm 0.006$ $+0.030/^\circ\text{C}$
$S_{21}$ Transmission Tracking <sup>1</sup>	$\pm 0.033$ $+0.010/^\circ\text{C}$	$\pm 0.045$ $+0.010/^\circ\text{C}$	$\pm 0.158$ $+0.020/^\circ\text{C}$	$\pm 0.159$ $+0.030/^\circ\text{C}$
$S_{12}$ Transmission Tracking <sup>1</sup>	$\pm 0.044$ $+0.010/^\circ\text{C}$	$\pm 0.049$ $+0.010/^\circ\text{C}$	$\pm 0.159$ $+0.020/^\circ\text{C}$	$\pm 0.155$ $+0.030/^\circ\text{C}$

<sup>1</sup>Temperature deviation is a characteristic value.

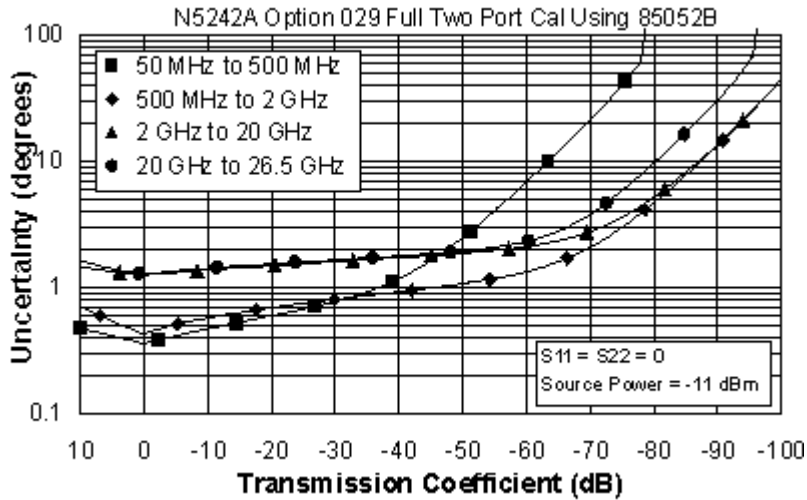
## Specifications: N5242A Option 029 (continued)

### S<sub>21</sub> Transmission Uncertainty (Specifications)

#### S<sub>21</sub> Magnitude



#### S<sub>21</sub> Phase

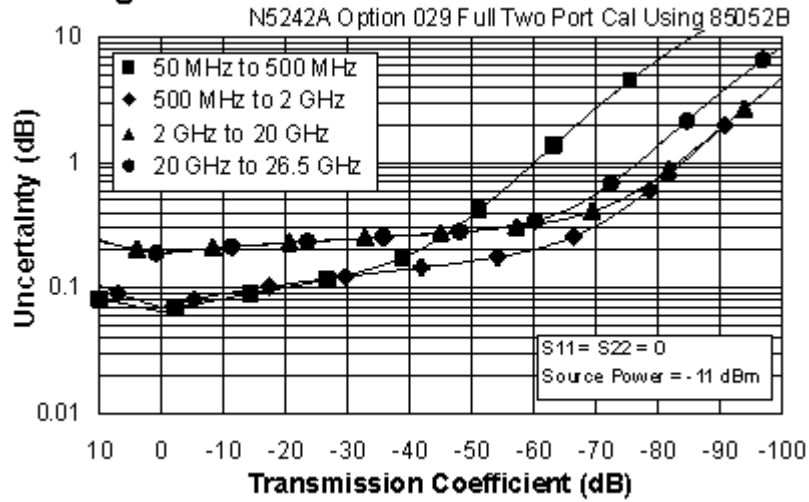




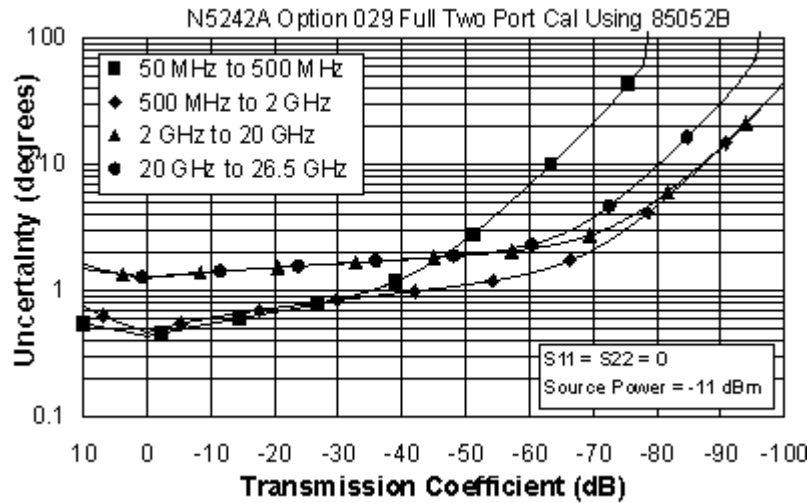
## Specifications: N5242A Option 029 (continued)

### S<sub>12</sub> Transmission Uncertainty (Specifications)

#### S<sub>12</sub> Magnitude



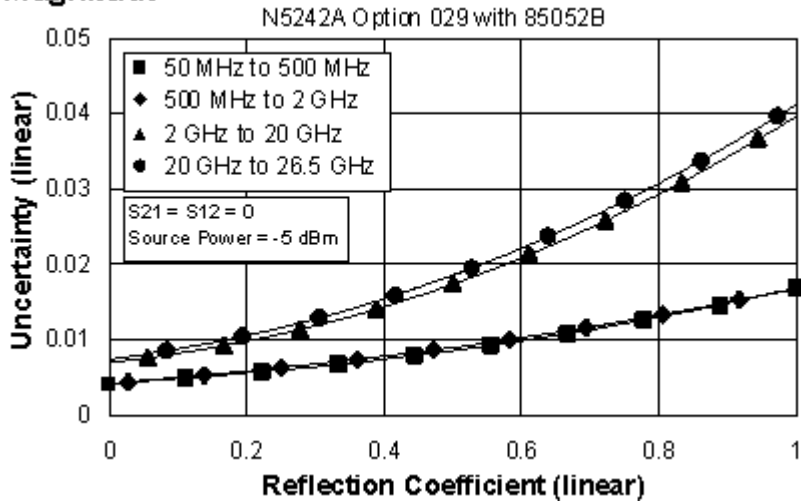
#### S<sub>12</sub> Phase



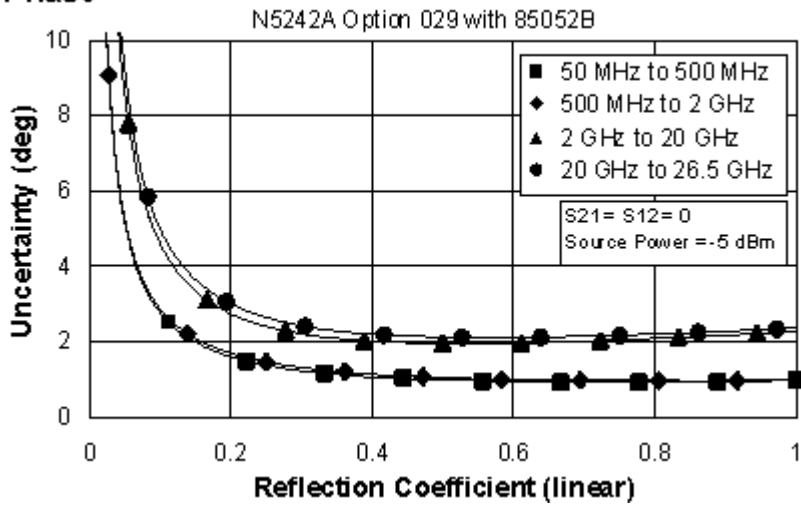
Specifications: N5242A Option 029 (continued)

Reflection Uncertainty (Specifications)

Magnitude



Phase



## Specifications: N5242A Option 029 (continued)

**Table 45. N4433A 4-Port Electronic Calibration Module**

### N5242A Option 029

**Note:** Uncertainty curves for the N4433A are created using a 2-port calibration. Multipoint uncertainties are not supported at this time.

Applies to the N5242A analyzer with Option 029, an N4433A (3.5mm) electronic calibration module, an 85131F flexible test port cable set, and a full 2-port calibration. S-parameter measurements were made with the analyzer in the noise figure configuration. Environmental temperature  $23^{\circ} \pm 3^{\circ} \text{C}$ , with  $< 1^{\circ} \text{C}$  deviation from calibration temperature

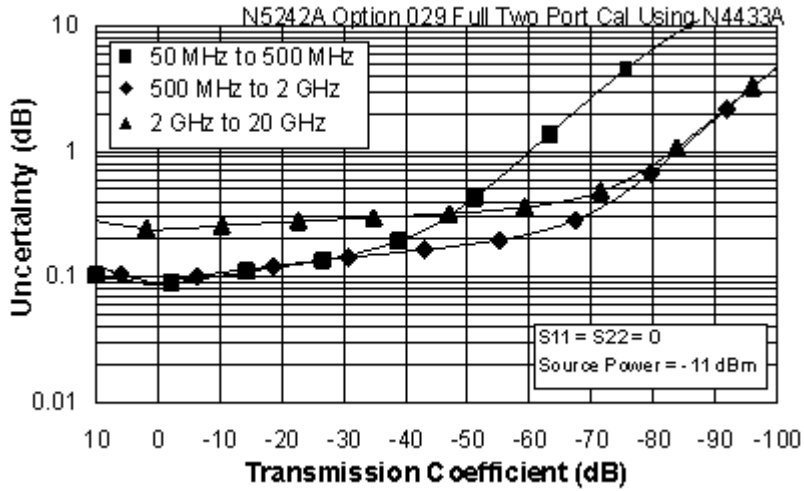
Description	Specification (dB)		
	50 MHz to 500 MHz	500 MHz to 2 GHz	2 to 20 GHz
Directivity	52	52	45
Source Match	42	42	31
Load Match	40	40	28
Reflection Tracking <sup>1</sup>	$\pm 0.060$ $+0.010/^{\circ}\text{C}$	$\pm 0.060$ $+0.010/^{\circ}\text{C}$	$\pm 0.180$ $+0.020/^{\circ}\text{C}$
S <sub>21</sub> Transmission Tracking <sup>1</sup>	$\pm 0.065$ $+0.010/^{\circ}\text{C}$	$\pm 0.068$ $+0.010/^{\circ}\text{C}$	$\pm 0.205$ $+0.020/^{\circ}\text{C}$
S <sub>12</sub> Transmission Tracking <sup>1</sup>	$\pm 0.069$ $+0.010/^{\circ}\text{C}$	$\pm 0.069$ $+0.010/^{\circ}\text{C}$	$\pm 0.206$ $+0.020/^{\circ}\text{C}$

<sup>1</sup> Temperature deviation is a characteristic value.

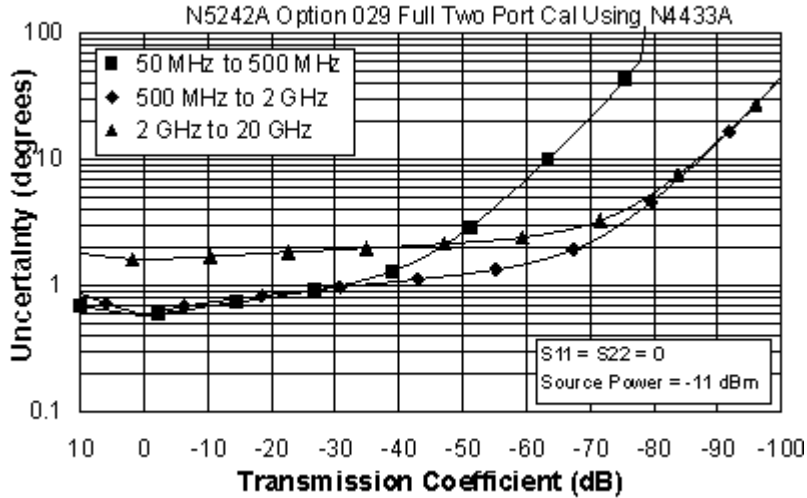
## Specifications: N5242A Option 029 (continued)

### S<sub>21</sub> Transmission Uncertainty (Specifications)

#### S<sub>21</sub> Magnitude



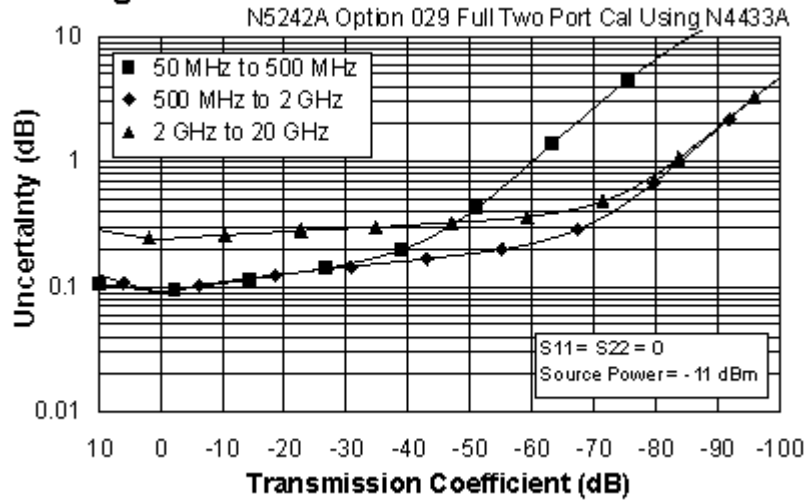
#### S<sub>21</sub> Phase



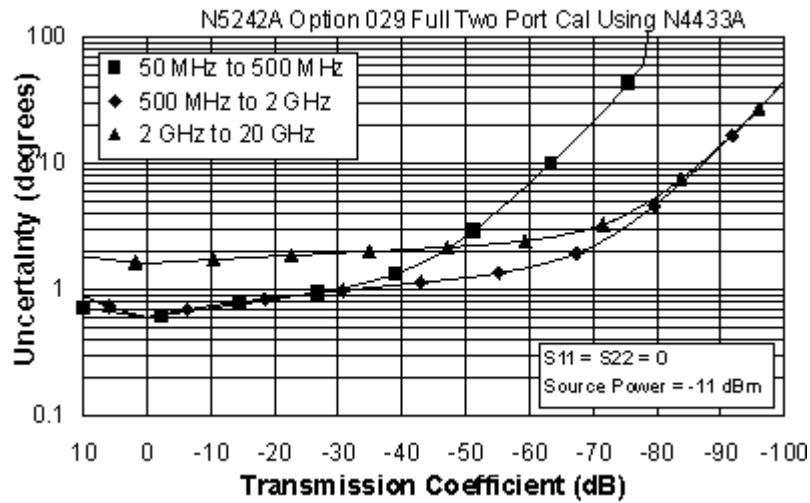
## Specifications: N5242A Option 029 (continued)

### S<sub>12</sub> Transmission Uncertainty (Specifications)

#### S<sub>12</sub> Magnitude



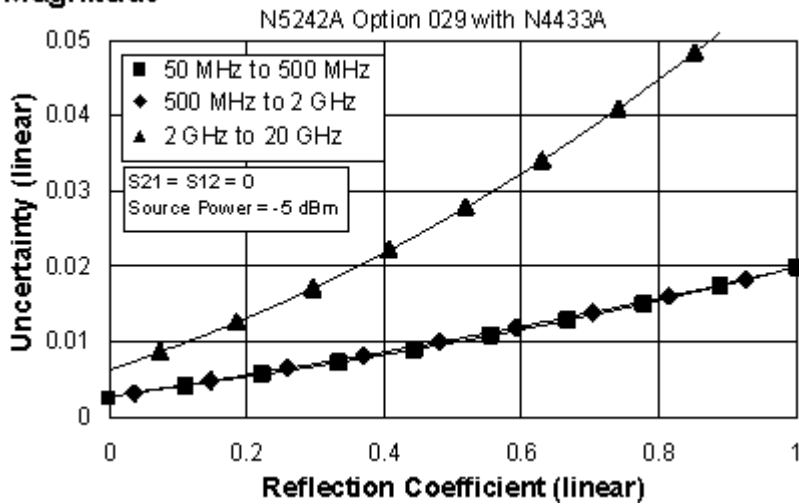
#### S<sub>12</sub> Phase



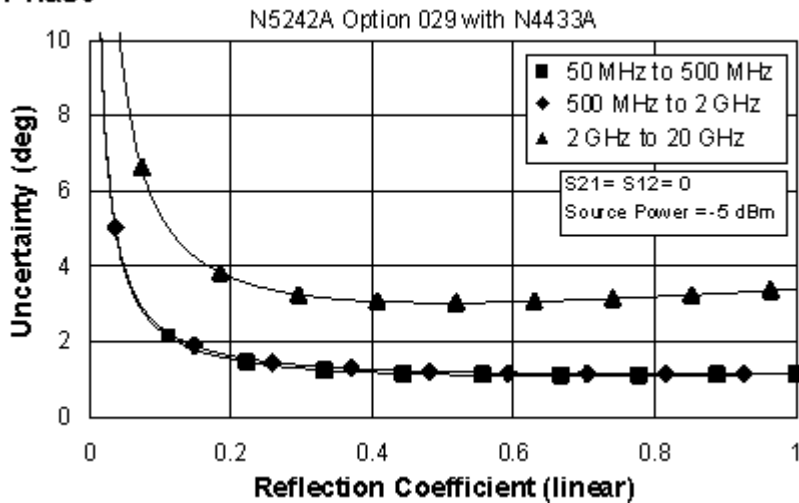
## Specifications: N5242A Option 029 (continued)

### Reflection Uncertainty (Specifications)

#### Magnitude



#### Phase



## Specifications: N5242A Option 029 (continued)

**Table 46. N4691B 2- Port Electronic Calibration Module**

### N5242A Option 029

Applies to the N5242A analyzer with Option 029, an N4691B (3.5mm) electronic calibration module, an 85131F flexible test port cable set, and a full 2-port calibration. S-parameter measurements were made with the analyzer in the noise figure configuration. Environmental temperature  $23^{\circ} \pm 3^{\circ} \text{C}$ , with  $< 1^{\circ} \text{C}$  deviation from calibration temperature.

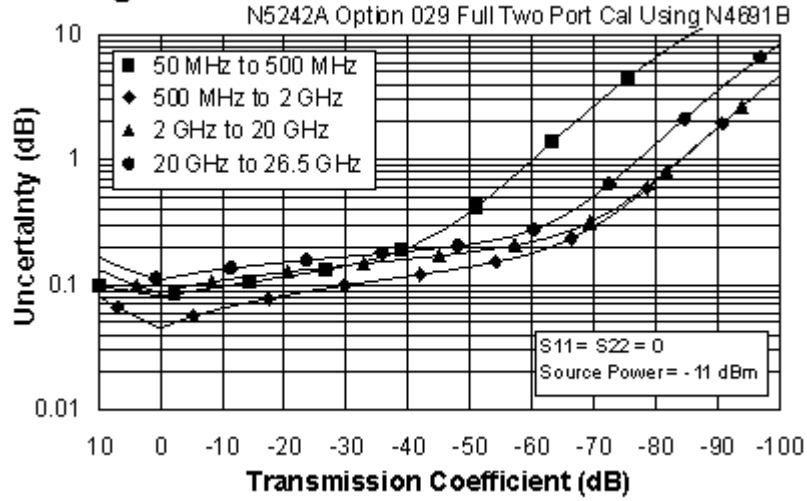
Description	Specification (dB)			
	50 MHz to 500 MHz	500 MHz to 2 GHz	2 to 20 GHz	20 to 26.5 GHz
Directivity	46	56	48	44
Source Match	41	47	44	40
Load Match	40	46	41	38
Reflection Tracking <sup>1</sup>	$\pm 0.050$ $+0.010/^{\circ}\text{C}$	$\pm 0.020$ $+0.010/^{\circ}\text{C}$	$\pm 0.040$ $+0.020/^{\circ}\text{C}$	$\pm 0.050$ $+0.030/^{\circ}\text{C}$
S <sub>21</sub> Transmission Tracking <sup>1</sup>	$\pm 0.060$ $+0.010/^{\circ}\text{C}$	$\pm 0.025$ $+0.010/^{\circ}\text{C}$	$\pm 0.058$ $+0.020/^{\circ}\text{C}$	$\pm 0.079$ $+0.030/^{\circ}\text{C}$
S <sub>12</sub> Transmission Tracking <sup>1</sup>	$\pm 0.068$ $+0.010/^{\circ}\text{C}$	$\pm 0.026$ $+0.010/^{\circ}\text{C}$	$\pm 0.059$ $+0.020/^{\circ}\text{C}$	$\pm 0.119$ $+0.030/^{\circ}\text{C}$

<sup>1</sup> Temperature deviation is a characteristic value.

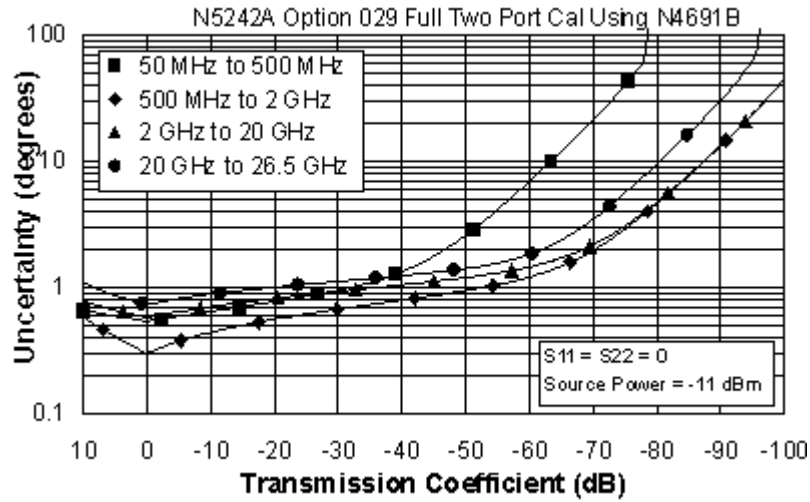
## Specifications: N5242A Option 029 (continued)

### Transmission Uncertainty (Specifications)

#### S21 Magnitude



#### S21 Phase

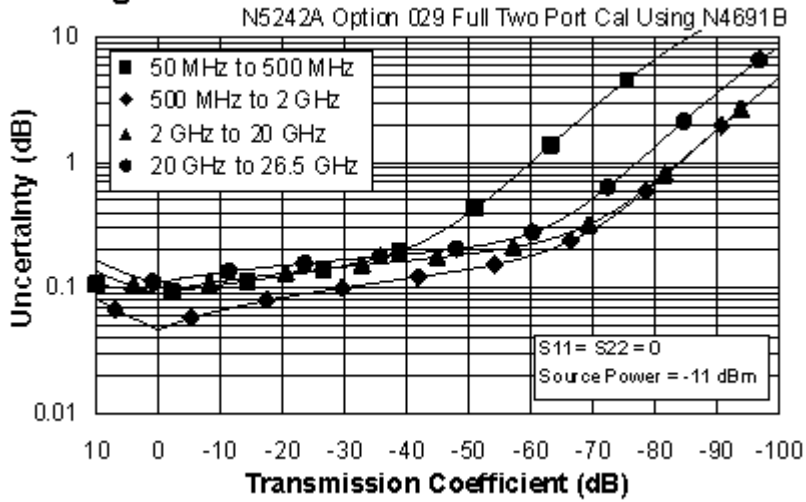




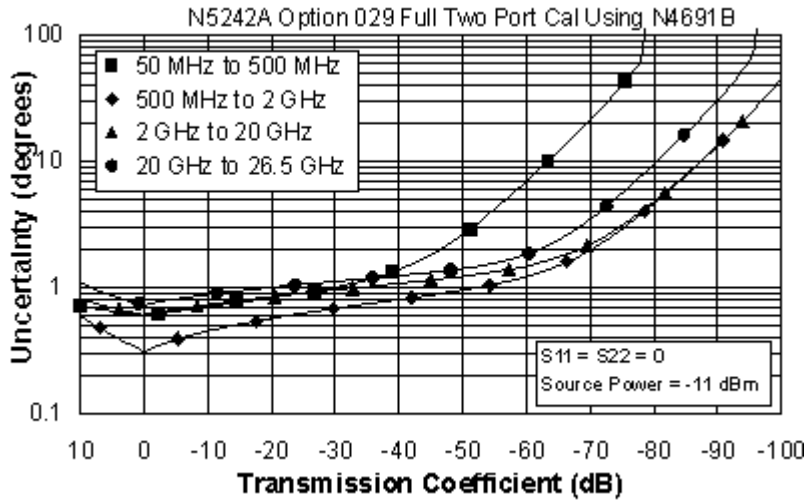
## Specifications: N5242A Option 029 (continued)

### Transmission Uncertainty (Specifications)

#### S12 Magnitude



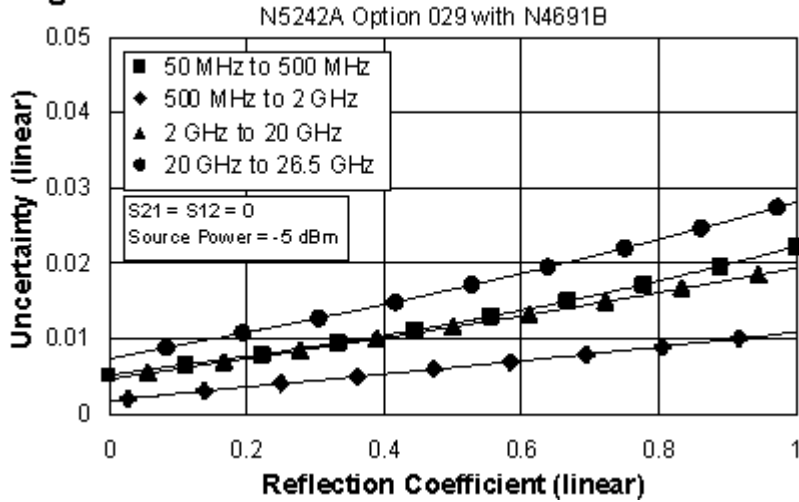
#### S12 Phase



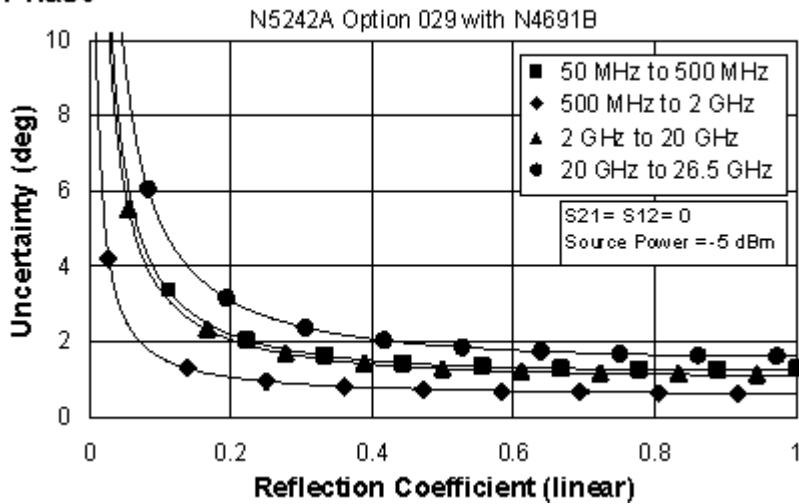
## Specifications: N5242A Option 029 (continued)

### Reflection Uncertainty (Specifications)

#### Magnitude



#### Phase



This N5242A document does not present specifications for the 85052C or 85052D Calibration Kit. Please download our free Uncertainty Calculator from [http://www.agilent.com/find/na\\_calculator](http://www.agilent.com/find/na_calculator) to generate the data and curves for the 85052C or the 85052D Calibration Kit.

**Specifications: N5242A Option 029 (continued)**  
**Uncorrected System Performance, N5242A Option 029**

**Noise Error Terms: N5242A Option 029**

**Table 47. Noise State Directivity, Port 1 and Port 2<sup>1</sup> (dB)**

<b>Frequency</b>	<b>Specification</b>	<b>Typical</b>
10 MHz to 50 MHz	-16	-22
50 MHz to 500 MHz	-24	-28
500 MHz to 3.2 GHz	-24	-32
3.2 GHz to 10 GHz	-23	-25
10 GHz to 16 GHz	-16	-20
16 GHz to 20 GHz	-15	-20
20 GHz to 24 GHz	-15	-20
24 GHz to 26.5 GHz	-15	-20

<sup>1</sup>Analyzer test set switches are set in accordance with the [Figure 22 block diagram](#), but with a jumper replacing the ECal module.

**Table 48. Noise State Load Match, Port 1<sup>1</sup> (dB)**

<b>Frequency</b>	<b>Specification</b>	<b>Typical</b>
10 MHz to 50 MHz	-11	-18
50 MHz to 500 MHz	-17	-24
500 MHz to 3.2 GHz	-15	-19
3.2 GHz to 10 GHz	-10	-15
10 GHz to 16 GHz	-9	-15
16 GHz to 20 GHz	-8	-13
20 GHz to 24 GHz	-7	-13
24 GHz to 26.5 GHz	-7	-11

<sup>1</sup>Analyzer test set switches are set in accordance with the [Figure 22 block diagram](#), but with a jumper replacing the ECal module.

## Specifications: N5242A Option 029 (continued)

**Table 49. Noise State Load Match, Port 2<sup>1</sup> (dB)**

Frequency	Specification	Typical
10 MHz to 50 MHz	-9	-12
50 MHz to 500 MHz	-13	-15
500 MHz to 3.2 GHz	-9	-12
3.2 GHz to 10 GHz	-5.5	-7.5
10 GHz to 16 GHz	-5.5	-7.5
16 GHz to 20 GHz	-5.5	-7.5
20 GHz to 24 GHz	-5.5	-7.5
24 GHz to 26.5 GHz	-5.5	-7.5

<sup>1</sup>Analyzer test set switches are set in accordance with the [Figure 22 block diagram](#), but with a jumper replacing the ECal module.

**Table 50. Noise State Reflection Tracking ( $S_{11}$  and  $S_{22}$ ), Min/Max (dB)**

Frequency	Specification	Typical
10 MHz to 50 MHz	--	+/-1.5
50 MHz to 500 MHz	--	+/-1.5
500 MHz to 3.2 GHz	--	+/-1.5
3.2 GHz to 10 GHz	--	+/-1.5
10 GHz to 16 GHz	--	+/-1.5
16 GHz to 20 GHz	--	+/-1.5
20 GHz to 24 GHz	--	+/-1.5
24 GHz to 26.5 GHz	--	+/-1.5

## Specifications: N5242A Option 029 (continued)

**Table 51. Noise State Transmission Tracking, Min/Max (dB)**

Frequency	Specification	Typical
10 MHz to 50 MHz	--	+/-1.5
50 MHz to 500 MHz	--	+/-1.5
500 MHz to 3.2 GHz	--	+/-1.5
3.2 GHz to 10 GHz	--	+/-1.5
10 GHz to 16 GHz	--	+/-1.5
16 GHz to 20 GHz	--	+/-1.5
20 GHz to 24 GHz	--	+/-1.5
24 GHz to 26.5 GHz	--	+/-1.5

**Table 52. Noise State Source Match, Port 1<sup>1</sup> (dB)**

Frequency	Specification	Typical
10 MHz to 50 MHz	-9	-13
50 MHz to 500 MHz	-18	-28
500 MHz to 3.2 GHz	-17	-22
3.2 GHz to 10 GHz	-12	-18
10 GHz to 16 GHz	-11	-16
16 GHz to 20 GHz	-9	-13
20 GHz to 24 GHz	-8	-13
24 GHz to 26.5 GHz	-7	-12

<sup>1</sup>Analyzer test set switches are set in accordance with the [Figure 22 block diagram](#), but with a jumper replacing the ECal module.

## Specifications: N5242A Option 029 (continued)

**Table 53. Noise State Source Match, Port 2<sup>1</sup> (dB)**

Frequency	Specification	Typical
10 MHz to 50 MHz	-9	-12
50 MHz to 500 MHz	-13	-15
500 MHz to 3.2 GHz	-9	-12
3.2 GHz to 10 GHz	-6	-7
10 GHz to 16 GHz	-6	-8
16 GHz to 20 GHz	-7	-9
20 GHz to 24 GHz	-6	-9
24 GHz to 26.5 GHz	-6	-9

<sup>1</sup>Analyzer test set switches are set in accordance with the [Figure 22 block diagram](#), but with a jumper replacing the ECal module.

## Test Port Input: Option 029

**Table 54. Receiver Noise Figure, Port 2 (dB)**

Frequency	Specification	Typical
<b>800 kHz, 2 MHz, 4 MHz, 8 MHz BW, High Gain Setting<sup>1</sup></b>		
10 MHz to 200 MHz	9.0	--
200 MHz to 2 GHz	12.0	--
2 GHz to 20 GHz	14.5	--
20 GHz to 26.5 GHz	17.0	--
<b>24 MHz BW, High Gain Setting<sup>1</sup></b>		
20 MHz to 200 MHz	9.0	--
200 MHz to 2 GHz	12.0	--
2 GHz to 20 GHz	14.5	--
20 GHz to 26.5 GHz	18.5	--

<sup>1</sup>Using Option 029 noise receivers.

## Specifications: N5242A Option 029 (continued)

**Table 55. Noise Jitter<sup>1,2</sup> (dB)**

Frequency	Specification	Typical
<b>4 MHz BW, Low Gain Setting</b>		
10 MHz to 15 MHz	0.30	0.15
15 MHz to 3 GHz	0.10	0.07
3 GHz to 26.5 GHz	0.11	0.07
<b>4 MHz BW, Medium Gain Setting</b>		
10 MHz to 15 MHz	0.30	0.15
15 MHz to 3 GHz	0.10	0.07
3 GHz to 26.5 GHz	0.10	0.07
<b>4 MHz BW, High Gain Setting</b>		
10 MHz to 15 MHz	0.10	0.07
15 MHz to 3 GHz	0.10	0.07
3 GHz to 26.5 GHz	0.10	0.07

<sup>1</sup> 201 points, 1 noise average

<sup>2</sup> May typically be degraded at frequencies below 500 MHz due to spurious noise receiver residuals.

**Table 56. Noise Receiver Linearity (dB)**

Power Range	Specification	Typical
<b>4 MHz BW, Low Gain Setting</b>		
-34 dBm to -64 dBm	+/-0.05 dB	--
-64 dBm to -70 dBm	+/-0.10 dB	--
<b>4 MHz BW, Medium Gain Setting</b>		
-48 dBm to -76 dBm	+/-0.05 dB	--
-76 dBm to -86 dBm	+/-0.10 dB	--
<b>4 MHz BW, High Gain Setting</b>		
-58 dBm to -84 dBm	+/-0.05 dB	--
-84 dBm to -92 dBm	+/-0.10 dB	--

## Specifications: N5242A Option 029 (continued)

**Table 57. Noise Receiver Input Range**

Power Range	Specification		
	High Gain Setting	Medium Gain Setting	Low Gain Setting
<b>500 MHz to 3 GHz</b>			
Max DUT NF + Gain (dB)	32 dB	44 dB	55 dB
Max Input Power (dBm) for <0.1 dB Compression <sup>1</sup>	<=-57 dBm	<=-45 dBm	<=-34 dBm
Max Operating Input Power (dBm)	-37 dBm Typical	-33 dBm Typical	-26 dBm Typical
Limit BW for full NF + Gain	400 MHz	400 MHz	400 MHz
<b>3 GHz to 26.5 GHz</b>			
Max DUT NF + Gain (dB)	46 dB	57 dB	68 dB
Max Input Power (dBm) for <0.1 dB Compression <sup>1</sup>	<=-43 dBm	<=-32 dBm	<=-21 dBm
Max Operating Input Power (dBm) <b>Typical</b>	-23 dBm	-20 dBm	-13 dBm
Limit BW for full NF + Gain	400 MHz	400 MHz	400 MHz

<sup>1</sup> Derived from 0.25 dB CW compression specification and -5 dB offset, derived from exponential model for device compression. Referenced to test port 2.



## Test Port Output: Option 029

**Table 58. Max Leveled Power, Port 1 Filtered Mode – Option 219/029, 419/029 (dBm)**

Frequency	Specification	Typical
10 MHz to 50 MHz	7	9
50 MHz to 500 MHz	9	10
500 MHz to 3.2 GHz	9	10
3.2 GHz to 10 GHz	12	17
10 GHz to 16 GHz	12	15
16 GHz to 20 GHz	10	13
20 GHz to 24 GHz	8	12
24 GHz to 26.5 GHz	3	8

## Specifications: N5242A Option 029 (continued)

**Table 59. Max Leveled Power, Port 1 High Power Mode – Option 219/029, 419/029 (dBm)**

Frequency	Specification	Typical
10 MHz to 50 MHz	12	18
50 MHz to 500 MHz	12	19
500 MHz to 3.2 GHz	9	12
3.2 GHz to 10 GHz	12	17
10 GHz to 16 GHz	12	15
16 GHz to 20 GHz	10	13
20 GHz to 24 GHz	8	12
24 GHz to 26.5 GHz	3	8

**Table 60. Max Leveled Power, Port 1 Filtered Mode – Option 224/029, 423/029 (dBm)**

<b>Frequency</b>	<b>Specification</b>	<b>Typical</b>
10 MHz to 50 MHz	6	8
50 MHz to 500 MHz	8	11
500 MHz to 3.2 GHz	8	11
3.2 GHz to 10 GHz	13	19
10 GHz to 16 GHz	12	15
16 GHz to 20 GHz	10	13
20 GHz to 24 GHz	6	11
24 GHz to 26.5 GHz	0	8

**Table 61. Max Leveled Power, Port 1 High Power Mode – Option 224/029, 423/029 (dBm)**

Frequency	Specification	Typical
10 MHz to 50 MHz	12	18
50 MHz to 500 MHz	13	20
500 MHz to 3.2 GHz	10	13
3.2 GHz to 10 GHz	13	19
10 GHz to 16 GHz	12	15
16 GHz to 20 GHz	10	13
20 GHz to 24 GHz	6	11
24 GHz to 26.5 GHz	0	8

**Table 62. Max Leveled Power, Port 1 Source 1, Combine Mode, Filtered Mode – Option 224/029, 423/029 (dBm)**

Frequency	Specification	Typical
10 MHz to 50 MHz	--	6
50 MHz to 500 MHz	--	9
500 MHz to 3.2 GHz	--	9
3.2 GHz to 10 GHz	--	15
10 GHz to 16 GHz	--	11
16 GHz to 20 GHz	--	8
20 GHz to 24 GHz	--	5
24 GHz to 26.5 GHz	--	0

**Table 63. Max Leveled Power, Port 1 Source 1, Combine Mode, High Power Mode – Option 224/029, 423/029 (dBm)**

Frequency	Specification	Typical
10 MHz to 50 MHz	--	16
50 MHz to 500 MHz	--	17
500 MHz to 3.2 GHz	--	10
3.2 GHz to 10 GHz	--	15
10 GHz to 16 GHz	--	11
16 GHz to 20 GHz	--	8
20 GHz to 24 GHz	--	5
24 GHz to 26.5 GHz	--	0

**Table 64. Max Leveled Power, Port 1 Source 2, Combine Mode, Filtered Mode – Option 224/029, 423/029 (dBm)**

Frequency	Specification	Typical
10 MHz to 50 MHz	--	-8
50 MHz to 500 MHz	--	-5
500 MHz to 3.2 GHz	--	-5
3.2 GHz to 10 GHz	--	2
10 GHz to 16 GHz	--	-2
16 GHz to 20 GHz	--	-4
20 GHz to 24 GHz	--	-7
24 GHz to 26.5 GHz	--	-11

**Table 65. Max Leveled Power, Port 1 Source 2, Combine Mode, High Power Mode – Option 224/029, 423/029 (dBm)**

<b>Frequency</b>	<b>Specification</b>	<b>Typical</b>
10 MHz to 50 MHz	--	2
50 MHz to 500 MHz	--	4
500 MHz to 3.2 GHz	--	-4
3.2 GHz to 10 GHz	--	2
10 GHz to 16 GHz	--	-2
16 GHz to 20 GHz	--	-4
20 GHz to 24 GHz	--	-7
24 GHz to 26.5 GHz	--	-11

**Table 66. Max Leveled Power, Port 2 – Option 219/029, 419/029 (dBm)**

<b>Frequency</b>	<b>Specification</b>	<b>Typical</b>
10 MHz to 50 MHz	13	17
50 MHz to 500 MHz	13	19
500 MHz to 3.2 GHz	13	18
3.2 GHz to 10 GHz	13	17
10 GHz to 16 GHz	9	12
16 GHz to 20 GHz	5	7
20 GHz to 24 GHz	2	4
24 GHz to 26.5 GHz	-2	3

**Specifications: N5242A Option 029 (continued)**

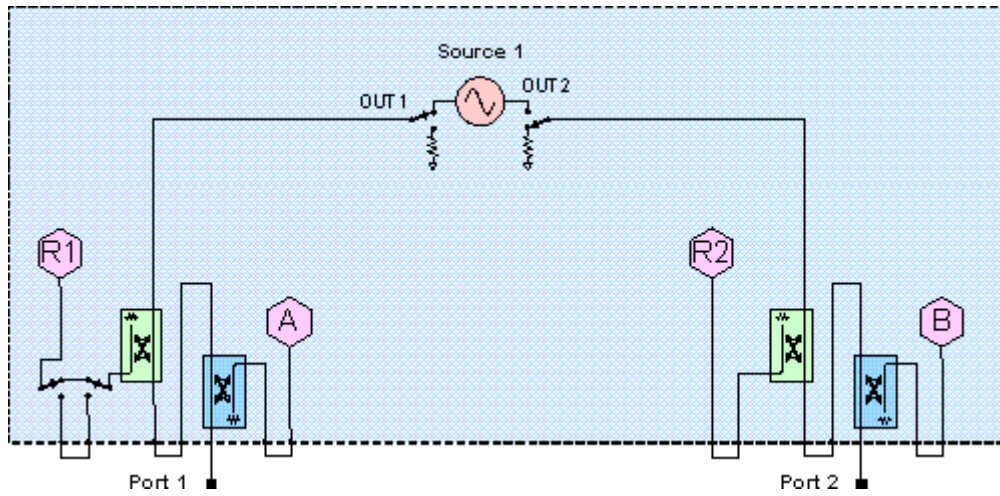
**Table 67. Max Leveled Power, Port 2 – Option 224/029, 423/029 (dBm)**

<b>Frequency</b>	<b>Specification</b>	<b>Typical</b>
10 MHz to 50 MHz	13	17
50 MHz to 500 MHz	13	20
500 MHz to 3.2 GHz	12	16
3.2 GHz to 10 GHz	13	17
10 GHz to 16 GHz	10	14
16 GHz to 20 GHz	6	9
20 GHz to 24 GHz	4	8
24 GHz to 26.5 GHz	-2	4

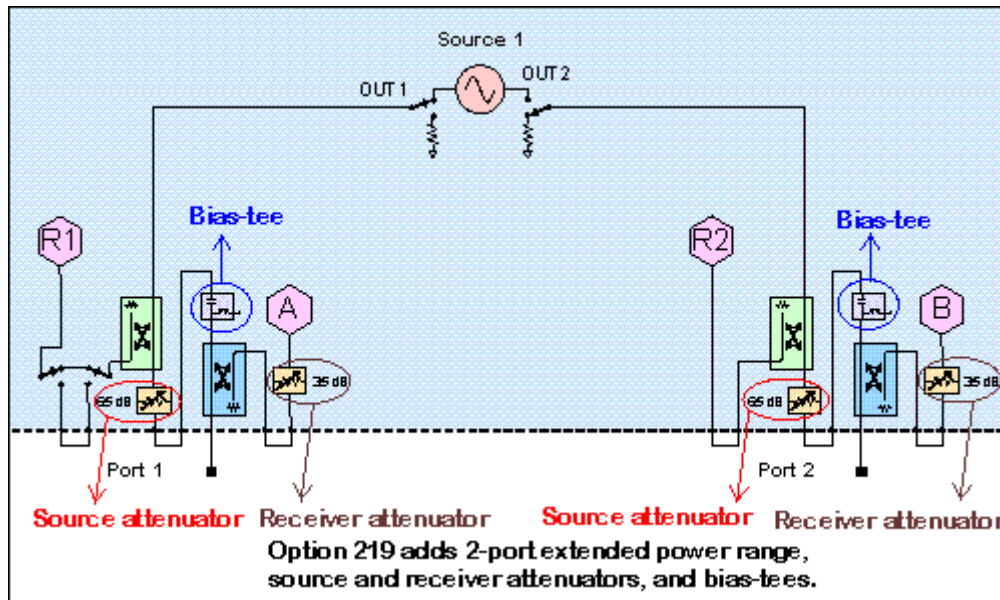
## Test Set Block Diagrams

**NOTE:** For best readability, use a color printer for printing the following graphics.

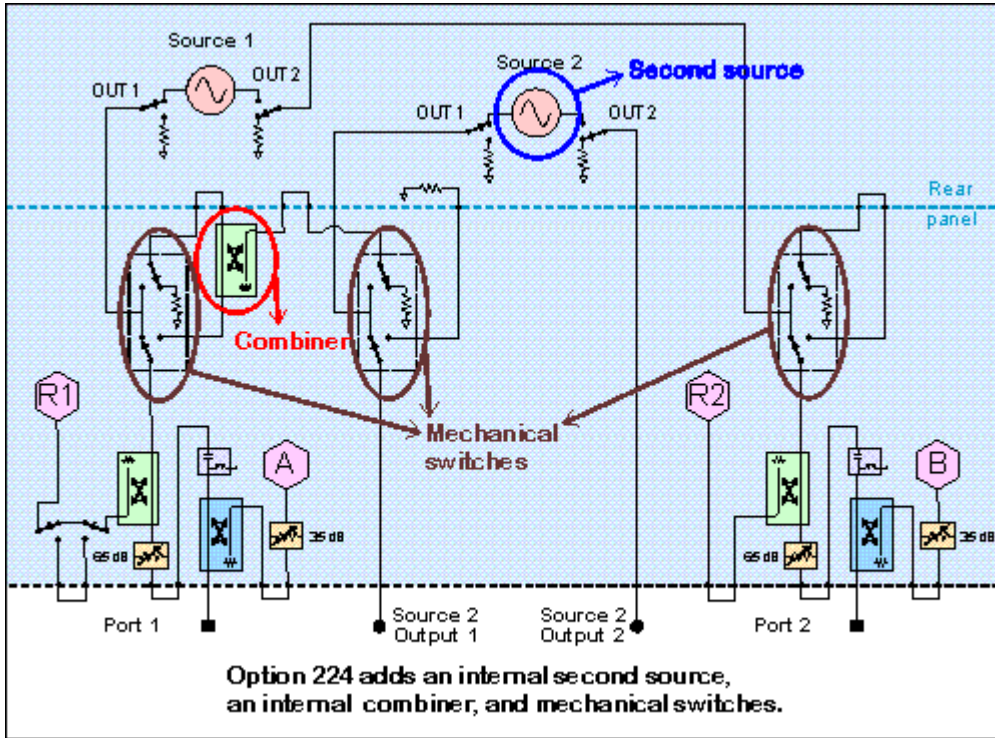
**Figure 15.** 2-Port N5242A Base Unit (Option 200)



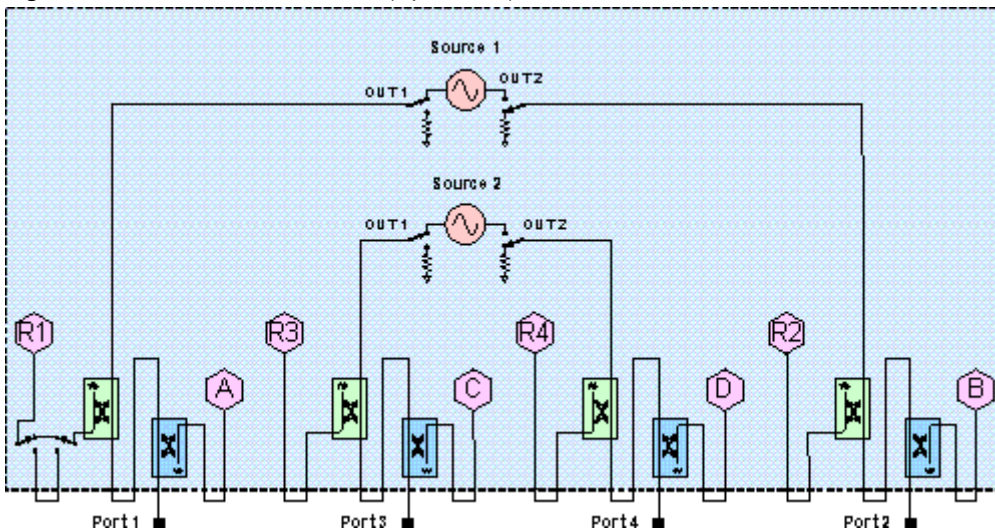
**Figure 16.** 2-Port N5242A (Option 219)



**Figure 17. 2-Port N5242A (Option 224)**

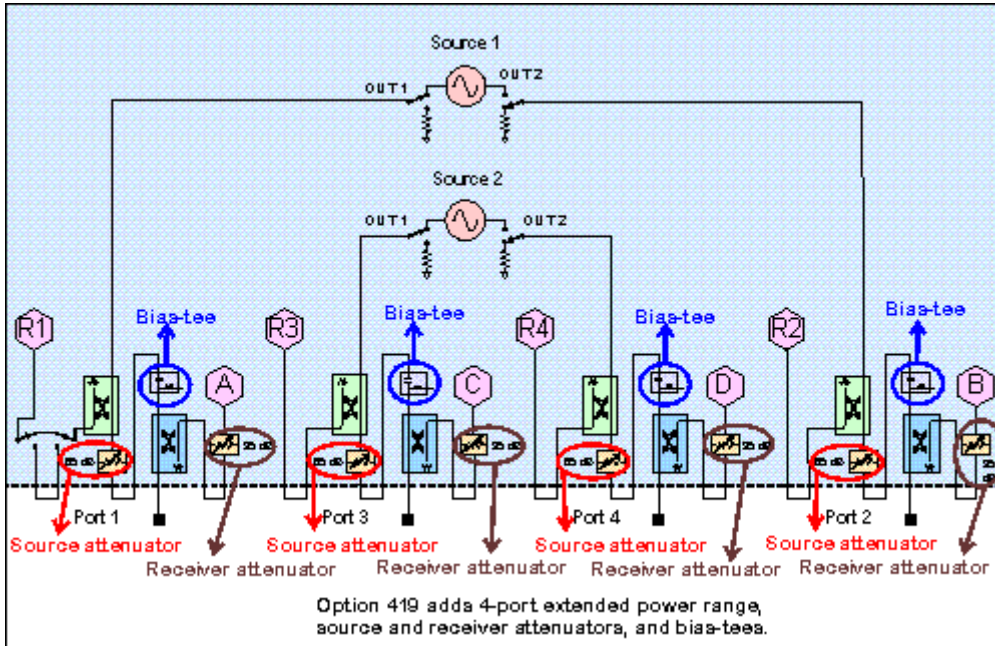


**Figure 18. 4-Port N5242A Base Unit (Option 400)**





**Figure 19.** 4-Port N5242A (Option 419)



**Figure 20.** 4-Port N5242A (Option 423)

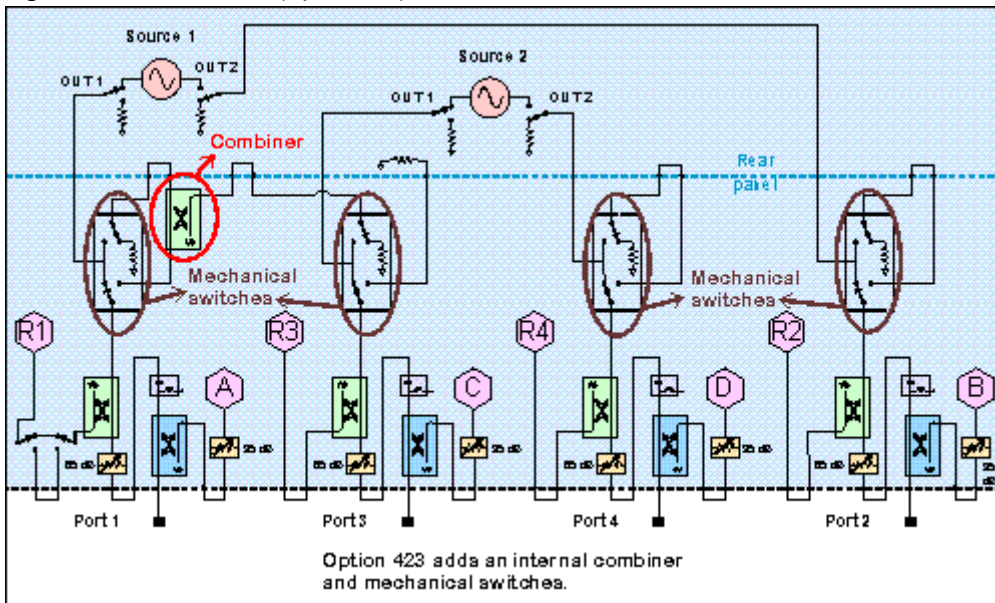
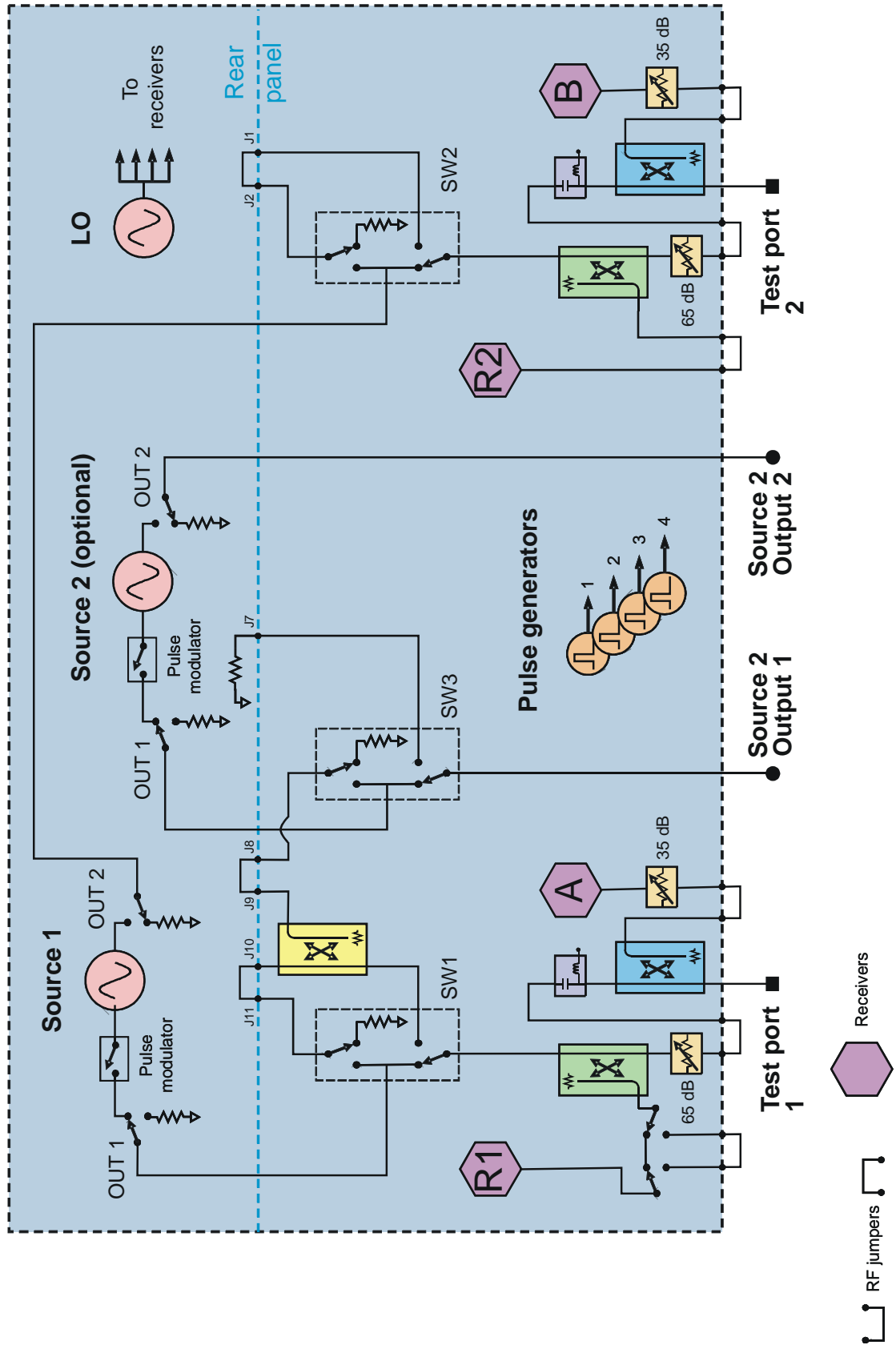


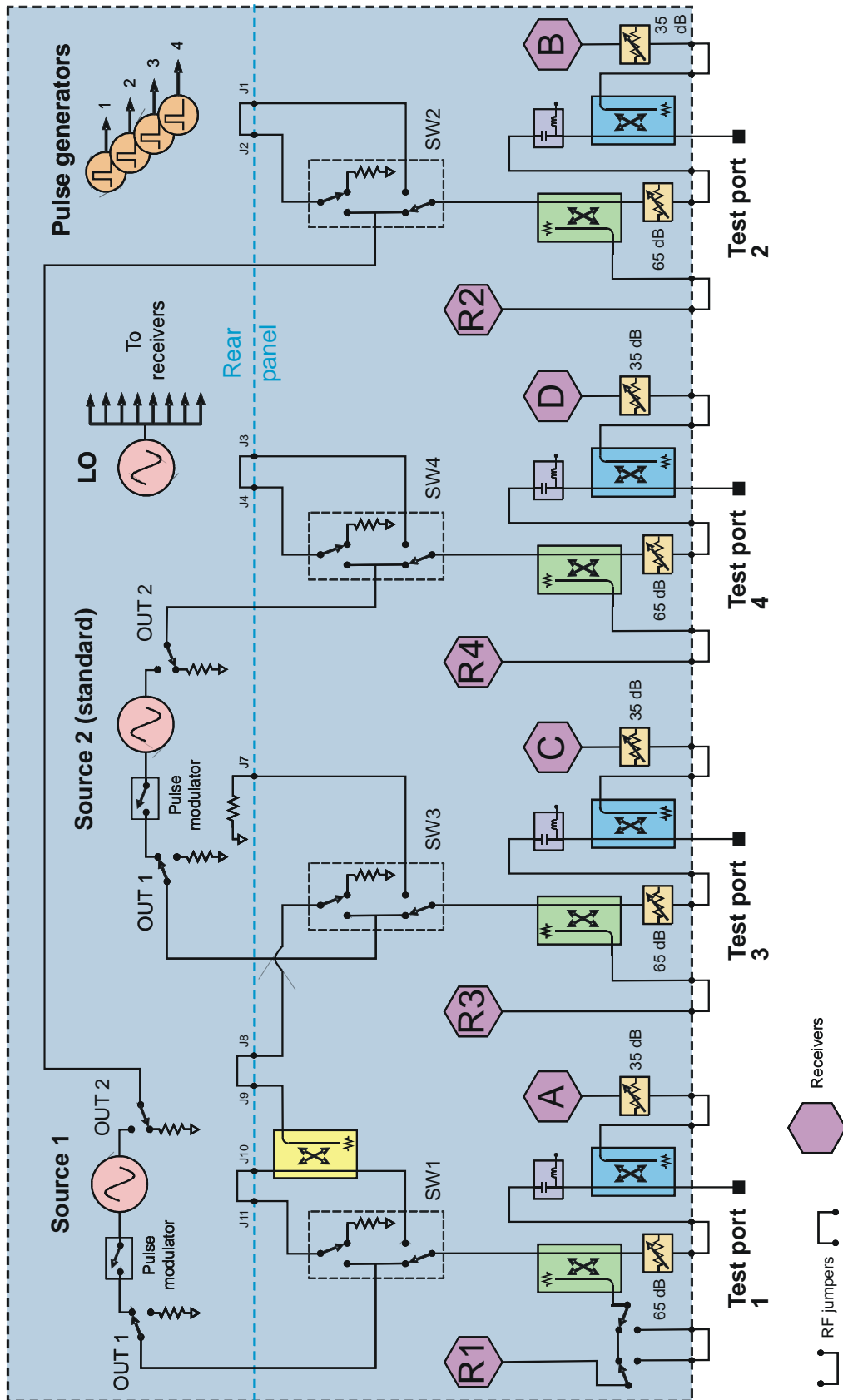
Figure 21. 2-Port N5242A (Option 219, 224), Showing J-Designators for Rear Panel Connectors

# 2-Port PNA-X Options 219, 224

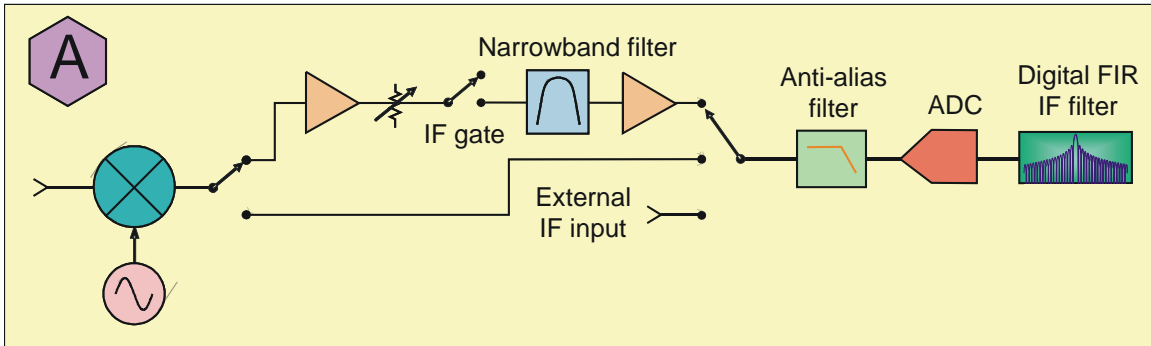


# 4-Port PNA-X Options 419, 423

Figure 22. 4-Port N5242A (Option 419, 423), Showing J-Designators for Rear Panel Connectors

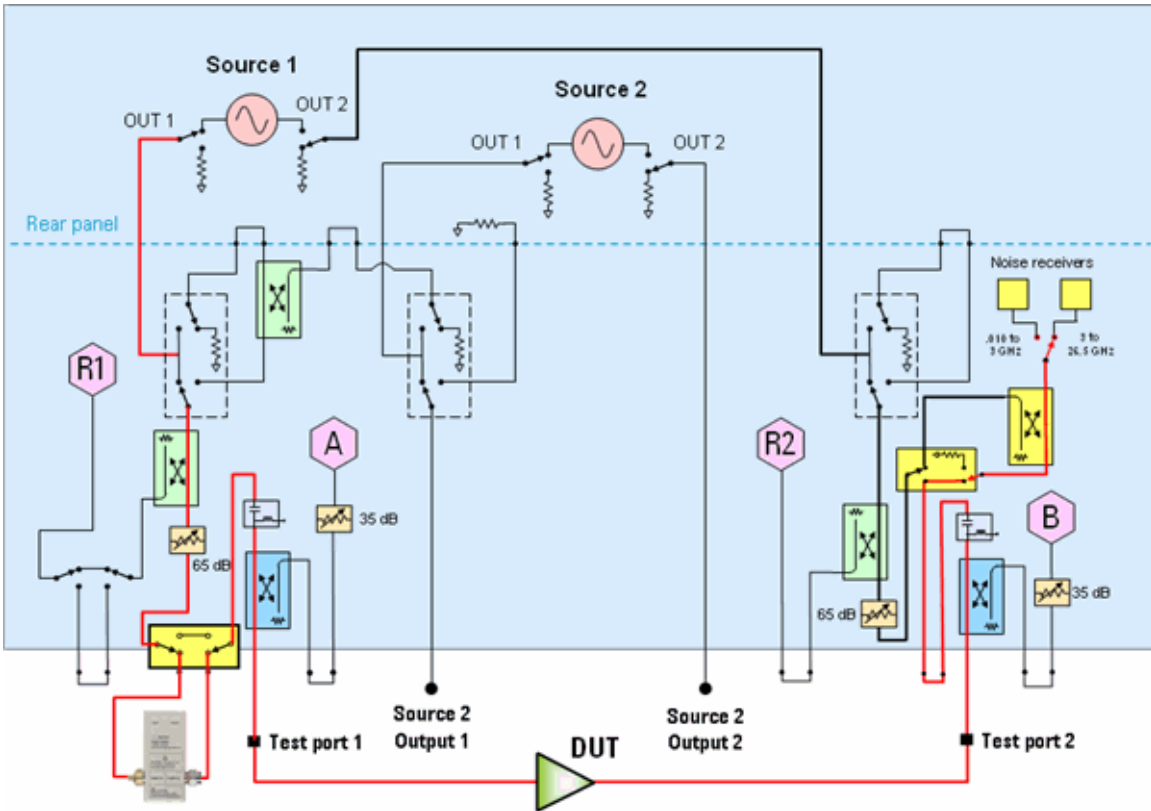


**Figure 23. Receiver Block Diagram**



**Figure 24. 2-Port PNA-X with Noise Figure Hardware (shown with Options 200, 219, 224, & 029).**

On 4-Port analyzers (Option 419 or 423) with Option 029, ports 1 and 2 are the same as shown here.



- At test port 1 front panel loops, a noise tuner switch connects the noise tuner (ECal module) in series with Source 1, providing several different input impedances.
- At test port 2, a noise tuner switch and a coupler route the RF signal from the DUT output to two noise receivers. The appropriate receiver is automatically selected as required for the frequency being measured.

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