

High Performance Signal Analyzer LSA Series

Specifications

FREQUENCY

Frequency range	DC coupled	3Hz~3GHz / 13.2GHz / 26.5GHz	
	AC coupled	10MHz~3GHz / 13.2GHz / 26.5GHz (Option)	
	Resolution	1Hz	
Frequency reference	Temperature Drift	±0.1 [ppm]	
	Aging per year*	±0.3	
Frequency readout	Marker resolution	depending on span and measurement points (1Hz minimum)	
	Accuracy	± (maker frequency x reference error + 0.5% x span+5% x RBW + 0.5 x Horizontal resolution) *	
	Resolution	1 Hz / 10 Hz / 100 Hz / 1 kHz	
Frequency counter	Accuracy	± ((reference frequency accuracy x marker frequency accuracy) ± (counter resolution x 1LSB))	
	Sensitivity	-60dBm @ 3GHz>f>2MHz, span<3MHz	
		-50dBm @ 13.2GHz>f>3GHz, span<3MHz	
Frequency span	Range	0Hz, 10Hz~3GHz / 13.2GHz / 26.5GHz	
	Resolution	1Hz	
	Accuracy	±1%	
Sweep	Zero span	1 us to 2000 sec, ±0.5%	
	Span ≥ 10Hz	10 ms to 2000 sec, ±0.5% nominal	
	Sweep points	3 to 8192 (span=0 Hz) 101 to 8192 (span≥10 Hz)	
Trigger	Span ≥ 10Hz	Source External, Line, Video, Free run	
		Offset 1 us to 500ms	
	Span = 0 Hz	Source External, Line, Video, Free run	
Spectral purity	[dB c/Hz]	100Hz offset	-76 (@ f = 1GHz, 0dBm input)
		1kHz offset	-97
		10kHz offset	-112 (-115 typical)
		100kHz offset	-112 (-115 typical)
		1MHz offset	-136
		10MHz offset	-144
Residual FM		< 10 x N** Hzp-p in 1 sec	
	3dB bandwidths	30Hz to 5MHz (1-2-3-5 Sequence)	
RBW	Bandwidth accuracy	± 1.5% (@ 500Hz~500kHz Filter) ± 6% (@ 1MHz~5MHz Filter)	
	Shape factor -60dB: -3dB	< 5 (@500Hz~5MHz)	
	Bandwidth switching uncertainty	± 0.05dB nominal @ 5 kHz RBW reference, CF = 100MHz	
VBW	3dB bandwidths	1Hz to 3 MHz, none (1-2-3-5 sequence)	
	3dB bandwidths	1Hz to 300 Hz (1-2-3-5 sequence)	
FFT filters	Bandwidth accuracy	< 1%, Nominal	
	Shape factor (-60dB: -3dB)	< 4.5, Nominal	

AMPLITUDE

Display range	DANL to + 30dBm		
Maximum input level	DC (AC coupled)	± 50VDC (Option)	
	DC (DC coupled)	0V	
	CW RF power	+ 30dBm	
RF input attenuator	Preamp on	+ 20dBm	
	Range	0 to 55dB	
	Steps	5dB	
1 dB CP	[dBm]	Switching accuracy	± 0.5dB @ 100MHz (LSA-30) ± 0.5dB @ <13.2GHz (LSA-132, 265) ± 0.8dB @ 13.2GHz~26.5GHz (LSA-265)
		0 dB RF attenuation	0 @ 100MHz~3 GHz -5 @ 3GHz~26.5 GHz
		Preamp on	-22 @ 1GHz

Third-order intermodulation distortion (TOI)	[dBm]	Two -30 dBm tones at input mixer with tone separation > 100 kHz +15, +18 (typical) @ 100MHz ~ 26.5GHz		
Second harmonic intercept (SHI)	[dBm]	+30 @ <100MHz, -30dBm input +40 @ 100MHz to 1.5GHz, -30dBm input +80 @ 1.5GHz to 26.5GHz, -30dBm input		
Displayed average noise level (DANL)	[dBm/Hz]	0 dB RF attenuation, RBW 1Hz Average detector, 50 Ω termination -90 nominal @ 3Hz to 1kHz -100 nominal @ 1kHz to 10kHz -120 @ 10kHz to 100kHz -125 @ 100kHz to 300kHz -132 @ 300kHz to 500kHz -137 @ 500kHz to 700kHz -142 @ 700kHz to 10MHz -151 @ 10MHz to 1GHz (Typical) -147 @ 1GHz to 2 GHz -146 @ 2GHz to 6.4GHz -143 @ 6.4GHz to 18GHz -138 @ 18GHz to 22GHz -136 @ 22GHz to 24GHz -133 @ 24GHz to 26.5GHz		
		Image frequency	-70 @ -10dBm input	
		Intermediate frequency	-70 @ -10dBm input	
		Residual responses (input termed, 0 dB attenuation)	[dBm]	-95 @ 1MHz ~ 6.4GHz -95 nominal @ 6.4GHz ~ 26.5GHz
			Other spurious	[dBc]
		Log scale		0.1 to 1 dB/div in 0.1 dB steps, 1 to 20 dB/div in 1 dB steps
			Linear scale	
		Units of level axis		dBm, dBμV, dBmV, dBpW (log level display) μV, mV, pW, nW (linear level display)
			Logarithmic range	
		Reference level	Linear range	
Accuracy			0dB	
Number			3 Traces	
	Trace detectors		Normal, Peak, Sample, Negative peak, Log power average, RMS average, and Voltage average	
Trace functions			Clear/Write, Max hold, Min hold, View, Blank, Average	
	Trace functions		10dB input attenuation, preselector centering applied ± 0.5dB at 1MHz to 3.0GHz ± 1.0dB at 3.0GHz to 6.4GHz ± 1.5dB at 6.4GHz to 13.2GHz ± 2.0dB at 13.2GHz to 22GHz ± 2.5dB at 22GHz to 26.5GHz	
Preamp on			± 1.0dB at 1MHz to 3.0GHz	
Linear and Log switching error	[dB]		0	
		Log scale switching error	0	
Linearity			±0.1 total @ input mixer level ≤ -20 dBm ±0.13 total @ -20 dBm < mixer level ≤ -10 dBm	
	AM demodulation depth		~ 100%	
FM deviation range			~ 100kHz	
Audio output port			Loudspeaker, Phone jack	

INPUTS AND OUTPUTS

RF input	Type	Front	N female, 50 Ω (3G, 13.2G), APC 2.92 mm, 50 Ω (26.5GHz)
	VSWR		≥ 10 dB input attenuation, <1.5 nominal @ 10MHz to 3GHz <1.8 nominal @ 3GHz to 13.2GHz, <2.0 nominal @ 13.2GHz to 26.5GHz
3rd IF output	Type	Rear	BNC female, 50 Ω nominal
	Frequency		21.4MHz
	Bandwidth		16MHz Max, different as Prefilterer
2nd IF output	Level		+3dBm nominal, Top of screen
	Type	Rear	SMA female, 50 Ω nominal
	Frequency		421.4MHz
Level			40MHz
			0dBm nominal, Top of screen

1st LO Output (for external mixer option)	Type	Front	SMA female, 50Ω nominal
	Frequency		3321.4 ~ 6821.4MHz
	Level		+10dBm, Nominal
2nd IF Input (for external mixer option)	Type	Front	SMA female, 50Ω nominal
	Frequency		421.4 MHz
	Level		-20 dBm (MAX)
Probe power supply		Front	+15V, -12V, GND
Audio output	Type	Front	Phone jack
Ext trigger input	Type	Rear	BNC female, 10 kΩ nominal
	Trigger level		TTL nominal
Sweep gate output	Type	Rear	BNC female
	Trigger level		TTL nominal
Reference frequency output	Type	Rear	BNC female
	Frequency		10MHz
	Level		+5dBm, Nominal
Reference frequency input	Type	Rear	BNC female
	Frequency		10 MHz
	Required level		-5 to +15 dBm nominal
 GPIB	Type	Rear	IEEE 488.2, 24-pin female
	Command set		SCPI 1997.0
	Interface functions		SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, E2, LE0, TE0
Serial interface		Rear	RS-232C (COM), 9-pin D-SUB male
LAN interface		Rear	10/100 Base T, Connector RJ45
USB		Front/ Rear	1.1 or Higher (2.0)
	Printer interface		Rear
Monitor output (VGA)		Rear	15-pin mini D-sub, 800×600
Mouse connector		Front	PS / 2-compatible
Keyboard connector		Front	PS / 2-compatible
Cal. Out	Frequency	Front	100MHz
	Level		-20 ± 1.0dBm

GENERAL SPECIFICATIONS

Display	Size	10.4" Color TFT LCD	
	Resolution	800 x 600 pixels	
Mass memory		Hard disk	
Environmental Conditions	Temperature operating	Operating	0°C to + 50°C
		Permissible	0°C to + 55°C ***
		Storage	-40°C to + 71°C
	Humidity	5% to 95% ****	
Altitude	4,600 Meters (15,000 Feet)		
Mechanical resistance		MIL-PRF-28800F, Class 3	
	Vibration, Random	5Hz to 500Hz	
	Vibration, Sinusoidal	5Hz to 55Hz	
	Shock	30G, Half-sine shock pulse	
EMC		IEC/EN 61326:1997+A1 / :1998+A2:2001+A3:2003	
Safety		IEC/EN 61010-1: 2001+C1:2002+C2:2003	
Power supply	Steady state voltage	88 - 135VAC(Range1), 193 - 269VAC or 273 - 381 VDC(Range2) (Automatically selected)	
	Frequency	45-66Hz AC(Voltage range1, 2), 360- 440Hz AC, 100 - 135VAC(Voltage 1only)	
	Power consumption	280 Watt Max	
Dimensions (WxHxD)	[mm]	430(W) x 222(H) x 467(D), without handles and down feet 485(W) x 240(H) x 489(D), with handles and down feet	
Weight	LSA-30	[kg]	< 18
	LSA-132, 265		< 19.5
Recommended calibration interval		1-year	
Standard warranty		2-year	

OPTION

	Frequency		9kHz ~ 3GHz
			≤±4.0 @ -10dBm (9kHz ~ 100kHz) , Before normalization
	Frequency flatness	[dB]	≤±2.0 @ -10dBm (100kHz ~ 3GHz) , Before normalization ≤±1.0 @ -10dBm (9kHz ~ 3GHz) , After normalization
Tracking generator	Output level	[dBm]	0 ~ -70
	Output level resolution		0.1 dB
	Absolute level accuracy		≤±1.0 dB
	Spurious		≤ -15 dBc , Harmonic Level ≤ -30 dBc , nonharmonic Level
	Leakage	[dBm]	≤ -95
	VSWR		≤ 1.5 @ -10dBm Output Level
	Connector		N female, 50Ω

Note

* Horizontal resolution is span/(sweep points-1)

** N : LO Harmonic order

Frequency	Band	N
0Hz ~ 3GHz	0	1
2.9GHz ~ 6.4GHz	1	1
6.3GHz ~ 13.2GHz	2	2
13.1GHz ~ 26.5GHz	3	4

*** Permissible temperature has slightly wider range as compared to the normal operating temperature. We guarantee the specification of the equipment when operating within the Operating Temperature range. We guarantee that the equipment is functional when operating within the Permissible Temperature.

**** 75% RH above 30°C, 45% RH above 40°C

ACCESSORY INFORMATION

Standard

종류	Type	Freq. Range
Adapter	N(M) to BNC(F)	DC to 1 GHz

Option

종류	Type	Freq. Range
Adapter	2.92mm (M) to 2.92mm (M)	DC to 40GHz
	2.92 mm (F) to 2.92mm (F)	DC to 40GHz
	SMA (M) to SMA (M)	DC to 26.5GHz
	SMA (F) to SMA (F)	DC to 26.5GHz
	N (M) to SMA (M)	DC to 18GHz
	N (M) to SMA (F)	DC to 18GHz
	SMA (M) to SMA (M)	DC to 12GHz
	SMA (F) to SMA (F)	DC to 12GHz
	N (M) to SMA (M)	DC to 12GHz
	N (M) to SMA (F)	DC to 12GHz
Attenuator	Fixed Att. 1~10dB, 15, 20, 30dB	DC to 3GHz
	Termination	SMA Type
RF cable	SMA (M) to SMA (M)	~ 18GHz
	2.92mm (M) to 2.92mm (M)	~ 40GHz
Bias tee	N (M) to N (M)	~ 18GHz
	16VDC, 100mA Max / 16VDC, 750mA Max	16kHz ~ 26.5GHz
Impedance matching pad	50 Ohm BNC (M) to 75 Ohm BNC (F)	DC ~ 2GHz
	SMA type	5kHz ~ 23GHz
DC Block	SMA type	5kHz ~ 26.5GHz
	SMA type	5kHz ~ 26.5GHz

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