S5104 Series Radio Communications Test Set

Datasheet

Saluki Technology Inc.

The document applies to the radio communications test set of the following models:

- S5104B Radio Communications Test Set (300kHz - 1.05GHz).
- S5104C Radio Communications Test Set (300kHz - 3GHz).

Standard pack and accessories:

No.	Item
1	Main machine
2	User manual
3	Tri-core 220VAC power cord
4	N-BNC adapter
5	N-SMA adapter
6	TNC-SMA adapter

Options of the S5104 series radio communications test set in addition to standard accessories:

Part No.	Name
S5104-H01	Built-in lithium battery
S5104-S01	Software for vector signal generation and bit error rate measurement
S5104-S02	Software for vector signal demodulation and analysis
S5104-S03	Software for frequency-hopping signal generation
S5104-S04	Software for frequency-hopping signal analysis
S5104-S05	Software for dual-channel oscilloscope

Preface

Thank you for choosing S5104 radio communications test set produced by Saluki Technology Inc.

We devote ourselves to meeting your demands, providing you high-quality measuring instrument and the best after-sales service. We persist with “superior quality and considerate service”, and are committed to offering satisfactory products and service for our clients.

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Version

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Saluki Technology

Document Authorization

Product Quality Assurance

The warranty period of the product is 5 years from the date of delivery. The instrument manufacturer will repair or replace damaged parts according to the actual situation within the warranty period.

Product Quality Certificate

The product meets the indicator requirements of the document at the time of delivery. Calibration and measurement are completed by the measuring organization with qualifications specified by the state, and relevant data are provided for reference.

Quality/Settings Management

Research, development, manufacturing and testing of the product comply with the requirements of the quality and environmental management system.

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Content

1. Overview

Saluki S5104 Series Radio Communications Test Set, which is a multifunctional and portable model based on software radio architecture, integrates plentiful functions, like frequency-hopping signal generation and analysis, vector signal generation and demodulation analysis, analog modulation signal generation and demodulation analysis, audio signal generation and analysis, audio oscilloscope, automatic testing and so on. The tester is capable of major performance testes on transmit and receiving of radio communication equipment, measurement and analysis on feature parameters of RF, modulation, audio, and digit etc. Wide applications of the tester cover R&D, production, verification, maintenance and repair, and testing on radio communication equipment, including short-wave/ultra short-wave radio stations, data link systems, communication and surveillance satellites, radio relay equipment. Military mobile carriers with radio communication terminals like communication vehicles, surveillance vehicles, vessels and ships, as well as external field tests can use this tester conveniently.

Key Features

- Multiple RF testing functions: sweep spectrum analysis, broadband and narrow band power measurement, frequency error measurement, RF signal source;
- Analog standard communication testing: AM, FM, SSB signal generation and demodulation analysis. Equipped with graphic display of demodulation audio, SINAD, SNR, distortion degree, modulation rate and other measurement functions. The built-in speaker outputs demodulation voice in real-time. Modulation signal generator and modulation source support external audio and microphone;
- Digital standard communication testing (option): 10MHz bandwidth digital vector signal generation and analysis, bit error rate measurement, with real-time output interface of digital demodulation;
- Frequency-hopping testing (option): 60MHz transient bandwidth frequency-hopping signal generation and analysis. Frequency-hopping analysis supports measurements types like waterfall chart and frequency-time. Single capture lasts 1.3s at the bandwidth of 60MHz and the time resolution is 10ns;
- Audio signal testing: audio signal generation and analysis, the max. audio input level reaches 30Vrms (high impedance), the max. audio output level reaches 7Vrms (high impedance); capable of measurements on frequency, level, SINAD, SNR and distortion degree; audio generation supports dual-tone output; individual adjustment is available for dual-tone frequency and amplitude, phase is adjustable relatively;
- Dual-channel oscilloscope (option)： DC - 4MHz;
- Auto testing software: on-line editing of DUT (device under testing) parameters, auto pilot testing, yield of testing reports and other functions. The PTT control interface regulates transmit and receiving of DUT;
- Built-in attenuator with high power: the max. input power is as high as 150W;
- Portable structure: external dimensions (without handles): W426×H222×D180mm, easy for carry-on and application;
- Diversified power supply modes: the standard configuration supports AC220V or DC24V, built-in lithium battery is available;
- Support network interface programming control;
- 10.4" large screen, resistor touch screen, English/Chinese interface, interface colors are free for your choice;
- Support simultaneous operations on multi-function windows, up to 4 windows can be operated at the same time.

1. 1. Definitions

Specification (Spec.)

Specifications describe the performance of parameters within the warranty of the instrument. Product specifications applies under the following conditions:

1) Two hours storage at ambient temperature(0-40℃) followed by 30 minutes warm-up operation

2) Specified environmental conditions met

3) Instrument is within its calibration cycle.

4) The specification listed in the datasheet includes measurement uncertainties.

Data in this document are Spec. unless otherwise noted.

Typical (typ.)

Typical data is not guaranteed by instrument warranty. It describes additional product performance information that 80 percent of the units exhibit. Typical data only valid at 25℃. Typical performance does not include measurement uncertainty.

Nominal(nom.)

Nominal values indicate expected performance, or describe product performance that is useful in the application of the product, but are not covered by the product warranty.

2. Specifications

2. 1. RF Signal Generation

Freq. range	S5104B: 1MHz - 1.05GHz (up to 100kHz) S5104C: 1MHz - 3GHz (up to 100kHz)
Freq. resolution	1Hz
Output level range	GEN: -120dBm to +5dBm(max. modulation 0dBm) T/R interface: -130dBm to -35dBm
Level resolution	0.1 dB
Level accuracy	±1.5dB(≥-110dBm), ±2.0dB(<-110dBm)
Single sideband phase noise	f≤1.05GHz: -93dBc/Hz@20kHz
	F>1.05GHz: -90dBc/Hz@20kHz
Harmonic	Better than -25dBc (>1MHz, ≤0dBm)
Non-harmonic	Better than -35dBc (>1MHz, +5dBm output)
Internal analog modulation source	Sine, square wave, triangle, saw-tooth, dual-tone (analog pilot)
Internal FM	Max. frequency offset: 150kHz
	Accuracy: ±5% (frequency offset 5kHz - 150kHz)
	Modulation rate: 20Hz - 20kHz
Internal AM	Modulation range: 0 - 100%
	Accuracy: ±5% (relative value, depth 10% - 90%)
	Modulation rate: 20Hz - 20kHz
Internal SSB	Modulation options: USB, LSB
	Modulation rate: 300Hz - 5kHz
External FM/AM/SSB	Modulation rate: 20Hz - 15kHz (FM, AM), 300Hz - 3kHz (SSB)
Vector signal generation (Option)	Modulation type: 2ASK, 2FSK, GMSK, BPSK, QPSK, 8PSK, 16QAM
	Max. modulation bandwidth: 10MHz
	Max. symbol rate: 5MHz
	Digit source: PRBS, whole 0, whole 1, 0 and 1 alternation, external
	Digital filter: RC, RRC, GAUSS
	EVM: ≤2%rms (symbol rate≤1MHz), ≤3%rms (symbol rate>1MHz)

Frequency-hopping signal generation (Option)	Max. frequency-hopping transient bandwidth: 60MHz
	Max. non-repetitive hopping graphic length: 4000
	Frequency agility time: <10μs
	Max. hopping rate: 100,000 times/sec
	Hopping type: internal stepping repetition, external frequency control

2. 2. Broad Band Power Measurement

Frequency range	S5104B: 400kHz - 1.05GHz S5104C:400kHz - 3GHz
Measurement range	0.1mW - 100mW (ANT interface), 100mW - 150W(T/R interface, >40W, continuous input for a single time should not be longer than 1 min, interval between two consecutive input should not be shorter than 2 min.)
Measurement accuracy	15% (≤120W, CW or frequency modulation)

2. 3. Narrow Band Power Measurement

Frequency Range	S5104B: 300kHz - 1.05GHz (low frequency depends on small IF bandwidth)
	S5104C: 300kHz - 3GHz (low frequency depends on small IF bandwidth)
Measurement range	+51dBm to -40dBm (T/R interface, low frequency depends on small IF bandwidth)
	+10dBm to -80dBm(ANT interface, low frequency depends on small IF bandwidth)
Measurement accuracy	±2dB
Receiving bandwidth	6.25, 8.33, 10, 12.5, 25, 30, 100, 300kHz

2. 4. Frequency Error Meter

Frequency Range	S5104B: 300kHz - 1.05GHz (low frequency depends on small IF bandwidth)
	S5104C: 300kHz - 3GHz (low frequency depends on small IF bandwidth)
Accuracy	Frequency standards ±1Hz

2. 5. Audio Signal Generation

Waveform	Sine, square wave, triangle, saw-tooth
Signal type	Single-tone, dual-tone

Frequency	20Hz - 20kHz (sine), 20Hz - 4kHz (square wave, triangle, saw-tooth)
Frequency resolution	0.1Hz
Level range	1mV - 7Vrms (10kΩ load)
Level accuracy	±5% (10kΩ load ≥10mVrms)

2. 6. Audio Signal Analysis

Input impedance	150Ω , 600Ω , high impedance
Max.input level	30Vrms (high impedance)
Audio filter	Low-pass: 300Hz, 5kHz, 15kHz, 20kHz
	Band-pass: 0.3-3.4kHz, 0.3-5kHz, 0.3-15kHz, 0.3-20kHz
Frequency meter	Frequency range: 20Hz - 20kHz
	Input level: 20mV - 30Vrms
	Resolution: 0.1Hz
	Precision: 1Hz
Level meter	Frequency range: 20Hz - 20kHz
	Input level: 1mV - 30Vrms
	Unit: V, dBV, dBm
	Precision: ±5 (High impedance, ≥10mVrms)
SINAD meter	Measurement range: 3 - 60dB
	Precision: ±1.0dB (SINAD>3dB, ≤40dB, 5kHz low-pass)
	Frequency range: 300Hz - 5kHz
	Input level: 0.1 - 30Vrms
Distortion meter	Measurement range: 0 - 90%
	Precision: <±0.5% (distortion degree<10%), <±1.0%
	Frequency range: 300Hz - 5kHz
	Input level: 0.1 - 30Vrms
SNR meter	Measurement range: 3 - 60dB
	Precision: ±1.0dB (SNR>20dB, ≤40dB)

	Frequency range: 300Hz - 5kHz
	Input level: 0.1 - 30Vrms

2. 7. Sweep Spectrum Analyzer

Frequency range	S5104B: 100kHz - 1.05GHz S5104C: 100kHz - 3GHz
Sweep width	0Hz - whole frequency bands
Level precision	±1.5dB
Min.average noise level displayed	Better than -125dBm (ANT interface), -75dBm (T/R interface)
Resolution bandwidth	30Hz - 3MHz (1-3 stepping)

2. 8. Demodulation And Analysis Of Analog Modulation Signals

Frequency range	S5104B: 300kHz - 1.05GHz (low frequency depends on small IF bandwidth)
	S5104C: 300kHz - 3GHz (low frequency depends on small IF bandwidth)
Signal format	FM, AM, SSB
Demodulation	6.25, 8.33, 10, 12.5, 25, 30, 100, 300kHz
Demodulation audio filter	Low-pass: 300Hz, 5kHz, 15kHz, 20kHz
	Band-pass: 0.3-3.4kHz, 0.3-5kHz, 0.3-15kHz, 0.3-20kHz
Frequency range of demodulation counter	20Hz - 20kHz
Demodulation counter resolution	0.1Hz
FM	Frequency offset range: 0 - 150kHz
	Precision: ±5% (frequency offset range 5-150kHz, modulation rate 1kHz)
	Modulation rate: 20Hz - 20kHz
AM	AM depth range: 0 - 100%
	Precision: ±5% (relative value, modulation range 30% - 90%, modulation rate 1kHz)
	Modulation rate: 20Hz - 20kHz
Sensitivity	≤-100dBm (10dB SINAD, ANT interface)

2. 9. Demodulation And Analysis Of Vector Signals (Option)

Frequency range	S5104B: 300kHz - 1.05GHz (low frequency depends on small IF bandwidth)
	S5104C: 300kHz - 3GHz (low frequency depends on small IF bandwidth)
Signal format	GMSK, BPSK, QPSK, 8PSK, 16QAM
Demodulation bandwidth	10kHz - 10MHz
Max.symbol rate	5MHz

2. 10. Frequency-hopping Signal Analysis (Option)

Filter	RC, RRC, GAUSS
Transient bandwidth	60MHz, 30MHz, 15MHz, 7.5MHz, 3.75MHz, 1.875MHz
Capture storage depth	8GB
Analysis domain	Time-frequency (modulation domain), time-amplitude, time-spectrum (waterfall chart), spectrum at random time
Min.time resolution	10ns

2. 11. Dual-channel Oscilloscope (Option)

Frequency range	DC - 4MHz
Vertical scale	10mV - 10V/mark (1, 2, 5 stepping)
Horizontal scale	1us - 1s/mark (1, 2, 5 stepping)
Coupling type	DC, AC
Input impedance	1MΩ

2. 12. Digital Sequence Generation And Bit Error Rate Measurement (Option)

Digital format	PN3, PN5, PN9, PN11
Baud rate	300bps - 1Mbps (BPSK, GMSK, 2FSK, 2ASK)
Bite error rate measurement range	0.1 - 0.000001

2. 13. General

Internal time-base	Frequency: 10MHz; Aging rate: 1×10-7/year;

	Temperature stability: ±0.05ppm (0 - 50℃)
Working Temperature	0℃ to +50℃
Storage Temperature	-40℃ to +70℃
Dimensions	External dimensions (without handles and auxiliaries): W×H×D=426×222×180mm
Weight	≤12kg
Power supply	Internal AC: 220V±10%, frequency 50Hz±5%; External DC: 24V±2V (16V is Acceptable); Built-in and rechargeable battery: ≥11000mAh (option)
Consumption	<100W
Cooling type	Internal air cooling
Interface	RF: GEN interface(TNC), T/R interface(type N), ANT interface(TNC)
	BNC: audio input, audio output, oscilloscope input etc
	Others: network port (support remote control), 26-core testing bus interface, USB-host interface etc.

2. 14. Compliant

2. 14. 1. CE

CE

- EMC

Complies with the requirements of the **EC EMC** directives.

Test Standards:EN 61326

- Safety

Complies with **EC LVD** Directive.

Test Standard:**EN61010-1**

2. 14. 2. ISO

- Manufacturing

This instrument is manufactured in an ISO-9001 registered facility

- End of Document -