S1103 Series Synthesized Sweep Generator

(250kHz - 20GHz / 40GHz / 50GHz / 67GHz)

Datasheet

Saluki Technology Inc.

The document applies to the synthesized sweep signal generators of the following models:

- S1103A synthesized sweep signal generator (250kHz-20GHz).
- S1103B synthesized sweep signal generator (250kHz-40GHz).
- S1103C synthesized sweep signal generator (250kHz-50GHz).
- S1103D synthesized sweep signal generator (250kHz-67GHz).

Options of the S1103 series synthesized sweep signal generator in addition to standard accessories:

- S1103-001, 115dB programmable step attenuator, stepping by 5dB(Only for S1103A, S1103B).
- S1103-002, 90dB programmable step attenuator, stepping by 10dB (Only for S1103C, S1103D).
- S1103-003, Aluminum carrying case.
- S1103-004, Cabinet installation kit.

Preface

Thank you for choosing S1103 synthesized sweep signal generator 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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Saluki Technology

Document Authorization

The information contained in this document is subject to change without notice. The power to interpret the contents of and terms used in this document rests with Saluki.

Product Quality Assurance

The warranty period of the product is 36 months 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 S1103 is a series of microwave synthesized sweep generators with top-level performance. Integrated with a dual-channel internal modulation synthesized sweep generator and pulse generator, S1103 can also provide AM, FM, ØM and pulse modulated signals.

Saluki S1103 is designed for comprehensive performance evaluation of electronic systems. Meanwhile, it can also be used as a local oscillator for transmitters and receivers.S1103 is widely used in aviation, spaceflight, radar, communication, navigation equipment etc.

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. Frequency & Sweep

2. 1. 1. Frequency Range

Model	Frequency Range
S1103A	250kHz - 20GHz
S1103B	250kHz - 40GHz
S1103C	250kHz - 50GHz
S1103D	250kHz - 67GHz

2. 1. 2. Frequency Resolution

Frequency Resolution	0.001Hz

2. 1. 3. Frequency Band (Nom.)

Band	N	Frequency Range
1	1/8	250kHz≤f≤250MHz
2	1/16	250MHz≤f≤500MHz
3	1/8	500MHz≤f≤1GHz
4	1/4	1GHz≤f≤2GHz
5	1/2	2GHz≤f≤3.2GHz
6	1	3.2GHz≤f≤10GHz
7	2	10GHz≤f≤20GHz
8	4	20GHz≤f≤40GHz
9	8	40GHz≤f≤67GHz

2. 1. 4. CW Switching Speed

Frequency Switching Time	<40ms

2. 1. 5. Aging Rate

Aging Rate	2 x 10^{-7} /year

2. 1. 6. Sweep Mode

Sweep Modes	Step Sweep / List Sweep / Analogue Ramp Sweep / Power Sweep

List Sweep Point	2 - 1601
List Sweep Dwell Time	1ms - 60s

2. 1. 7. Trigger

Triggering	Auto, external, single, or GPIB

2. 1. 8. Settling Time

Frequency	<30ms
Amplitude	<5ms

2. 1. 9. Sweep Speed

	Frequency	Figure
Max. Analogue Sweep Speed	250kHz ≤ f ≤ 500MHz	25MHz/ms
	500MHz ≤ f ≤ 1GHz	50MHz/ms
	1GHz < f ≤ 2GHz	100MHz/ms
	2GHz < f ≤ 3.2GHz	200MHz/ms
	3.2GHz < f	400MHz/ms

2. 1. 10. Sweep Time

Sweep time	10ms - 200s
Resolution	1ms

2. 1. 11. Sweep Accuracy

Sweep Accuracy	0.05% x Span

2. 2. Amplitude Specifications

2. 2. 1. Output Power Level (for full frequency range)

Model	Standard	With Programmable Step Attenuator (Option)
S1103A	-20dBm - +13dBm	-120dBm - +11dBm (Option 001)
S1103B	-20dBm - +10dBm	-120dBm - +8dBm (Option 001)
S1103C	-20dBm - +6dBm	-90dBm - +3dBm (Option 002)
S1103D	-20dBm - +6dBm	-90dBm - +3dBm (Option 002)

2. 2. 2. Output Power Accuracy

- Without Attenuator

	Frequency	>10dBm	+10~-10dBm	-10~ -20dBm
Output Power Accuracy (25±10℃) (Standard)	250kHz ≤ f ≤ 2GHz	±1.0dB	±1.0dB	±2.0dB(typ.)
	2GHz< f ≤20GHz	±1.2dB	±1.0dB	±2.0dB(typ.)
	20GHz< f ≤40GHz		±1.2dB	±1.8dB(typ.)
	40GHz< f ≤50GHz		±1.5dB	±2.2dB(typ.)
	50GHz< f ≤67GHz		±1.8dB	±2.5dB(typ.)

- With Attenuator (Option 001,002)

	Frequency	> +10 dBm	+10~-10dBm	-10~ -60dBm	-60~-90dBm
Output Power Accuracy (25±10℃) (With Programmable Step Attenuator Option 001,002)	250kHz ≤ f ≤ 2GHz	±1.0dB	±1.0dB	±1.5dB	±1.8dB(typ.)
	2GHz< f ≤20GHz	±1.2dB	±1.0dB	±1.5dB	±2.0dB(typ.)
	20GHz< f ≤40GHz	/	±1.2dB	±1.8dB	±2.2dB(typ.)
	40GHz< f ≤50GHz	/	±1.5dB	±2.0dB	±2.5dB(typ.)
	50GHz< f ≤67GHz	/	±1.8dB	±2.5dB	±3.0dB(typ.)

2. 2. 3. Power Resolution

Power Resolution	0.01dB

2. 2. 4. Amplitude Switching Time

Amplitude Switching Time	<5ms

2. 2. 5. Reverse Power Protection

Reverse Power Protection	0.5W, 0Vdc

2. 2. 6. SWR

- No attenuator

SWR	250KHz - 2GHz	≤ 1.6
	2GHz - 20GHz	≤ 1.8
	20GHz - 40GHz	≤ 2.0
	40GHz - 67GHz	≤ 2.2

- 10dB attenuator (Typ.)

SWR （10dB Attenuator)	250KHz - 2GHz	≤ 1.5
	2GHz - 20GHz	≤ 1.7

	20GHz - 40GHz	≤ 1.9
	40GHz - 67GHz	≤ 2.0

2. 3. Signal Purity Specifications

Following harmonic specifications are test on Max. power output at each frequency range.

2. 3. 1. Harmonics

Frequency Range	Harmonics
250kHz ≤ f ≤ 10MHz	≤ -28dBc (Typ.)
10MHz ≤ f ≤ 1GHz	≤ -28dBc
1GHz < f ≤2GHz	≤ -30dBc
2GHz < f ≤ 20GHz	≤ -55dBc
20GHz < f ≤ 40GHz	≤ -50dBc
40GHz < f ≤ 50GHz	≤ -45dBc

2. 3. 2. Sub-harmonics

Frequency Range	Harmonics
250kHz ≤ f ≤ 10GHz	None
10GHz < f ≤ 20GHz	<-55dBc
20GHz < f ≤ 67GHz	<-50dBc

2. 3. 3. Non-Harmonic

Frequency Range	Harmonics
250kHz ≤ f ≤ 2GHz	-65dBc
2GHz ≤ f ≤ 20GHz	-56dBc
20GHz < f ≤ 40GHz	-50dBc
40 GHz < f ≤67GHz	-44dBc

2. 3. 4. Broadband Noise (>10MHz frequency offset)

250kHz - 3.2GHz	<140Bc/Hz
3.2GHz - 20GHz	<148Bc/Hz
20GHz - 67GHz	<135Bc/Hz

2. 3. 5. SSB Phase Noise

	Carrier Frequency Offset	100Hz	1kHz	10kHz	100kHz
SSB Phase Noise (dBc/Hz)	250kHz ≤ f ≤ 250MHz	–101	–121	–130	–130
	250MHz < f ≤ 500MHz	–108	–126	–132	–132
	500MHz < f ≤ 1GHz	–101	–121	–130	–130
	1GHz < f ≤ 2 GHz	–96	–115	–124	–124
	2GHz < f ≤3.2GHz	–92	–111	–120	–120
	3.2GHz < f ≤ 10GHz	–81	–101	–110	–110
	10GHz < f ≤20GHz	–75	–95	–104	–104
	20GHz < f ≤40GHz	–69	–89	–98	–98
	40GHz < f ≤67GHz	–60	–83	–92	–92

2. 4. Modulation Specifications

2. 4. 1. Modulation Signal Generator

Modulation Type	amplitude modulation, frequency modulation, phase modulation	
Waveform	Sine, square, triangle, ramp, noise, double sine, swept sine	
Frequency Range	Sine wave, double sine, swept sine:	1Hz - 1MHz
	Square, triangle wave, sawtooth	1Hz - 100KHz
Frequency Resolution	1Hz	
Pulse Modulation	Pulse width	20ns - (42s-10ns)
	Pulse cycle	100ns - 42s,
	Resolution	10ns

2. 4. 2. Amplitude Modulation

10Mhz<f≤50GHz	Modulation depth	>90%
	AM width	(3dB, 30%modulation depth):DC - 100kHz
	AM Accuracy	<±3% (1KHz Modulation Rate, 30%modulation depth)
	AM distortion	<2% (1KHz Modulation Rate, 30%modulation depth)

2. 4. 3. Frequency Modulation

10Mhz<f≤50GHz	Max. Frequency Deviation		N×16MHz
	Accuracy (1KHz rate, 300Hz~3KHz Demodulation bandwidth, 1kHz<offset<N×800KHz,residual FM removed)		<±(5%×offset + 20Hz)
	Modulation rate (3dB Bandwidth)	Internal DC	DC - 100KHz
		Internal AC	100KHz - 1MHz
		External DC	DC - 100KHz
		External AC	100KHz - 10MHz
	Distortion (1KHz rate,1kHz<offset<N×800KHz, Total harmonic distortion)		<2%

2. 4. 4. Phase Modulation

Max. Phase Deviation	Modulation Band width 100kHz	N × 160rad
Accuracy (1KHz rate, 300Hz ~ 3kHz demodulation bandwidth, 1 rad <skew <N × 80rad, Modulation Bandwidth: 100kHz , residual PM removed)		<± (5% × offset + 0.01rad)
Modulation rate (3dB bandwidth)	Modulation Bandwidth 100kHz:	DC - 100kHz
	Modulation Bandwidth 1MHz	100kHz~1MHz (Typ.)

2. 4. 5. Pulse Modulation

Pulse on/ off ratio		>80dB	
Pulse modulation rise/fall time		500MHz - 20GHz	<15ns
		20GHz-67GHz	<20ns
Pulse repetition frequency		0Hz-10MHz	
Min. stable pulse width	ALC on	1μs	
	ALC off	50ns	

2. 5. Interfaces

2. 5. 1. Front Panel

- RF Output Port

S1103A	S1103B	S1103C	S1103D
3.5mm (M)	2.4mm (M)	2.4mm (M)	1.85mm (M)

- Other Ports

Description	Interface Type
External modulation signal input	BNC (F) 50ohm, damage level 5Vrms, 10 vp
Low frequency Output	BNC (F), output frequency 0.01Hz -1MHz, 40mVp - 4Vp
Pulse signal input	BNC (F) 2kohm
Pulse monitor signal output	BNC (F),50ohm
Pulse sync signal output	BNC (F),50ohm
USB port (for data record, software upgrade only)	USB 2.0

2. 5. 2. Rear Panel

- Telecommunication Ports

LAN (10base-T RJ45)	To be used for system upgrade, remote access, remote control
RS-232	
GPIB	

- Other Ports

Description	Interface Type
Stop sweep input/output	BNC (F) .damage level >5.5V, <-0.5V
External detection input	BNC (F), 1kohm, damage level >15V, <-15V
Trigger In	BNC (F), damage level >5.5V, <-0.5V
Trigger Out	BNC (F)
10MHz In	BNC (F), 50ohm, input signal frequency 10MHz ± 100Hz, 0 - 10dBm Damage Level >10V, <-5V
10MHz Out	BNC (F), 50ohm, signal level 0dBm ± 3dBm
Sweep Output	BNC (F), 0V - 10V
Z-axis blank/frequency marker Output	BNC (F)
Flyback Output	BNC (F) Damage level >5.5V, <-0.5V

2. 6. General

OS System	Vx Works
Screen	TFT-LCD
Dimension	426×133×510mm（without handles,feet）
	Standard Pack: 482×152×582mm（with handles,feet）
Weight	Approx. 20Kg
Operating Temperature	0- +40 ℃
Storage Temperature	-40℃ - +70℃
Temperature Stability	0.02dB/℃ @ 250kHz -3.2GHz 0.01dB/℃ @3.2GHz - 67GHz
Max.Power	300W
Power Supply	220V(±10%), 50Hz (±5%) AC

2. 7. Compliant

2. 7. 1. CE

- EMC

Complies with the requirements of the EC EMC directive 2014/30/EU with amendments.

Test Standards:

EN 61326-1:2013

EN 61000-3-2:2014

EN 61000-3-3:2013

- Safety

Complies with EC LVD Directive 2014/35/EU with amendment.

Test Standard

EN61010-1:2010

2. 7. 2. ISO

- Manufacturing

This instrument is manufactured in an ISO-9001 registered facility

- End of Document -