S3602E Vector Network Analyzer

Datasheet

Saluki Technology Inc.

The document applies to the vector network analyzers of the following models:

- S3602E vector network analyzer (10MHz-67GHz).

Options of the S3602 series vector network analyzer in addition to standard accessories:

- S3602E

Part No.	Name	Description
S3602E-201	2-ports, single source, with extended power range	The 2-ports test set with extended power range comes with a configurable test set, source and receiver attenuators at each port.. The source attenuators are 60 dB and the receiver attenuators are 35 dB.
S3602E-400	4-ports, dual source, base configuration	The 4-port configurable test set comes with two internal sources.
S3602E-401	4-ports, dual source, with extended power range (Need option 400)	The 4-ports test set with extended power range comes with a configurable test set, source and receiver attenuators at each port. The source attenuators are 60 dB and the receiver attenuators are 35 dB. (Option 400 required)
S3602B-402	Inter-modulation distortion application	Enable S3602 to set up and calibrate swept-IMD measurements of both amplifiers and frequency converters. (Option 400 required, for converter measurement Option S82 or S83 is required))
S3602E-008	Pulsed RF Measurements	Applicable for S Parameter Measurement under pulse conditions
S3602E-S10	Time Domain Measurement	Able to recognize and analyze the discontinuous location of the network, cable or fixture .
S3602E-S80	Frequency offset measurements	Applicable for frequency offset measurement, necessary for millimeter extenders.
S3602E-S82	Scalar calibrated converter measurements (Need Option 400)	Enable S3602 for the converter scalar measurement (Option 400 required). Converter scalar measurement needs power sensor/power meter. Power sensor/power meter is not covered in this option
S3602E-S83	Vector calibrated converter measurements (Need Option 400)	Enable S3602 for the converter vector/scalar measurement (Option 400 required). Converter vector measurement needs calibration and reference mixers. They are not covered in this option.Converter scalar measurement needs power sensor/power meter. Power sensor/power meter is not covered in this option
S3602E-S84	Embedded LO measurements (Need Option 400)	Enable S3602 for the embedded LO frequency converter measurement (Option 400 required)
S3602E-S86	Gain compression application	Enable S3602 for the gain compression measurement of amplifier

Part No.	Name	Description
SAV31123A	1.85mm Calibration kit	Applicable for Whole-Machine Calibration
FF0CN0CM025.0	1.85mm/1.85mm Test Cable (Male DUT end)	Applicable for Whole-Machine Measurement. Cable is manufactured by Gore.
FF0CN0CL025.0	1.85mm/1.85mm Test Cable (Female DUT end)	Applicable for Whole-Machine Measurement. Cable is manufactured by Gore.
SCAVNA67FM-(1.85/1.85)	1.85mm/1.85mm Test Cable (Male DUT end)	Applicable for Whole-Machine Measurement
SCAVNA67FF-(1.85/1.85)	1.85mm/1.85mm Test Cable (Female DUT end)	Applicable for Whole-Machine Measurement

Preface

Thanks for choosing S3602 vector network analyzer 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

S3602 Series VNA is a top level VNA with excellent specifications. Its frequency ranges from 10MHz to 67GHz. With Saluki frequency extension modules, S3602 can reach up to 325GHz. S3602 has a wide dynamic range, low trace noise, flexible interfaces and friendly UI.

S3602 series VNA can be universally implemented in fields including transmission/reception module measurement, dielectric material property measurement, microwave pulse characteristic measurement and photoelectric property measurement; It is a necessary instrument in the scientific research, production process of systems like radar, communication and navigation.

This document will show technical specifications of S3602E(10MHz - 67GHz).

Definitions

Instrument specifications listed in this datasheet applies to all different configurations S3602 VNA unless options are clearly noted.

Specification (Spec.)

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

- 90 min warming up
- Environmental temperature of 25℃ (± 5℃) with less than 1℃ deviation from the calibration temperature
- Specifications include 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.

Calibration Kit and Ecal Modules

Corrected system in this document is calibrated with following calibration kit:

- SAV31123A 1.85mm Mechanical Calibration Kit

2. Specifications

2. 1. Frequency

Frequency Range	10MHz - 67GHz
Frequency Resolution	1Hz
Frequency Accuracy	±1×10^{-7}（23℃±3℃）

2. 2. Test Port Specification

2. 2. 1. Maximum Output Power

- 2-port configuration (Standard), signal source

Frequency	Filtering mode (dBm)	High-power mode (dBm)
10MHz - 50MHz	≥-1	≥+8
0.05GHz - 4GHz	≥0	≥+5
4GHz - 26.5GHz	≥+5	
26.5GHz - 35GHz	≥+7	
35GHz - 40GHz	≥+4	
40GHz - 67GHz	≥+5	

- 2-port configuration (Option 201), signal source

Frequency	Filtering mode (dBm)	High-power mode (dBm)
10MHz - 50MHz	≥-2	≥+7
0.05GHz - 4GHz	≥-1	≥+4
4GHz - 26.5GHz	≥+3	
26.5GHz - 35GHz	≥+4	
35GHz - 40GHz	≥+1	
40GHz - 67GHz	≥0	

- 4-port configuration(Option 400), 2 sources

Frequency	Port 1,3	Port 1,3	Port 2, 4 (dBm)
	Filtering mode (dBm)	High-power mode (dBm)	
10MHz - 50MHz	≥-1	≥+8	≥+8
0.05GHz - 4GHz	≥0	≥+5	≥+5
4GHz - 26.5GHz	≥+5		≥+5

Frequency	Port 1,3	Port 1,3	Port 2, 4 (dBm)
	Filtering mode (dBm)	High-power mode (dBm)	
26.5GHz - 35GHz	≥+7		≥+7
35GHz - 40GHz	≥+4		≥+4
40GHz - 67GHz	≥+5		≥+5

- 4-port configuration(Option 401, 402), 2 sources

Frequency	Port 1,3	Port 1,3	Port 2, 4 (dBm)
	Filtering mode (dBm)	High-power mode (dBm)	
10MHz - 50MHz	≥-2	≥+7	≥+7
0.05GHz - 4GHz	≥-1	≥+4	≥+4
4GHz - 26.5GHz	≥+3		≥+3
26.5GHz - 35GHz	≥+4		≥+4
35GHz - 40GHz	≥+1		≥+1
40GHz - 67GHz	≥0		≥0

2. 2. 2. Stable Minimum Output Power

Without Anttenuator	-25dBm
With Attenuator (Option 201,401)	-75dBm

2. 2. 3. Power Resolution

Power Resolution	0.01dB

2. 2. 4. Temperature Stability

Temperature Stability	0.06dB/℃

2. 2. 5. Power Accuracy

10MHz≤f≤13.5GHz	±2.0dB
13.5GHz<f≤40GHz	±3.0dB
40GHz - 67GHz	±4.0dB

2. 2. 6. Port Damage Level

Damage Level	+26dBm, 30Vdc

2. 2. 7. Power Sweep Range

Frequency	Figure(dB)
10MHz-500MHz	32
0.5GHz-4GHz	29
4GHz-26.5GHz	28
26.5GHz-35GHz	29
35GHz-40GHz	26
40GHz-67GHz	25

2. 2. 8. Power Linearity

Power Linearity (23℃±3℃)	±2.0dB

2. 2. 9. Port Harmonics Suppression

- 2-port configuration (Standard, Option 201)

	Frequency	Figure(dBc)
Port 1 Harmonic Suppression	0.01GHz-4GHz	≤-48 (≤ -51 typ.)
	4GHz-67GHz	≤-57 (≤ -60 typ.)
Port 2 Harmonic Suppression	0.01GHz-4GHz	≤-13 (≤ -15 typ.)
	4GHz-13.5GHz	≤-18 (≤-21 typ.)
	13.5GHz-67GHz	≤-57 (≤-60 typ.)

- 4-port configuration (Option 400, Option 401)

	Frequency	Figure(dBc)
Port 1,3 Harmonic Suppression	0.01GHz-4GHz	≤-48 (≤ -51 typ.)
	4GHz-67GHz	≤-57 (≤ -60 typ.)
Port 2,4 Harmonic Suppression	0.01GHz-4GHz	≤-13 (≤ -15 typ.)
	4GHz-13.5GHz	≤-18 (≤-21 typ.)
	13.5GHz-67GHz	≤-57 (≤-60 typ.)

2. 2. 10. Phase Noise

Frequency	1kHz Offset (dBc/Hz)	10kHz Offset (dBc/Hz)	100kHz Offset (dBc/Hz)	1MHz Offset (dBc/Hz)
10MHz - 500MHz	-95	-85	-85	-120
500MHz - 1GHz	-106	-112	-112	-127
1GHz - 2GHz	-101	-106	-106	-120
2GHz - 4GHz	-95	-100	-100	-113
4GHz - 8GHz	-89	-94	-94	-107
8GHz - 16GHz	-83	-88	-88	-103
16GHz - 32GHz	-76	-83	-82	-95
32GHz - 64GHz	-72	-82	-76	-91
64GHz - 67GHz	-65	-75	-70	-85

2. 3. Network Specifications

2. 3. 1. System Dynamic Range

Frequency range	Figure(dB)
10MHz - 1GHz	≥74
1GHz - 4GHz	≥90
4GHz - 10GHz	≥107
10GHz -26.5GHz	≥110
26.5GHz -35GHz	≥100
35GHz -50GHz	≥90
50GHz -67GHz	≥75

2. 3. 2. Noise Floor

- IF = 1Hz
- Averaging factor = 8

Frequency Range	Noise Floor (dBm)
10MHz - 1GHz	≤ -66
1GHz - 4GHz	≤ -85
4GHz - 10GHz	≤ -106
10GHz -13.5GHz	≤ -106
13.5GHz -26.5GHz	≤ -105
26.5GHz -35GHz	≤ -97
35GHz -40GHz	≤ -87
40GHz - 50GHz	≤ -85
50GHz -67GHz	≤ -70

2. 3. 3. Corrected System Performance

Measurement environmental temperature 23° ±3 °C, with < 1 °C deviation from calibration temperature.

Following test cables are used in this test:

FF0CN0CM025.0	1.85mm/1.85mm Test Cable (Male DUT end)	Applicable for Whole-Machine Measurement
FF0CN0CL025.0	1.85mm/1.85mm Test Cable (Female DUT end)	Applicable for Whole-Machine Measurement

Mechanical Calibration Kit SAV 31123A

- Effective Directivity

Frequency	Effective Directivity (dB)
0.01GHz-2GHz	≥+35
2GHz-13.5GHz	≥+41
13.5GHz-40GHz	≥+34
40GHz-67GHz	≥+32

- Effective Source Match

Frequency	Effective Source Match (dB)
0.01GHz-2GHz	≥+35
2GHz-13.5GHz	≥+31
13.5GHz-40GHz	≥+28
40GHz-67GHz	≥+25

- Effective Load Match

Frequency	Effective Load Match (dB)
0.01GHz-2GHz	≥+35
2GHz-13.5GHz	≥+41
13.5GHz-40GHz	≥+33
40GHz-67GHz	≥+30

- Reflection Tracking

Frequency	Reflection Tracking (dB)
0.01GHz-2GHz	±0.05
2GHz-13.5GHz	±0.06
13.5GHz-26.5GHz	±0.08
26.5GHz-67GHz	±0.10

- Transmission Tracking

Frequency	Transmission Tracking (dB)
0.01GHz-2GHz	±0.10
2GHz-13.5GHz	±0.11
13.5GHz-26.5GHz	±0.16
26.5GHz-67GHz	±0.20

2. 3. 4. Trace Noise

	Frequency range	Figure(dB rms)
Trace Noise Magnitude 1KHz IF bandwidth	10-50MHz	≤ 0.05
	50-500MHz	≤ 0.02
	0.5-13.5GHz	≤ 0.005
	13.5-26.5GHz	≤ 0.004
	26.5-67GHz	≤ 0.02

	Frequency range	Figure(deg rms)
Trace Noise Phase 1KHz IF bandwidth	10-50MHz	≤ 0.9
	50-500MHz	≤ 0.7
	0.5-13.5GHz	≤ 0.04
	13.5-26.5GHz	≤ 0.05
	26.5-67GHz	≤ 0.1

2. 4. Pulse Specifications

Pulse Width Setting Range	33ns - 60s	
Pulse transition time （10% - 90%）	30ns	
Pulse ON/OFF ratio	Frequency range	Figure(dB)
	0.01GHz-4GHz	64
	4GHz-67GHz	80

2. 5. General

IF Bandwidth	1MHz - 5MHz
Max. Sweep Point per Trace	32001
Max Window Qty	16
Max Channel Qty	64
Max Marker Qty	9

Saved Data format	Status (*.sta) Calibration settings (*.cal) Data (*.dat, *.cti, *.s1p, *.s2p, *.s3p, *.s4p) List (*.prn) Picture (*.bmp, *.jpg)
Magnitude Display Resolution	0.001dB/div
Phase display Resolution	0.01°/div
Reference Level Magnitude	-500 ~ +500dB
Input Reference Phase Range	-500 ~ +500°
Port Connector Type	1.85mm (M），50 Ω impedance
Measurement of Ports	2 port Standard；4-port with option 400
Peripheral Interface	8 x USB type B, 1 x USB type A
	GPIB
	VGA
	LAN
Operating System	Windows 7
Storage Capability	160G SSD
Screen	12.1 inch high resolution(1280*800) touch screen
Dimension (LxHxW)	463 × 281 × 690 （W x H x D)
Power	110V/220V±10%, 50Hz - 60Hz
Operating Temperature	0℃ - 50℃
Storage Temperature	-30℃ - 70℃
The Maximum Power Consumption	500W
Maximum Weight	50kg

2. 6. Compliant

2. 6. 1. CE

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. 6. 2. ISO

- Manufacturing

This instrument is manufactured in an ISO-9001 registered facility

- End of Document -