

# SPA-900TG Series Spectrum Analyzer

 **COM-POWER**



SPA-932TG

SPA-921TG

## General Description

Com-Power's SPA-900TG 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 SPA-900TG offer a bright easy to read display, powerful and reliable automatic measurements, and plenty of powerful features. Applications include broadcast monitoring/evaluation, site surveying, EMI pre-compliance, research and development, education, production, and maintenance.

## 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
- 📡 1 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 Test Kit (Opt.)
- 📡 10.1 Inch WVGA (1024x600) Display



## Model and Main index

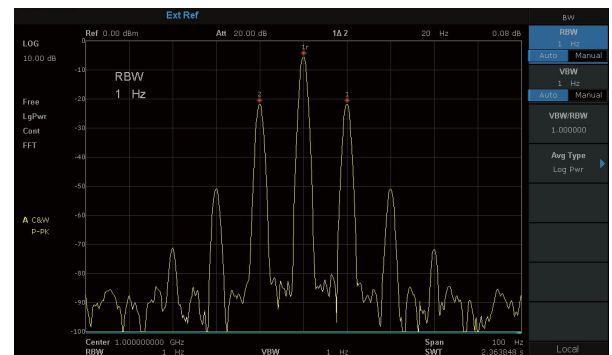
Model	SPA-932TG	SPA-921TG
Frequency Range	9 kHz~3.2 GHz	9 kHz~2.1 GHz
Resolution Bandwidth	1 Hz~1 MHz, in 1-3-10 sequence	1 Hz~1 MHz, in 1-3-10 sequence
Displayed Average Noise Level	-161 dBm/Hz, Normalize to 1 Hz (typ.)	-161 dBm/Hz, Normalize to 1 Hz (typ.)
Phase Noise	< -98 dBc/Hz@1 GHz, 10 kHz offset	< -98 dBc/Hz@1 GHz, 10 kHz offset
Amplitude Precision	< 0.7 dB	< 0.7 dB

## Design features

### Easy to operate, Support four independent traces and cursors



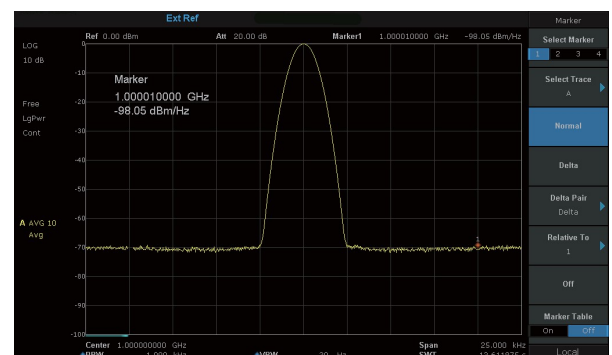
### 1 Hz Minimum Resolution Bandwidth (RBW)



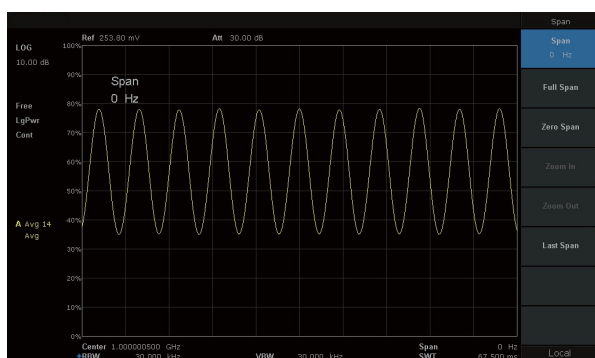
### -151 dBm Displayed Average Noise Level (RBW=10 Hz)



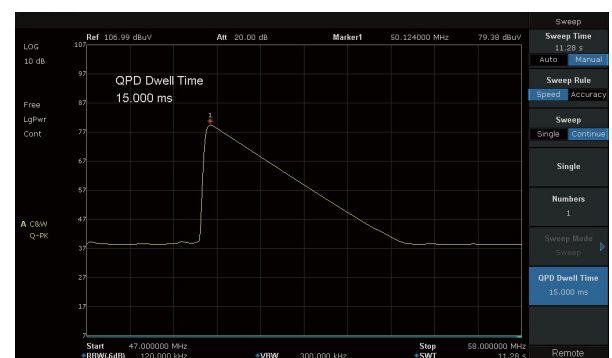
### Phase noise -98 dBc/Hz@ 1 GHz, offset 10 kHz



### Zero span and demodulation capabilities



### EMI filter and Quasi-Peak detector following CISPR 16



## Specifications

Specifications are valid under the following conditions: The instrument is within the calibration period, has been stored between 0 and 50°C for at least 2 hours prior to use, and has been powered on and warmed up for at least 40 minutes. The specifications include the measurement uncertainty, unless otherwise noted.

**Specifications:** All products are guaranteed to meet published specifications when operating temperatures from 5 to 45°C, unless otherwise noted.

**Typical:** Performance deemed typical implies that 80 percent of the measurement results will meet the typical published performance with a 95th percentile confidence level at room temperature (approximately 25°C). Typical performance is not warranted and does not include measurement uncertainty.

**Nominal:** The expected performance or design attribute

Frequency Characteristic		
	SPA-932TG	SPA-921TG
<b>Frequency</b>		
Frequency range	9 kHz-3.2 GHz	9 kHz-2.1 GHz
Frequency resolution	1 Hz	1 Hz
<b>Frequency Span</b>		
Range	0 Hz, 100 Hz to 3.2 GHz	0 Hz, 100 Hz to 2.1 GHz
Accuracy	± Span / (number of sweep points - 1)	
<b>Internal Reference Source</b>		
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 °C ~50 °C	
Frequency aging rate	<0.5 ppm/first year, 3.0 ppm/20 years	
<b>Marker</b>		
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]	
<b>Bandwidths</b>		
Resolution bandwidth (-3dB)	1 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%	

\*The DANL with RBW set to 1 or 3 Hz will be similar to 10 Hz.

## 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 <sub>DC</sub>
Maximum average RF power	30 dBm, 3 minutes, f <sub>c</sub> ≥10 MHz, attenuation >20 dBm, preamp off
Maximum damage level	33 dBm, f <sub>c</sub> ≥10 MHz, attenuation >20 dBm, preamp off

### Displayed Average Noise Level (DANL)

20 °C ~30 °C ,attenuation = 0 dB, sample detector, trace average >50			
Preamp off		RBW=10 Hz	Normalization to 1 Hz
	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 °C ~30 °C ,f <sub>c</sub> =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 200 dB
Linear level axis	0 to reference level
Units of level axis	dBm, dBmV, dBμV, dBμA, 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 °C to 30 °C , 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 °C to 30 °C , f <sub>c</sub> = 50 MHz, preamp off, Relative to 20 dB, 1 to 51 dB attenuation ±0.5 dB
Absolute amplitude accuracy	20 °C to 30 °C , f <sub>c</sub> = 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 °C to 30 °C , F <sub>c</sub> >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	$f_c \geq 50$ MHz, mixer level -30dBm, attenuation = 0 dB, preamp off, 20 °C to 30 °C , typ. -65 dBc
Third-order intercept	$f_c \geq 50$ MHz, two -20 dBm tones at input mixer spaced by 100 kHz, attenuation = 0 dB, preamp off, 20 °C to 30 °C , typ. +10 dBm
1dB Gain Compression	$f_c \geq 50$ MHz, attenuation = 0 dB, preamp off, 20 °C to 30 °C , nom. >-5 dBm
Residual response	input terminated = 50 $\Omega$ , attenuation = 0 dB, 20 °C to 30 °C , typ. <-90 dBm
Input related spurious	Mixer level = -30 dBm, 20 °C to 30 °C <-65 dBc

## Sweep and Trigger

Sweep time	1 ms to 3000 s	
Sweep accuracy	Accuracy, Speed	
Sweep mode	Sweep	FFT
	RBW=30 Hz~1 MHz	RBW=1 Hz~10 kHz
Sweep rule	Single, Continuous	
Trigger source	Free, Video, External	
External trigger	5 V TTL level, rising edge/falling edge	

## Tracking Generator

	SPA-932TG	SPA-921TG
Frequency range	100 kHz~3.2 GHz	100 kHz~2.1 GHz
RBW	30 Hz~1 MHz, only sweep mode	
Output level	-20 dBm~0 dBm	
Output level resolution	1 dB	
Output flatness	+/-3 dB	
Output maximum reverse level	Mean power:30 dBm,DC: $\pm 50$ V <sub>DC</sub>	

## EMI Receiver Measurement

Resolution bandwidth (6 dB)	200 Hz,9 kHz,120 kHz
Detector	Quasi-peak (following CISPR 16-1-1)
Dwell time	0 us~10 s

## External input and external output

Front panel RF input	50 $\Omega$ , N-female
Front panel TG output	50 $\Omega$ , N-female
10 MHz reference output	10 MHz, >0 dBm, 50 $\Omega$ , BNC-female
10 MHz reference input	10 MHz, -5 dBm~+10 dBm, 50 $\Omega$ , BNC-female
External Trigger input	1 k $\Omega$ , 5 V 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 30 W
Temperature	Working temperature 0 °C to 50 °C , Storage temperature -20 °C to 70 °C
Humidity	0 °C to 30 °C , $\leq 95\%$ Relative humidity; 30 °C to 50 °C , $\leq 75\%$ 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