



LUCID SERIES
THINK RF THINK **LUCID**

DATA SHEET

LSX Analog Signal Generator

Modular RF and MW signal generators

50 kHz to 8 GHz, 14 GHz, 20 GHz, and 40 GHz

Introduction

Modular 50 kHz to 8 GHz, 14 GHz, 20 GHz, and 40 GHz ultra-low phase noise, 10 μ s phase coherent switching, multi-channel signal generator

The Lucid-X is a small footprint modular signal generator that is available in multiple form factors including PXIe module, benchtop, rackmount, and portable. It has been designed to provide low phase noise, fast frequency switching with a frequency range all the way up to 40GHz.

Specification Notes

- Warranted specifications represent the tested and verified performance of the instrument at $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$ after a minimum 30-minute warm-up.
- Typical values indicate the expected average performance of most units under nominal conditions; they are not guaranteed and may vary.
- Minimum and maximum limits define the design-verified operating range, established through design validation and/or production testing.
- Warranted limits include appropriate guard bands to account for statistical performance variations, measurement uncertainty, and environmental effects.
- Specifications and performance characteristics are subject to change without notice as part of ongoing product improvement.

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Specifications & Graphs

Frequency Parameters / Range

Parameter	Min	Typical	Max	Note
Frequency Range	50 kHz	8 GHz		LSX808xy ⁽¹⁾
	50 kHz	14 GHz		LSX149xy ⁽¹⁾
	50 kHz	20 GHz		LSX209xy ⁽¹⁾
	50 kHz	40 GHz		LSX409xy ⁽¹⁾
Resolution		0.001Hz		
Phase Offset	0 deg		360 deg	0.01 deg resolution
Phase Resolution		0.01 deg		
Switching Speed				
Sweep / List Mode		500 µs		Standard
Sweep / List Mode		100 µs		FS Option
Sweep / List Mode		10 µs		UFS Option

⁽¹⁾ x = Number of channels, y=X/R/B/D/P=PXIe/Rackmount/Benchtop/Desktop/Portable.

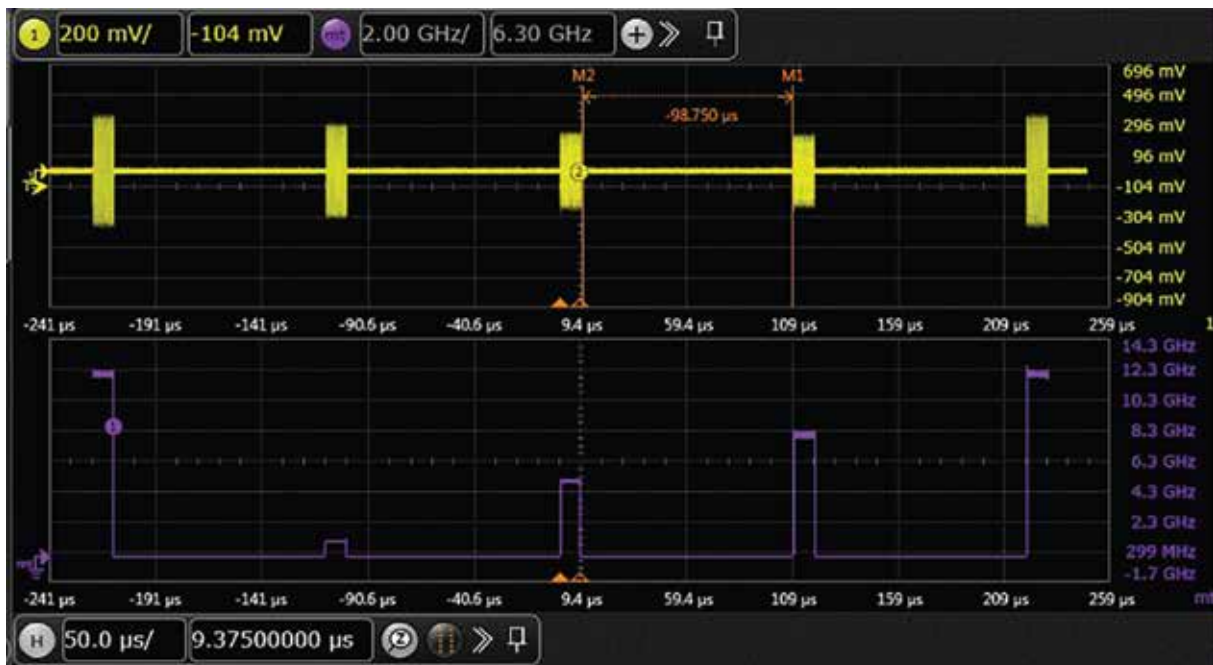


Figure 1: Frequency Switching Option FS Option

For more information contact us at: info@taborelec.com | www.taborelec.com

SSB Phase Noise

Typical Values (dBc/Hz), CW Level Nominal 0 dBm

	1 Hz	10 Hz	100 Hz	1 kHz	10 kHz	100 kHz	1 MHz	10 MHz	100 MHz
Carrier Frequency									
100 MHz	-68	-90	-112	-142	-148	-149	-149	-149	-150
1 GHz	-49	-70	-92	-123	-133	-138	-140	-145	-157
4 GHz	-36	-58	-80	-111	-121	-127	-128	-134	-154
8 GHz	-31	-52	-74	-105	-115	-121	-122	-128	-155
10 GHz	-29	-50	-72	-103	-114	-119	-120	-126	-139
20 GHz	-23	-44	-66	-97	-108	-113	-114	-121	-142
40 GHz		-38	-59	-91	-102	-107	-107	-114	-139

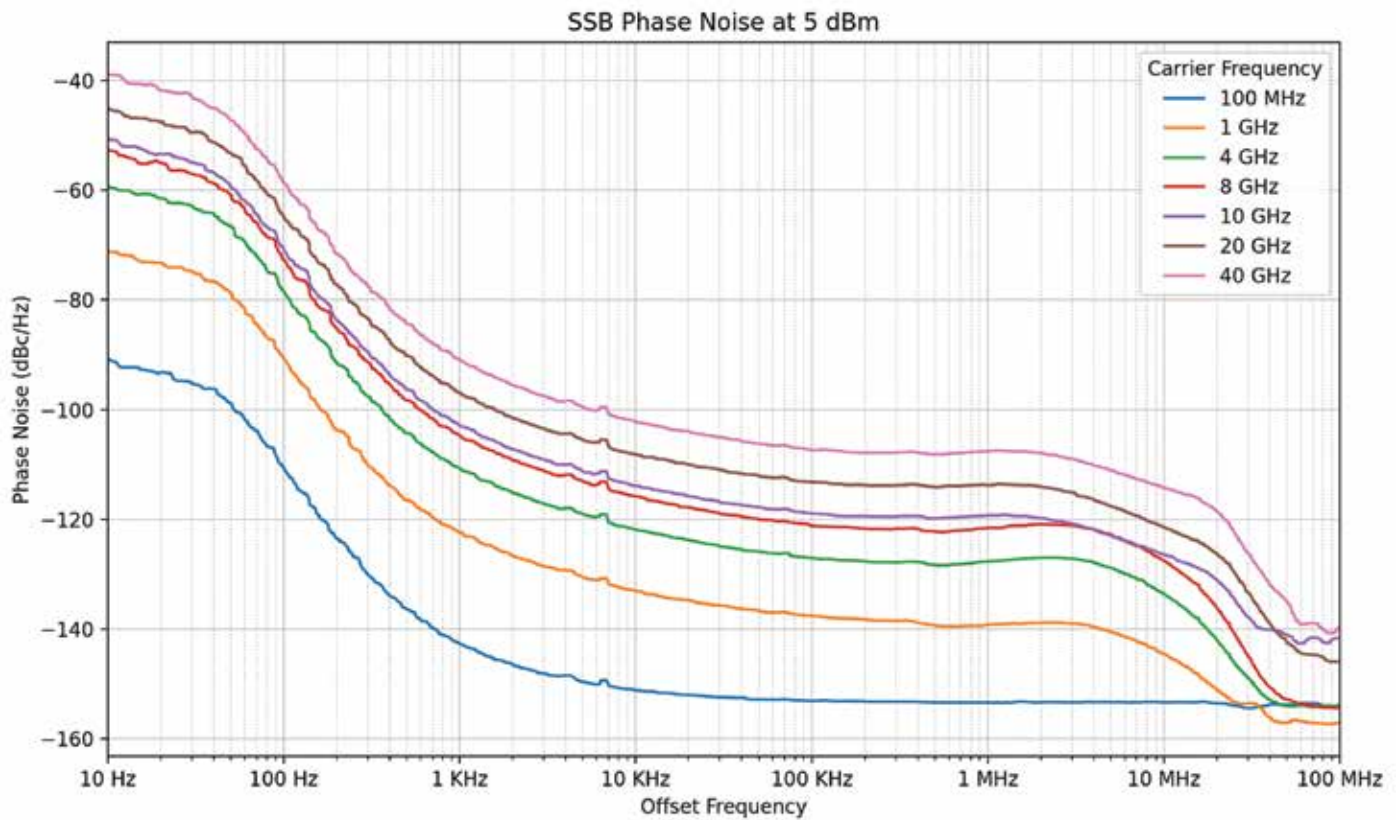


Figure 2: Phase Noise vs. Frequencies at 5 dBm

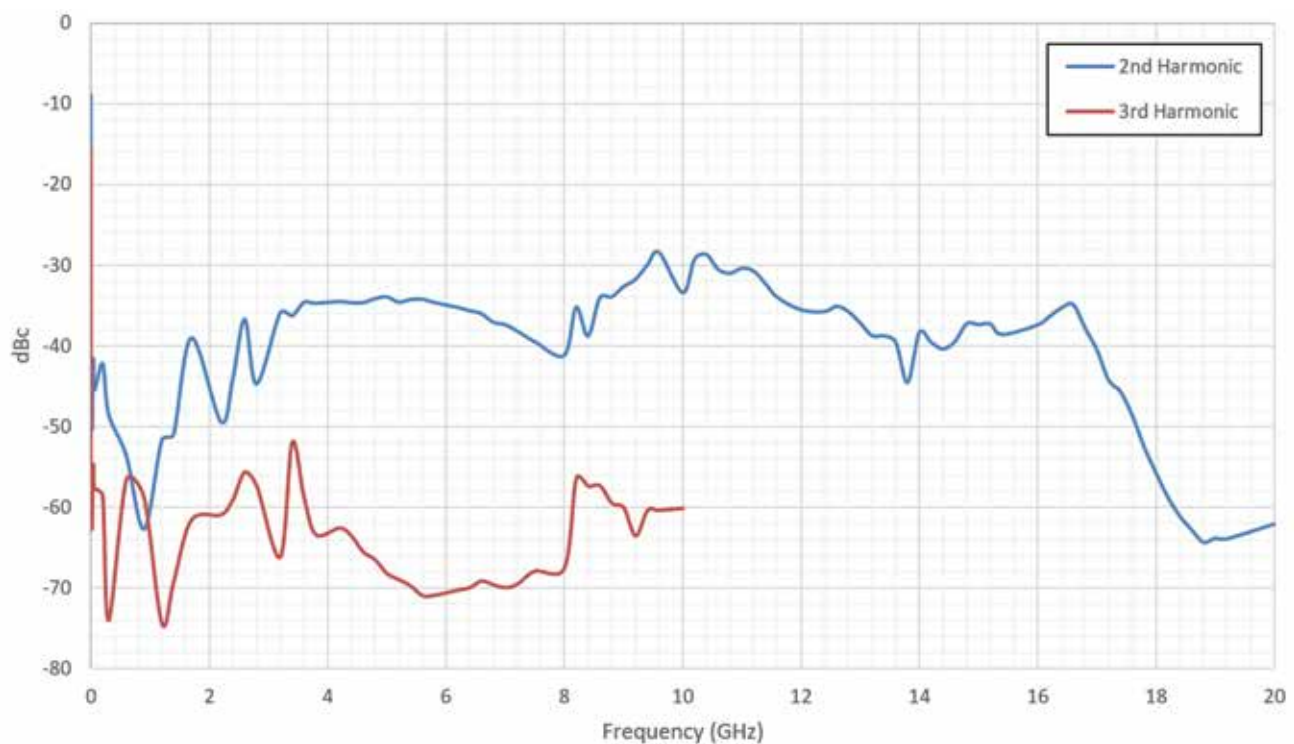
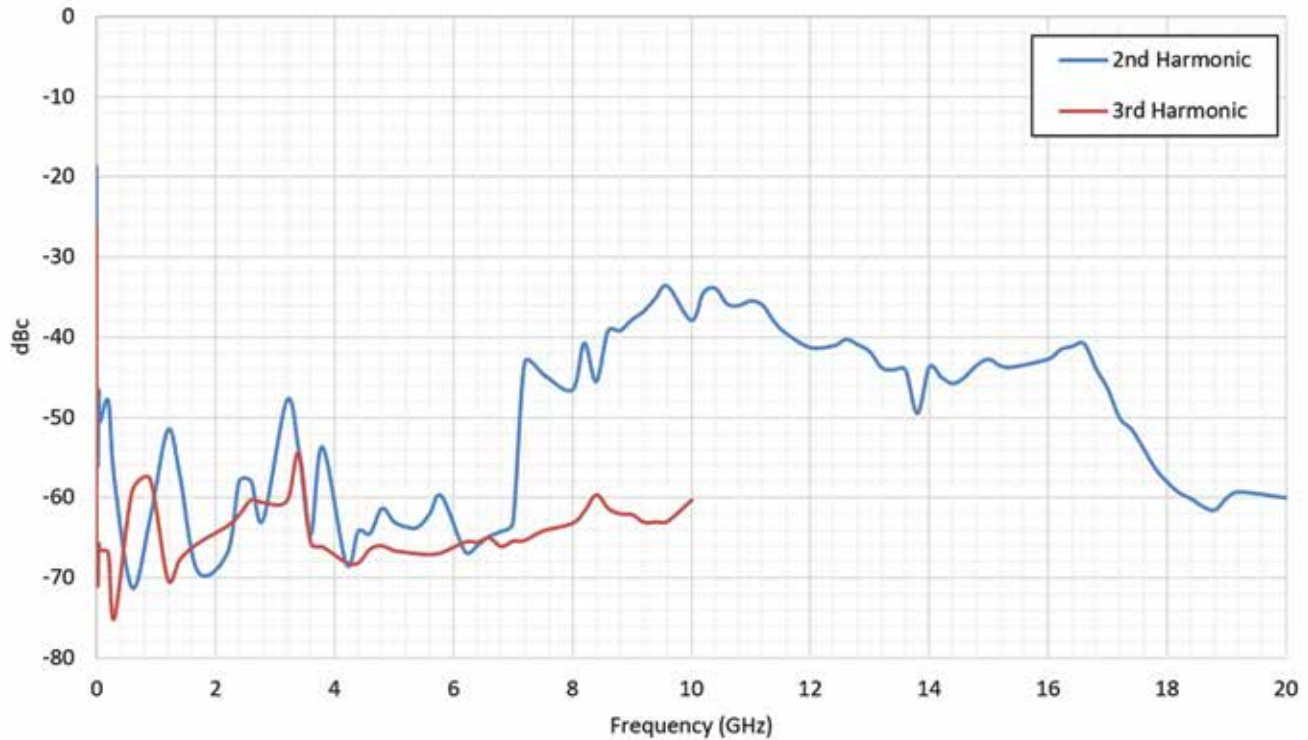


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Spectral Purity

Parameter	Min	Typical	Max	Note
Harmonics @ 0 dBm Output Power				
<1.5 GHz		<-50 dBc	-45 dBc	
1.5 GHz to 8 GHz		<-50 dBc	-45 dBc	
8 GHz to 12 GHz		<-40 dBc	-37 dBc	
12 GHz to 17 GHz		<-43 dBc	-40 dBc	
17 GHz to 20 GHz		<-55 dBc	-51 dBc	
20 GHz to 40 GHz		<-45 dBc	-40 dBc	
Harmonics @ +10 dBm Output Power				
<1.5 GHz		<-40 dBc	-37 dBc	
1.5 GHz to 8 GHz		<-35 dBc	-32 dBc	
8 GHz to 12 GHz		<-32 dBc	-28 dBc	
12 GHz to 17 GHz		<-35 dBc	-34 dBc	
17 GHz to 20 GHz		<-50 dBc	-41 dBc	
20 GHz to 40 GHz		<-35 dBc	-30 dBc	
Sub Harmonics @ 0 dBm				
Up to 20 GHz		<-75 dBc		
>20 GHz		<-75 dBc	-45 dBc	
Non-Harmonic Spurious				
Up to 20 GHz		<-75 dBc	-50 dBc	Max is defined by boundary spurs that may appear @ -100 MHz to +100 MHz offset from CW
>20 GHz		<-75 dBc	-42 dBc	

Spectral Purity (continued)



Level Performance

Parameter	Min	Typical	Max	Note
Output Power Level				
Settable	-30 dBm		+20 dBm	Up to 40 GHz
Calibrated	-20 dBm		+15 dBm	(38-40 GHz Max +11 dBm)
Settable	-100 dBm		+20 dBm	LP Option
Calibrated	-90 dBm		+15 dBm	
Power Resolution				
up to 20GHz			0.01 dB	
20GHz to 40GHz		0.1 dB		
Power Mute				
		-100 dB	-70 dB	

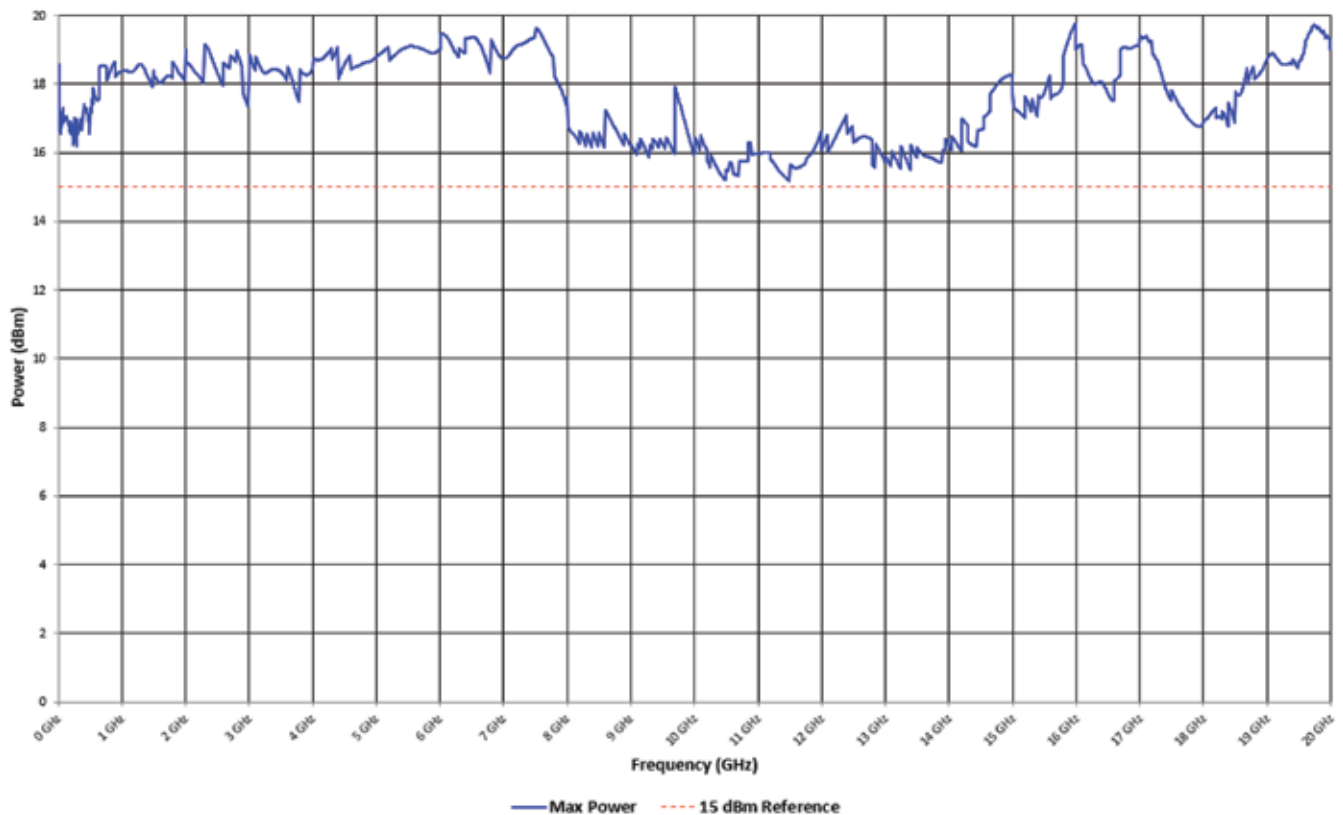


Figure 5: Max Power vs. Frequency up to 20 GHz

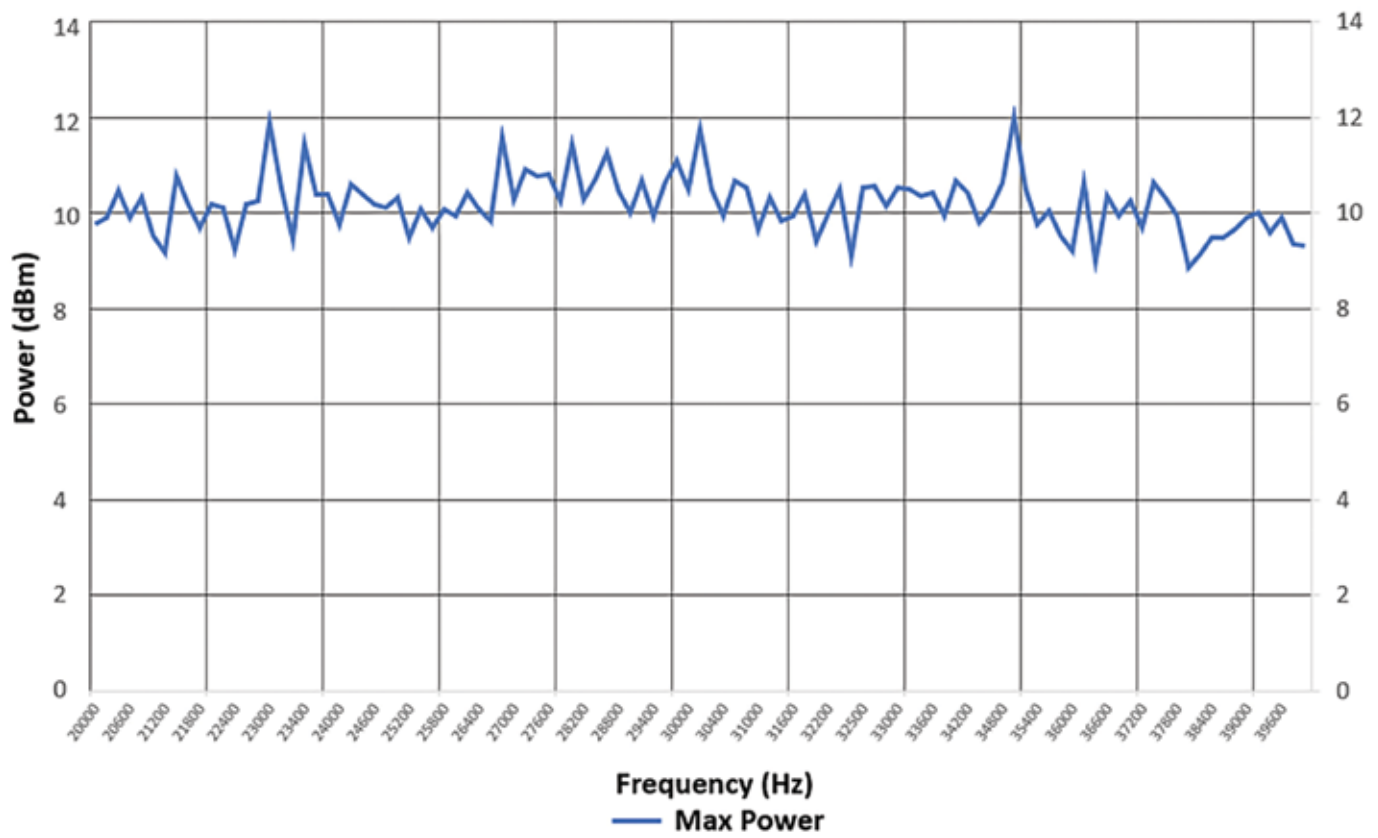


Figure 6: Max Power vs. Frequency up to 20 - 40 GHz

Level Accuracy

Parameter	<-90 dBm (ELP/EPR)	-90dBm to -40 dBm	-40dBm-0dBm	0dBm-15dBm
Frequency Range				
50Khz-8GHz	+/- 2 dB	+/- 2 dB (<+/-0.5 dB)	+/-0.7 dB (<+/-0.3 dB)	+/-0.7 dB (<+/-0.3 dB)
8GHz-20GHz	+/- 2 dB	+/- 2 dB (<+/-0.8 dB)	+/-1 dB (<+/-0.3 dB)	+/-1 dB (<+/-0.4 dB)
20GHz-40GHz	+/- 2 dB	+/- 2 dB (<+/-1 dB)	+/-1.5 dB (<+/-0.8 dB)	+/-1.5 dB (<+/-0.9 dB)

Output Return Loss

Parameter	Min	Typical	Max	Note
Output Return Loss		-10 dBm		

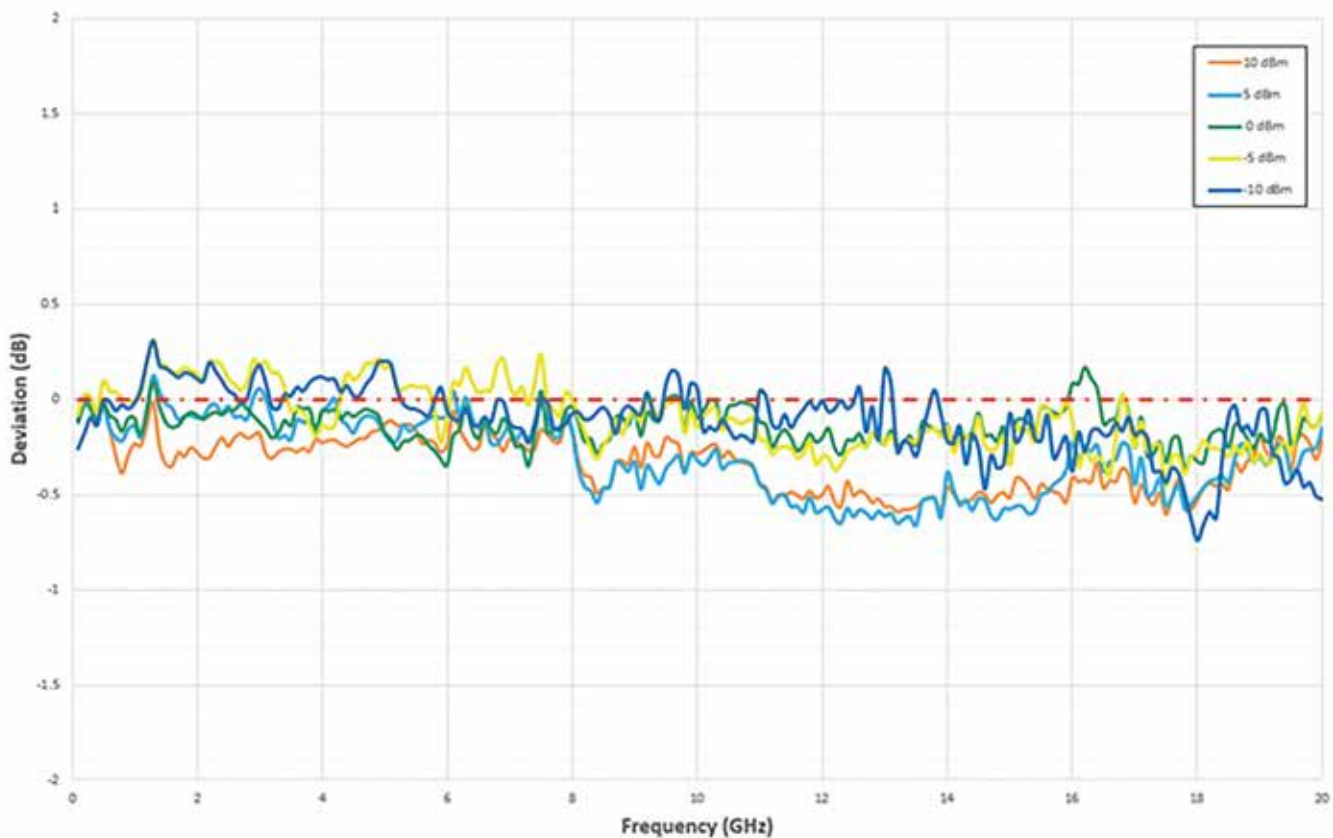


Figure 7: Level Accuracy over Frequency

Power Linearity

Frequency Range	-20.0 to -8.3 dBm	-8.3 to 3.3 dBm	3.3 to 15.0 dBm
0.1-5.1 GHz	0.5 dB (<0.2 dB)	0.7 dB (<0.2 dB)	0.62 dB (<0.2 dB)
5.1-10.0 GHz	1.2 dB (<0.4 dB)	0.81 dB (<0.4 dB)	0.9 dB (<0.4 dB)
10.0-15.0 GHz	1 dB (<0.6 dB)	1 dB (<0.2 dB)	0.7 dB (<0.3 dB)
15-20 GHz	1 dB (<0.7 dB)	0.75 dB (<0.4 dB)	0.9 dB (<0.6 dB)

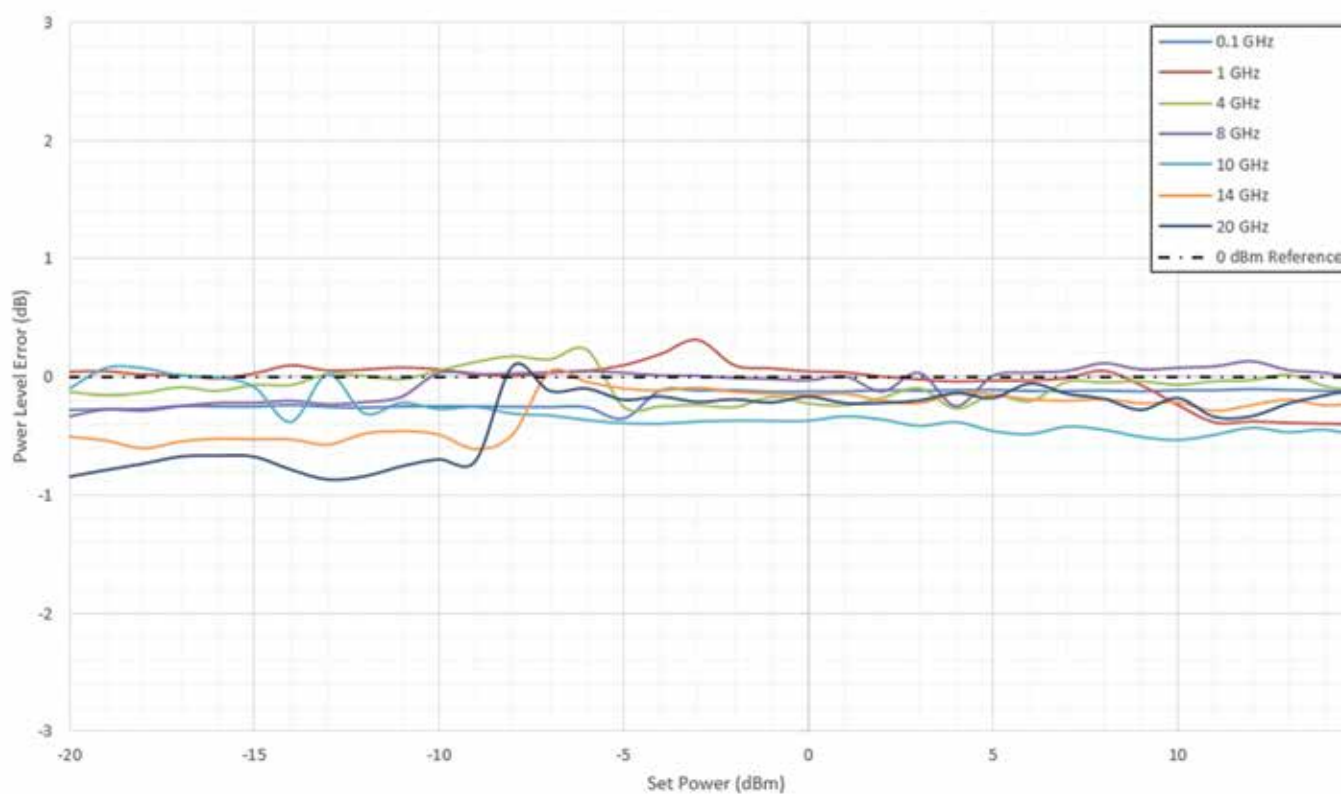


Figure 8: Power Linearity over Frequencies up to 20 GHz

Modulation

Frequency Modulation

Parameter	Min	Typical	Max	Note
Modulation Source				Internal/External
Deviation	1 Hz		10MHz	
Resolution:		0.1% or 1 Hz (the greater)		
Modulation Rate:	1 Hz		1MHz	Internal
Resolution:		1 Hz		
Modulation Waveforms				Sine

Amplitude Modulation

Parameter	Min	Typical	Max	Note
Modulation Source				Internal/External
Modulation Type:		Linear		
AM Depth:				
Maximum settable:	0%		100%	
Resolution:		0.1% of depth		
Modulation rate:	1Hz		100 kHz	
Modulation Waveforms				Sine

Phase Modulation

Parameter	Min	Typical	Max	Note
Modulation Source				Internal
Peak Deviation:	0 deg		360 deg	
Modulation Rate:	1 Hz		100 kHz	
Modulation Waveforms				Sine

Modulation - continued

Sweep

Parameter	Min	Typical	Max	Note
Range:		Same as freq. range		
Modes:		Frequency step, Amplitude step, List		
Dwell time:	10 μ s		562,499 s	
Resolution:		1 μ s		
Number of points:	2		4096	
Step change:		Linear		
Trigger:		Free run, External, Bus, Timer		

Pattern Modulation (PAT Option)

Parameter	Min	Typical	Max	Note
Number of steps:	1		2048	
Step Repetition:	1		65535	
On/off time:	32 ns		20 days	

Pulse Modulation (PLS Option)

Parameter	Min	Typical	Max	Note
Modulation Source				Internal / External External Input Amplitude: TTL, 50 Ohm
On/off ratio:		70 dB		
Rise/fall time:			15ns, 10%-90% (typ.)	
Resolution:		10 ns		
Width:	32 ns		100 ms	
Repetition frequency:	1 Hz		10 MHz	

Modulation - continued

Frequency Reference

Parameter	Min	Typical	Max	Note
Internal reference frequency		10 MHz		
Temperature stability		±10 ppb max.		Over range 0 to 50°C
Aging 1st year		± 0.3 ppm		
Aging 10 years		1.5 ppm		
Warm up Time		30 min		
Frequency Accuracy		±0.5ppm		

Reference Input

Connector Type		SMA		
Input Impedance		50 Ω		
Waveform		Sine or Square		
Frequency		10/100 MHz		
Power		-3 dBm to +10 dBm		
Absolute Max. Level		+15 dBm		

Connectors

RF Out

Parameters	Typical Value
Impedance	50 Ω
Connector Type	
LSX8081xy	2.92 mm
LSX149xy	2.92 mm
LSX209xy	2.92 mm
LSX409xy	2.92 mm
VSWR	1:2.1
Reverse Power	0.5 W, 16 VDC
Reference Out	
Impedance	50 Ω
Connector Type	SMA
Frequency	10 MHz or 100 MHz
Shape	Sine
Power	3 to 7 dBm
Modulation Input	
Connector Type	SMP
Input Impedance	50 Ω
Max. Input Voltage	± 1 V
Input Damage Level	± 3.5 V
Pulse / Trigger Input	
Connector Type	SMP
Input Impedance	50 Ω
Input Voltage	TTL, CMOS compatible
Threshold	1.5 V
Damage Level	-0.42 V min or 5.42 V max
Reference Input	
Connector Type	SMA
Input Impedance	50 Ω
Waveform	Sine or Square
Frequency	10/100 MHz
Power	-3 dBm to +10 dBm
Absolute Max. Level	+15 dBm

Common

Temperature	
Operating	0°C to +40°C
Storage	-40°C to +70°C
Warm up Time	30 minutes
Humidity	85% RH, non-condensing
Safety	CE Marked, IEC61010-1:2010
EMC	IEC 61326-1:2013
Calibration	2 years
Warranty	3 years

Desktop

Power Supply	Input: 100 – 240 V AC, 1.5 A, 47-63 Hz. Output 12.0 V DC, 8.34 A, 100.0 W
Power Consumption	
LSX8081D	25 W typ., 35 W max.
LSX1491D	30 W typ., 45 W max.
LSX2091D	30 W typ., 45 W max.
LSX4091D	35 W typ., 55 W max.
Interface	USB TYPE C , SPI (factory use only)
Dimensions	145 x 95 x 30 mm (5.71 x 3.74 x 1.18 inches)
Weight	
Without Package	1.0 kg
Shipping Weight	1.5 kg

Portable

Power Supply	Input: 100 – 240 V AC, 1.5 A, 47-63 Hz. Output 12.0 V DC, 8.34 A, 100.0 W
Power Consumption	60 W max.
LSX8081P	25 W typ., 35 W max.
LSX1491P	30 W typ., 45 W max.
LSX2091P	30 W typ., 45 W max.
Display Type	10.1", 1280x800 TFT capacitive touch screen
Battery	
Type	BAT1 - 4-cell, replaceable; BAT2 - 8-cell, non-replaceable
Standby	Up to 2 hours
Maximum Load	LSX8081P 60 min, LSX1491P 40 min, LSX2091P 40 min, LSX4091P 60 min.
Interface	
Host	2 x USB type A
Device	1 x USB type B, 1 x micro-USB for LAN adapter
Storage	Removable SD card
Dimensions (WxHxD)	280 x 225 x 65 mm (11.0 x 8.86 x 2.56 inches)
Weight	
Without Package	3.0 kg
Shipping Weight	4.5 kg

General ~ continued

PXle

Voltage	+12.0 to +12.6 VDC
Power Consumption	
LSX8081X	25 W typ., 35 W max.
LSX1491X	30 W typ., 45 W max.
LSX2091X	30 W typ., 45 W max.
LSX4091X	35 W typ., 55 W max.
Current Consumption	
+3.3 V	0.5 A max.
+12 V	5.5 A max.
Interface	PXle Gen3 x8 Lanes
Dimensions	8HP PXle (2 Slots)
Weight	
Without Package	1.0 kg
Shipping Weight	1.5 kg

Rackmount

Voltage Range	90 VAC to 264 VAC
Frequency Range	47 Hz to 63 Hz
Power Consumption	
LSX8081R	25 W typ., 35 W max.
LSX8082R	50 W typ., 70 W max.
LSX8084R	100 W typ., 140 W max.
LSX1491R	30 W typ., 45 W max.
LSX1492R	60 W typ., 90 W max.
LSX1494R	120 W typ., 180 W max.
LSX2091R	30 W typ., 45 W max.
LSX2092R	60 W typ., 90 W max.
LSX2094R	120 W typ., 180 W max.
LSX4091R	35 W typ., 55 W max.
LSX4092R	70 W typ., 110 W max.
LSX4094R	140 W typ., 220 W max.
Interface	
Host	2 x front panel USB type A 1 x rear panel USB type A
Device	1 x rear panel USB type B
LAN	1 x rear panel 1000/100/10 BASE-T
Storage	Removable SD card
Dimensions (WxHxD)	450 x 43 x 500 mm (17.7 x 1.7 x 19.7 inches)
Weight	
Without Package	6 kg
Shipping Weight	7 kg

General ~ continued

Benchtop

Voltage Range	90 VAC to 264 VAC
Frequency Range	47 Hz to 63 Hz
Power Consumption	
LSX8081B	25 W typ., 35 W max.
LSX8082B	50 W typ., 70 W max.
LSX8084B	100 W typ., 140 W max.
LSX1491B	30 W typ., 45 W max.
LSX1492B	60 W typ., 90 W max.
LSX1494B	120 W typ., 180 W max.
LSX2091B	30 W typ., 45 W max.
LSX2092B	60 W typ., 90 W max.
LSX2094B	120 W typ., 180 W max.
LSX4091B	35 W typ., 55 W max.
LSX4092B	70 W typ., 110 W max.
LSX4094B	140 W typ., 220 W max.
Display Type	5", TFT capacitive touch screen
Interface	
Host	2 x front panel USB type A 1 x rear panel USB type A
Device	1 x rear panel USB type B
LAN	1 x rear panel 1000/100/10 BASE-T RJ45
Storage	Removable SD card
Dimensions (WxHxD)	
With Feet	315 X 102 x 425 mm (12.40 x 4.02 x 16.73 inches)
Without Feet	315 X 88 x 425 mm (12.40 x 3.46 x 16.73 inches)
Weight	
Without Package	6 kg
Shipping Weight	6.5 kg

Ordering Information & Options

Desktop

Model

LSX8081D
LSX1491D
LSX2091D
LSX4091D

Description

8 GHz, 1 channel, desktop analog RF signal generator
14 GHz, 1 channel, desktop analog RF signal generator
20 GHz, 1 channel, desktop analog RF signal generator
40 GHz, 1 channel, desktop analog RF signal generator

PXIe

Model

LSX8081X
LSX1491X
LSX2091X
LSX4091X

Description

8 GHz, 1 channel, PXIe analog RF signal generator
14 GHz, 1 channel, PXIe analog RF signal generator
20 GHz, 1 channel, PXIe analog RF signal generator
40 GHz, 1 channel, PXIe analog RF signal generator

Rackmount

Model

LSX8081R
LSX8082R
LSX8084R
LSX1491R
LSX1492R
LSX1494R
LSX2091R
LSX2092R
LSX2094R
LSX4091R
LSX4092R
LSX4094R

Description

8 GHz, 1 channel, rackmount analog RF signal generator
8 GHz, 2 channels, rackmount analog RF signal generator
8 GHz, 4 channels, rackmount analog RF signal generator
14 GHz, 1 channel, rackmount analog RF signal generator
14 GHz, 2 channels, rackmount analog RF signal generator
14 GHz, 4 channels, rackmount analog RF signal generator
20 GHz, 1 channel, rackmount analog RF signal generator
20 GHz, 2 channels, rackmount analog RF signal generator
20 GHz, 4 channels, rackmount analog RF signal generator
40 GHz, 1 channel, rackmount analog RF signal generator
40 GHz, 2 channels, rackmount analog RF signal generator
40 GHz, 4 channels, rackmount analog RF signal generator

Benchtop

Model

LSX8081B
LSX8082B
LSX8084B
LSX1491B
LSX1492B
LSX1494B
LSX2091B
LSX2092B
LSX2094B
LSX4091B
LSX4092B
LSX4094B

Description

8 GHz, 1 channel, benchtop analog RF signal generator
8 GHz, 2 channels, benchtop analog RF signal generator
8 GHz, 4 channels, benchtop analog RF signal generator
14 GHz, 1 channel, benchtop analog RF signal generator
14 GHz, 2 channels, benchtop analog RF signal generator
14 GHz, 4 channels, benchtop analog RF signal generator
20 GHz, 1 channel, benchtop analog RF signal generator
20 GHz, 2 channels, benchtop analog RF signal generator
20 GHz, 4 channels, benchtop analog RF signal generator
40 GHz, 1 channel, benchtop analog RF signal generator
40 GHz, 2 channels, benchtop analog RF signal generator
40 GHz, 4 channels, benchtop analog RF signal generator

Ordering Information & Options ~ continued

Portable

Model	Description
LSX8081P	8 GHz, 1 channel, portable analog RF signal generator
LSX1491P	14 GHz, 1 channel, portable analog RF signal generator
LSX2091P	20 GHz, 1 channel, portable analog RF signal generator
LSX4091P	40 GHz, 1 channel, portable analog RF signal generator

Options

Option	Description	Models
MOD	Modulation package (AM, FM, PM)	X/R/B/D/P
LP	Low power option, calibrated to -90 dBm. Standard on Benchtop and Rackmount.	X/D/P
ELP1	1 channel, extended low power range: settable -150 dBm, calibrated -130 dBm. Not available for 4 channels.	B/R
ELP2	2 channels, extended low power range: settable -150 dBm, calibrated -130 dBm. Not available for 4 channels.	B/R
EPR1	1 channel, extended power range -130dBm to +27dBm. Not available for 4 channels.	B/R
EPR2	2 channel, extended power range -130dBm to +27dBm. Not available for 4 channels.	B/R
PLS	Pulse modulation	X/R/B/D/P
PAT	Pattern modulation	X/R/B/D/P
FS	Fast switching 100 μ s	X/R/B/D/P
UFS	Ultra-fast switching 10 μ s	X/R/B/D/P
BAT1	4-cell, replaceable extra battery 48 Wh	P
BAT2	8-cell, non - replaceable extra battery 98 Wh (default for LSX4091P)	P
CHA	External charger	P
LAN	USB Ethernet adapter	P
B-Rack Mount	Rack-mount kit	B
WE	1 year warranty extension (standard warranty 3 years)	X/R/B/D/P

Accessories

PXE21100	21 slot PXIe chassis	X
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(1) X/R/B/D/P=PXIe/Rackmount/Benchtop/Desktop/Portable.