

# Data Sheet

## GPS-SA3000XX Series Spectrum Analyzer

- ◆ SA3032X
- ◆ SA3021X



### General Description

GPS-SA3000XX series spectrum analyzer has a frequency range from 9 kHz up to 2.1 GHz/3.2 GHz, it is lightweight and small size, with an user friendly interface, concise style of display, reliable measurement precision and plenty of RF measurement functions. Applicable to research and development, education, production, maintenance and other related fields, that meets a wider range of application requirements.

### Features and Benefits

## GPS-SA3000XX Spectrum Analyzer Data Sheet

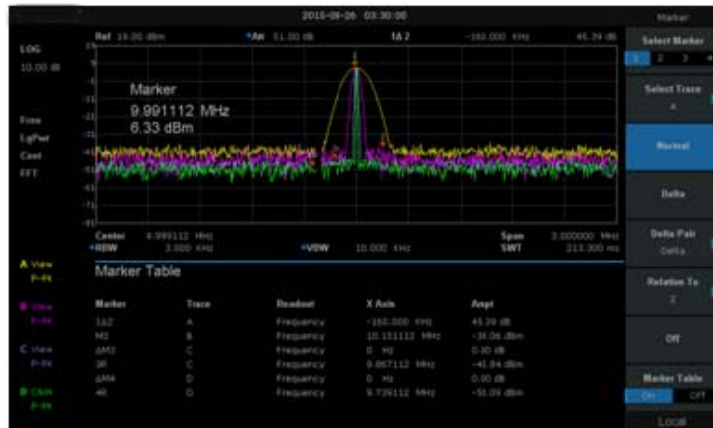
- ◆ All-Digital IF Technology
- ◆ Frequency Range from 9 kHz up to 3.2 GHz
- ◆ Min. -161 dBm/Hz Displayed Average Noise Level (Typ.)
- ◆ Min. <-98 dBc/Hz @ 10 kHz Offset Phase Noise (1 GHz, Typ.)
- ◆ Total Amplitude Accuracy < 0.7 dB
- ◆ 10 Hz Minimum Resolution Bandwidth (RBW)
- ◆ Standard Preamplifier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

### Model and Main index

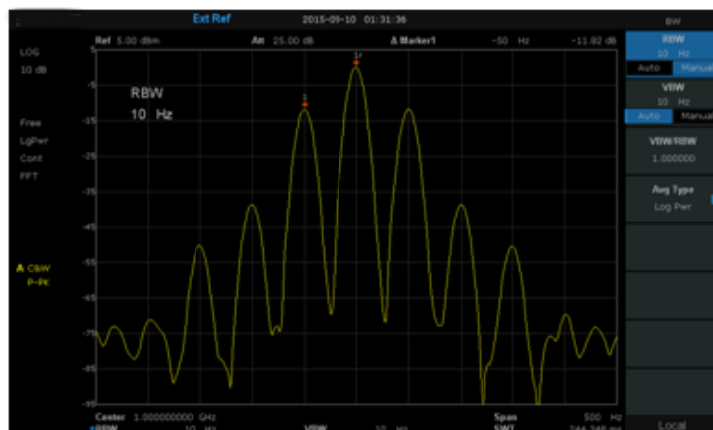
Model	GPS-SA3032XX	GPS-SA3021XX
Frequency Range	9 kHz ~ 3.2 GHz	9 kHz ~ 2.1 GHz
Resolution Bandwidth	10 Hz ~ 1 MHz, in 1-3-10 sequence	
Displayed Average Noise Level	-161 dBm/Hz, Normalize to 1 Hz (typ.)	
Phase Noise	<-98 dBc/Hz @ 1 GHz, 10 kHz offset	
Amplitude Precision	< 0.7 dB	

## Design features

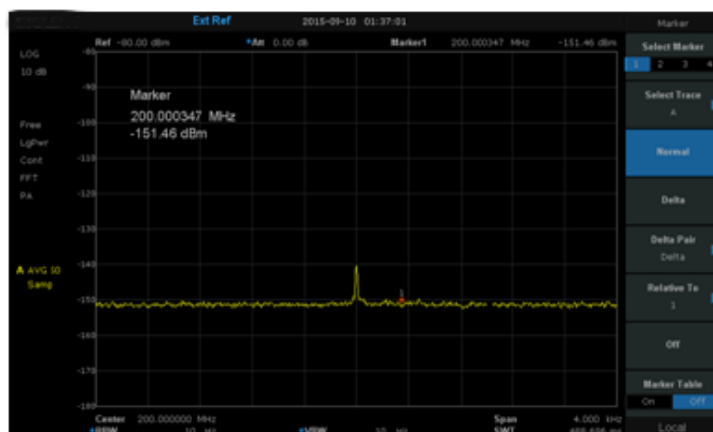
Supports four traces and cursors independently



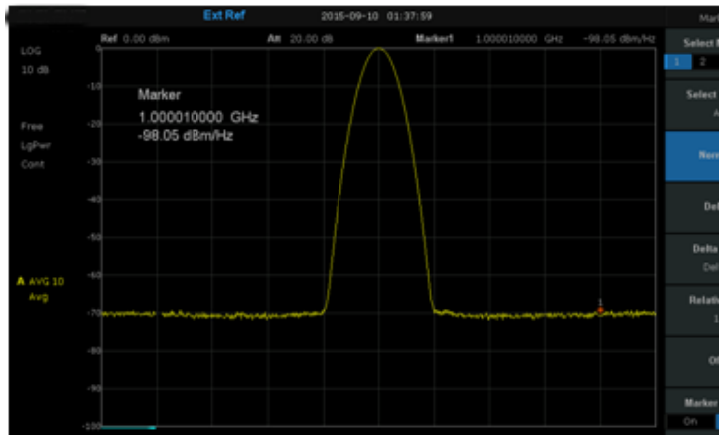
10 Hz Minimum Resolution Bandwidth(RBW)



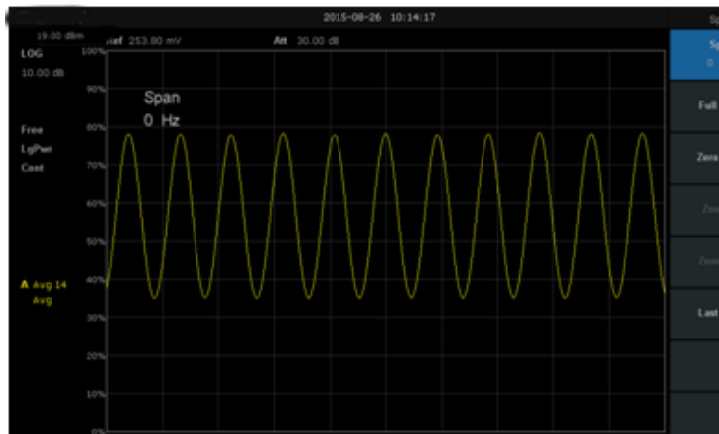
-151 dBm Displayed Average Noise Level(RBW=10 Hz)



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



Demodulation at the zero span

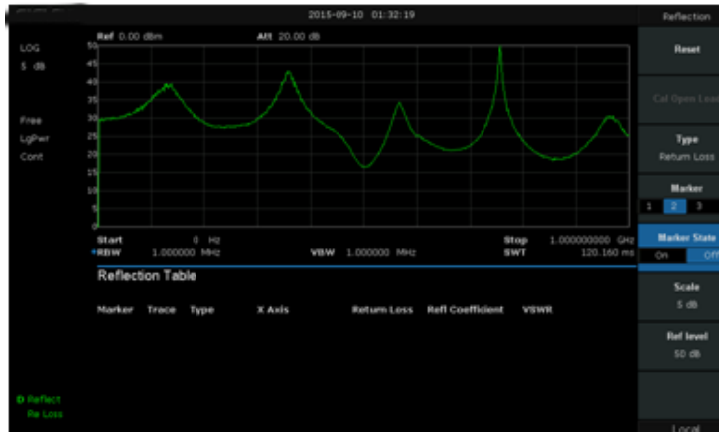


Advanced power measurement, calculate the ACPR parameters

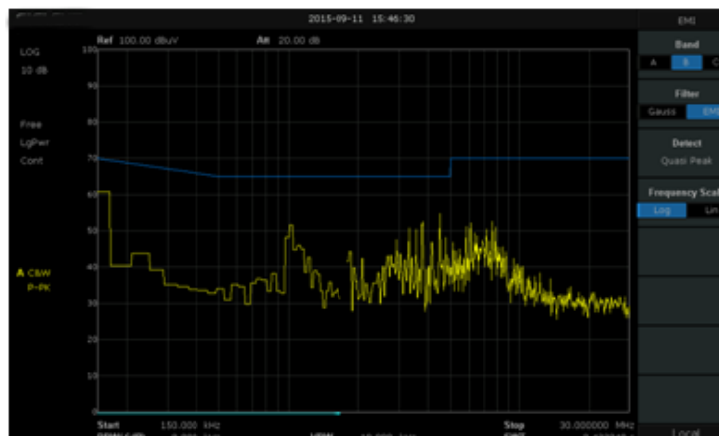


Reflection measurement, acquire characteristic curve of the Return Loss

## GPS-SA3000XX Spectrum Analyzer Data Sheet



EMI filter, Quasi-Peak detector with limit template 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°C to 50°C 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 °C to 45 °C temperature range.

**Typical** : 80 percent of the measurement result will meet at room temperature

(approximately 25 °C). It has 95th percentile reliability. This date is not warranted and does not include the measurement uncertainty.

**Nominal** : The expected mean or average performance or a designed attribute such as the 50 Ω connector. This date is not warranted and does not include the measurement uncertainty. This measurement meet at room temperature (approximately 25 °C).

Frequency Characteristic		
Frequency	GPS-SA3032XX	GPS-SA3021XX
Frequency range	9 kHz-3.2 GHz	9 kHz-2.1 GHz
Frequency resolution	1 Hz	1 Hz
Frequency Span		
Range	0Hz, 100 Hz to 3.2 GHz	0Hz, 100 Hz to 2.1 GHz
Accuracy	±span / (number of sweep points - 1)	
Internal Reference Source		
Reference frequency	10.000000MHz	
frequency reference accuracy	±[(time since last adjustment×frequency aging rate) +temperature stability+calibration accuracy]	
Initial calibration accuracy	<0.2ppm	
Temperature stability	<1ppm/year,0°C~50°C	
Frequency aging rate	<0.5ppm/first year,3.0ppm/20years	
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	1Hz
Frequency counter uncertainty	±[frequency indication × frequency reference accuracy + counter resolution]
<b>Bandwidths</b>	
Resolution bandwidth (-3dB)	10Hz~1MHz, in 1-3-10 sequence
Resolution filter shape factor	<4.8:1(60dB:3dB), Gaussian-like
RBW uncertainty	<5%
Video bandwidth (-3dB)	1Hz ~3MHz, in 1-3-10 sequence
VBW uncertainty	<5%

<b>Amplitude Characteristic</b>			
<b>Amplitude and Level</b>			
Measurement range	DANL to +10dBm, 100kHz~1MHz, preamplifier off DANL to +20dBm, 1MHz~3.2GHz, preamplifier off		
Reference level	-100 dBm to +30 dBm, 1dB steps		
Preamplifier	20 dB(nom.), 9 kHz~3.2GHz		
Input attenuation	0~51dB, 1dB steps		
Maximum input DC voltage	+/- 50Vdc		
Maximum series RF power	33dBm, 3minutes, input attenuation >20dB		
<b>Displayed Average Noise Level (DANL)</b>			
	20°C~30°C, attenuation=0dB, sample detector, trace average >50		
PA off		RBW=10Hz	Normalization to 1Hz
	9kHz~100kHz	-100 dBm(nom.)	-110 dBm(nom.)
	100kHz ~1MHz	-97dBm, -101dBm(typ.)	-107dBm, -111dBm(typ.)
	1MHz~10MHz	-122dBm, -126dBm(typ.)	-132dBm, -136dBm(typ.)
	10MHz~200MHz	-127dBm, -131dBm(typ.)	-137dBm, -141dBm(typ.)
	200MHz~2.1GHz	-125dBm, -129dBm(typ.)	-135dBm, -139dBm(typ.)
	2.1GHz~3.2GHz	-116dBm, -122dBm (typ.)	-126dBm, -132dBm(typ.)
PA on	9kHz~100kHz	-107 dBm(nom.)	-117 dBm(nom.)
	100 kHz ~1MHz	-122dBm, -127dBm(typ.)	-132dBm, -137dBm(typ.)
	1MHz~10MHz	-138dBm, -141dBm(typ.)	-148dBm, -154dBm(typ.)
	10MHz~200MHz	-146dBm, -151dBm(typ.)	-156dBm, -161dBm(typ.)
	200MHz~2.1GHz	-145dBm, -148 dBm(typ.)	-155dBm, -158dBm(typ.)
	2.1GHz~3.2GHz	-135dBm, -139dBm(typ.)	-145dBm, -149dBm(typ.)
<b>Phase Noise</b>			
	20°C~30°C, fc=1 GHz		

## GPS-SA3000XX Spectrum Analyzer Data Sheet

Phase noise	<-95dBc/Hz@10kHz offset, <-98dBc/Hz(typ.)	
	<-96dBc/Hz@100kHzoffset, <-97dBc/Hz(typ.)	
	<-115dBc/Hz@1MHzoffset, <-117dBc/Hz(typ.)	
<b>Level Display</b>		
Logarithmic level axis	10 dB to 100dB	
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	
<b>Frequency Response</b>		
	20°C to 30°C, 30% to 70% relative humidity, attenuation=20dB, reference frequency50MHz	
PA off	±0.8dB,±0.4dB,(typ.)	
PA on	±0.9dB,±0.5dB,(typ.)	
<b>Error and Accuracy</b>		
Resolution bandwidth	10KHz RBW	
switching uncertainty	Logarithmic resolution ±0.2 dB,liner resolution ±0.01,nominal	
Input attenuation	20□ to 30 □,fc=50 MHz,preamp off, Relative to 20 dB, 1 to 51 dB	
switching uncertainty	attenuation, ±0.5dB	
Absoluteamplitude accuracy	20 °C to 30 °C ,fc=50 MHz,RBW=1 kHz, VBW=1 kHz,peak detector,attenuation = 20 dB,95th percentile reliability	
	preamp off	±0.4dB,input signal -20dBm
	preamp on	±0.5dB,input signal -40dBm
Total amplitude accuracy	20 °C to 30 °C , Fc>100 kHz, input signal -50dBm~0dBm, RBW=1 kHz, VBW=1 kHz, peak detector, attenuation = 20 dB,preamp off,95th percentilereliability	
	±0.7dB	
RF input VSWR	<1.5 (nom.) ,input attenuation10dB,1MHz~3.2GHz	
<b>Distortion and Spurious Responses</b>		
Second harmonic	fc≥50 MHz,mixer level -30dBm,attenuation= 0dB,	



## GPS-SA3000XX Spectrum Analyzer Data Sheet

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

	SA3032X	SA3021X
Frequency range	100kHz~3.2GHz	100 kHz~2.1 GHz
Output level	-20dBm~0dBm	
Output level resolution	1dB	
Output flatness	+/-3dB	
Output maximum reverse level	Mean power:30dBm DC:±50V <sub>DC</sub>	

### EMI Receiver Measurement (Option)

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

### ReflectionMeasurement (Option)

Function	VSWR,Return loss
----------	------------------

### AdvancedMeasurement (Option)

Function	Channel power,adjacent channel power ratio,time domain power,occupied bandwidth
----------	---

## GPS-SA3000XX Spectrum Analyzer Data Sheet

External input and external output	
Front panel RF input	50Ω,N-female
Front panel tracking generator output	50Ω,N-female
10MHz referenceoutput	10MHz,>0dBm,50Ω,BNC-female
10MHz reference input	10 MHz, -5dBm~+10dBm,50Ω,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) ,10/100Base,RJ-45
General Specifications	
Display	TFT LCD,1024×600(waveform area 751×501),10.1inch
Storage	Internal(Flash)256MByte, External(USB storage device) 32GByte
Source	Input voltage range(AC)100V~240V,AC frequency supply 45Hz~440Hz,Power consumption 30W
Temperature	Working temperature 0°C to 50°C,Storage temperature -20°C to 70°C
Humidity	0°C to 30°C,≤95%Relative humidity; 30°C to 50°C,≤75% Relative humidity
Dimensions	393mm×207mm×116.5mm(W×H×D)
Weight	Containtracking generator4.60 kg(10.1 lb)
Electromagnetic Compatibility and Safety	
EMC	EN61326-1:2013
Electrical safety	EN 61010-1:2010

## Ordering Information

Product Description	GPS-SA3000XSpectrum Analyzer	Order Number
Product code	Spectrum Analyzer, 9kHz~3.2GHz	SA3032X
	Spectrum Analyzer, 9kHz~2.1GHz	SA3021X
Standard configurations	A Quick Start,A Product Certification,A Power Cable,A USB Cable,A CD(Including Quick Start,Data Sheet and Application Software), A Calibration Certificate	SA3000X
Options	EMI measurement kit	EMI-SA3000X
	Advanced measurement kit	AMK-SA3000X
	Reflect measurement kit	Refl-SA3000X
	Tracking Generator Kit	TG-SA3000X
Optional accessories	Utility Kit: N(M) – SMA(M)cable N(M) – N(M)cable N(M) – BNC(F)adaptor(2pcs) N(M)-SMA(F) adaptor(2pcs) 10 dB attenuator	UKitSA3X
	Refl-SA3000X RB(1 MHz~2 GHz) N(M) – N(M) adaptor(2 pcs)	RBSA3X20
	Near field probe : H field probe(4 pcs) N(M)-SMA(M) cable N(M)-BNC(F)adaptor	SRP5030
	N-SMA cable	N-SMA-6L
	N-N cable	N-N-6L
	N-BNC cable	N-BNC-6L
	Soft carrying bag	BAG-SCC