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

Ver 2.0

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

TABOR ELECTRONICS

LUCID SERIES
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Introduction

Modular 50 kHz to 8 GHz, 14 GHz, 20 GHz, and 40 GHz ultra-low phase noise, 10 µs 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 °C ± 5 °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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Figures

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				
CW Mode				
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

SSB Phase Noise

Typical Values (dBc/Hz), CW Level Nominal 5 dBm

	CW Level	10 Hz	100 Hz	1 kHz	10 kHz	100 kHz	1 MHz	10 MHz	100 MHz
Carrier Frequency									
100 MHz	5.08	-91	-111	-143	-151	-153	-153	-153	-154
1 GHz	4.36	-71	-91	-122	-133	-138	-139	-145	-157
4 GHz	3.1	-59	-78	-111	-122	-127	-128	-134	-154
8 GHz	3.3	-53	-73	-105	-116	-121	-122	-128	-154
10 GHz	3.34	-51	-71	-103	-114	-119	-119	-126	-142
20 GHz	3.09	-45	-65	-97	-108	-113	-114	-122	-146
40 GHz	3.43	-39	-59	-91	-102	-107	-108	-114	-140

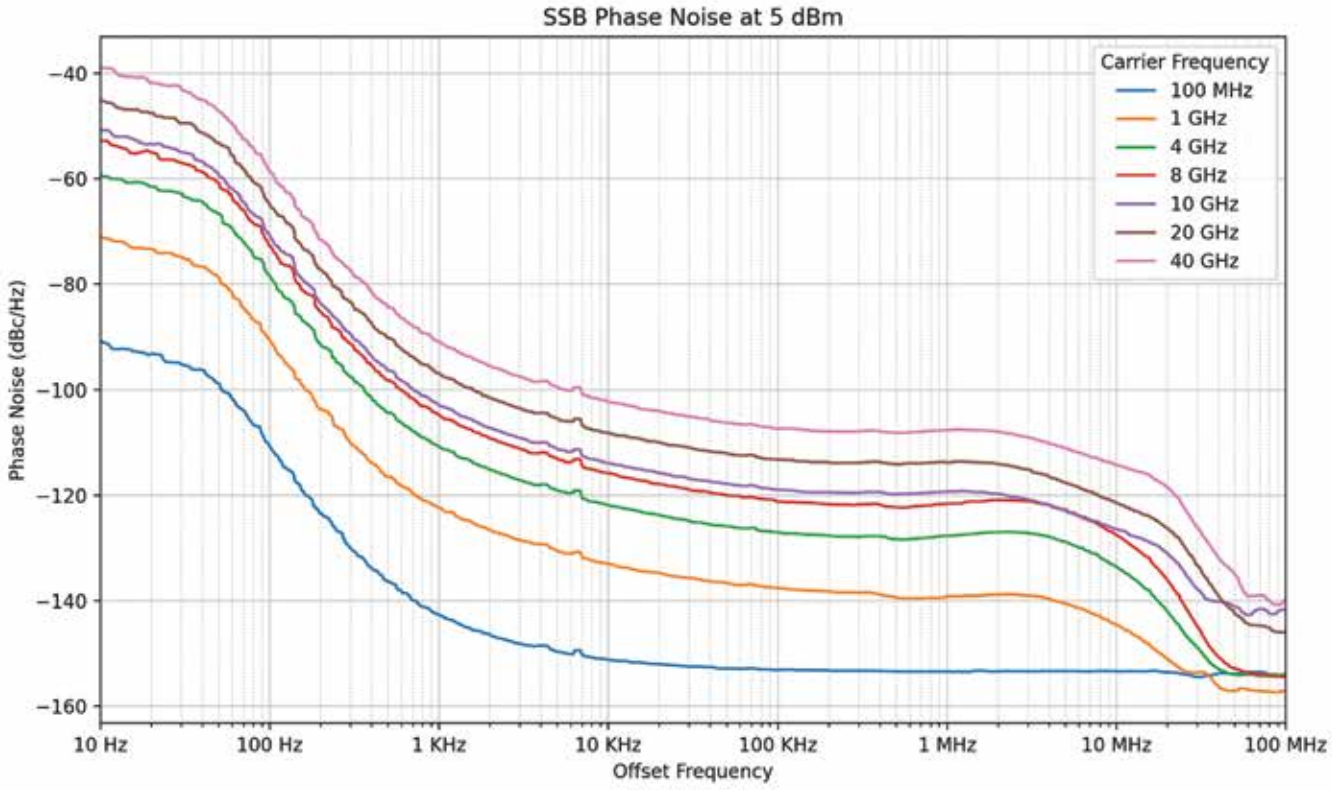

Figure 2: Phase Noise vs. Frequencies at 5 dBm

Spectral Purity

Parameter	Min	Typical	Max	Note
Harmonics @ 0 dBm Output Power				
<1.5 GHz		<-50 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		<-60 dBC	-57 dBc	
Harmonics @+10 dBm Output Power				
<1.5 GHz		<-40 dBc		
1.5 GHz to 8 GHz		<-35 dBc	-33 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	-43 dBc	
20 GHz to 40 GHz		<-62 dBc	-60 dBc	
Sub Harmonics @ 0 dBm				
Up to 20 GHz		<-60 dBc		
20 GHz to 40 GHz		<-55 dBc		
Non-Harmonic Spurious				
Up to 20 GHz		<-90 dBc	-60 dBc	Max is defined by boundary spurs that may appear @ -100 MHz to +100 MHz offset from CW
20 GHz to 40 GHz		<-60 dBc	-45 dBc	

Spectral Purity (continued)

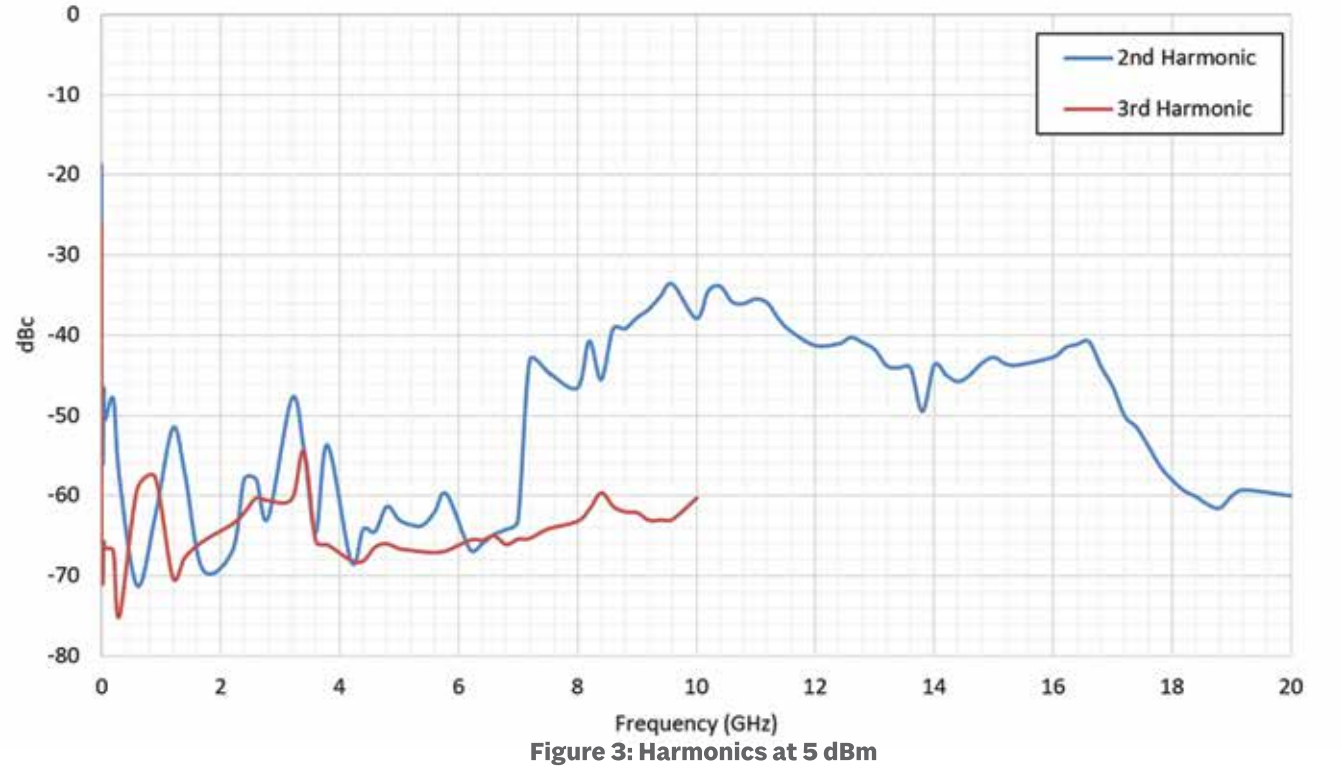

Figure 3: Harmonics at 5 dBm

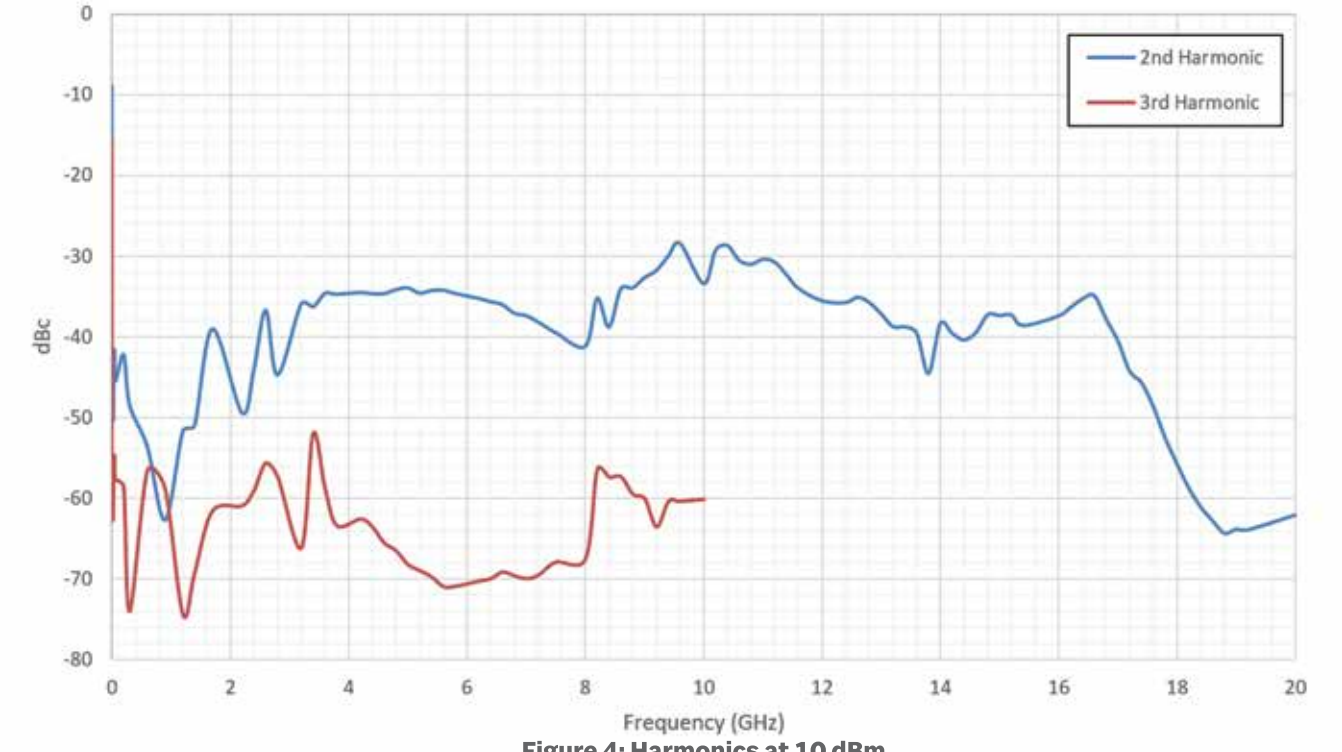

Figure 4: Harmonics at 10 dBm

Level Performance

Parameter	Min	Typical	Max	Note
Output Power Level				
Settable	-80 dBm		+20 dBm	Up to
Calibrated	-70 dBm		+15 dBm	20 GHz
Power Resolution		0.01 dB		
Power Mute		-100 dB	-70 dB	

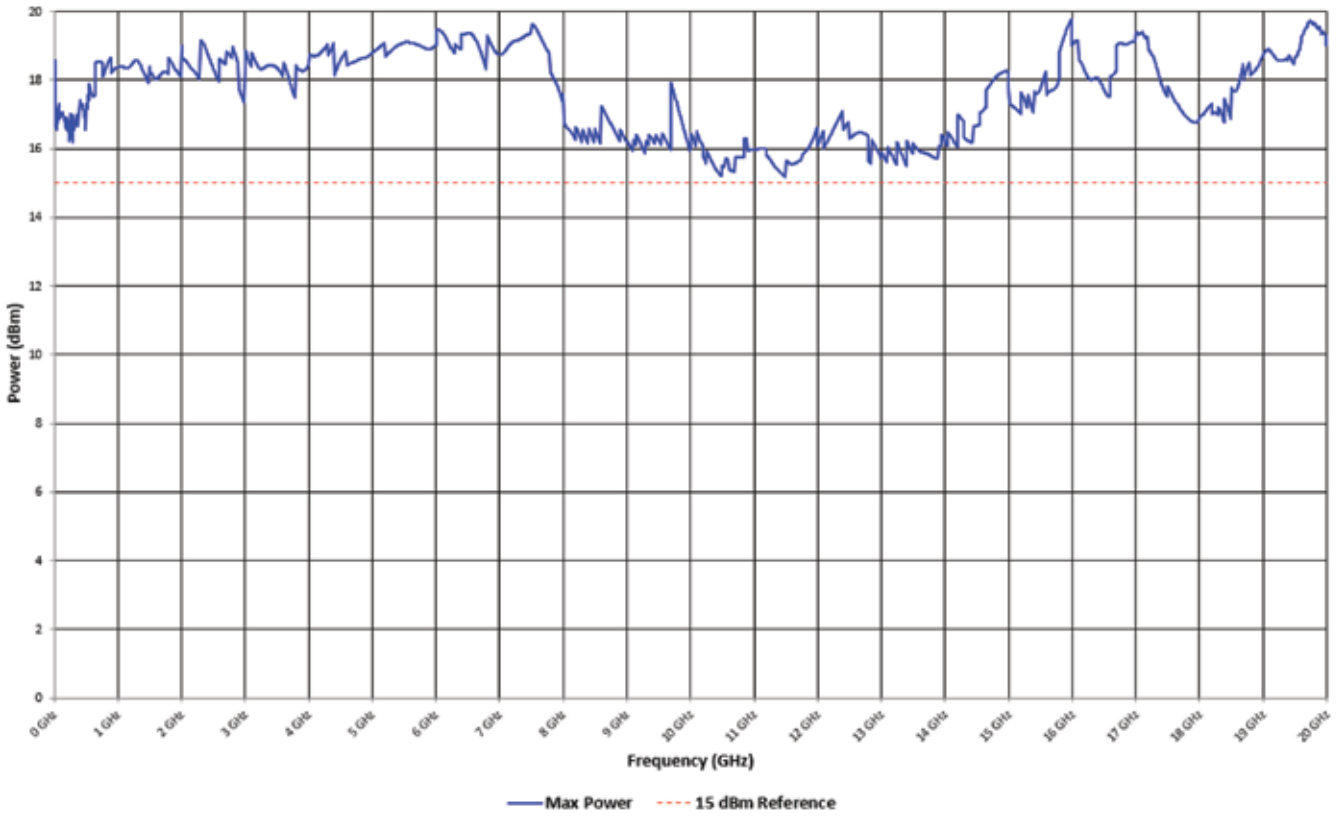

Figure 5: Max Power vs. Frequency up to 20 GHz

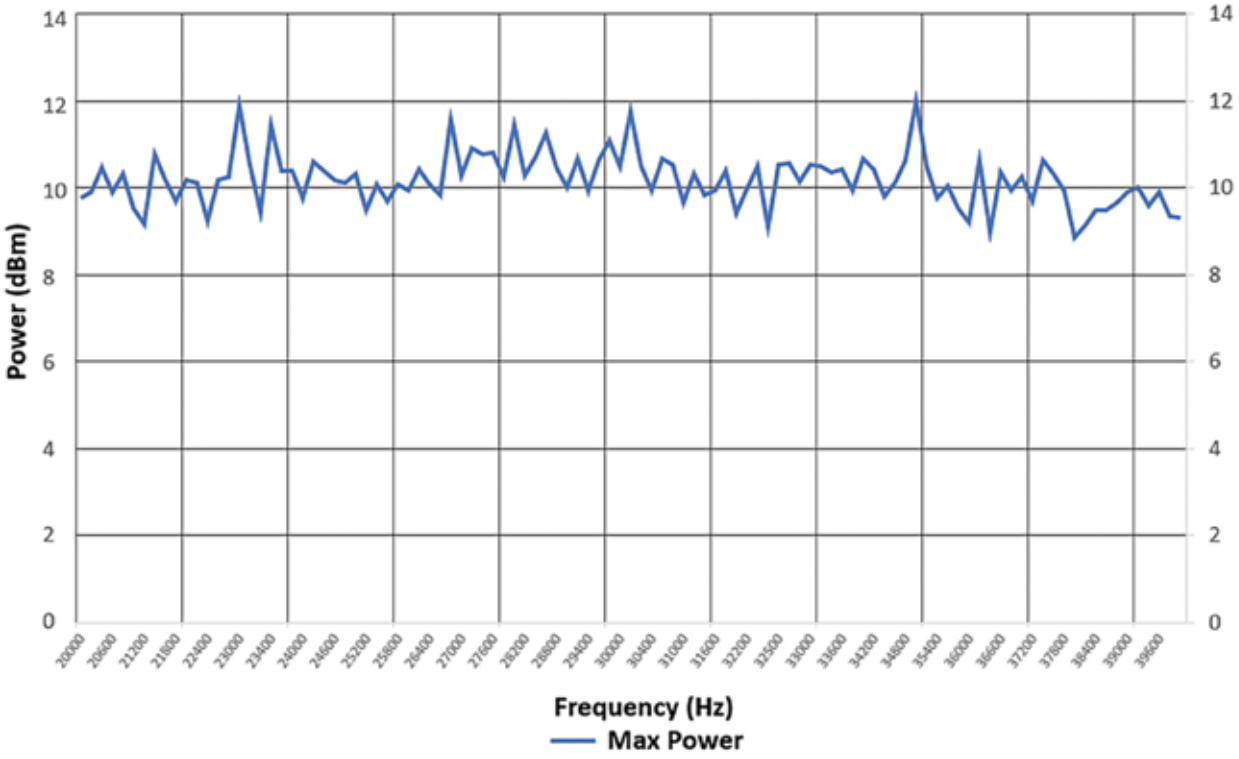

Figure 6: Max Power vs. Frequency up to 20 - 40 GHz

Level Accuracy

Parameter	-5 dBm	0 dBm	5 dBm	10 dBm
Frequency Range				
0.0–1.5 GHz	0.6 dB (<0.1 dB)	0.5 dB (<0.1 dB)	0.5 dB (<0.1 dB)	0.7 dB (<0.2 dB)
1.5–8.0 GHz	0.8 dB (<0.1 dB)	0.6 dB (<0.1 dB)	0.8 dB (<0.1 dB)	0.5 dB (<0.2 dB)
8.0–16.0 GHz	1.0 dB (<0.2 dB)	1.0 dB (<0.1 dB)	1.1 dB (<0.5 dB)	1.1 dB (<0.4 dB)
16.0–20.0 GHz	1.3 dB (<0.3 dB)	1.0 dB (<0.2 dB)	1.2 dB (<0.4 dB)	1.1 dB (<0.4 dB)
20.0-40.0 GHz	1.6 dB (<0.4 dB)	1.3 dB (<0.3 dB)	1.6 dB (<0.5 dB)	1.9 dB (<0.5 dB)

Output Return Loss

Parameter	Min	Typical	Max	Note
Output Return Loss		-10 dBm		

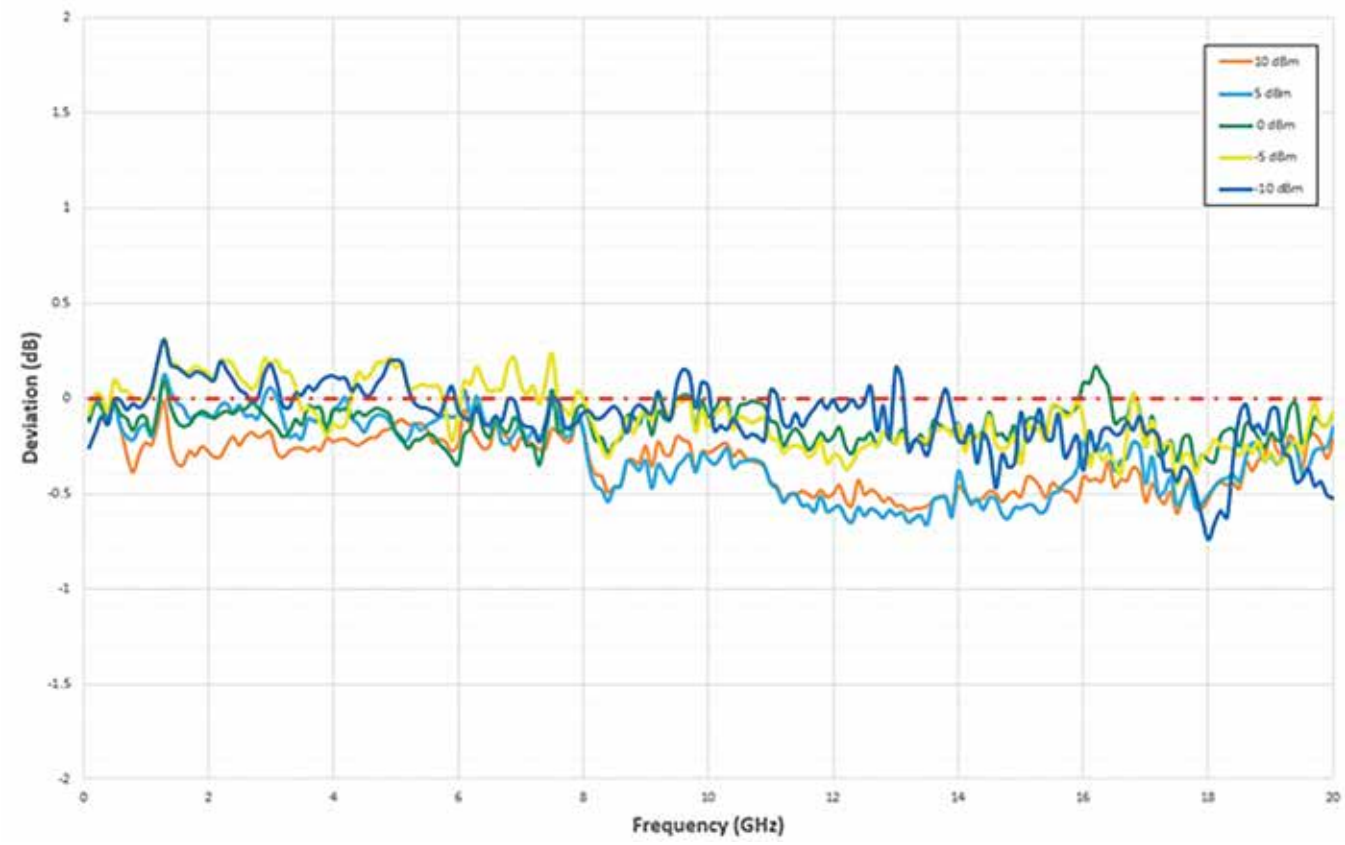

Figure 7: Level Accuracy over Frequency

Power Linearity

Parameter	Min	Typical	Max	Note
Frequency Range				-20.0 to -8.3 dBm
100 MHz to 5.1 GHz		0.5 dB (<0.2 dB)		
5.1 GHz to 10 GHz		1.2 dB (<0.4 dB)		
10 GHz to 15 GHz		1 dB (<0.6 dB)		
15 GHz to 20 GHz		1 dB (<0.7 dB)		

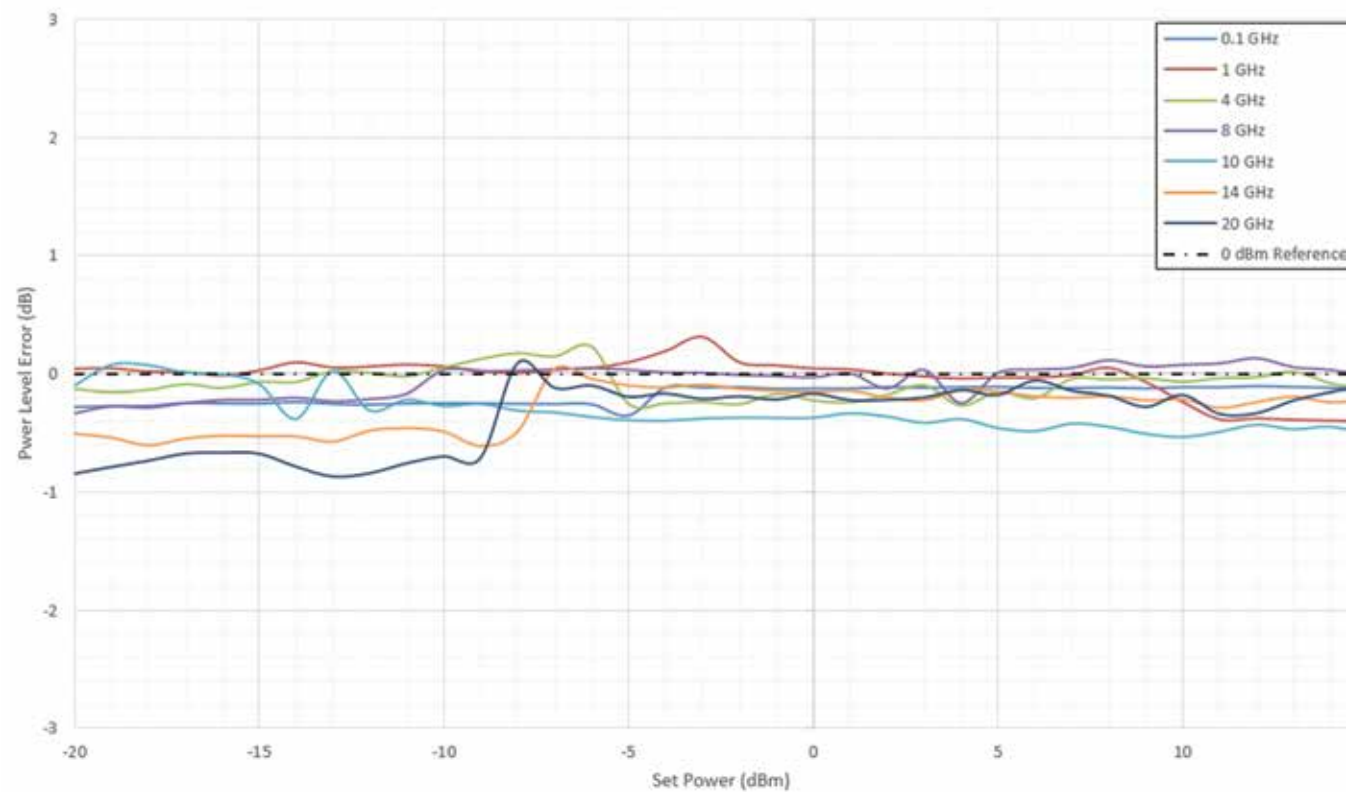

Figure 8: Power Linearity over Frequencies up to 20 GHz

Modulation

Pulse Modulation

Parameter	Min	Typical	Max	Note
Pulse Modulation				Opt PLS
Modulation Source				Internal / external
External Input Amplitude		TTL		50 Ohm
On / off ratio		70 dB		
Pulse rise / fall time			15 ns	10%-90%
Resolution		10 ns		
Width	32 ns		100 ms	
Repetition Frequency	DC		10MHz	
Internal Pulse Generator				Opt PAT
Number of Steps	1		2048	
Step Repetition	1		65535	
On/Off Time	32		20 days	

Amplitude Modulation

Parameter	Min	Typical	Max	Note
Modulation Source				Internal / External
Type				Linear
Depth	0%		100%	
Deviation Resolution		0.1% of depth		
Modulation Rate	DC		100 kHz	
Modulation Waveforms				Sine

Frequency Modulation

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

Modulation - continued

Phase Modulation

Parameter	Min	Typical	Max	Note
Modulation Source				Internal / External
Peak Deviation	0 deg		360 deg	
Modulation Rate	DC		100 kHz	
Modulation Waveforms				Sine

Sweep

Parameter	Min	Typical	Max	Note
Range				Same as the device frequency range
Modes		Frequency step, Amplitude step, List		
Type		Linear		
Dwell Time	10 µs		562,499 s	
Resolution		1 µs		
Number of Points	2		4096	
Trigger		Free run, External, Bus, Timer		

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	0.2 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	15 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
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	4-cell, replaceable
Standby	Up to 2 hours
Maximum Load	Up to 1 hour
Interface	USB TYPE C, SPI
Host	2 x USB type A
Device	1 x USB type B, 1 x micro-USB for LAN adapter
Storage	16 GB 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

PXIe

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	PXIe Gen3 x8 Lanes
Dimensions	8HP PXIe (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	16 GB 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	32 GB 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	Description
LSX8081D	8 GHz, 1 channel, desktop analog RF signal generator
LSX1491D	14 GHz, 1 channel, desktop analog RF signal generator
LSX2091D	20 GHz, 1 channel, desktop analog RF signal generator
LSX4091D	40 GHz, 1 channel, desktop analog RF signal generator

PXIe

Model	Description
LSX8081X	8 GHz, 1 channel, PXIe analog RF signal generator
LSX1491X	14 GHz, 1 channel, PXIe analog RF signal generator
LSX2091X	20 GHz, 1 channel, PXIe analog RF signal generator
LSX4091X	40 GHz, 1 channel, PXIe analog RF signal generator

Rackmount

Model	Description
LSX8081R	8 GHz, 1 channel, rackmount analog RF signal generator
LSX8082R	8 GHz, 2 channels, rackmount analog RF signal generator
LSX8084R	8 GHz, 4 channels, rackmount analog RF signal generator
LSX1491R	14 GHz, 1 channel, rackmount analog RF signal generator
LSX1492R	14 GHz, 2 channels, rackmount analog RF signal generator
LSX1494R	14 GHz, 4 channels, rackmount analog RF signal generator
LSX2091R	20 GHz, 1 channel, rackmount analog RF signal generator
LSX2092R	20 GHz ,2 channels, rackmount analog RF signal generator
LSX2094R	20 GHz, 4 channels, rackmount analog RF signal generator
LSX4091R	40 GHz, 1 channel, rackmount analog RF signal generator
LSX4092R	40 GHz, 2 channels, rackmount analog RF signal generator
LSX4094R	40 GHz, 4 channels, rackmount analog RF signal generator

Benchtop

Model	Description
LSX8081B	8 GHz, 1 channel, benchtop analog RF signal generator
LSX8082B	8 GHz, 2 channels, benchtop analog RF signal generator
LSX8084B	8 GHz, 4 channels, benchtop analog RF signal generator
LSX1491B	14 GHz, 1 channel, benchtop analog RF signal generator
LSX1492B	14 GHz, 2 channels, benchtop analog RF signal generator
LSX1494B	14 GHz, 4 channels, benchtop analog RF signal generator
LSX2091B	20 GHz, 1 channel, benchtop analog RF signal generator
LSX2092B	20 GHz, 2 channels, benchtop analog RF signal generator
LSX2094B	20 GHz, 4 channels, benchtop analog RF signal generator
LSX4091B	40 GHz, 1 channel, benchtop analog RF signal generator
LSX4092B	40 GHz, 2 channels, benchtop analog RF signal generator
LSX4094B	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

Options

Options	Description	Models (1)
MOD	Modulation package (AM, FM, PM)	X/R/D/P
PLS	Pulse modulation	X/R/B/D/P
PAT	Pattern modulation	X/R/B/D/P
FS	Fast switching 100 µs	X/R/B/D
UFS	Ultra-fast switching 10 µs	R/B
BAT	4-cell, replaceable extra battery 39 Wh	P
BAT2	4-cell, replaceable extra battery 98 Wh	P
CHA	External charger	P
LAN	USB Ethernet adapter	P
W-Rack	Rack-mount kit	B/R
WE	1 year warranty extension (standard warranty 3 years)	X/R/B/D/P

Accessories

PXE21100	21 slot PXIe chassis	X

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