GPS-SA3000X Series

Spectrum Analyzer

GPS-SA3032X 9KHz~3.2GHz
GPS-SA3021X 9KHz~2.1GHz

GPS LTD.

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GPS-SA3032X

GPS-SA3021X

General Description

GPS Ltd.'s GPS-SA3000X series of spectrum analyzers have a frequency range of 9 KHz to 2.1 GHz / 3.2 GHz. With their light weight, small size, and friendly user interface, the SA3000s offer a bright easy to read display, powerful and reliable automatic measurements, and plenty of powerful features. Applications are many, but include research and development, education, production, maintenance, and many more.

Features and Benefits

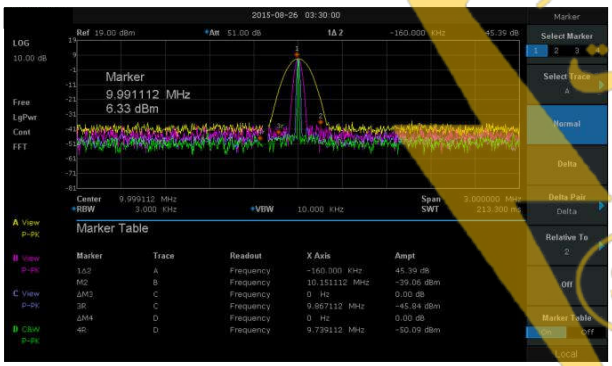
- All-Digital IF Technology
- Frequency Range from 9 kHz up to 3.2 GHz
- -161 dBm/Hz Displayed Average Noise Level (Typ.)
- -98 dBc/Hz @10 kHz Offset Phase Noise (1 GHz, Typ.)
- Total Amplitude Accuracy < 0.7 dB
- 10 Hz Minimum Resolution Bandwidth (RBW)
- Standard Preamplifier
- Up to 3.2 GHz Tracking Generator Kit (Opt.)
- Reflection Measurement Kit (Opt.)
- Advanced Measurement Kit (Opt.)
- EMI Pre-compliance Measurements Kit (Opt.)
- 10.1 Inch WVGA(1024x600)Display

Model and Main index

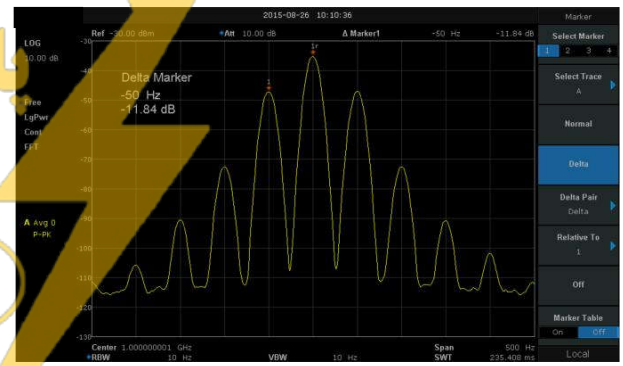
Model	GPS-SA3032X	GPS-SA3021X
Frequency Range	9 kHz~3.2 GHz	9 kHz~2.1 GHz
Resolution Bandwidth	10 Hz~1 MHz, in 1-3-10 sequence	10 Hz~1 MHz, in 1-3-10 sequence
Displayed Average Noise Level	-161 dBm/Hz, Normalize to 1 Hz (typ.)	-161 dBm/Hz, Normalize to 1 Hz (typ.)
Phase Noise	<-98 dBc/Hz@1 GHz, 10 kHz offset	<-98 dBc/Hz@1 GHz, 10 kHz offset
Amplitude Precision	< 0.7 dB	< 0.7 dB

Design features

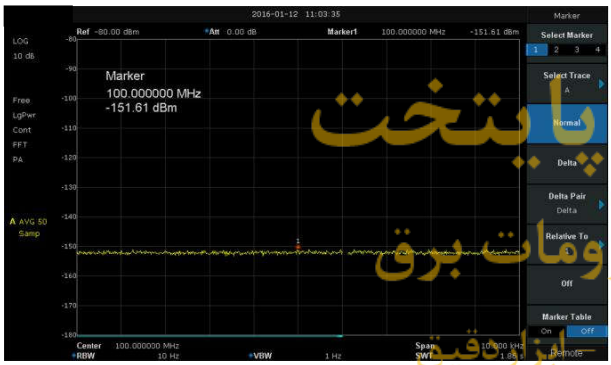
Support four traces and cursors independently



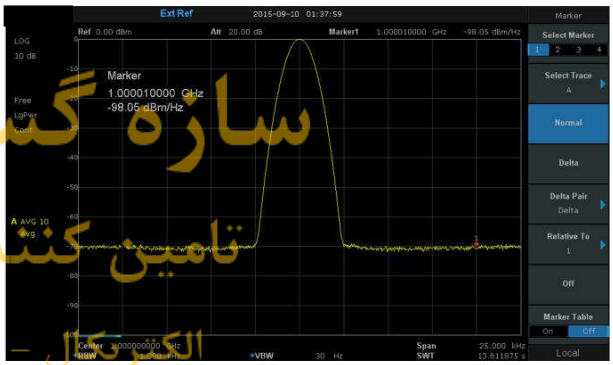
10 Hz Minimum Resolution Bandwidth (RBW)



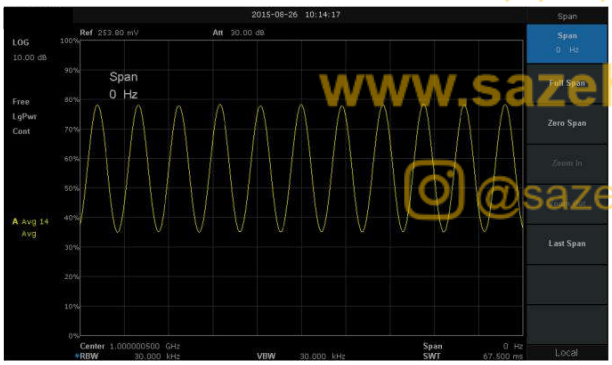
-151 dBm Displayed Average Noise Level (RBW=10 Hz)



Phase noise -98 dBc/Hz@1 GHz, offset 10 kHz



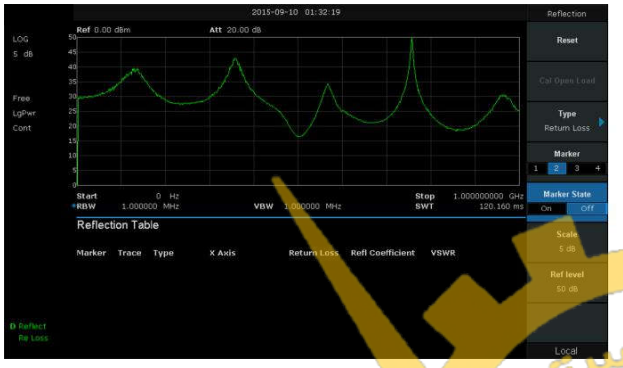
Demodulation at the zero span



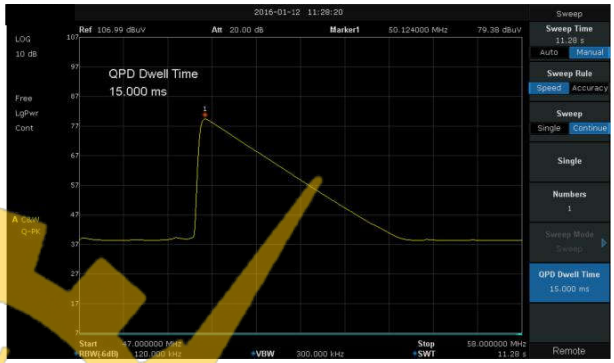
Advanced power measurement, calculate the ACPR parameters

Design features

Characteristic curve of the Return Loss



EMI filter, Quasi-Peak detector following CISPR 16



Specifications

Specification are valid under the following conditions: the instrument is within the calibration period, is stored for at least two hours at 0 ℃ to 50 ℃ temperature, and is warmed up 40 minutes. In addition tracking generator indicators, the specifications in this manual include the measurement uncertainty.

Technical index: All products guaranteed performance parameters, Apply to 5 ℃ to 45 ℃ temperature range.

Typical: 80 percent of the measurement result will meet at room temperate (approximately 25 ℃).It has 95th percentile reliability. This date is not warranted and does not include the measurement uncertainly.

Nominal: The expected mean or average performance or a designed attribute such as the 50 Ω connecter. This date is not warranted and does not include the measurement uncertainly. This measurement meet at room temperate (approximately 25 ℃).

Frequency Characteristic

	GPS-SA3032X	GPS-SA3021X
Frequency		
Frequency range	9 kHz-3.2 GHz	9 kHz-2.1 GHz
Frequency resolution	1 Hz	1 Hz
Frequency Span		
Range	0 Hz, 100 Hz to 3.2 GHz	0 Hz, 100 Hz to 2.1 GHz
Accuracy	± Span / (number of sweep points - 1)	
Internal Reference Source		
Reference frequency	10.000000 MHz	
frequency reference accuracy	± [(time since last adjustment × frequency aging rate) + temperature stability + calibration accuracy]	
Initial calibration accuracy	<1 ppm	
Temperature stability	<1 ppm/year, 0 ℃ ~50 ℃	
Frequency aging rate	<0.5 ppm/first year, 3.0 ppm/20 years	
Marker		
Marker resolution	Span / (number of sweep points - 1)	
Marker uncertainty	± [frequency indication × frequency reference uncertainty + 1% × span + 10% × resolution bandwidth + marker resolution]	
Frequency counter resolution	1 Hz	
Frequency counter uncertainty	± [frequency indication × frequency reference accuracy + counter resolution]	
Bandwidths		
Resolution bandwidth (-3dB)	10 Hz~1 MHz, in 1-3-10 sequence	
Resolution filter shape factor	< 4.8:1 (60 dB:3 dB), Gaussian-like	
RBW uncertainty	<5%	
Video bandwidth (-3dB)	1 Hz ~3 MHz, in 1-3-10 sequence	
VBW uncertainty	<5%	

Amplitude Characteristic

Amplitude and Level

Measurement range	DANL to +10 dBm, 100 kHz~1 MHz, preamplifier off DANL to +20 dBm, 1 MHz~3.2 GHz, preamplifier off
Reference level	-100 dBm to +30 dBm, 1 dB steps
Preamplifier	20 dB (nom.), 9 kHz~3.2 GHz
Input attenuation	0~51 dB, 1 dB steps
Maximum input DC voltage	+/- 50 V_{DC}
Maximum series RF power	33 dBm, 3 minutes, input attenuation >20 dB

Displayed Average Noise Level (DANL)

20 ℃ ~30 ℃ ,attenuation = 0 dB, sample detector, trace average >50

		RBW=10 Hz	Normalization to 1Hz
Preamp off	9 kHz~100 kHz	-100 dBm (nom.)	-110 dBm (nom.)
	100 kHz ~1 MHz	-97 dBm, -101 dBm (typ.)	-107 dBm,-111 dBm (typ.)
	1 MHz~10 MHz	-122 dBm, -126 dBm (typ.)	-132 dBm,-136 dBm (typ.)
	10 MHz~200 MHz	-127 dBm,-131 dBm (typ.)	-137 dBm,-141 dBm (typ.)
	200 MHz~2.1 GHz	-125 dBm, -129 dBm (typ.)	-135 dBm,-139 dBm (typ.)
	2.1 GHz~3.2 GHz	-116 dBm, -122 dBm (typ.)	-126 dBm,-132 dBm (typ.)
Preamp on	9 kHz~100 kHz	-107 dBm (nom.)	-117 dBm (nom.)
	100 kHz ~1 MHz	-122 dBm, -127 dBm (typ.)	-132 dBm,-137 dBm (typ.)
	1 MHz~10 MHz	-138 dBm, -144 dBm (typ.)	-148 dBm,-154 dBm (typ.)
	10 MHz~200 MHz	-146 dBm, -151 dBm (typ.)	-156 dBm,-161 dBm (typ.)
	200 MHz~2.1 GHz	-145 dBm, -148 dBm (typ.)	-155 dBm,-158 dBm (typ.)
	2.1 GHz~3.2 GHz	-135 dBm, -139 dBm (typ.)	-145 dBm,-149 dBm (typ.)

Phase Noise

20 ℃ ~30 ℃ ,fc=1 GHz

Phase noise	<-95 dBc/Hz @10 kHz offset, <-98 dBc/Hz (typ.) <-96 dBc/Hz @100 kHz offset,<-97 dBc/Hz (typ.) <-115 dBc/Hz @1 MHz offset, <-117 dBc/Hz (typ.)

Level Display

Logarithmic level axis	10 dB to 100 dB
Linear level axis	0 to reference level
Units of level axis	dBm, dBmV, dBuV, V, W
Number of display points	751
Number of traces	4
Trace detectors	Positive-peak, Negative-peak, Sample, Normal, Average (Voltage/RMS/Video) , Quasi-peak (with EMI option)
Trace functions	Clear write, Max Hold, Min Hold, View, Blank, Average

Frequency Response

20 ℃ to 30 ℃ , 30% to 70% relative humidity, attenuation = 20 dB, reference frequency 50 MHz

Preamp off	±0.8 dB, ±0.4 dB, (typ.)
Preamp on	±0.9 dB, ±0.5 dB, (typ.)

Error and Accuracy

Resolution bandwidth switching uncertainty	10 kHz RBW Logarithmic resolution ±0.2 dB, liner resolution ±0.01, nominal	
Input attenuation switching uncertainty	20 ℃ to 30 ℃ , fc = 50 MHz, preamp off, Relative to 20 dB, 1 to 51 dB attenuation ±0.5 dB	
Absolute amplitude accuracy	20 ℃ to 30 ℃ , fc = 50 MHz, RBW = 1 kHz, VBW = 1 kHz, peak detector, attenuation = 20 dB, 95th percentile reliability	
	preamp off	±0.4 dB, input signal -20 dBm
	preamp on	±0.5 dB, input signal -40 dBm
Total amplitude accuracy	20 ℃ to 30 ℃ , Fc>100 kHz, input signal -50 dBm~0 dBm, RBW = 1 kHz, VBW = 1 kHz, peak detector, attenuation = 20 dB, preamp off, 95th percentile reliability ± 0.7 dB	
RF input VSWR	input attenuation 10 dB, 1 MHz~3.2 GHz <1.5,nom	

Amplitude Characteristic

Distortion and Spurious Responses

Second harmonic distortion	fc≥50 MHz, mixer level -30dBm, attenuation = 0dB, preamp off, 20 ℃ to 30 ℃ -65 dBc
Third-order intercept	fc≥50 MHz, two -20 dBm tones at input mixer spaced by 100 kHz, attenuation = 0 dB, preamp off, 20 ℃ to 30 ℃ +10dBm
1dB Gain Compression	fc≥50 MHz, attenuation = 0 dB, preamp off, 20 ℃ to 30 ℃ >-5 dBm,nom.
Residual response	input terminated = 50 Ω,attenuation = 0 dB, 20 ℃ to 30 ℃ <-90 dBm,typ.
Input related spurious	Mixer level = -30 dBm, 20 ℃ to 30 ℃ <-65 dBc

Sweep and Trigger

Sweep time	1 ms to 3000 s, Span ≥ 100 Hz 1 μs to 3000 s, Span = 0 Hz, RBW ≥ 100 kHz
Sweep accuracy	Accuracy, Speed
Sweep mode	Sweep, FFT
Sweep rule	Single, Continuous
Trigger source	Free, Video, External
External trigger	5V TTL level, rising edge/falling edge

Tracking Generator (Option)

	GPS-SA3032X	GPS-SA3021X
Frequency range	100 kHz~3.2 GHz	100 kHz~2.1 GHz
Output level	-20 dBm~0 dBm	
Output level resolution	1 dB	
Output flatness	+/-3 dB	
Output maximum reverse level	Mean power:30 dBm,DC: ±50 V_{DC}	

EMI Receiver Measurement (Option)

Resolution bandwidth (6dB)	200 Hz,9 kHz,120 kHz
Detector	Quasi-peak

Reflection Measurement (Option)

Function	VSWR, Return Loss

Advanced Measurement (Option)

Function	Channel power, Adjacent channel power ratio, Time domain power, Occupied bandwidth, Third-order intercept,

External input and external output	
Front panel RF input	50 Ω,N-female
Front panel TG output	50 Ω,N-female
10 MHz reference output	10 MHz, >0 dBm, 50 Ω, BNC-female
10 MHz reference input	10 MHz, -5dBm~+10dBm, 50 Ω, BNC-female
External Trigger input	1 kΩ, 5V TTL , BNC-female
Communication Interface	
USB Host	USB-A 2.0 +
USB Device	USB-B 2.0
LAN	LAN (VXI11), 10/100 Base, RJ-45
General Specification	
Display	TFT LCD, 1024×600(waveform area 751×501), 10.1 inch
Storage	Internal (Flash) 256 MByte, External (USB storage device) 32 GByte
Source	Input voltage range (AC) 100 V~240 V, AC frequency supply 45 Hz~440 Hz, Power consumption 30W
Temperature	Working temperature 0 ℃ to 50 ℃ , Storage temperature -20 ℃ to 70 ℃
Humidity	0℃ to 30℃ ,≤95% Relative humidity; 30℃ to 50℃ , ≤75% Relative humidity
Dimensions	393 mm×207 mm×116.5 mm (W×H×D)
Weight	Contain tracking generator 4.60 kg (10.1 lb)
Electromagnetic Compatibility and Safety	
EMC	EN 61326-1:2013
Electrical safety	EN 61010-1:2010

Ordering Information

Product Description	GPS-SA3000X Spectrum Analyzer	Order Number
Product code	Spectrum Analyzer, 9 kHz~3.2 GHz	GPS-SA3032X
	Spectrum Analyzer, 9 kHz~2.1 GHz	GPS-SA3021X
Standard configurations	A Quick Start, A Product Certification, A Product Certification, A USB Cable, A CD (Including Quick Start, Data Sheet and Application Software) , A Calibration Certificate	QG-GPS-SA3000X
Utility Options	Tracking Generator Kit (Software)	TG-GPS-SA3000X
	Advanced Measurement Kit (Software)	AMK-GPS-SA3000X
	Utility Kit: N(M)-SMA(M) cable N(M)-N(M) cable N(M)-BNC(F) adaptor(2 pcs) N(M)-SMA(F) adaptor(2 pcs) 10 dB attenuator	UKitSSA3X
	N(M)-SMA(M) cable	N-SMA-6L
	N(M)-N(M) cable	N-N-6L
	N(M)-BNC(M) cable	N-BNC-6L
	Soft carrying bag	BAG-SCC
EMI Options	EMI Measurement Kit (Software)	EMI-GPS-SA3000X
	Near Field Probe: H field probe(25 mm, 10 mm, 5 mm, 2mm) , 30 MHz~3.0 GHz	SRF5030
Reflect Measurement Options	Tracking Generator Kit (Software)	TG-GPS-SA3000X
	Reflect Measurement Kit (Software)	Refl-GPS-SA3000X
	Reflect Bridge Kit: Reflect Bridge(1 MHz~2 GHz) N(M)-N(M) adaptor(2 pcs)	RBSSA3X20