

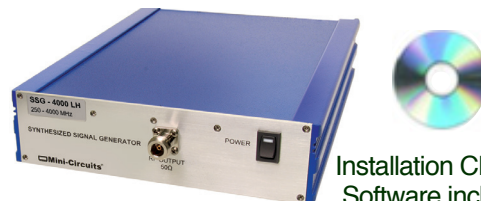
Low Harmonics level

USB Synthesized Signal Generator SSG-4000LH

50Ω -60 dBm to +10 dBm, 250-4000 MHz

The Big Deal

- Low Harmonics (-66dBc typ.)
- 70dB Adjustable output power range
- Internal & External pulse modulation
- Cost effective Signal Generator



Installation CD with Software included

Case Style: LV1753

Product Overview

Mini-Circuits SSG-4000LH is a wideband synthesized signal generator operating over a frequency range of 250 to 4000 MHz. The signal generator is cased in a rugged metal shielded package (11.0" x 8.5" x 2.15") and equipped with an N-type 50Ω connector at the RF output port.

The signal generator is supplied with a CD containing user friendly GUI control software and programming APIs for 32 and 64 bit environments. Using the supplied software, the user can easily select one of several different output modes including multiple pulse modulation options, frequency sweep, and power sweep (up, down, or bidirectional).

The SSG-4000LH can be controlled from almost any Windows or Linux PC, via USB 2.0 interface. Included with the generator are a 2.7 ft. USB cable and a 24V power adapter. Longer USB cables and a mounting bracket are available as additional options.

Key Features

Feature	Advantages
Wide output power dynamic range	Dynamic range 70 dB, output power from -60dBm to +10dBm in 0.25dB steps
USB HID (Human Interface Device)	Plug-and-Play (no need to install a driver for the device).
Pulse modulation options	The SSG-4000LH can produce pulse modulated RF using internal or external modulating signal
Multiple sweep options	The SSG-4000LH can be set to sweep either power or frequency up, down, or bidirectionally.
Software CD with program instructions for various operating systems	The unit is supplied with a CD containing a user friendly Graphical User Interface (GUI) control program and API objects for Windows® operating systems. Programming instructions are included for 32 and 64 bit versions of Linux® and Windows® operating systems. The SSG-6001RC is compatible with LabVIEW®, Delphi®, C++, C#, Visual Basic®, .NET software and more; for other operating environments and languages please contact our applications department for support.

Trademarks: Windows is a registered trademark of Microsoft Corporation in the United States and other countries. Linux is a registered trademark of Linus Torvalds. Pentium is a registered trademark of Intel Corporation. Neither Mini-Circuits nor the Mini-Circuits SSG-series Synthesized Signal Generators are affiliated with or endorsed by the owners of the above referenced trademarks

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Low Harmonics level

USB Synthesized Signal Generator

50Ω -60 dBm to +10 dBm, 250-4000 MHz

Features

- Low Harmonics level (-66 dBc typ.)
- Adjustable output power, 70 dB dynamic range
- USB HID control interface (Plug and Play)
- Small, light weight
- Power and/or frequency sweep options
- Multiple pulse modulation options (external, free run, triggered)
- Separate Trigger In and Trigger Out ports
- Easy installation and operation
- User friendly Windows® Graphical User Interface
- Supports a wide range of programming environments
(See application note [AN-49-001](#) for details)
- Mounting bracket (Optional)



Installation CD with
Software included

SSG-4000LH

Included Accessories

Model No.	Description	Qty.
AC/DC-24-3W1	AC/DC 24V adapter (see Ordering Information)	1
CBL-3W1-XX	AC power cord (see Ordering Information)	1
USB-CBL-AB-3+	2.7ft. USB cable	1
SSG-CD	Software CD	1

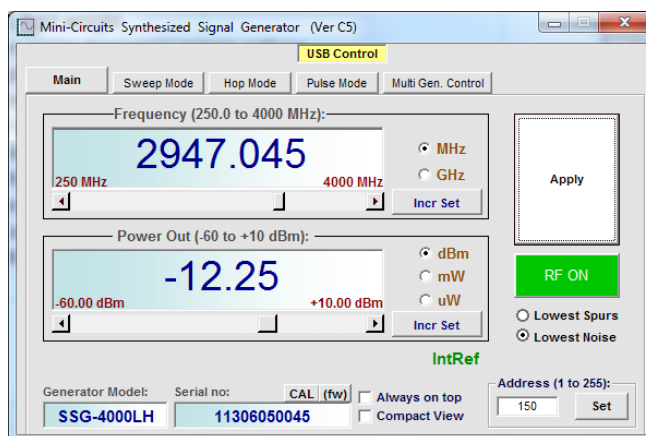
RoHS Compliant

See our web site for RoHS Compliance methodologies and qualifications

Applications

- Lab test equipment
- Automated test capability
- Production line testing
- Field testing

Mini-Circuits Control Program for USB Synthesized Signal Generators



Electrical Specifications at +25°C

Parameter	Test Conditions	Min.	Typ.	Max.	Units
Output Frequency	–	250	–	4000	MHz
Frequency Resolution	–	5	–	–	kHz
Frequency accuracy	Using Internal Reference	–	±1	–	ppm
Settling time ^{1,3}	–	–	2.5	–	msec
Minimum Dwell Time ^{2,3}	–	–	15	–	
VSWR	250 - 3000 MHz	–	1.5	–	:1
	3000 - 4000 MHz	–	2.3	–	
Output power Max	250 - 4000 MHz	+10	–	–	dBm
Output power Min	250 - 4000 MHz	–	–	-60	
Power resolution (nom.)	–	–	0.25	–	dB
Dynamic range	–	–	70	–	dB
Output power accuracy	–	–	±0.25	±1.00	dB
RF output level	@RF OFF	–	-95	–	dBm
Harmonics & Sub-Harmonics	PWR _{out} = -50 dBm	–	-58	–	dBc
	PWR _{out} = -30 dBm	–	-78	–	
	PWR _{out} = -10 dBm	–	-78	–	
	PWR _{out} = 0 dBm	–	-74	–	
	PWR _{out} = +10 dBm	–	-47	–	
Non-Harmonic Spurious ⁴	@Frequency step size = 5 kHz	–	-50	–	dBc
	@Frequency step size = 100 kHz	–	-66	–	
	@Frequency step size = 1 MHz	–	-80	–	
	@Frequency step size = 10 MHz	–	-94	–	

Typical Phase Noise, SSB ⁴ (dBc/Hz) at +25°C

Carrier Frequency (MHz)	Frequency Offset									
	100 Hz		1 kHz		10 kHz		100 kHz		1 MHz	
	Lowest Spurs	Lowest Noise	Lowest Spurs	Lowest Noise	Lowest Spurs	Lowest Noise	Lowest Spurs	Lowest Noise	Lowest Spurs	Lowest Noise
250	-95	-96	-102	-111	-101	-107	-121	-123	-147	-147
1060	-81	-83	-92	-98	-91	-94	-111	-112	-139	-139
2600	-74	-75	-82	-91	-82	-89	-102	-105	-132	-132
4000	-70	-72	-79	-85	-81	-88	-101	-106	-131	-131

¹ Settling time - transition between two signals during which generator is in RF OFF state.

² Dwell time - duration of each signal point in a Sweep or Hop sequence set by user. Default is minimum dwell time.

³ Generator response time is Dwell time + Settling Time.

⁴ It is recommended to work in Lowest Spur mode when using frequency step size of up to 50 kHz and Lowest Noise mode for frequency step size greater than 50kHz. Working in Lowest Spur or Lowest Noise mode outside the recommended range may cause excessive Noise (in Lowest Spur mode) or excessive spurs (in Lowest Noise mode)

Electrical Specifications (Pulse modulation modes)⁵ at +25°C

Parameter	Test Conditions	Min.	Typ.	Max.	Units
Pulse Width	Nominal value	Internal Pulse source	1	–	μ Sec
		External Pulse source	10	–	
Pulse Period	Measured at the 50% points	2 μ Sec	–	10 Sec	–
Duty cycle (in Free Run)	Pulse Width divided by Pulse Period	0.01	–	99.99	%
Rise / Fall time	Measured between 10% and 90%	–	35 / 45	–	nSec
Pulse Width Accuracy	Measured at 50% of pulse level for Internal and external modulation	–	± 2	–	%
External pulse mod. input threshold	External pulse modulation	–	–	2.4	V
Trigger response delay	Trigger edge to 50% of pulse level	Internal Pulse source ⁶	–	3.5	μ Sec
		External Pulse source	–	0.8	
Pulse Power ratio	@PWR _{OUT} =+10dBm, FREQ _{OUT} =250 MHz	–	60	–	dB
Pulse Power ratio	@PWR _{OUT} =+10dBm, FREQ _{OUT} =4000 MHz	–	45	–	

⁵ Pulse mode is supported from Firmware Rev. B3, external pulse source from Firmware Rev. C4. Firmware from Rev. B1 onwards can be upgraded using the latest software CD (available for download from http://www.minicircuits.com/support/software_download.html)

⁶ Max trigger frequency is 200 kHz

Electrical Specifications at +25°C (Reference, Trigger & DC power)

Parameter	Test Conditions	Min.	Typ.	Max.	Units
Aging	Using Internal Reference	–	1	–	ppm/yr
Reference In	Frequency	–	10	–	MHz
	Power	–3.5	–	+7.5	dBm
Reference Out	Frequency	–	10	–	MHz
	Freq. Accuracy	Using Internal Reference	± 1	–	ppm
	Power	–	+7	–	dBm
	Aging	Using Internal Reference	1	–	ppm/yr
Trigger Out, Low	–	0	–	0.4	V
Trigger Out, High	–	2.4	–	3.3	
Trigger In, Low	–	0	–	0.8	
Trigger In, High	–	2.4	–	3.3	
Supply Voltage ⁷	–	22.8	24	25.2	V _{DC}
Supply Current ⁸	–	–	400	500	mA
USB current ⁷	SSG-4000LH does not draw power from the USB bus, only from DC power adapter				mA

⁷ Power On Sequence: Connect the 24V power, followed by the USB control before turning on the Generator

Minimum System Requirements

Interface	USB HID
Host operating system - USB Control	Windows 32/64 Bit operating system: Windows 98®, Windows XP®, Windows Vista®, Windows 7®, Windows 8®, Windows 10® Linux® support: 32/64 Bit operating system
Hardware	Pentium® II or better

Absolute Maximum Ratings

Operating Temperature	0°C to +50°C
Storage Temperature	-20°C to +60°C
Power in @ Reference In	+10 dBm
Reverse Power(DC) @ Reference Out	25V _{DC}
Reverse Power(DC) @ RF Out	10V _{DC}
Voltage @ Trigger out	-0.3V _{DC} to +3.5V _{DC}
Voltage @ Trigger in	-0.3V _{DC} to +3.5V _{DC}

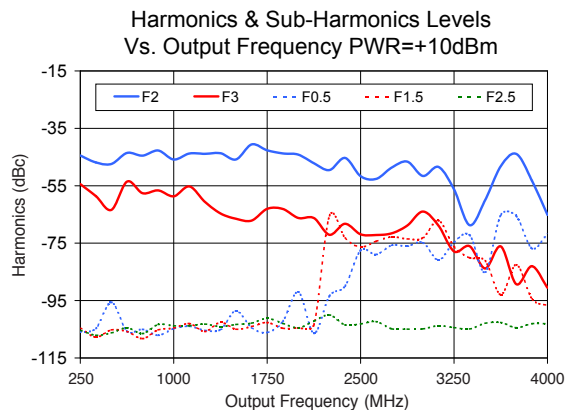
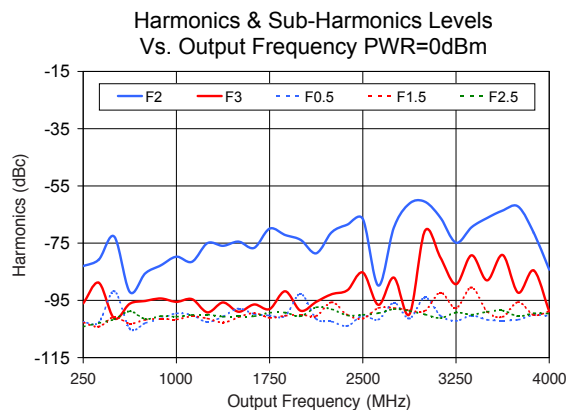
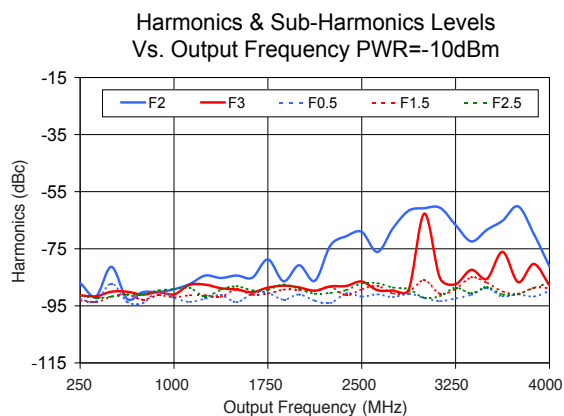
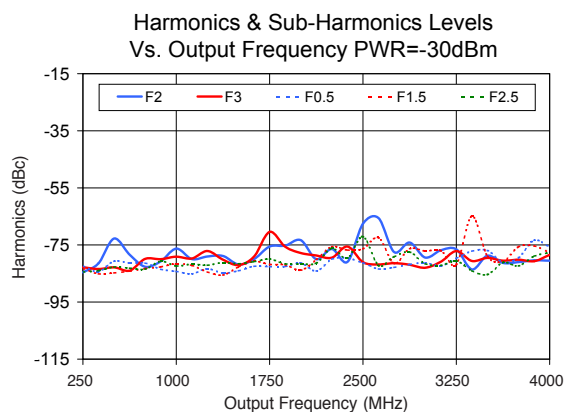
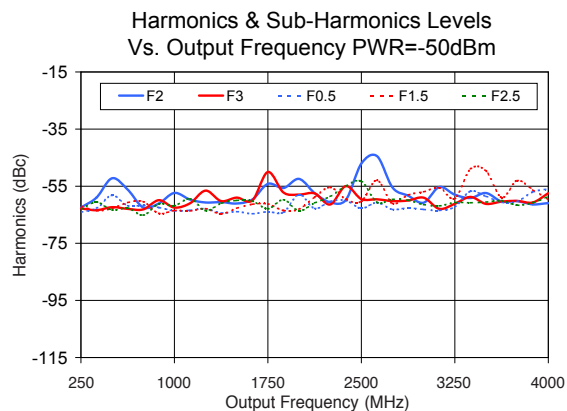
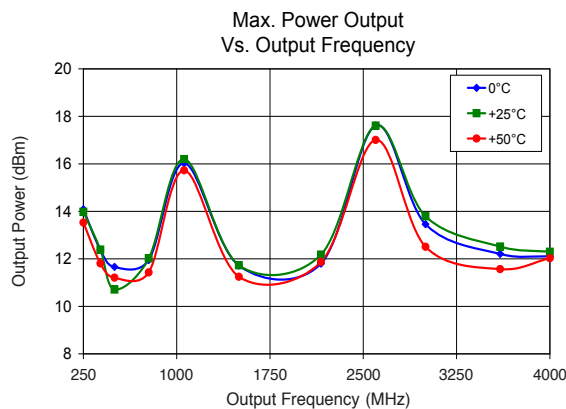
Permanent damage may occur if any of these limits are exceeded.

Connections

RF Output	(N Type-Female)
Ref. In	(BNC-Female)
Ref. Out	(BNC-Female)
Trigger In	(BNC-Female)
Trigger Out	(BNC-Female)
Power In	(2.1 mm DC socket)
USB Port	(USB B female)

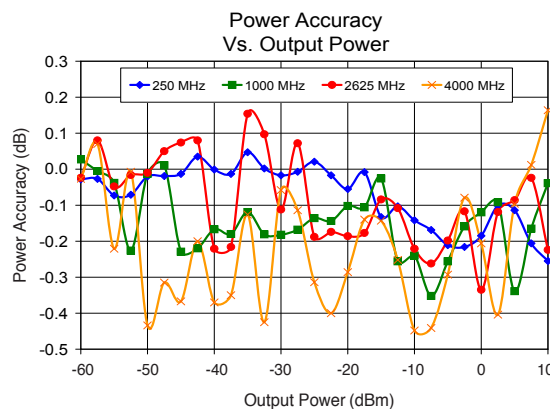
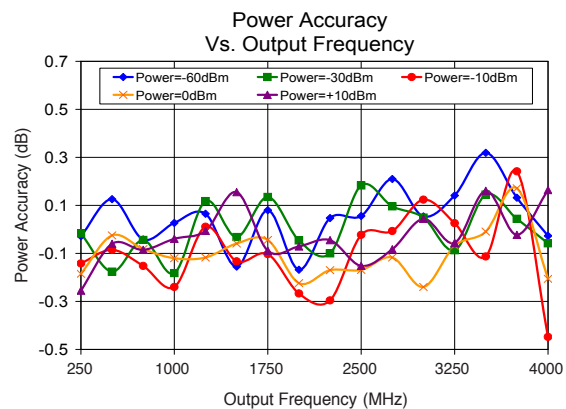
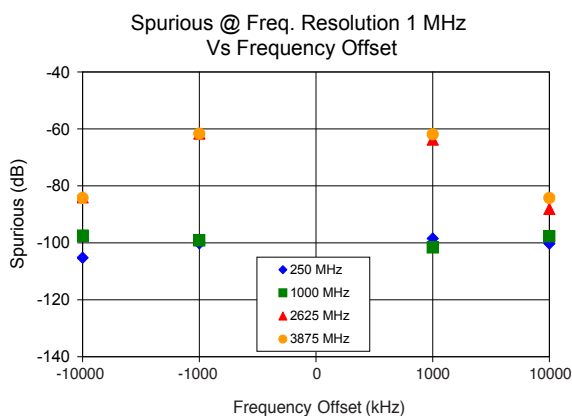
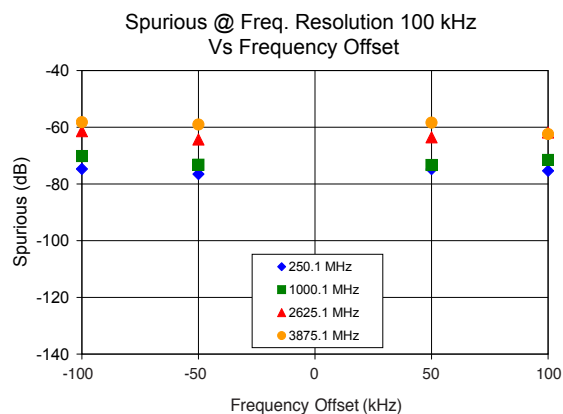
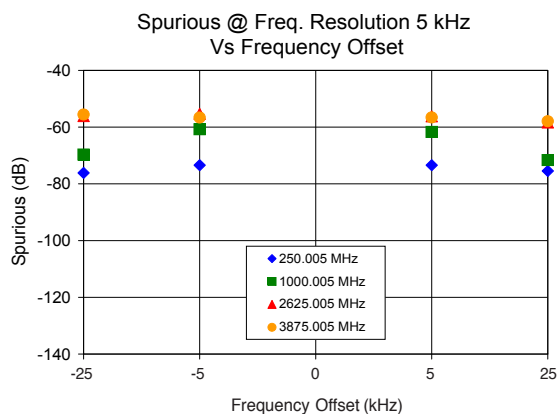
Typical Performance Curves*

*at +25°C unless mentioned otherwise



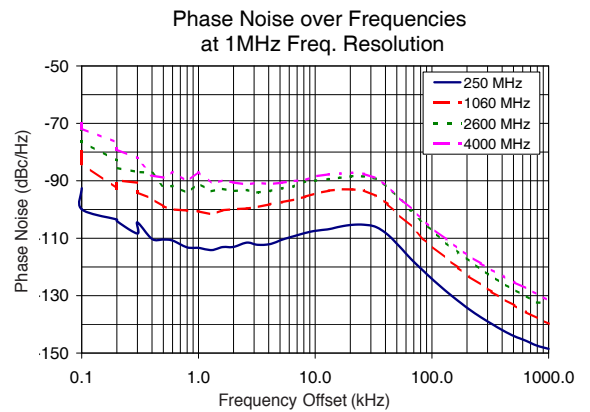
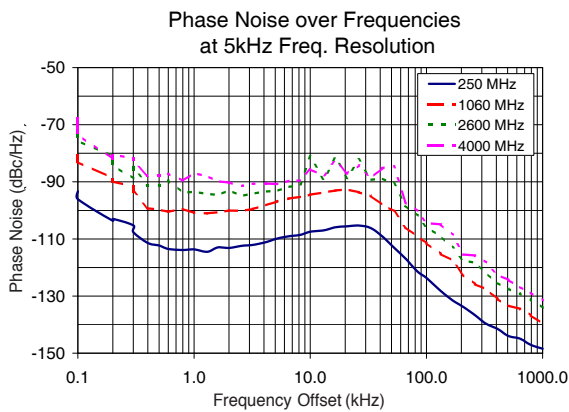
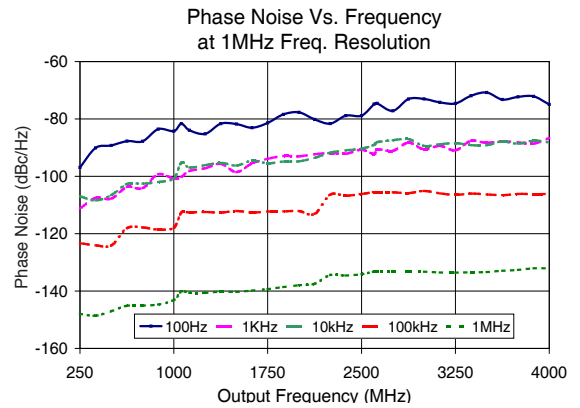
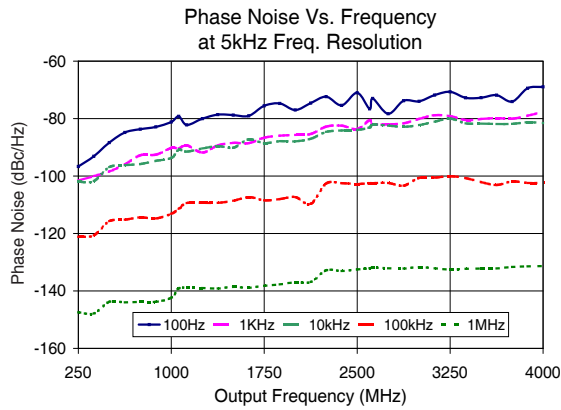
Typical Performance Curves* (continued)

*at +25°C unless mentioned otherwise

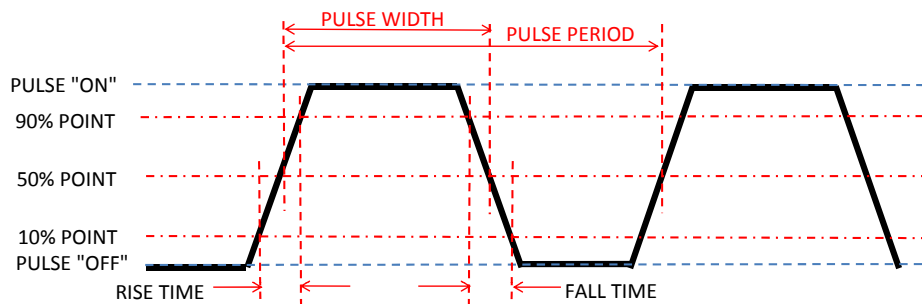


Typical Performance Curves* (continued)

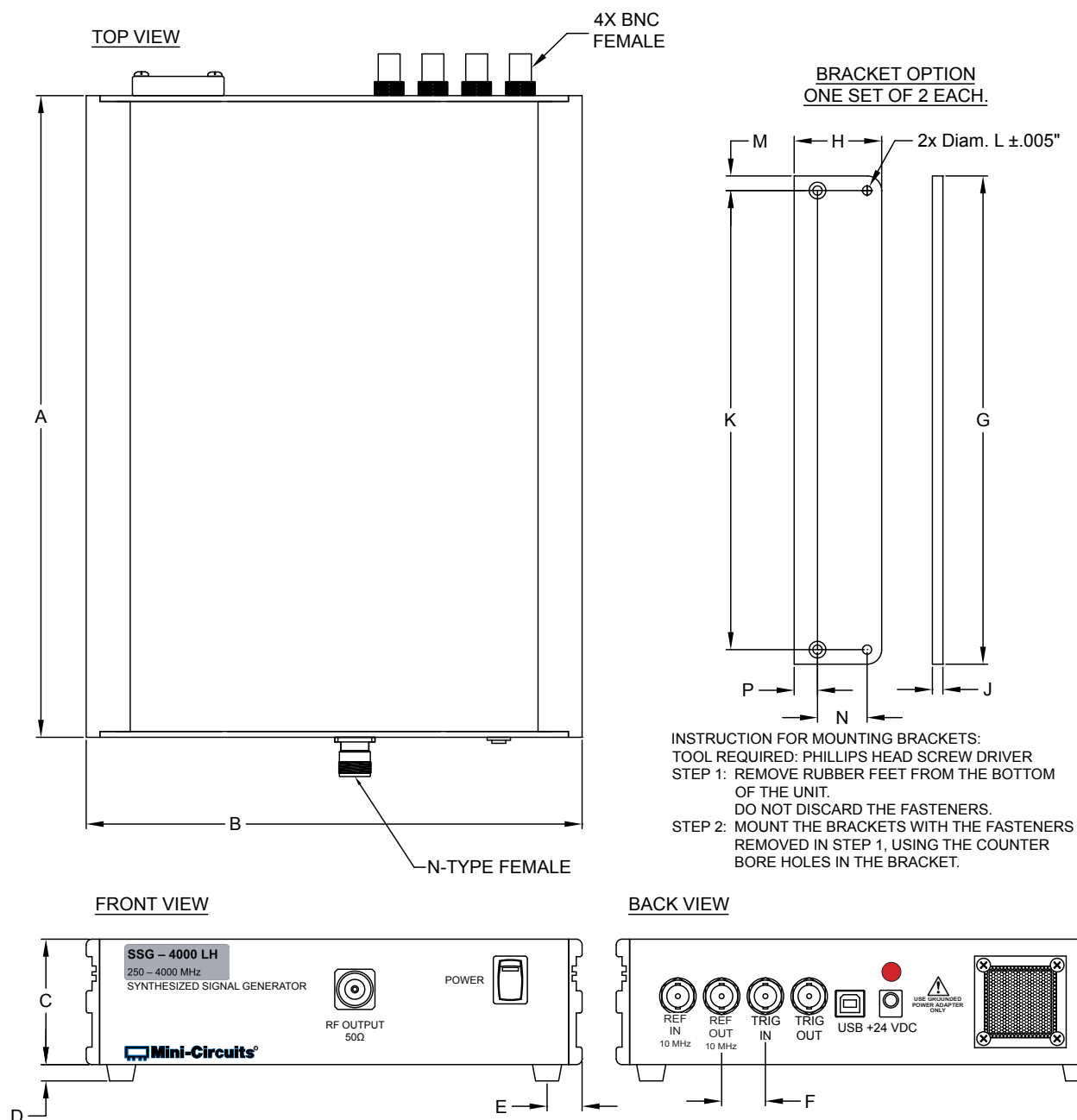
*at +25°C unless mentioned otherwise



Pulse mode definitions



Outline Drawing LV1753



Outline Dimensions (inch mm)

A	B	C	D	E	F	G	H	J	K	L	M	N	P	WT. GRAMS
11.00	8.50	2.15	0.28	0.60	0.75	8.37	1.50	0.18	7.870	0.158	0.25	0.850	0.40	2500
279.4	215.9	54.6	7.1	15.2	19.05	212.6	38.1	4.6	199.9	4.0	6.35	21.6	10.2	

Ordering, Pricing & Availability Information see our web site

Model	Description
SSG-4000LH	USB Synthesized Signal Generator

Included Accessories	Part No.	Description
	AC/DC-24-3W1	AC/DC 24V _{DC} Grounded Power Adaptor. Operating temperature: 0°C to +40°C, I _{Max} =2.5A
	CBL-3W1-XX	AC Power Cord (Select one power cord from below with each Signal Generator)
	SSG-CD	Software CD
	USB-CBL-AB-3+	2.7 ft (0.8 m) USB Cable: USB type A(Male) to USB type B(Male)

AC Power Cords ⁸	Part No.	Description
	CBL-3W1-US	Power Cord for United States
	CBL-3W1-EU	Power Cord for Europe
	CBL-3W1-UK	Power Cord for United Kingdom
	CBL-3W1-AU	Power Cord for Australia and China
	CBL-3W1-IL	Power Cord for Israel

⁸. Power cords for other countries are also available, if you need a power cord for a country not listed in the table please contact apps@minicircuits.com or check <http://www.minicircuits.com/contact/offices.html> for regional offices e-mail and phone numbers.

Optional Accessories	Description
USB-CBL-AB-3+ (spare)	2.7 ft. (0.8 m) USB cable
USB-CBL-AB-7+	6.8 ft. (2.1 m) USB Cable
USB-CBL-AB-11+	11 ft. (3.4 m) USB Cable
BKT-280-06+	Bracket (One set of 2 each)

Calibration	Description
CALSSG-4000LH	Calibration Service

[Click Here](#)

Additional Notes

- Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp



USB Synthesized Signal Generator

SSG-4000LH

Typical Performance Data

Frequency (MHz)	Max Power Output Vs. Output Frequency (dBm)		
	0°C	+25°C	+50°C
250	14.09	13.98	13.53
387	12.37	12.39	11.81
500	11.66	10.71	11.21
775	11.95	12.02	11.43
1060	16.03	16.20	15.73
1500	11.72	11.73	11.25
2160	11.80	12.18	11.87
2600	17.62	17.61	17.01
3000	13.46	13.79	12.51
3600	12.21	12.52	11.57
4000	12.10	12.30	12.03

Frequency (MHz)	Power deviation from nominal Vs. Output Frequency (dBm)				
	-60 dBm	-30 dBm	-10 dBm	0 dBm	+10 dBm
250	-0.028	-0.017	-0.142	-0.185	-0.255
500	0.126	-0.176	-0.085	-0.025	-0.060
750	-0.042	-0.044	-0.152	-0.082	-0.085
1000	0.027	-0.182	-0.240	-0.120	-0.039
1250	0.065	0.118	0.011	-0.117	-0.006
1500	-0.155	-0.032	-0.133	-0.059	0.155
1750	0.080	0.135	-0.103	-0.044	-0.089
2000	-0.168	-0.046	-0.267	-0.224	-0.071
2250	0.047	-0.100	-0.296	-0.170	-0.045
2500	0.056	0.183	-0.023	-0.169	-0.152
2750	0.210	0.096	-0.007	-0.117	-0.083
3000	0.054	0.049	0.124	-0.240	0.044
3250	0.141	-0.087	0.026	-0.068	-0.056
3500	0.319	0.145	-0.113	-0.009	0.161
3750	0.132	0.044	0.242	0.171	-0.023
4000	-0.027	-0.058	-0.448	-0.206	0.164

Power (dBm)	Power deviation from nominal Vs. Output Power (dBm)			
	250 MHz	1000 MHz	2625 MHz	4000 MHz
-60	-0.028	0.027	-0.024	-0.027
-55	-0.073	-0.038	-0.048	-0.221
-50	-0.020	-0.013	-0.010	-0.434
-45	-0.013	-0.229	0.074	-0.367
-40	-0.001	-0.167	-0.221	-0.370
-35	0.047	-0.119	0.154	-0.126
-30	-0.017	-0.182	-0.112	-0.058
-25	0.021	-0.136	-0.188	-0.314
-20	-0.055	-0.102	-0.186	-0.286
-15	-0.133	-0.026	-0.084	-0.143
-10	-0.142	-0.240	-0.221	-0.448
-5	-0.211	-0.256	-0.198	-0.293
0	-0.185	-0.120	-0.335	-0.206
5	-0.114	-0.339	-0.086	-0.096
10	-0.255	-0.039	-0.224	0.164



ISO 9001 ISO 14001 AS 9100 CERTIFIED

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IF/RF MICROWAVE COMPONENTS

For detailed performance specs
& shopping online see web site

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REV. OR
SSG-4000LH
130630
Page 1 of 6

USB Synthesized Signal Generator

SSG-4000LH

Typical Performance Data

Frequency (MHz)	Harmonics & Sub-Harmonics Levels Vs. Output Frequency														
	-50dBm					-30dBm					-10dBm				
	F0.5	F1.5	F2	F2.5	F3	F0.5	F1.5	F2	F2.5	F3	F0.5	F1.5	F2	F2.5	F3
250	-64.10	-62.01	-62.48	-63.11	-62.76	-82.40	-83.27	-84.59	-84.47	-82.79	-92.60	-93.07	-86.96	-91.42	-91.31
375	-62.70	-63.57	-58.97	-60.61	-63.40	-84.34	-85.11	-81.43	-83.96	-83.43	-93.50	-93.76	-91.72	-92.16	-91.68
500	-58.20	-62.78	-52.23	-63.31	-62.36	-80.71	-84.80	-72.75	-82.73	-82.85	-87.22	-91.76	-81.32	-91.80	-90.04
625	-61.83	-60.74	-56.21	-62.65	-62.95	-81.33	-84.21	-78.40	-83.13	-84.01	-93.59	-91.06	-92.61	-91.00	-90.06
750	-61.76	-60.40	-62.44	-65.14	-63.12	-81.33	-83.26	-82.65	-83.49	-79.86	-94.04	-92.83	-90.19	-91.10	-91.06
875	-62.49	-64.55	-61.03	-61.18	-59.89	-83.52	-82.65	-80.74	-80.71	-79.97	-89.96	-91.27	-90.15	-89.57	-90.19
1000	-63.62	-63.51	-57.34	-61.86	-62.47	-84.27	-81.60	-76.26	-82.34	-79.12	-92.21	-92.00	-89.18	-89.14	-90.97
1125	-63.42	-63.67	-59.69	-59.42	-61.00	-85.12	-82.17	-79.96	-81.73	-79.75	-93.61	-91.31	-87.35	-88.69	-87.64
1250	-62.86	-62.87	-60.72	-63.54	-56.54	-83.32	-84.45	-79.04	-82.11	-77.12	-92.50	-91.30	-84.37	-91.79	-87.56
1375	-64.36	-64.69	-60.56	-60.98	-60.22	-84.86	-85.53	-78.87	-81.18	-80.15	-91.27	-91.86	-85.24	-89.38	-88.83
1500	-63.90	-62.74	-61.07	-59.98	-58.98	-84.07	-82.72	-81.84	-81.59	-82.05	-93.69	-89.16	-84.37	-88.14	-89.29
1625	-64.66	-61.35	-59.66	-60.23	-59.98	-82.48	-80.74	-79.95	-80.85	-79.02	-90.82	-91.12	-85.13	-89.59	-90.22
1750	-63.94	-61.23	-54.18	-62.90	-50.01	-82.59	-81.83	-75.53	-79.96	-70.41	-90.49	-90.74	-78.75	-89.36	-88.60
1875	-64.16	-63.49	-55.63	-59.72	-57.22	-82.58	-81.97	-75.25	-81.63	-75.62	-92.86	-89.32	-86.38	-87.55	-87.95
2000	-57.94	-63.04	-52.44	-63.60	-57.93	-81.36	-83.86	-73.31	-81.62	-77.82	-91.03	-89.48	-80.78	-89.05	-88.56
2125	-62.79	-58.85	-57.43	-60.85	-57.52	-84.15	-80.13	-80.00	-81.39	-78.68	-93.21	-89.68	-86.22	-90.76	-89.71
2250	-60.32	-55.40	-60.67	-58.59	-61.41	-79.96	-75.60	-76.42	-76.17	-79.47	-94.03	-88.32	-73.82	-90.48	-88.18
2375	-60.00	-59.58	-59.80	-54.95	-54.98	-79.65	-76.75	-80.92	-79.58	-75.54	-90.65	-91.35	-70.64	-89.53	-88.05
2500	-62.78	-60.32	-47.07	-53.27	-59.51	-81.27	-76.36	-67.54	-72.06	-81.04	-91.73	-89.24	-69.08	-87.11	-86.47
2625	-60.74	-52.92	-44.47	-60.69	-59.58	-83.40	-72.43	-65.59	-82.23	-81.82	-90.98	-87.98	-76.12	-87.07	-89.53
2750	-63.14	-61.06	-55.47	-59.61	-60.21	-82.88	-81.45	-77.48	-79.15	-81.36	-91.91	-90.63	-67.75	-88.59	-89.63
2875	-62.62	-58.07	-58.31	-59.92	-60.00	-81.82	-76.32	-74.15	-77.51	-81.93	-90.69	-90.08	-61.67	-89.18	-89.33
3000	-63.14	-56.97	-60.77	-61.44	-59.02	-81.24	-77.10	-79.42	-81.58	-82.98	-92.26	-86.03	-60.82	-92.18	-62.69
3125	-63.50	-55.56	-55.31	-61.88	-62.93	-82.40	-76.98	-76.88	-82.14	-80.87	-93.36	-90.82	-60.63	-91.60	-85.33
3250	-62.21	-59.29	-57.98	-60.73	-61.16	-79.66	-81.87	-76.53	-80.61	-77.15	-92.40	-89.10	-66.69	-88.61	-87.42
3375	-56.80	-48.97	-59.15	-60.81	-58.74	-77.19	-64.86	-83.57	-84.03	-80.61	-91.12	-85.05	-72.43	-90.60	-82.36
3500	-58.54	-49.64	-57.39	-60.58	-61.20	-76.91	-78.97	-78.76	-85.37	-79.53	-88.85	-86.87	-68.36	-88.42	-85.54
3625	-60.65	-59.00	-60.40	-60.02	-60.38	-81.02	-80.83	-81.30	-81.14	-80.49	-91.62	-90.00	-65.19	-91.00	-76.09
3750	-60.32	-53.05	-60.21	-61.64	-60.16	-79.44	-75.65	-80.98	-82.36	-80.16	-91.01	-90.76	-60.16	-90.82	-86.71
3875	-57.05	-56.28	-61.39	-60.76	-60.70	-73.37	-75.34	-80.39	-78.92	-80.67	-91.74	-88.70	-69.84	-88.78	-80.33
4000	-55.96	-59.77	-60.91	-58.63	-57.45	-75.71	-77.67	-80.52	-77.68	-78.45	-89.79	-88.78	-81.18	-86.92	-87.80



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REV. OR
SSG-4000LH
130630
Page 2 of 6

USB Synthesized Signal Generator

SSG-4000LH

Typical Performance Data

Frequency (MHz)	Harmonics & Sub-Harmonics Levels Vs. Output Frequency									
	0dBm					+10dBm				
	F0.5	F1.5	F2	F2.5	F3	F0.5	F1.5	F2	F2.5	F3
250	-102.53	-102.72	-83.03	-104.21	-96.05	-105.91	-104.48	-44.46	-105.36	-54.40
375	-102.69	-104.19	-80.74	-102.94	-88.86	-104.71	-107.75	-46.88	-107.09	-58.60
500	-91.77	-100.75	-72.73	-101.59	-101.30	-95.57	-105.21	-47.40	-106.28	-63.40
625	-104.94	-103.12	-92.10	-98.79	-96.15	-105.70	-105.78	-43.55	-104.50	-53.55
750	-102.94	-101.78	-85.54	-101.52	-95.22	-105.02	-108.26	-44.49	-106.52	-57.59
875	-101.38	-101.47	-82.72	-100.51	-94.33	-107.11	-105.21	-42.73	-103.34	-56.62
1000	-99.57	-101.65	-79.75	-100.69	-95.53	-104.82	-104.61	-45.85	-103.80	-58.69
1125	-100.11	-100.59	-81.52	-100.09	-94.56	-103.98	-103.04	-43.76	-103.77	-55.22
1250	-102.58	-101.30	-74.97	-99.98	-99.18	-105.36	-105.80	-43.87	-103.18	-60.61
1375	-100.60	-102.75	-75.92	-100.67	-95.73	-105.15	-102.61	-43.67	-104.07	-64.66
1500	-97.85	-100.88	-74.47	-100.61	-98.98	-98.65	-104.98	-45.82	-103.34	-66.49
1625	-99.73	-99.41	-76.67	-100.56	-96.44	-104.45	-104.05	-40.59	-102.89	-67.13
1750	-100.26	-101.08	-69.92	-99.33	-98.03	-106.14	-102.64	-42.65	-101.21	-63.04
1875	-100.46	-100.36	-72.17	-99.29	-91.82	-102.31	-104.61	-43.73	-102.96	-63.07
2000	-92.69	-99.94	-73.88	-100.56	-98.63	-91.99	-104.50	-44.15	-104.48	-66.23
2125	-101.47	-100.47	-78.53	-97.44	-95.53	-106.44	-103.45	-47.17	-102.16	-66.25
2250	-102.40	-95.66	-71.19	-98.11	-92.81	-93.42	-65.46	-49.54	-100.01	-72.10
2375	-103.94	-100.02	-68.52	-100.24	-91.48	-89.95	-73.25	-45.31	-103.47	-68.23
2500	-100.28	-101.33	-66.52	-100.05	-85.25	-77.53	-76.34	-51.68	-103.11	-71.90
2625	-101.74	-97.67	-89.83	-99.48	-96.56	-78.96	-74.35	-52.61	-102.31	-72.15
2750	-95.92	-97.64	-69.54	-98.06	-87.03	-75.74	-72.81	-48.65	-104.84	-71.56
2875	-101.36	-98.46	-61.16	-98.65	-99.83	-76.08	-73.54	-46.60	-104.96	-68.85
3000	-93.99	-98.67	-60.54	-99.91	-70.69	-74.81	-73.17	-51.60	-104.88	-63.98
3125	-100.37	-92.29	-66.14	-101.18	-80.10	-80.86	-67.10	-48.44	-103.76	-68.91
3250	-102.13	-97.74	-74.85	-99.26	-89.33	-74.66	-76.22	-56.26	-104.42	-77.90
3375	-100.29	-90.50	-69.44	-99.97	-79.24	-72.19	-80.12	-68.73	-104.92	-76.08
3500	-101.77	-98.92	-66.22	-99.00	-87.99	-85.11	-81.17	-59.96	-102.93	-83.84
3625	-102.03	-100.75	-63.61	-98.55	-79.15	-65.16	-92.97	-48.15	-102.64	-76.12
3750	-101.75	-95.60	-62.19	-100.55	-92.30	-65.58	-82.53	-43.91	-104.46	-89.32
3875	-100.09	-100.13	-71.39	-99.55	-84.55	-76.85	-94.38	-53.22	-103.05	-83.01
4000	-100.43	-98.84	-84.24	-99.61	-98.82	-71.85	-96.78	-65.14	-103.06	-90.52



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REV. OR
SSG-4000LH
130630
Page 3 of 6

USB Synthesized Signal Generator

SSG-4000LH

Typical Performance Data

Frequency (MHz)	Phase Noise (dBc/Hz) @Offsets at 5KHz Frequency Resolution					Phase Noise (dBc/Hz) @Offsets at 1MHz Frequency Resolution				
	+25°C					+25°C				
	100Hz	1kHz	10kHz	100kHz	1MHz	100Hz	1kHz	10kHz	100kHz	1MHz
250	-93.61	-104.61	-102.76	-121.77	-146.57	-95.45	-112.58	-106.58	-123.54	-146.81
375	-89.37	-102.08	-101.18	-118.60	-144.91	-96.19	-112.21	-108.22	-123.49	-145.22
500	-90.54	-98.61	-97.75	-116.42	-143.72	-94.83	-107.85	-106.25	-124.00	-144.23
625	-88.94	-98.49	-95.40	-114.62	-143.95	-89.66	-105.80	-102.62	-118.55	-144.90
750	-84.70	-93.70	-94.87	-112.59	-143.36	-85.89	-103.68	-102.34	-117.35	-144.74
875	-84.66	-90.77	-93.82	-111.83	-143.26	-86.58	-102.07	-101.50	-117.14	-144.29
1000	-81.30	-93.69	-93.57	-112.72	-142.43	-84.72	-102.13	-100.98	-117.75	-143.08
1060	-83.28	-91.26	-90.94	-111.30	-139.05	-83.95	-102.73	-94.68	-112.93	-139.86
1125	-80.87	-91.77	-90.05	-108.44	-138.96	-83.92	-100.09	-96.91	-112.85	-140.34
1250	-81.18	-86.85	-89.91	-108.53	-138.98	-81.03	-100.56	-96.14	-112.89	-140.17
1375	-80.20	-90.47	-90.04	-109.95	-138.95	-80.56	-96.86	-94.54	-112.76	-140.05
1500	-80.30	-89.29	-89.20	-106.48	-138.20	-80.33	-101.16	-96.37	-111.33	-139.63
1625	-78.05	-86.47	-86.85	-105.21	-138.03	-80.40	-95.59	-94.86	-111.42	-139.08
1750	-77.66	-87.30	-87.88	-105.87	-137.60	-80.37	-98.03	-95.19	-110.84	-138.80
1875	-74.86	-88.32	-88.61	-107.23	-137.20	-78.15	-95.75	-94.43	-111.37	-138.09
2000	-76.17	-86.95	-87.87	-106.49	-136.95	-77.16	-97.03	-94.92	-111.56	-137.70
2125	-74.61	-86.13	-86.58	-110.56	-136.98	-78.03	-92.95	-92.47	-114.02	-137.38
2250	-75.68	-84.28	-83.39	-101.37	-132.82	-77.84	-95.32	-91.11	-106.85	-134.24
2375	-75.27	-83.67	-83.36	-101.27	-132.95	-78.50	-93.50	-90.27	-107.16	-134.25
2500	-74.17	-82.78	-82.40	-101.30	-131.88	-76.51	-93.02	-89.39	-106.30	-133.35
2600	-74.75	-82.68	-82.73	-101.90	-131.74	-78.91	-93.70	-88.82	-105.83	-132.71
2625	-76.36	-83.51	-82.85	-102.77	-131.57	-73.62	-93.24	-88.40	-105.99	-132.67
2750	-75.33	-80.94	-82.81	-102.83	-131.66	-75.56	-90.69	-87.33	-105.63	-132.54
2875	-74.14	-82.85	-83.27	-103.13	-131.58	-74.03	-91.78	-87.02	-105.61	-132.45
3000	-73.36	-82.26	-81.66	-98.88	-131.02	-78.33	-92.08	-88.93	-104.44	-132.19
3125	-72.31	-80.95	-80.86	-98.79	-131.17	-76.29	-91.45	-88.22	-104.97	-132.62
3250	-71.48	-80.11	-80.09	-97.59	-131.53	-74.65	-90.46	-88.37	-105.25	-132.71
3375	-70.04	-81.89	-80.71	-96.81	-131.38	-74.05	-93.23	-89.03	-104.68	-132.68
3500	-71.60	-81.56	-80.51	-97.86	-131.57	-73.17	-91.98	-89.39	-105.09	-132.72
3625	-70.07	-82.99	-81.86	-101.00	-131.65	-73.99	-89.81	-87.80	-105.66	-132.55
3750	-70.92	-81.71	-81.98	-100.33	-131.36	-75.90	-90.12	-88.23	-105.23	-132.39
3875	-71.10	-79.70	-81.60	-101.63	-131.28	-71.03	-90.71	-87.92	-105.89	-132.14
4000	-70.93	-80.90	-81.31	-101.01	-131.54	-71.67	-88.36	-88.66	-105.79	-132.06



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REV. OR
SSG-4000LH
130630
Page 4 of 6

USB Synthesized Signal Generator

SSG-4000LH

Typical Performance Data

Frequency Offset (kHz)	Phase Noise (dBc/Hz) @Offsets at 5KHz Frequency Resolution				Phase Noise (dBc/Hz) @Offsets at 1MHz Frequency Resolution			
	250MHz	1060MHz	2600MHz	4000MHz	250MHz	1060MHz	2600MHz	4000MHz
0.1	-95.16	-79.71	-70.42	-70.38	-94.05	-81.69	-74.83	-68.32
0.2	-97.43	-86.22	-77.13	-73.84	-104.44	-93.05	-86.38	-84.52
0.5	-103.17	-90.10	-82.93	-78.78	-110.45	-95.30	-90.79	-87.08
1.0	-102.68	-90.54	-82.07	-80.50	-111.84	-101.10	-95.27	-89.64
2.1	-103.17	-92.29	-82.54	-81.51	-113.41	-100.32	-93.41	-90.37
4.2	-103.06	-92.02	-82.16	-81.92	-110.02	-97.75	-90.80	-89.22
10.4	-101.74	-90.78	-81.29	-81.57	-106.79	-94.25	-88.44	-88.02
19.4	-100.83	-90.31	-80.83	-80.71	-105.22	-92.96	-86.56	-86.96
51.7	-108.32	-99.66	-86.75	-88.22	-112.15	-102.07	-94.43	-94.21
105.5	-120.99	-111.54	-101.11	-101.00	-124.10	-113.58	-106.42	-106.31
150.8	-125.14	-117.37	-107.78	-108.01	-129.66	-118.95	-111.89	-111.64
164.8	-128.65	-118.72	-109.14	-109.27	-131.02	-120.25	-113.31	-113.04
180.2	-129.92	-120.02	-110.88	-110.76	-132.14	-121.28	-114.39	-114.06
197.0	-131.36	-121.44	-112.63	-112.33	-133.32	-122.59	-115.83	-115.35
215.4	-132.79	-122.59	-113.85	-113.79	-134.47	-123.59	-116.80	-116.27
235.6	-133.94	-123.66	-115.10	-114.75	-135.49	-124.87	-117.94	-117.48
257.5	-135.16	-124.84	-116.83	-116.35	-136.71	-125.88	-118.97	-118.41
281.6	-136.26	-125.93	-117.65	-117.40	-137.63	-127.13	-120.14	-119.30
307.9	-137.20	-126.89	-119.26	-118.72	-138.77	-128.11	-121.28	-120.37
336.6	-138.42	-127.92	-120.56	-119.73	-139.67	-129.00	-122.32	-121.33
368.0	-139.17	-128.89	-121.28	-120.60	-140.59	-130.07	-123.30	-122.24
402.4	-140.21	-129.80	-122.50	-121.72	-141.41	-130.97	-124.11	-123.09
440.0	-140.60	-130.82	-123.28	-122.93	-141.59	-132.11	-124.64	-124.05
481.0	-142.03	-131.69	-124.56	-123.80	-143.15	-133.02	-126.13	-124.96
525.9	-142.67	-132.58	-125.33	-124.63	-143.92	-133.86	-127.10	-125.70
575.0	-143.47	-133.61	-126.23	-125.51	-144.64	-134.77	-127.96	-126.59
628.7	-144.13	-134.47	-127.12	-126.43	-145.24	-135.68	-128.79	-127.47
687.4	-144.92	-135.32	-128.11	-127.29	-145.95	-136.42	-129.57	-128.31
751.6	-145.56	-136.20	-129.09	-128.12	-146.54	-137.33	-130.26	-129.10
821.7	-146.17	-137.07	-129.93	-129.06	-147.06	-138.20	-131.37	-129.92
898.4	-146.41	-137.99	-130.64	-130.06	-147.07	-138.98	-132.00	-130.93
982.3	-146.34	-138.62	-131.34	-130.82	-146.58	-138.34	-132.63	-129.60
1000.0	-146.19	-138.81	-131.45	-131.09	-144.59	-132.95	-132.07	-123.06



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REV. OR
SSG-4000LH
130630
Page 5 of 6

USB Synthesized Signal Generator

SSG-4000LH

Typical Performance Data

Frequency (MHz)	Spurious @Frequency Resolution 5KHz vs. Frequency Offset (dBc)			
	Spurious @-5KHz Offset	Spurious @+5KHz Offset	Spurious @-25KHz Offset	Spurious @+25KHz Offset
250	-73.43	-73.42	-76.16	-75.47
1000	-60.76	-61.69	-69.67	-71.63
2625	-55.30	-56.19	-56.09	-58.34
3875	-56.62	-56.59	-55.56	-57.91

Frequency (MHz)	Spurious @Frequency Resolution 100KHz vs. Frequency Offset (dBc)			
	Spurious @-50KHz Offset	Spurious @+50KHz Offset	Spurious @-100KHz Offset	Spurious @+100KHz Offset
250	-76.50	-74.76	-74.70	-75.37
1000	-73.21	-73.31	-70.17	-71.54
2625	-64.29	-63.53	-61.37	-61.83
3875	-59.03	-58.37	-58.20	-62.38

Frequency (MHz)	Spurious @Frequency Resolution 100KHz vs. Frequency Offset (dBc)			
	Spurious @-1000KHz Offset	Spurious @+1000KHz Offset	Spurious @-10000KHz Offset	Spurious @+10000KHz Offset
250	-100.19	-98.48	-105.22	-100.24
1000	-99.19	-101.64	-97.47	-97.69
2625	-61.62	-63.72	-83.97	-88.07
3875	-61.69	-61.87	-84.26	-84.24



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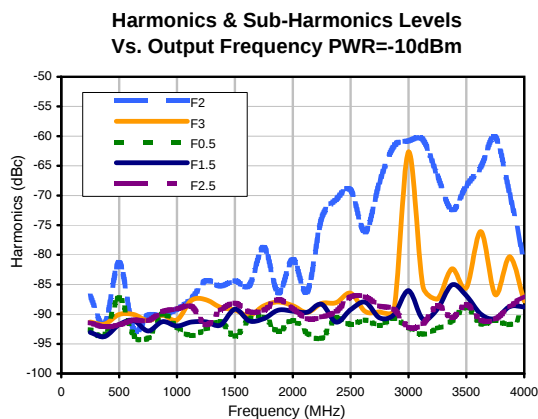
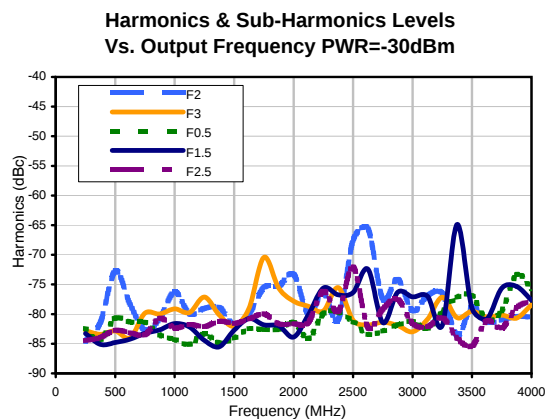
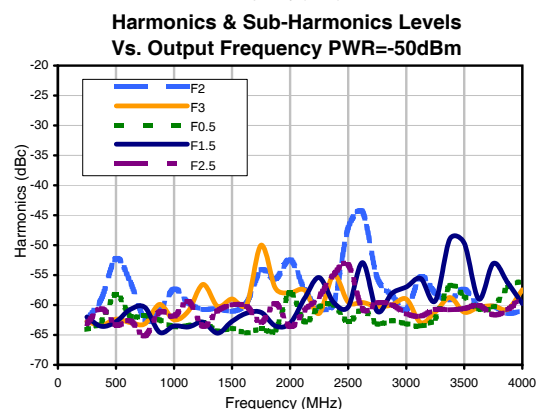
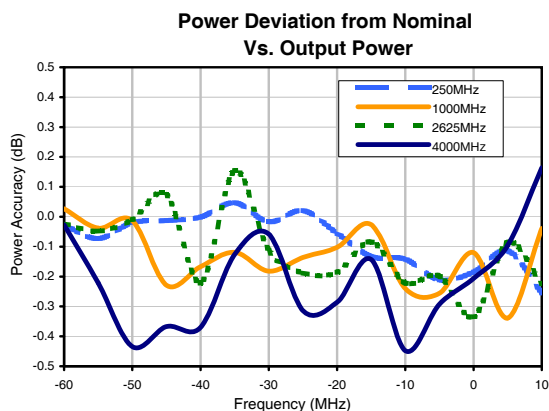
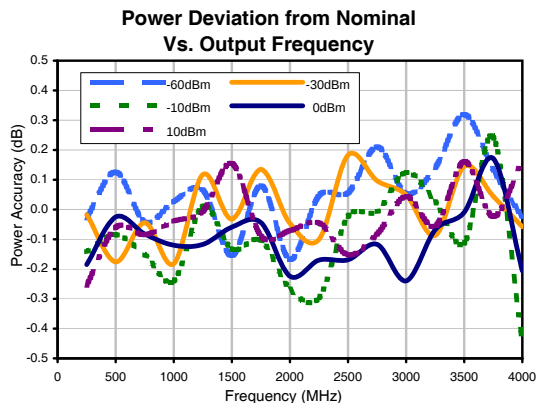
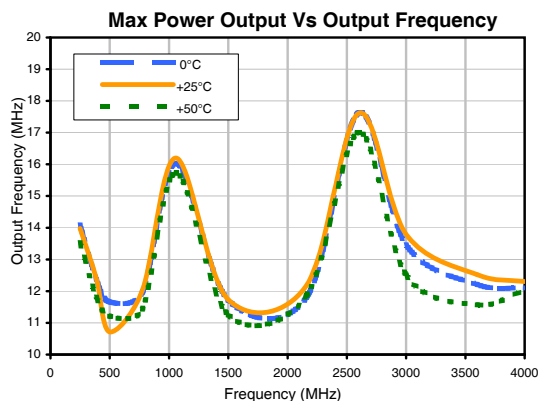
Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuits' applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"). Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCStore/terms.jsp.

REV. OR
SSG-4000LH
130630
Page 6 of 6

USB Synthesized Signal Generator

SSG-4000LH

Typical Performance Data



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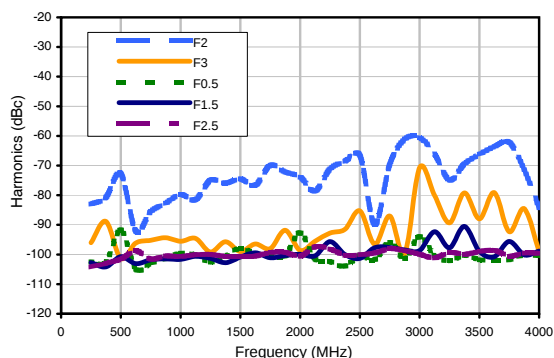
REV. OR
SSG-4000LH
130630
Page 1 of 3

USB Synthesized Signal Generator

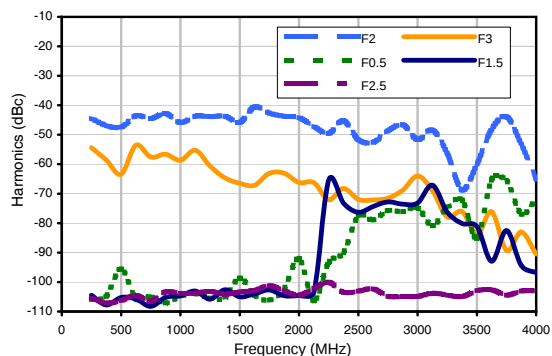
SSG-4000LH

Typical Performance Data

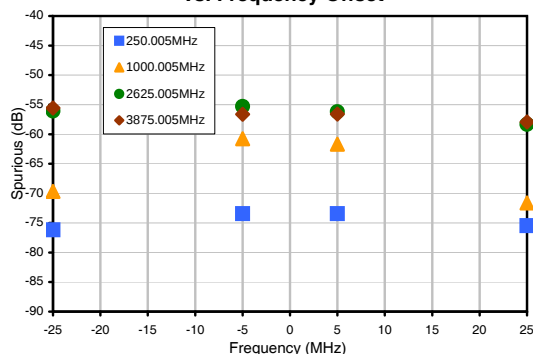
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Vs. Output Frequency PWR=0dBmBm**



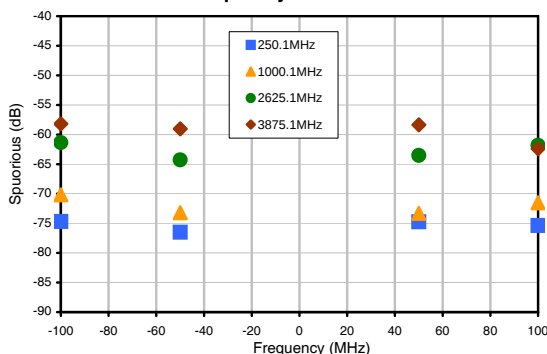
**Harmonics & Sub-Harmonics Levels
Vs. Output Frequency PWR=+10dBm**



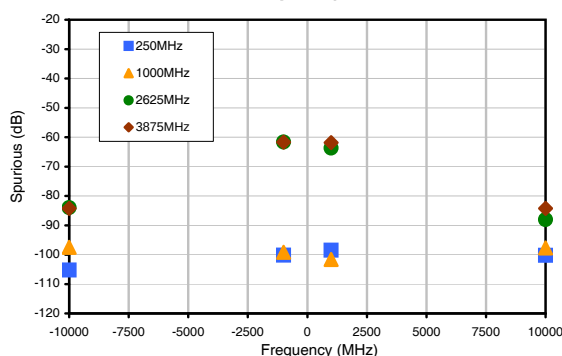
**Spurious @Frequency Resolution 5KHz
vs. Frequency Offset**



**Spurious @Frequency Resolution 100KHz vs.
Frequency Offset**



**Spurious @Frequency Resolution 1MHz
vs. Frequency Offset**



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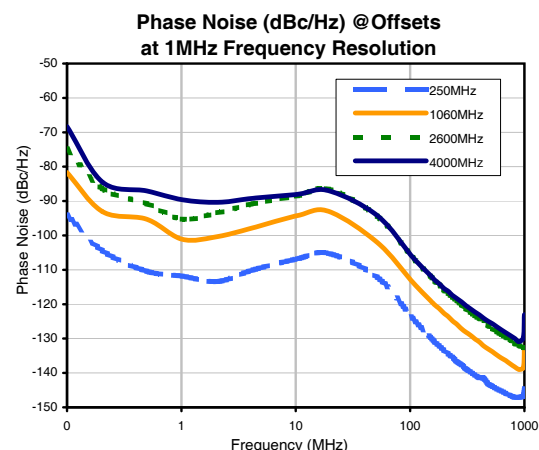
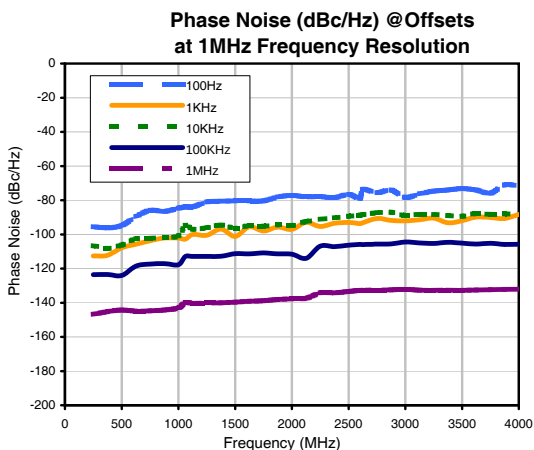
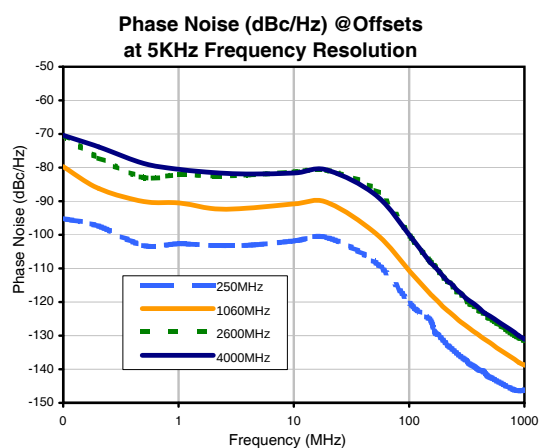
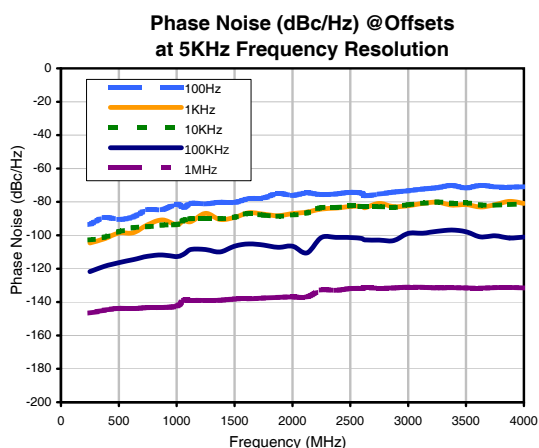
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REV. OR
SSG-4000LH
130630
Page 2 of 3

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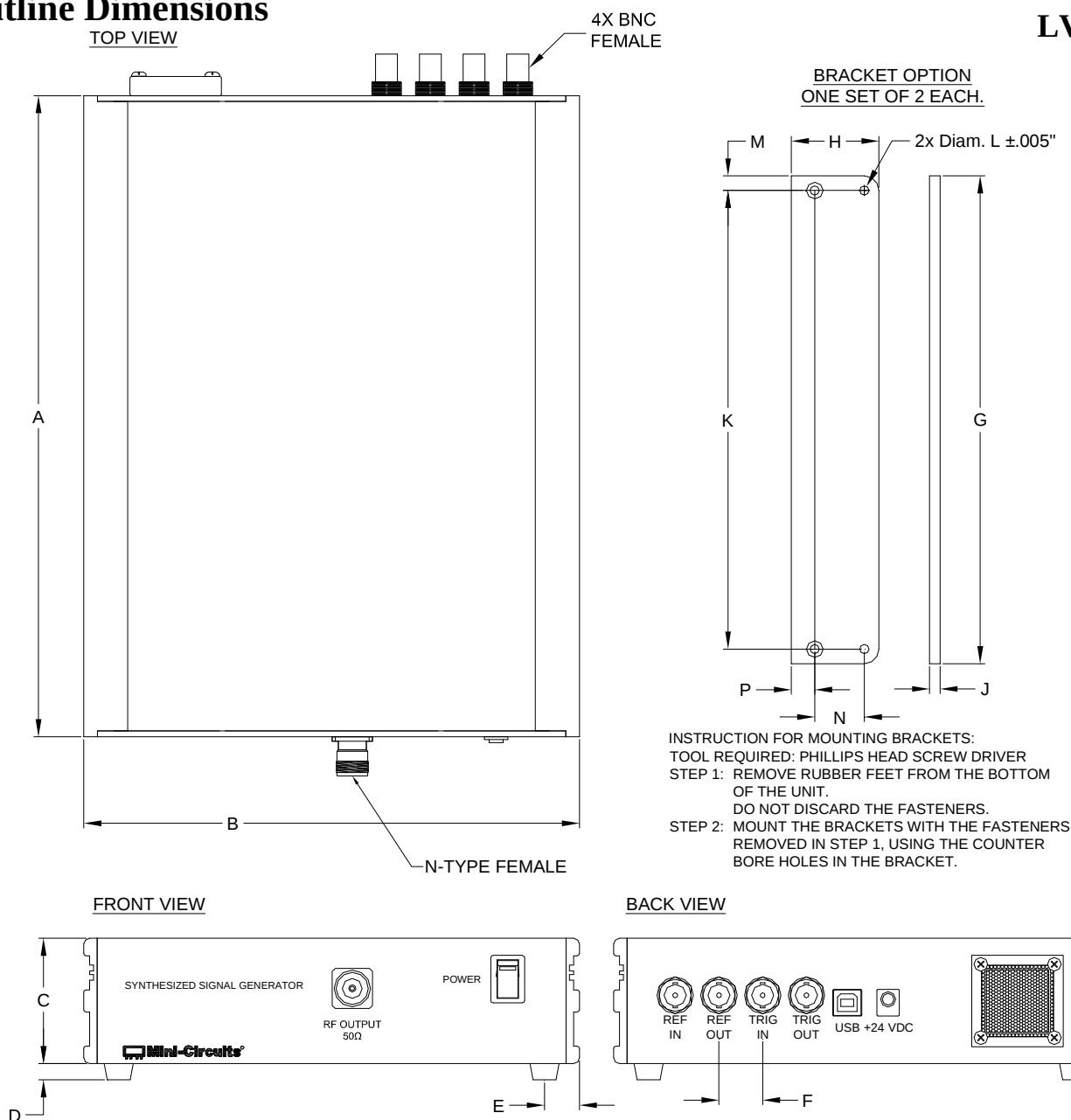
REV. OR
SSG-4000LH
130630
Page 3 of 3

Case Style

LV

Outline Dimensions

LV1753



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N	P	WT. GRAMS
LV1753	11.00 (279.4)	8.50 (215.9)	2.15 (54.6)	.28 (7.1)	.60 (15.2)	0.75 (19.05)	8.37 (212.6)	1.50 (38.1)	.18 (4.6)	7.870 (199.9)	.158 (4.0)	.25 (6.35)	0.850 (21.6)	0.40 (10.2)	2500

Dimensions are in inches (mm). Tolerances: 2PL. +/- .03; 3PL. +/- .015

Notes:

1. Case material: Aluminum.

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Environmental Specifications ENV55

All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-0° to 50° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-20° to 60° C Ambient Environment	Individual Model Data Sheet
Operating and Storage Humidity	5% to 85% RH (non-condensing)	Ambient
Bench Handling Test	Bench Top Tip 45° & Drop	MIL-PRF-28800F
Transit Drop Test	Free Fall Drop, 20 cm (7.9 inches)	MIL-PRF-28800F Class 3