

Technical Datasheet

# Microwave Signal Generator

2500B Series - 100 kHz to 50 GHz



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Ultra-Low Phase Noise and Fast-Switching Speed in a Single Unit





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# 2500B Series Microwave Signal Generator

Specifications formally describe product performance. A specification is a numerical value, or range of values, that bounds the performance of a product parameter. The product warranty covers the performance of parameters described by specifications. Products meet all specifications when shipped from the factory.

Typical and Nominal describe product performance that is useful in the application of the product, but is not covered by the product warranty. They describe performance that is expected of a given product at room temperature after 30 minutes warm-up time, but is not subject to the same statistical analysis of specification.

## Signal Generator Frequency Range

The 2500B series Microwave Signal Generators include six models covering 100 kHz to 50 GHz.

Model Number	Frequency Range	RF Output Connector
2502B	100 kHz to 2.5 GHz	Type-N (F)
2508B	2 GHz to 8 GHz	Type-N (F)
2520B	2 GHz to 20 GHz	SMA (F)
2526B	2 GHz to 26.5 GHz	SMA (F)
2540B	2 GHz to 40 GHz	2.92 mm (F)
2550B	2 GHz to 50 GHz	2.4 mm (F)

## Available Options

Option	Description
17A	Add Internal and External Modulation Suite (includes internal function generator)
17B	Add External Modulation Suite
18	Add 100 kHz to 2 GHz Frequency Range (10 MHz to 2 GHz with option 27) (Standard on the 2502B model)
20	Add High RF Output Power
22	Move RF Output Connector to Rear Panel
23	Add Type-N RF Connector (for 2520B model only)
26A	Add 90 dB Mechanical Step Attenuator (for 2502B, 2508B, 2520B models only)
26B	Add 90 dB Mechanical Step Attenuator (for 2526B model only)
26C	Add 90 dB Mechanical Step Attenuator (for 2540B model only)
26D	Add 90 dB Mechanical Step Attenuator (for 2550B model only)
27	Add 110 dB Electronic Step Attenuator (for 2502B, 2508B models only)
28	Add Ultra-Low Close-in Phase Noise
29	Add Fast Frequency Switching Speed
32	Add Narrow Pulse Width $\leq 100$ ns (Requires Option 17A or 17B)
44	Replace Standard Front Panel with Blank Front Panel (Requires Option 22)

# 2500B Series Technical Specifications

## Frequency

Range (with option 18)	<b>2502B</b>	100 kHz to 2.5 GHz
	<b>2508B</b>	100 kHz to 8 GHz
	<b>2520B</b>	100 kHz to 20 GHz
	<b>2526B</b>	100 kHz to 26.5 GHz
	<b>2540B</b>	100 kHz to 40 GHz
	<b>2550B</b>	100 kHz to 50 GHz
<b>Frequency Accuracy</b>	Same as time base	
<b>Frequency Resolution</b>	0.001 Hz	
<b>Power Slope</b>	0 to 0.5 dB/GHz	
<b>Phase Adjust</b>	± 360°	
<b>Phase Adjust Resolution</b>	0.1°	

## Frequency Stability

<b>Internal Reference Output</b>	<b>10 MHz</b>	TTL level into 50 Ω
	<b>100 MHz</b>	> +5 dBm square wave into 50 Ω
<b>Aging Rate</b> <sup>1</sup>	< 5 x 10 <sup>-10</sup> /day	
<b>Temperature Stability</b> <sup>2</sup>	< ± 2.5 x 10 <sup>-8</sup>	
<b>External Reference Frequency Input</b>	<b>Frequency</b>	10 MHz or 100 MHz
	<b>Frequency Deviation</b>	± 1 ppm
	<b>Recommended Input Level</b>	> -5 dBm into 50 Ω for 10 MHz > +5 dBm to < +8 dBm into 50 Ω for 100 MHz
<b>Reference Tuning</b>	<b>Voltage Range</b>	0 to 10V
	<b>Sensitivity</b>	2 ppm/V nominal 0.2 ppm/V nominal with option 28
<b>Lock/Level Indicator (CW Mode Only)</b>	Sync Out = +5 V (TTL High)	

## Frequency Bands

Band	Frequency	N
0	0.1 to ≤ 10 MHz	N/A
1	> 10 to ≤ 15.625 MHz	512
2	> 15.625 to ≤ 31 MHz	256
3	> 31 to ≤ 63 MHz	128
4	> 63 to ≤ 125 MHz	64
5	> 125 to ≤ 250 MHz	32
6	> 250 to ≤ 500 MHz	16
7	> 500 to ≤ 1000 MHz	8
8	> 1 to ≤ 2 GHz	4
9	> 2 to ≤ 4 GHz	2
10	> 4 to ≤ 10.1 GHz	1
11	> 10.1 to ≤ 20.2 GHz	1/2
12	> 20.2 to ≤ 39.6 GHz <sup>3</sup>	1/4
13	> 39.6 to ≤ 50 GHz	1/6

<sup>1</sup> After 30 days

<sup>2</sup> Temperature stability over operating range of 0°C to +55°C after 30 days

<sup>3</sup> Band 12 frequency range extends to 40 GHz for model 2540B

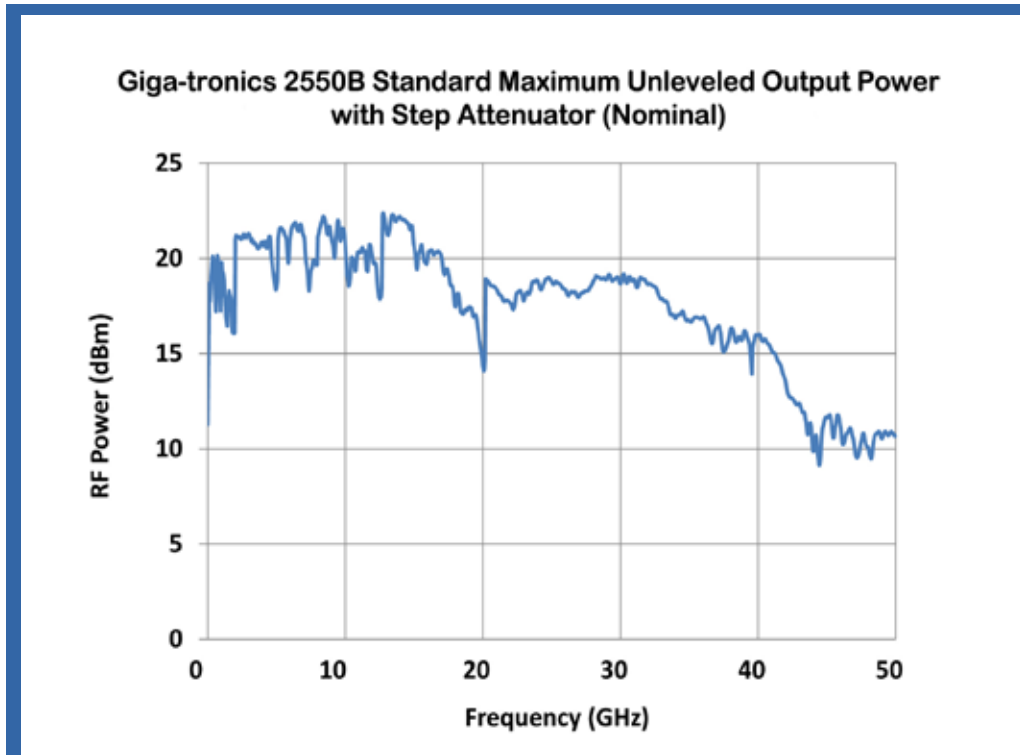
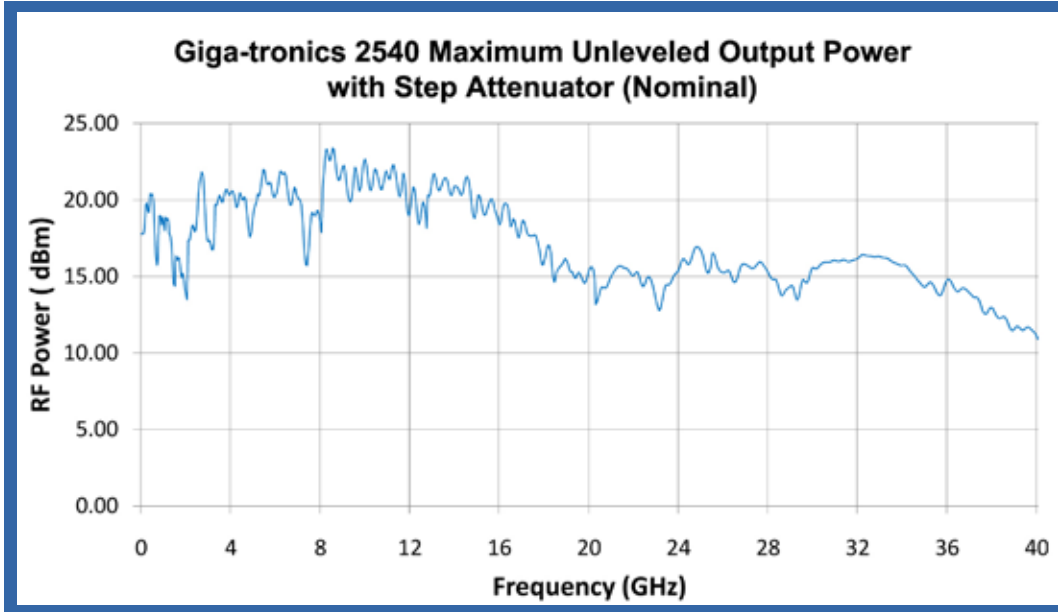
## Maximum Levelled Output Power in dBm

Specification applies into 50 Ω load over 0 °C to 35 °C range and degrades < 2 dB from 35 °C to 55 °C

Number in ( ) is for instruments with mechanical step attenuator option 26

Number in [ ] is for instruments with electronic step attenuator option 27

Model	0.1 to 10 MHz <sup>4</sup>	0.01 to 2 GHz	2 to 8 GHz	8 to 20 GHz	20 to 26.5 GHz	26.5 to 40 GHz	40 to 50 GHz
2502B <sup>5</sup>	10 (9)	12 (11) [7]	N/A	N/A	N/A	N/A	N/A
2508B	10 (9)	12 (11) [7]	14 (13) [7]	N/A	N/A	N/A	N/A
2520B	10 (9)	12 (11)	14 (13)	14 (12)	N/A	N/A	N/A
2526B	10 (9)	11 (10)	11 (10)	11 (9)	10 (8)	N/A	N/A
2540B	10 (9)	11 (10)	11 (10)	11 (9)	10 (8)	10 (8)	N/A
2550B <sup>6</sup>	6 (5)	6 (5)	5 (4)	5 (3)	5 (3)	5 (3)	5 (3)



<sup>4</sup> Specification is typical below 10 MHz

<sup>5</sup> Specification for model 2502B applies to its maximum frequency of 2.5 GHz

<sup>6</sup> Model 2550B frequency crossing is at 39.6 GHz instead of 40 GHz

## Option 20 Maximum Levelled Output Power in dBm

Specification applies into 50 Ω load over 0 °C to 35 °C range and degrades < 2 dB from 35 °C to 55 °C

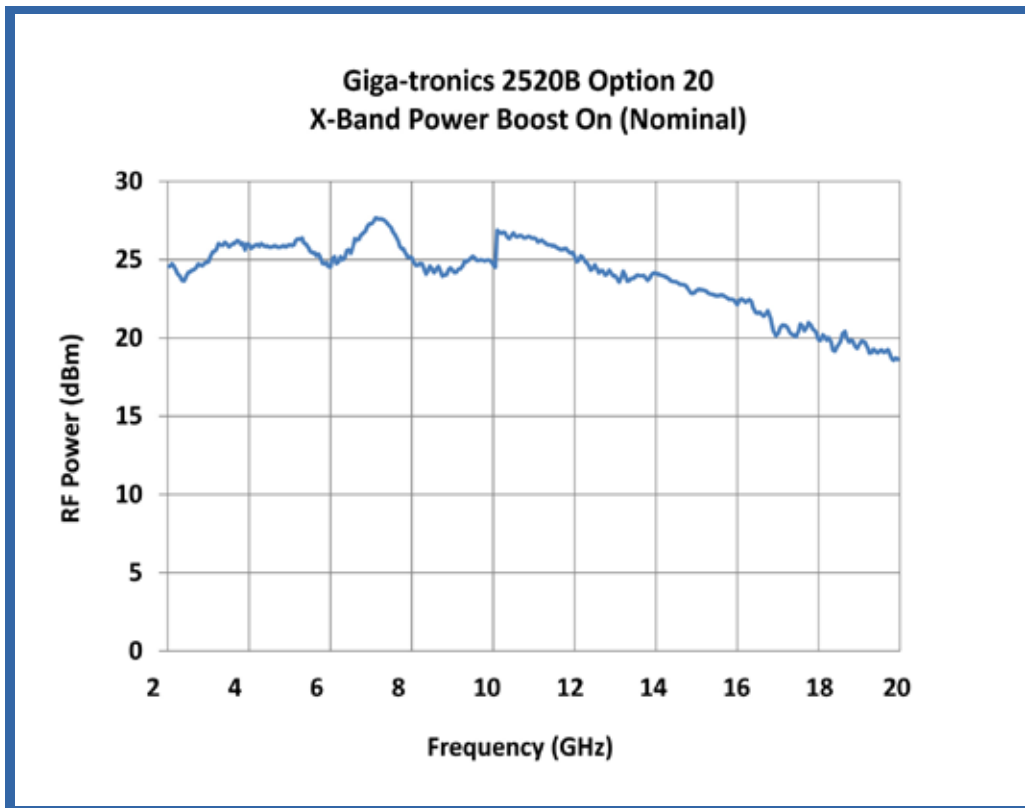
Number in ( ) is for instruments with mechanical step attenuator option 26

Number in [ ] is for instruments with electronic step attenuator option 27

Model	0.1 to 10 MHz <sup>4</sup>	0.01 to 2 GHz	2 to 8 GHz	8 to 18.5 GHz	18.5 to 20	20 to 26.5 GHz	26.5 to 40 GHz	40 to 50 GHz
2502B <sup>5</sup>	10 (9)	14 (13) [10]	N/A	N/A	N/A	N/A	N/A	N/A
2508B	10 (9)	14 (13) [10]	17 (16) [10]	N/A	N/A	N/A	N/A	N/A
2520B	10 (9)	14 (13)	17 (16)	20.5 (18.5)	18.5 (16.5)	N/A	N/A	N/A
2526B	10 (9)	14 (13)	12 (11)	15 (13)	15 (13)	11 (9)	N/A	N/A
2540B	10 (9)	14 (13)	12 (11)	15 (13)	15 (13)	11 (9)	11 (9)	N/A
2550B <sup>6</sup>	8 (7.5)	8 (7.5)	12 (11)	15 (13)	15 (13)	15 (13)	15 (13)	11 (9)

### X-Band Power Boost<sup>7</sup>

X-Band Power Boost is a special feature included in 2520B with Option 20, and when enabled, increases the maximum unleveled output power to 23 (21) dBm nominal from 4 to 12.7 GHz.



<sup>4</sup> Specification is typical below 10 MHz

<sup>5</sup> Specification for model 2502B applies to its maximum frequency of 2.5 GHz

<sup>6</sup> Model 2550B frequency crossing is at 39.6 GHz instead of 40 GHz

<sup>7</sup> AM specifications do not apply with X-Band Power Boost ON

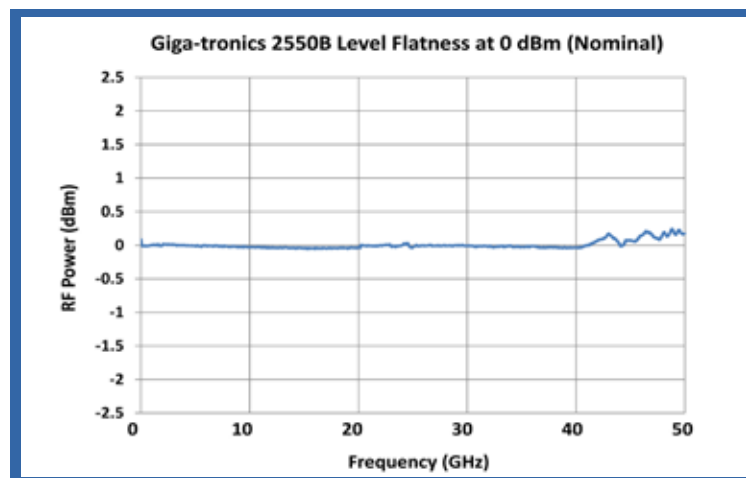
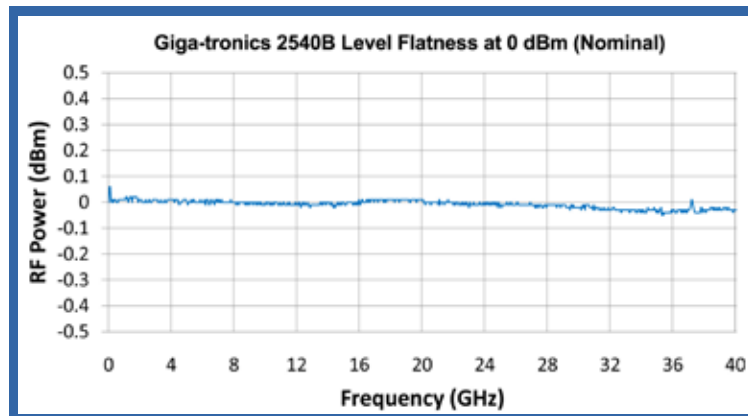
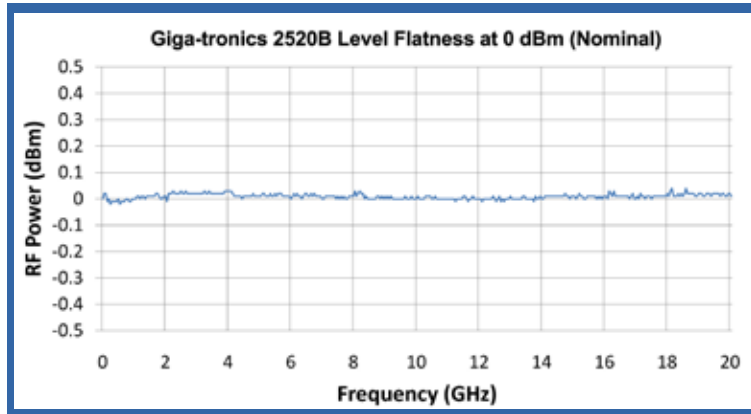


## RF Power Level Accuracy (dB)

Specifications apply over 15 °C to 35 °C range and degrades < 0.1 dB/°C outside that range

### Standard performance

Frequency Range	> +5 dBm	+5 dBm to > -5 dBm	-5 dBm to -10 dBm
10 MHz to 20 GHz	± 0.85	± 0.7	± 1.5
20 GHz to 40 GHz	± 1.05	± 0.9	± 1.5
40 GHz to 50 GHz	± 1.3	± 0.9	± 2.5



## RF Power Level Accuracy (dB)

Specifications apply over 15 °C to 35 °C range and degrades < 0.1 dB/°C outside that range

### Performance with mechanical step attenuator option 26:

Frequency Range	> +5 dBm	+5 dBm to > -5 dBm	-5 dBm to -90 dBm
10 MHz to 20 GHz	± 0.85	± 0.7	± 1.2
20 GHz to 40 GHz	± 1.05	± 0.9	± 1.5
40 GHz to 50 GHz	± 1.3	± 0.9	± 2.5

### Performance with electronic step attenuator option 27:

Frequency Range	> +5 dBm	+5 dBm to > -5 dBm	-5 dBm to -110 dBm <sup>8</sup>
10 MHz to 8 GHz	± 1.05	± 0.9	± 1.5

## Minimum Levelled Output Power in dBm

Specification applies over 0 °C to 35 °C range and degrades < 2 dB from 35 °C to 55 °C

Number in ( ) is for instruments with mechanical step attenuator option 26

Number in [ ] is for instruments with electronic step attenuator option 27

Model	0.1 to 10 MHz	0.01 to 2 GHz	2 to 8 GHz	8 to 20 GHz	20 to 26.5 GHz	26.5 to 40 GHz	40 to 50 GHz
2502B <sup>9</sup>	-13 (-103)	-10 (-100) [-127]	N/A	N/A	N/A	N/A	N/A
2508B	-13 (-103)	-10 (-100) [-127]	-10 (-100) [-127]	N/A	N/A	N/A	N/A
2520B	-13 (-103)	-10 (-100)	-10 (-100)	-10 (-100)	N/A	N/A	N/A
2526B	-13 (-103)	-10 (-100)	-10 (-100)	-10 (-100)	-10 (-100)	N/A	N/A
2540B	-13 (-103)	-10 (-100)	-10 (-100)	-10 (-100)	-10 (-100)	-10 (-100)	N/A
2550B <sup>10</sup>	-13 (-103)	-10 (-100)	-10 (-100)	-10 (-100)	-5 (-95)	-5 (-95)	-5 (-90)

### Additional Output Power Specifications

Power Offset (CW Mode)	0 to 10 dB
Power Adjust Resolution	0.01 dB
Temperature Stability	0.025 dB/°C
Output Source Match (ALC on) 50 Ω	< 2.0:1 to 50 GHz < 1.5:1 nominal, 2 GHz to 20 GHz, +5 dBm to -10 dBm

### External ALC

Polarity	Positive or negative diode detector, or positive power meter (selectable)
Range	-80 dBV (100 μV) to +6 dBV (2.0 V)
Power Meter Leveling Rate	0.7 Hz, typical
Input Impedance:	1 MΩ, typical

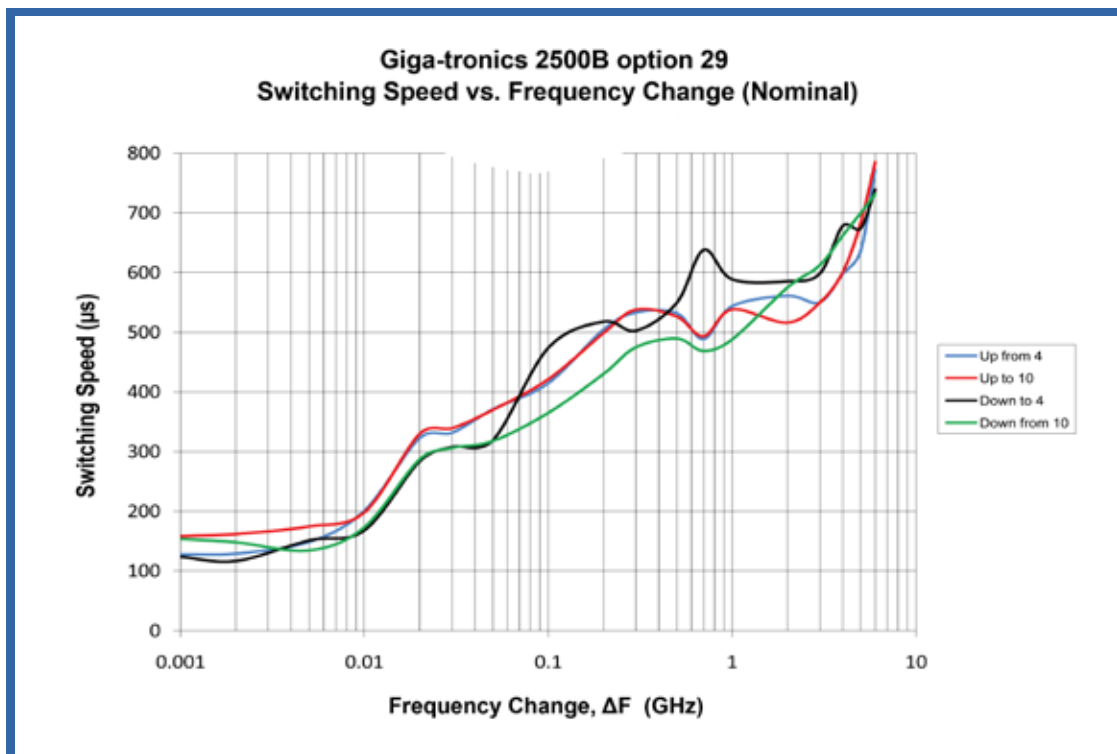
<sup>8</sup> Specification is nominal for levels below -90 dBm

<sup>9</sup> Specification for model 2502B applies to its maximum frequency of 2.5 GHz

<sup>10</sup> Model 2550B frequency crossing is at 39.6 GHz instead of 40 GHz only

## List Mode

Number of Points	4000	
Frequency Settling <sup>11, 12</sup>	2 ms minimum	
Frequency Settling <sup>11, 12</sup> Option 29	< 550 $\mu$ s for $\Delta F \leq 500$ MHz <sup>13</sup>	
Amplitude Settling <sup>12, 14</sup>	< 500 $\mu$ s	
Digital Sweep	Trigger Modes	External, GPIB GET, Software
	Sweep Modes	Continuous, Single Step, Single Sweep
Step Time	Standard	2 ms to 1 sec
	Option 29	150 $\mu$ s to 1 sec
Sync Out Delay <sup>15</sup>	50 $\mu$ s to 10 ms	
Sync Out Delay Resolution	10 ns	



Frequency Change,  $\Delta F = | (F_{stop} \times N_{stop}) - (F_{start} \times N_{start}) |$  where N is the value in the Frequency Band Table

<sup>11</sup> Time for frequency to settle within 50 kHz of final value after a frequency switch

<sup>12</sup> Settling time not specified with FM turned on

<sup>13</sup>  $\Delta F = | (F_{stop} \times N_{stop}) - (F_{start} \times N_{start}) |$  where N is the value in the Frequency Band Table

<sup>14</sup> Time for amplitude to settle within 0.1 dB of final value after an amplitude switch

<sup>15</sup> Delay is specified from edge of trigger pulse

## Frequency and Power Sweep

<b>Frequency Sweep Modes</b>	Start/Stop or Center/Span
<b>Frequency Sweep Range</b>	Full Frequency Range
<b>Frequency Range Resolution</b>	0.001 Hz
<b>Ramp Frequency Sweep Resolution</b>	Analog Sweep, 401, 801 or 1601 points
<b>Analog Sweep Mode</b>	Provides very fine resolution sweep, for use with Scalar Network Analyzers
<b>Ramp Frequency Sweep Time<sup>16</sup></b>	30 ms to 200 sec
<b>Frequency Sweep Time Resolution</b>	10 $\mu$ s
<b>Step Sweep Step Time<sup>16</sup></b>	10 ms to 10 sec
<b>Step Sweep Time Resolution</b>	1 ms
<b>Ramp Power Sweep</b>	0 to 25 dB
<b>Ramp Power Sweep Steps</b>	2000 max
<b>Ramp Power Sweep Resolution</b>	0.01 dBm
<b>Ramp Power Sweep Time<sup>16</sup></b>	30 ms to 200 sec
<b>Ramp Power Time Resolution</b>	10 $\mu$ s
<b>Power Slope (CW Mode, List Mode)</b>	0 to 0.5 dB/GHz
<b>Ramp Output</b>	0 to 10V and 0.5 V/GHz (2502B, 2508B, 2520B) or 0.25 V/GHz (2526B, 2540B, 2550B)
<b>Z-Axis Blanking</b>	+5V (Positive polarity only)
<b>Markers</b>	5 Intensity markers and 5 Amplitude markers
<b>Marker Resolution</b>	0.001 Hz
<b>Save and Recall</b>	10 Registers (0 through 9). These saved states are preserved until over-written or erased

## Remote Programming

<b>Software Interface</b>	SCPI, IVI-C, Automation Xpress		
<b>Code Compatibility<sup>17</sup></b>	Giga-tronics 2400, GT7000, GT9000, GT12000 and HP 8340, 8350, 8360, 8370, 8663 and 8673		
<b>Execution Speed (GPIB)</b>		<b>AXI</b>	<b>SCPI</b>
	<b>CW Switching (Typical)</b>	2.5 ms	28 ms
	<b>4000 Point List Download (Typical)</b>	20 sec	28 sec
<b>Remote Interface</b>	GPIB, RS-232, USB 2.0, Ethernet LAN (100 Base T)		

<sup>16</sup> Sweep Rate must be <500 MHz/msec <sup>13</sup> Settling time not specified with FM turned on

<sup>17</sup> See programming manual for supported commands. Basic emulation is included, and when emulating another signal generator, is limited to the capabilities, parameters and resolutions of the emulated instrument.

## Spectral Purity

<b>Harmonics</b>	Maximum leveled output power or +10 dBm, whichever is lower. Specification for harmonics above instrument frequency range are typical	
	100 kHz to 10 MHz	-30 dBc
	> 10 MHz to 100 MHz	-40 dBc <sup>18</sup>
	> 100 MHz to 39.6 GHz <sup>19</sup>	-50 dBc <sup>20</sup>
	> 39.6 to 50 GHz	-30 dBc (typical)
<b>Sub-Harmonics</b>	Maximum leveled output power or +10 dBm, whichever is lower. Specification for sub-harmonics above instrument frequency range are typical	
	100 kHz to 2.0 GHz	-80 dBc
	> 2 to 20.2 GHz	-60 dBc
	> 20.2 to 50 GHz	-40 dBc
<b>Spurious</b>	Specification is for offsets > 300 Hz	
	Specification is -45 dBc + 20 log(1/N) dBc typical for offsets < 300 Hz	
	100 kHz to 10.1 GHz	-66 dBc
	> 10.1 to 20.2 GHz	-60 dBc
	> 20.2 to 39.6 GHz <sup>19</sup>	-54 dBc
	> 39.6 to 50 GHz	-50 dBc
<b>Residual FM (typical)</b>	50 Hz to 15 kHz Bandwidth	
	100 kHz to 20.2 GHz	< 6 Hz
	> 20.2 to 39.6 GHz <sup>19</sup>	< 12 Hz
	> 39.6 to 50 GHz	< 18 Hz
<b>AM Noise (typical)</b>	Offset > 5 MHz at maximum leveled power. Applies in CW only	
	100 kHz to 2 GHz	-130 dBm/Hz
	> 2 to 20.2 GHz	-145 dBm/Hz
	> 20.2 to 50 GHz	-132 dBm/Hz

<sup>18</sup> Specification is -35 dBc for frequencies < 50 MHz on 2550B model only

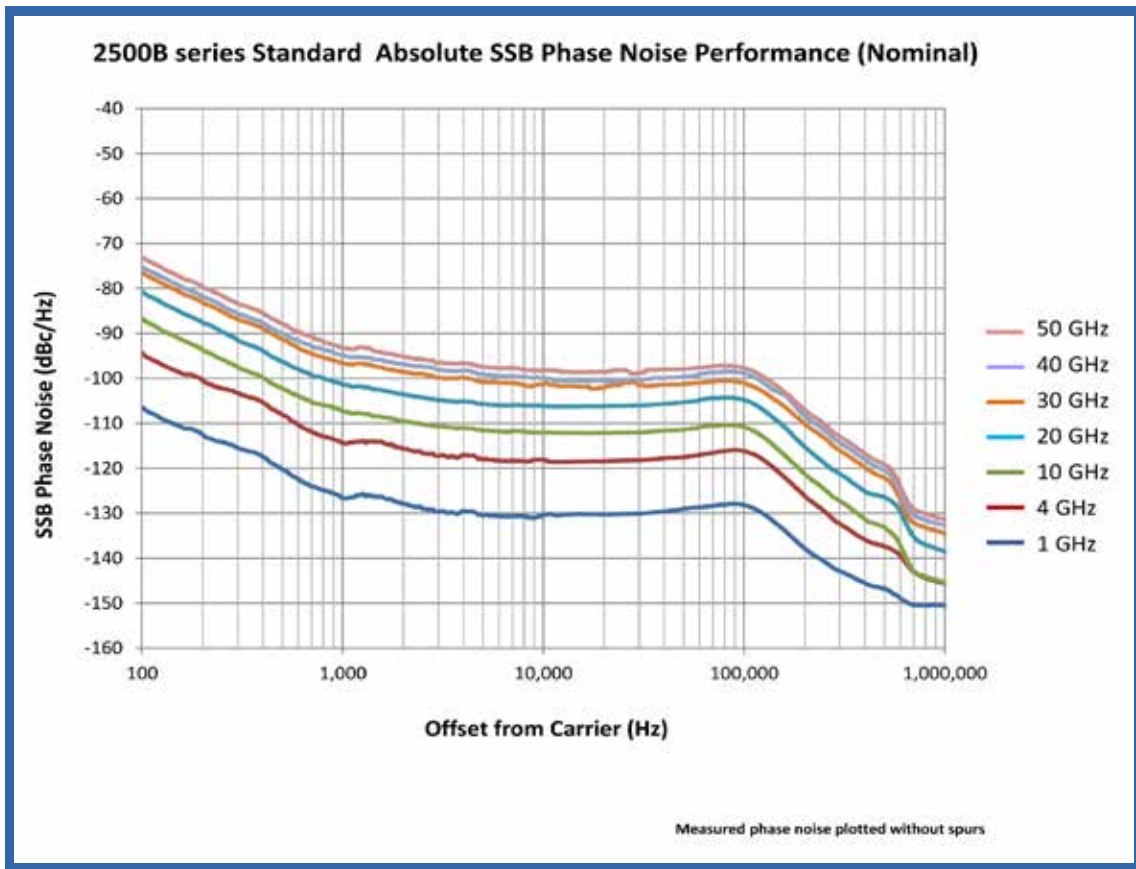
<sup>19</sup> Specification for model 2540B extends to 40 GHz

<sup>20</sup> Specification is nominally -25 dBc at +10 dBm with X-Band Power Boost enabled

## Phase Noise

### SSB Phase Noise - Standard

Carrier	Offset from Carrier (dBc/Hz)				
CW (GHz)	100 Hz	1 kHz	10 kHz	100 kHz	1 MHz
1	-96	-109	-121	-121	-147
4	-84	-94	-111	-109	-139
10	-74	-96	-106	-105	-135
20	-68	-88	-99	-99	-123
30	-67	-79	-96	-96	-124
40 <sup>21</sup>	-73	-90	-97	-96	-129
50 <sup>21</sup>	-71	-89	-96	-95	-128

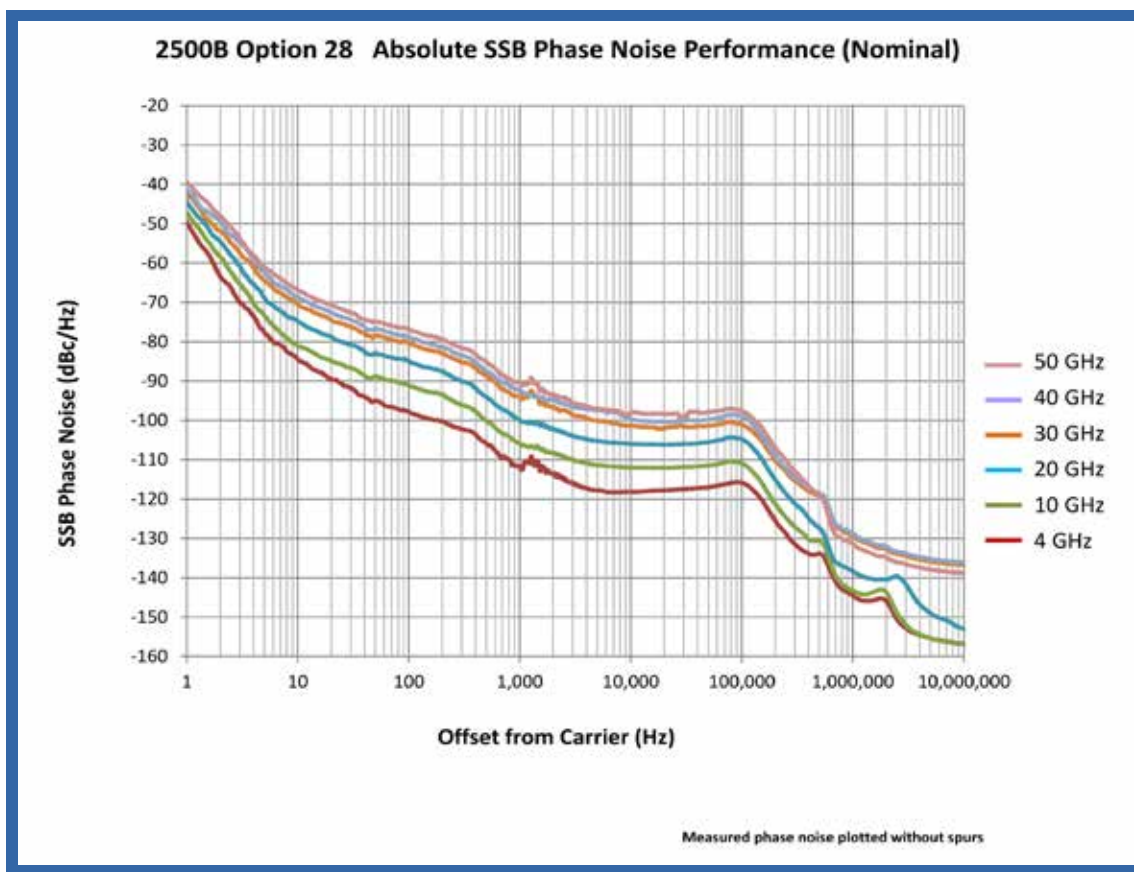


<sup>21</sup> Specifications for 40 GHz and 50 GHz are nominal

# Phase Noise

## SSB Phase Noise - Option 28

Carrier	Offset from Carrier (dBc/Hz)						
CW (GHz)	1 Hz	10 Hz	100 Hz	1 kHz	10 kHz	100 kHz	1 MHz
1	-55	-77	-100	-118	-124	-124	-150
4	-43	-67	-90	-108	-114	-112	-142
10	-35	-60	-83	-100	-109	-108	-138
20	-29	-54	-77	-94	-102	-102	-126
30	-23	-48	-71	-88	-99	-99	-127
40 <sup>21</sup>	-38	-67	-76	-90	-97	-96	-129
50 <sup>21</sup>	-36	-64	-74	-89	-96	-95	-128



<sup>21</sup> Specifications for 40 GHz and 50 GHz are nominal

## Frequency Modulation Table

(Specification applies for frequencies above 10 MHz)

Rate (3 dB bandwidth)	DC to 5 MHz
Peak Deviation DC to 750 kHz 750 kHz to 5 MHz	1.5 MHz/N 15 MHz/N
Modulation Index DC to 750 kHz 750 kHz to 5 MHz	Deviation limited < 25/N
Accuracy 5 kHz rate 1 MHz rate	± 5% at 5 kHz rate with 1 V <sub>peak</sub> input, 12.024 kHz/V sensitivity ± 5% at 1 MHz rate with 1 V <sub>peak</sub> input, 2.4048 MHz/V sensitivity
Sensitivity Range	40 Hz/V to 20 MHz/V
Sensitivity Resolution	1 Hz/V
Input Range	± 1V
Input Impedance	50 Ω

## Phase Modulation

(Specification applies for frequencies above 10 MHz)

Rate (3 dB Bandwidth)	100 Hz to 100 kHz
Peak Deviation	10 rad-pk/N
Accuracy	± 5% at 1 kHz rate with 1 V <sub>peak</sub> input, 3.83 rad/V sensitivity
Sensitivity Range	0.001 rad/V to 50 rad/V
Sensitivity Resolution	0.001 rad/V
Input Range	± 1V
Input Impedance	50 Ω

## Amplitude Modulation<sup>22</sup>

(Specification applies for frequencies above 10 MHz)

Depth (0 dBm carrier level)	0 to 90% (0 dB to 20 dB)
Depth Resolution	0.1%
Rate (3 dB bandwidth at 0 dBm carrier level)	DC to 100 kHz (Depth = 50%)
Sensitivity	0 to 95%/V, selectable
Sensitivity Resolution	0.1%/V
Accuracy	± 10% of setting at 1 kHz rate
Input Range	± 1V
Input Impedance	600 Ω

<sup>22</sup> Modulation peaks must be less than maximum available power



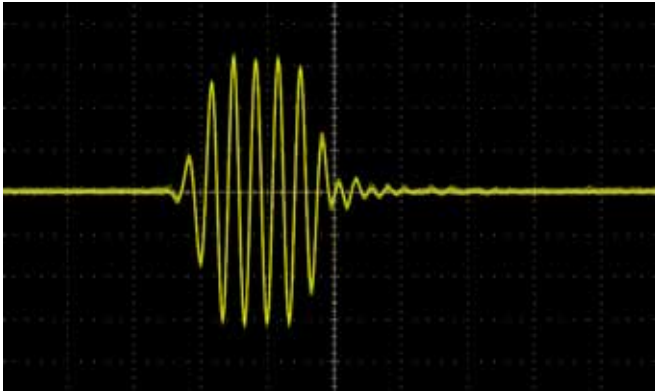
## Pulse Modulation

(Specification applies for frequencies above 500 MHz)

Parameter	Specification	
Standard Operating Modes	Internal, External	
Pulse On/Off Ratio <sup>23</sup>	> 80 dB minimum, 90 dB nominal	
Pulse Leveling Modes	Always on (closed-loop), Always off (open-loop Cal), Off for pulse widths < 1 μs	
Rise/Fall Times	500 MHz to 20 GHz	< 10 ns maximum, 3 ns typical
	20 GHz to 50 GHz	< 25 ns maximum, 10 ns typical
Minimum Leveled Pulse Width <sup>24</sup>	Internal / External	100 ns
Minimum Unleveled Pulse Width <sup>24</sup> (Option 32)	Open-Loop Calibrated Level	25 ns, 10 ns nominal
Level Accuracy <sup>24</sup>	Pulse Width > 350 ns	± 0.5 dB
	Pulse width > 100 ns to 350 ns	+ 1.5 dB/ - 0.5 dB
Level Accuracy <sup>24</sup> (Option 32)	Pulse Width > 25 ns to 100 ns	+ 2.5 dB/ - 0.5 dB
PRF (50% Duty Cycle)	Leveled	< 3 MHz
	Open-Loop Calibrated (Option 32)	< 10 MHz
Pulse Fidelity	Video Feed-through, 500 MHz to 2 GHz	< 5%
	Video Feed-through, 2 GHz to 50 GHz	< 1%
	Compression	< ± 5 ns
	RF Delay (skew)	< 75 ns
Sync Out Delay	External	50 ns to 10 ms
Sync Out Delay Resolution	External	10 ns

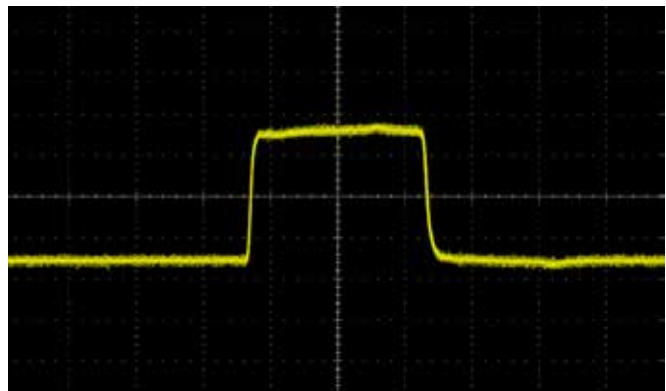
### 2500B Option 32 Narrow Pulse Performance (Nominal)

10 ns pulse at 750 MHz RF



Measured directly on wide-bandwidth Oscilloscope

20 ns pulse envelope at 10 GHz RF



Measured with low-capacitance Detector and wide-BW Oscilloscope

### Narrow Pulse Leveling Modes

Three ALC modes for pulse modulation exist. In the “Always On” mode the ALC automatically maintains the pulse amplitude accuracy for pulse widths as narrow as 350 ns over the full amplitude range, or as narrow as 100 ns at maximum leveled output power. In the “Always Off” mode the ALC provides accurate power output for pulses as low as 10 ns. Whenever RF is turned on, or the frequency or power settings are changed, the ALC turns on the RF on for 1 millisecond to calibrate the output power. After this initial calibration leveling is completed, the RF is turned off and pulse operation resumes. In the “Off for pulse widths < 1 μs” mode the ALC automatically reengages leveling whenever the pulse width exceeds 1 μs. This provides automatic closed loop leveling for pulse widths greater than 1 μs while still providing accurate output power for pulse widths as low as 10 ns.

<sup>23</sup> Specification for model 2502B applies up to a frequency of 2.0 GHz.

<sup>24</sup> Duty Cycle must be >0.01%

## Internal Function Generator

AM Source	Waveforms	Sine, Square, Triangle, Ramp, Gaussian Noise
	Rate	0.01 Hz to 100 kHz, all waveforms
	Resolution	0.01 Hz
	Accuracy	Same as time base
	AM Out	2 V <sub>peak-to-peak</sub> into 10 k $\Omega$ load
FM and Phase Modulation Source	Waveforms	Sine, Square, Triangle, Ramp
	Rate	0.01 Hz to 1 MHz, all waveforms
	Resolution	0.01 Hz
	Accuracy	Same as time base
	FM/ $\phi$ M Out	2 V <sub>peak-to-peak</sub> into 10 k $\Omega$ load
Pulse Modulation Modes	Single Pulse Modes	Continuous, Gated, Triggered
	Pulse Burst Modes	Continuous, Gated, Triggered
Pulse Modulation Source	Pulse Width	10 ns to 1 s
	Pulse Repetition (PRI)	20 ns to 1 s
	Pulse Burst Mode Pulses	2 to 300
	Pulse Burst Period	30 ns to 10 s
	Sync Out Delay	-1 s to +1 s
	Triggered RF Pulse Delay	100 ns to 1 s
	Resolution	10 ns
	Pulse Accuracy	$\pm 2\%$ of setting or $\pm 15$ ns whichever is greater. $\pm 0.08\%$ nominal
	Delay Accuracy	$\pm 15$ ns
	Pulse Modulation Out	2 V into 50 $\Omega$
	Gated Mode Input	Active High or Active Low polarity
	Triggered Mode Input	Rising Edge or Falling Edge polarity

## Physical Table

Environmental	MIL-PRF-28800F, Class 3
Safety	EN61010
Weight	< 35 lbs (15.9 kg)
Emissions	EN61326
Rack Height	3U (5.25 inches) (133 mm)
Dimensions (with rack handles)	19 inches (W) x 21 inches (D) x 5.2 inches (H) 483 mm (W) x 534 mm (D) x 133 mm (H)
Power	90 to 253 VAC, 47 to 440 Hz 300 Watts nominal, 350 Watts max.



## 2500B Series Rear Panel I/O Connector Descriptions

Connector Label	Specifications	Connector Type
EXT ALC	External ALC Input	BNC
RF OUT	50 Ω Rear Panel Output, option 22 only	SMA, N, 2.92 mm or 2.4 mm
FM/ φM OUT	Internal modulation generator output; 2 Vp-p into 10 kΩ	BNC
PULSE OUT	A +4 V video representation of the pulsed RF output signal	BNC
AM OUT	Internal modulation generator output; 2 Vp-p into 10 kΩ	BNC
PM SYNC OUT	Synchronization output pulse width > 75 ns width	BNC
FM/ φM IN	50 Ω, +/- 1 V maximum	BNC
AM IN	600 Ω	BNC
PULSE IN/PM TRIG IN	50 Ω, TTL levels, polarity selectable	BNC
LOCK/LEVEL	+5 V indicator for phase/level lock for CW mode and in list mode	BNC
REF TUNE	0 to +10 V	BNC
SYNC OUT	+5 V output pulse	BNC
TRIGGER IN	Used to trigger a list. Accepts a TTL level signal of > 50 ns width.	BNC
BLANKING	+5 V output indicator for band crossing, filter switching, and retraces	BNC
RAMP OUT	0 to 10 V	BNC
STOP SWP IN/OUT	+5 V, 2 kΩ, active low	BNC
V/GHz	0.5 V/GHz (2502B, 2508B, 2520B) or 0.25 V/GHz (2526B, 2540B, 2550B)	BNC
100 MHz OUT	+5 dBm typical, 50 Ω	BNC
10 MHz OUT	2 Vp-p, 50 Ω	BNC
EXT REF IN	10 MHz ± 50 Hz (> -5 dBm), 100 MHz ± 500 Hz (> +5 dBm to +8 dBm), 50 Ω	BNC
GPIB	A 24-pin IEEE STD 488.2 connector for control of the instrument during remote operation using GPIB	Type 57
RS-232	A DB-9 connector for control of the instrument during remote operation using RS-232 serial communications	DB-9
USB	USB 2.0 (Device) for control of the instrument during remote operation using USB communications	USB type B
LAN	100 Base T Ethernet for control of the instrument during remote operation using Ethernet	RJ45
AC POWER INPUT	90 to 253 VAC, auto-sensing, 47 Hz to 440 Hz	IEC Power Line

### Included Accessories

The 2500B series Microwave Signal Generators include the following items: Giga-tronics Automation Xpress software (AX), operation and programming manual (CD-ROM), AC power cord (6 foot) and combined rack mount and handle brackets.



# Ordering Information

Giga-tronics has a network of RF and Microwave instrumentation sales engineers and a staff of factory support personnel to help you find the best, most economical instrument for your specific applications. In addition to helping you select the best instrument for your needs, our staff can provide quotations, assist you in placing orders, and do everything necessary to ensure that your business transactions with Giga-tronics are handled efficiently.

Model Number	Frequency Range
2502B	100 kHz to 2.5 GHz
2508B	2 GHz to 8 GHz
2520B	2 GHz to 20 GHz
2526B	2 GHz to 26.5 GHz
2540B	2 GHz to 40 GHz
2550B	2 GHz to 50 GHz

## Available Options and Accessories

Option	Description
17A	Add Internal and External Modulation Suite (includes internal function generator)
17B	Add External Modulation Suite
18	Add 100 kHz to 2 GHz Frequency Range (Standard on the 2502B model)
20	Add High RF Output Power
22	Move RF Output Connector to Rear Panel
23	Add Type-N RF Connector (for 2520B model only)
26A	Add 90 dB Mechanical Step Attenuator (for 2502B, 2508B, 2520B models only)
26B	Add 90 dB Mechanical Step Attenuator (for 2526B model only)
26C	Add 90 dB Mechanical Step Attenuator (for 2540B model only)
26D	Add 90 dB Mechanical Step Attenuator (for 2550B model only)
27	Add 110 dB Electronic Step Attenuator (for 2502B, 2508B models only)
28	Add Ultra-Low Close-in Phase Noise
29	Add Fast Frequency Switching Speed
32	Add Narrow Pulse Width $\leq 100$ ns (Requires Option 17A or 17B)
44	Replace Standard Front Panel with Blank Front Panel (Requires Option 22)
46	Add Rack Slide Kit
EWS20	Three Year Warranty (Two Year Extended Warranty)
EWS40	Five Year Warranty (Four Year Extended Warranty)

## Giga-tronics Support Services

At Giga-tronics, we understand the challenges you face. Our support services begin from the moment you call us. We help you achieve both top-line growth and bottom-line efficiencies by working to identify your precise needs and implement smart and result orientated solutions. We believe and commit ourselves in providing you with more than our superior test solutions. For technical support, contact:

Toll free: 1-800-726-4442(USA & Canada) / +1 925.328.4650 (International)  
Email: support@gigatronics.com

## Updates

All data is subject to change without notice. For the latest information on Giga-tronics products and applications, please visit:

<http://www.gigatronics.com>



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