

# SRA-90 Handheld Real-Time Spectrum Analyzer

9.5GHz · Powerful Performance · 1.5kg Ultra Portable



Saluki Technology Inc.

## SRA-90 Introduction

### Efficient desktop instrument · Ultimate portable device

- **Powerful Core**

The advanced receiver core, through complex high-density mixed signal design and precise assembly process, condenses thousands of components into a volume only the size of a mobile phone, and the use of every inch of space has been carefully considered. Thanks to advanced design and precision technology, the SRA series real-time spectrum analyzer has a breakthrough small size, low weight, low power consumption, and balanced and excellent RF performance and analysis capabilities.

- **High-Speed Analysis And Real-Time Spectrum**

Using high-speed FPGA to complete high-speed signal processing, it has outstanding performance and power consumption advantages, bringing users an extremely fast experience beyond traditional designs. The SRA series can seamlessly complete real-time spectrum analysis of signals up to 100MHz bandwidth, and achieve THz/s-level high-speed scanning, greatly enhancing interference detection under panoramic scanning, without having to endure the slow scanning of small RBW in traditional spectrum analyzers.

- **Extremely Portable Handheld Device**

Ultra-light design, weighing only 1.4kg, equipped with a side hand strap, can be easily held in one hand, supporting hanging strap and handless operation. The standard battery capacity can provide more than 3 hours of typical working time, and can be extended to ultra-long battery life through a power bank. The spectrum analyzer application software SAstudio4 provides a tablet mode for handheld work, providing gesture operation, control bar hiding and other functions, optimizing the efficiency of use in the handheld state.

- **Efficient Workstation**

The instrument comes with a standard stand, which can be placed firmly on the desktop. The smart body effectively saves desktop space, and the 10.1-inch touch screen provides a good interactive experience. At the same time, it provides high-resolution extended display output through Micro-HDMI to connect additional monitors; provides multiple USB interfaces for connecting mice and keyboards; spectrum analyzer measurement software SAstudio4 provides a special workstation mode to optimize mouse and keyboard operations and multi-monitor presentation, making the PX product an efficient desktop RF workstation.

## Features

Frequency range: 9 kHz-9.5 GHz	SHR architecture, 14-segments pre-selected filters
Sweep speed > 900 GHz/s (RBW ≥ 300 kHz)	Analytical bandwidth: 100 MHz (std.), 110 MHz (opt.)
Standard preamplifier, DANL: -168 dBm/Hz (typ.)	SSB Phase Noise: -100 dBc/Hz @10kHz (1 GHz typ.)
Typical IF rejection > 90dB	Typical image suppression: 90 dB (≤9 GHz), >60 dB (≤20 GHz)
Channel power, ACPR, IM3, OBW, Phase noise	Real-time spectrum analysis based on FPGA, 100% POI < 3us
Analog modulation analysis: AM/FM	Time domain IQ, PvT, real-time spectrum R&P

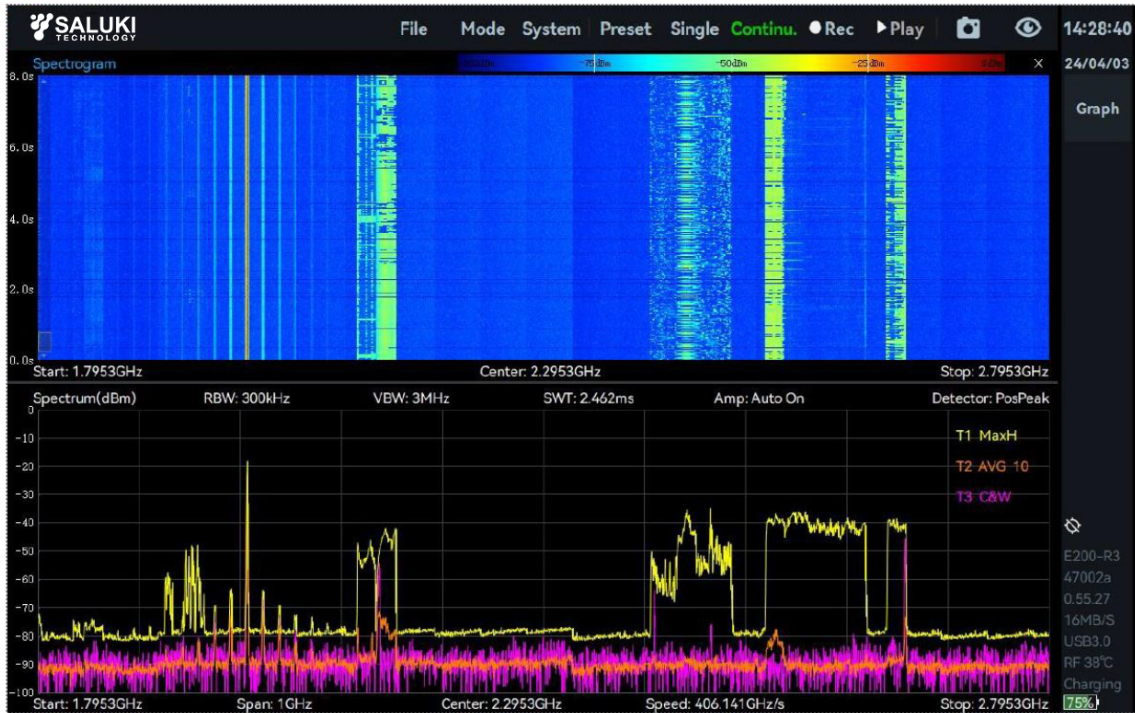
Spectrum scan rate up to 900GHz/s (RBW $\geq$ 300kHz)	Standard multi-mode GNSS positioning and timing
Weight: 1.4 kg, 10.1-inch all touch screen	Battery life: 3h+, support power bank supply
3 years warranty	Unbelievable price
HDMI interface support, expandable desktop station	Provides various interfaces such as analog IF output, external reference input, trigger input
Standard measurement functions: channel power, adjacent channel suppression ratio, third-order intermodulation, occupied bandwidth, phase noise	Desktop and handheld dual-purpose, detachable protective shell, supports one-handed holding, supports hands-free operation



## Working model overview

- **Standard Spectrum Mode**

This mode Provides standard spectrogram, waterfall graph, probability density graph, phase noise graph and other measurement graphs. It offers measurement functions such as channel power, adjacent channel suppression, occupied bandwidth, XdB bandwidth, phase noise, and IM3.



- **IQ Streaming Mode**

This mode provides time domain and spectrum view of IQ waveform, DDC function and AM/FM demodulation function, and delivers modulation depth and modulation frequency offset test.





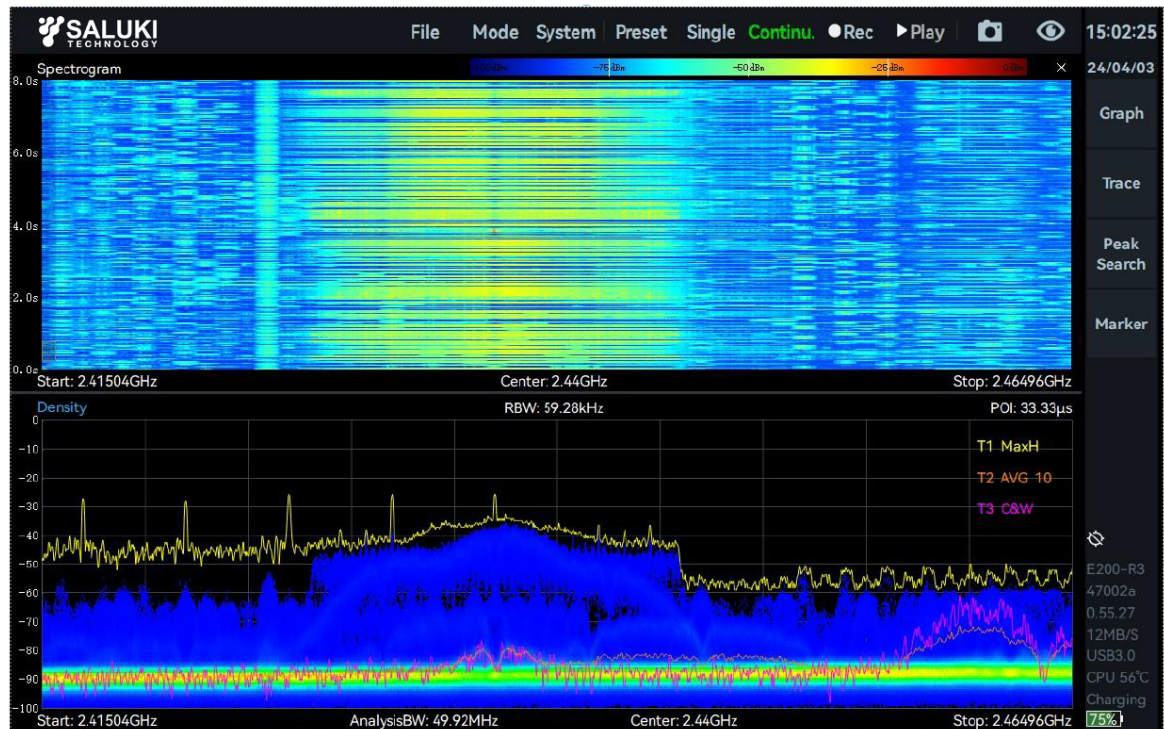
- **Power Detection Mode (Zero Span)**

This mode provides power time diagram (PvT) and its scaling, timing trigger, level trigger and other triggers.



- **Real-time spectrum Analysis mode**

This mode provides spectrum, probability density graph, waterfall graph and other measurement graphs. It offers timing trigger, level trigger and other triggers.



## Technical Specifications \* (typical value)

Test basis	Hardware Version: R2	API: 0.50.1	FPGA: 0.50.0	MCU: 0.50.2	SAS4: 4.50.40
Frequency					
Frequency Range	9 kHz to 9.5 GHz				
Initial Frequency Accuracy	<1 ppm, supporting program manual correction				
Reference Clock	Internal or external, program-controlled switching Internal TCXO aging<1 ppm/year, temperature drift<1 ppm Internal OCXO (option): temperature drift <0.15 ppm GNSS disciplined OCXO (option): <0.1 ppm (lock), <0.3 ppm (keep)				
Spectrum Purity					
SSB Phase Noise	dBc/Hz				
Carrier Frequency	1 GHz	3 GHz	6 GHz	9 GHz	
1 kHz	-95.2	-96.6	93.19	-91.5	
10 kHz	-101.6	-102.6	-101.6	-98.5	
100 kHz	-100.6	-103.9	-103.2	-99.7	
1 MHz	-120.9	-121.8	-120.3	-116.2	
10 MHz	-134.2	-133.5	-134.2	-131.4	
Residual Response Spurious rejection off dBm RBW =1 kHz Positive Peak Detector	Frequency Range	R.L.=0 dBm		R.L.=-20 dBm	
	9 kHz to 1.0 GHz	< -83		< -110	
	1.0 GHz to 3.0 GHz	< -83		< -92	
	3.0 GHz to 9.0 GHz	< -90		< -100	
Image Frequency Suppression	100 kHz to 3.0 GHz	>90 dBc (spurious rejection off), >90 dBc (spurious rejection on)			
	3.0 GHz to 9.5 GHz	>60 dBc (spurious rejection off), >90 dBc (spurious rejection on)			
IF rejection (R.L.=0 dB)	>90 dBc (spurious rejection on), >80 dBc (spurious rejection off)				
Local Oscillator Related Spurious	<-65 dBc (Offset Center Frequency $\pm(N/M)*125$ MHz, N/M = 1,2,3,4,5...)				
Input Related Spurious	<-75 dBc (spurious rejection on), <-50 dBc (spurious rejection off)				
Linearity					
IIP3 (dBm)	1 GHz	3 GHz	9 GHz		
R.L.= 20 dBm	48.1	45.1	40.5		
R.L.= 0 dBm	26.7	23.5	21.2		
R.L.= -20 dBm	5.1	2.6	-0.9		
R.L.= -50 dBm	-21..2	-22.6	-22.9		
Signal Processing					
Analysis Bandwidth	Maximum 100 MHz, Decimate Factor: 1				
IQ Data	122.88 MSPS, decimate factor: 1,2,4,8,16,32,64,128,256,512,1024,2048,4096 supported (FPGA)				
IQ Data Cache Depth	128 MBytes				
	When the data generation rate is smaller than the EMMC write rate, the cache depth depends only on the EMMC capacity				
External Trigger Response	Maximum response frequency 500 times/sec				
Analog IF Output	Supporting, 307.2 MHz $\pm$ 50 MHz				
Amplitude					
Maximum safe input power (CW)	23 dBm	50 MHz to 9.5 GHz and the preamplifier off (R.L. $\geq$ 0 dBm)			
	10 dBm	100 kHz to 50 MHz or preamplifier on (R.L. <0 dBm)			

Maximum DC Voltage	± 12 VDC			
Display Range	DANL to 23 dBm			
Amplitude Accuracy	± 2.0 dB			
IF in band spectrum ripple	± 2.0 dB			
Reference level	-50 dBm to 23 dBm			
RF Preamplifiers	Converting bands (frequency ≥ 50 MHz) are equipped with preamplifier that can be set as automatically turn on or forcibly turn off			
Displayed Average Noise Level (DANL) dBm/Hz RBW = 10 kHz RMS detector	Frequency Range	R.L.= 0 dBm (IFGainGrade = 2)	R.L.=-20 dBm (IFGainGrade = 2)	R.L.=-50 dBm (IFGainGrade = 2)
	9 kHz	-90.1	-105.7	-115.6
	100 kHz to 100 MHz	-134.2	-146.3	-150.9
	1 GHz	-134.8	-150.3	-169.5
	100 MHz to 3GHz	-131.0	-145.7	-165.1
	3 GHz to 6GHz	-136.2	-150.2	-164.6
	6 GHz to 9.5GHz	-135.4	-148.9	-157.4
<b>Standard Spectrum Analysis</b>				
Detector	Positive peak, Negative peak, Sampling, Average, RMS, Max Power			
RBW	1 Hz to 10 MHz			
VBW	1 Hz to 10 MHz			
Trace Function	Sample, Positive Peak, Negative Peak, Local average, Maximum hold, Minimum hold, Average			
Data Chart	SAStudio4 software provides regular spectrum, waterfall chart, and historical trace			
Measurements	Phase noise, Channel power, Occupied bandwidth, X dB bandwidth, Adjacent channel suppression, IM3			
Sweep speed - Standard Spectrum Analysis	12 THz/s	FPGA	RBW≥1 MHz, B-Nuttal window, spurious rejection: Bypass	
	564.4 GHz/s	FPGA	RBW=250 kHz, B-Nuttal window, spurious rejection: Standard	
	65.2 GHz/s	FPGA	RBW=30 kHz, B-Nuttal window, spurious rejection: Bypass	
	2.7 GHz/s	CPU	RBW=1 kHz, B-Nuttal window, spurious rejection: Bypass	
<b>Detection Analysis/Zero Span</b>				
Highest Time Resolution	8 ns			
Maximum Analysis Bandwidth	100 MHz			
Detector	Positive peak, Negative peak, Sampling, Average, RMS, Max Power			
<b>Real Time Spectrum Analysis</b>				
FFT Analysis	Variable point FFT engine implemented by FPGA. frame rate compression and trace detection are supported. There is strictly no gap and overlap between FFT frames			
	FFT refresh rate = $10^9 \text{ ns} / (N \cdot D \cdot 8 \text{ ns})$ ; POI = $2 \cdot N \cdot D \cdot 8 \text{ ns}$ N is the number of FFT points (2048,1024,512,256,128,64,32), D is the decimate factor (1,2,4,8...)			
	Typical Settings	FFT Refresh Rate	POI	
	N = 2048, D = 1	122,070 times/sec	16.384 us	
	N = 32, D = 1	3,906,250 times/sec	0.512 us	
Real-time Analysis BW	100 MHz			
Window Function	B-Nuttall, FlatTop			
RBW	14.73 MHz to 3.59 kHz (FlatTop); 7.81 MHz to 1.90 kHz (B-Nuttall); 13 grades for each window type			
Amplitude Resolution	0.75 dB			

General information		
Input and output	Power Supply	USB PD (20 V)
	USB interface	USB3.0 Type-C*1, USB2.0 Type-C*1, USB2.0 Type-A*1
	Video and audio interface	Micro HDMI*1 (Support for extended display), 3.5mm Headphone port*1
	RF input	2.92 (F), Input impedance 50 Ω
	External reference clock input	MMCX (F)(1), amplitude≥1.5 Vpp, input impedance 330 Ω
	External reference clock output	Integrated in MUXIO, 3.3 V CMOS, programmable on/off
	External trigger input	Integrated in MUXIO, 3.3V CMOS, input: high impedance
	External trigger output	Integrated in MUXIO, 3.3V CMOS
	Analog IF Output	MMCX (F)(2), maximum output power -25 dBm, output impedance 50 Ω
Display	IPS LCD 1280x800, 10.1inch multi-touch screen	
EMMC storage	16 GB	
Size (D * W * H) and weight	246x76x33 mm, ≤1.3kg 259.5x184.5x45.5 mm, ≤1.5 kg (including protective shell and bracket)	
Power Consumption	Typical 25 W	
Power adapter	100-240 V, 50/60 Hz USB PD	
Operating Temperature	0 to 50 °C	
Storage Temperature	-20 to 70 °C	
Packaging and Accessories	Standard	<ol style="list-style-type: none"> <li>1. Spectrum analyzer with protective shell*1</li> <li>2. Power adapter*1</li> <li>3. Power cable*1</li> </ol>
	Optional Accessories	<ol style="list-style-type: none"> <li>1. Hard transport case;</li> <li>2. N-type 18G test cable;</li> <li>3. 50G test cable;</li> <li>4. N-3.5mm adapter 18GHz;</li> <li>5. 2.4mm adapter;</li> </ol>

\*The typical values of the indicators are applicable for the following conditions: (1) Start up and warm up for 10 minutes; (2) Ambient temperature 25 °C; (3) standard spectrum sweep Spurious rejection off; (4) 100MHz bandwidth and IFGainGrade=2

No	Opt.	Explanation
01	Built-in OCXO reference clock	Providing a reference clock with better stability than the standard configuration, with a temperature drift of<0.15 ppm
02	Built-in premium GNSS	Providing improved positioning and timing capabilities.
03	Built-in GNSS disciplined OCXO reference clock	Providing GNSS disciplined reference clock and 1PPS