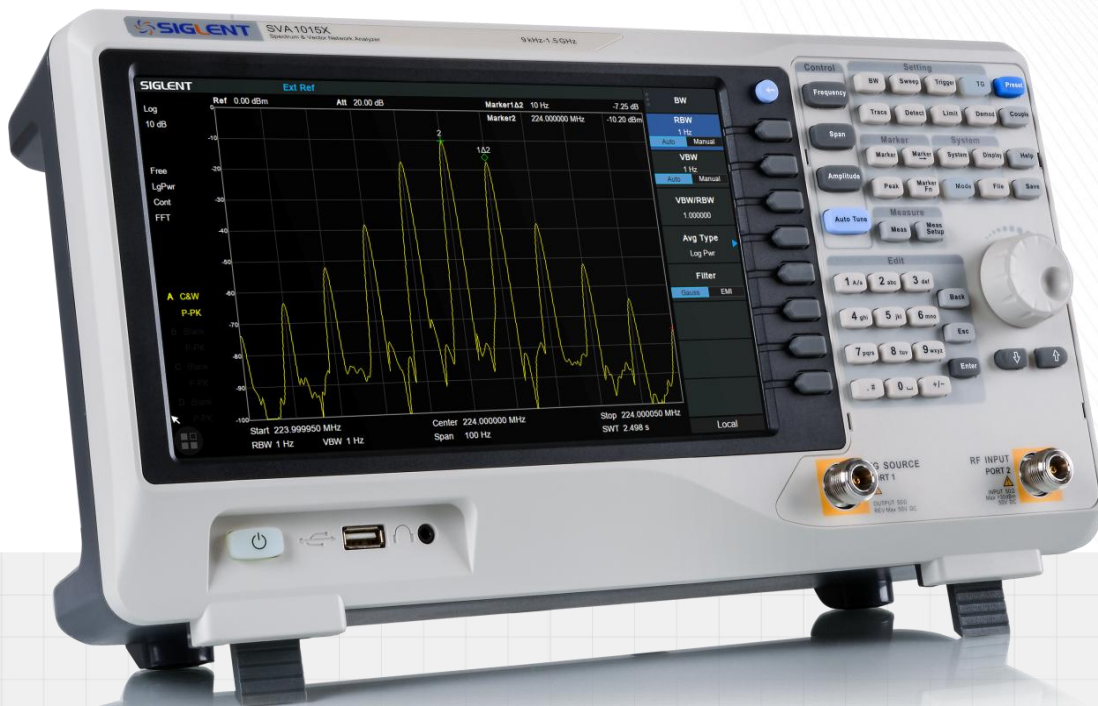


# SVA1000X Spectrum & Vector Network Analyzer



DataSheet DS0701X\_E02A



SIGLENT TECHNOLOGIES CO.,LTD

## General Description

The SIGLENT SVA1000X series spectrum & vector network analyzers are powerful and flexible tools for RF signal and network analysis.

With a frequency range to 3.2 GHz, the analyzer delivers reliable automatic measurements and multiple modes of operation: the base model are a spectrum analyzer and a vector network analyzer, optional functions include a distance-to-fault locator, a vector signal analyzer. Applications include broadcast monitoring/evaluation, site surveying, S-parameter measurement, cable and antenna testing, analog/digital modulation analysis, EMI pre-compliance test, research and development, education, production, and maintenance.

## Features and Benefits

- ◆ Spectrum Analyzer Frequency Range from 9 kHz up to 3.2 GHz
- ◆ Vector Network Analyzer Frequency Range from 100 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.)
- ◆ Level Measurement Uncertainty < 0.7 dB (Typ.)
- ◆ 1 Hz Minimum Resolution Bandwidth (RBW)
- ◆ Preamplifier Standard
- ◆ Tracking Generator Standard
- ◆ Distance To Fault (Opt.)
- ◆ Vector Signal Modulation Analysis (Opt.)
- ◆ EMI Filter and Quasi-Peak Detector Kit (Opt.)
- ◆ Advanced Measurement Kit (Opt.)
- ◆ 10.1 Inch Multi-Touch Screen , Mouse and Keyboard supported
- ◆ Web Browser Remote Control on PC and Mobile Terminals and File Operation

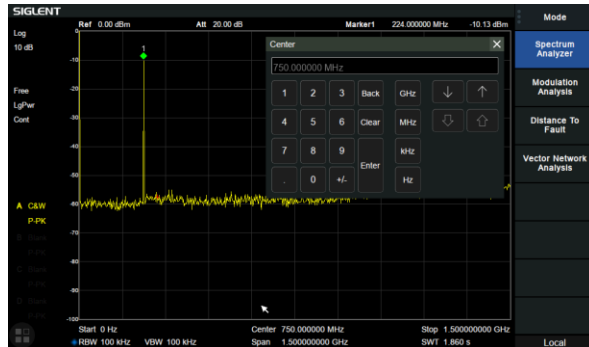
## Models and Main index

| Model                                   | SVA1015X                                                     | SVA1032X          |
|-----------------------------------------|--------------------------------------------------------------|-------------------|
| Spectrum Analyzer Frequency Range       | 9 kHz~1.5 GHz                                                | 9 kHz~3.2 GHz     |
| Vector Network Analyzer Frequency Range | 10 MHz~1.5 GHz                                               | 100 kHz~3.2 GHz   |
| Resolution Bandwidth                    | 1 Hz~1 MHz                                                   | 1 Hz~1 MHz        |
| Displayed Average Noise Level           | -156 dBm/Hz                                                  | -161 dBm/Hz       |
| Phase Noise                             | <-98 dBc/Hz                                                  | <-98 dBc/Hz       |
| Total Amplitude Accuracy                | < 1.2 dB                                                     | < 0.7 dB          |
| Tracking Generator                      | 5 MHz - 1.5 GHz                                              | 100 kHz - 3.2 GHz |
| Touch Screen                            | Multi Touch, Mouse and Keyboard supported                    |                   |
| Advanced Measurement                    | CHP, ACPR, OBW, CNR, Harmonic, TOI, Monitor                  |                   |
| Vector Network Analysis                 | Vector S11, Vector S21                                       |                   |
| Distance to Fault                       | VNA Timing Domain Analysis                                   |                   |
| Modulation Analysis                     | AM, FM, ASK, FSK, MSK, PSK, QAM                              |                   |
| EMI Test                                | EMI Filter and Quasi-Peak Detector, Log Scale and Limit Line |                   |
| Communication Interface                 | LAN, USB Device, USB Host(USB-GPIB)                          |                   |
| Remote Control Capability               | SCPI/Labview/IVI based on USB-TMC/VXI-11/Socket/Telnet       |                   |
| Remote Controller                       | NI-MAX, Web Browser, Easy Spectrum software, File Explorer   |                   |

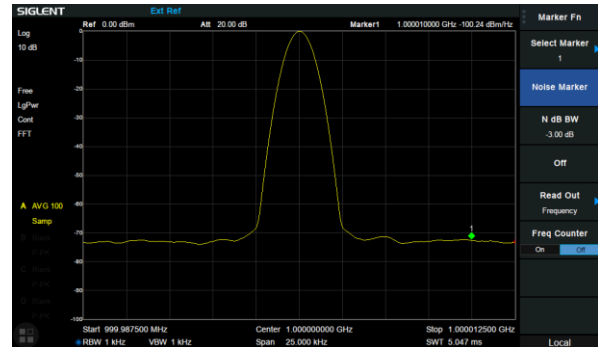
## Design Features

### Spectrum Analyzer Mode

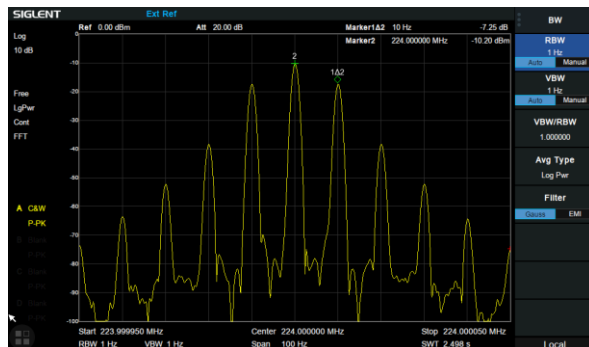
10.1 Inch Display with Multi-Touch Screen



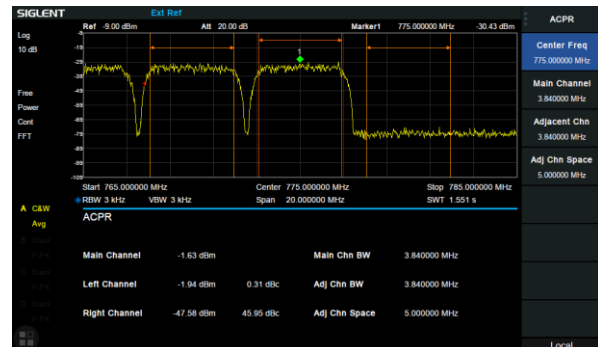
Phase noise <-98 dBc/Hz@1 GHz



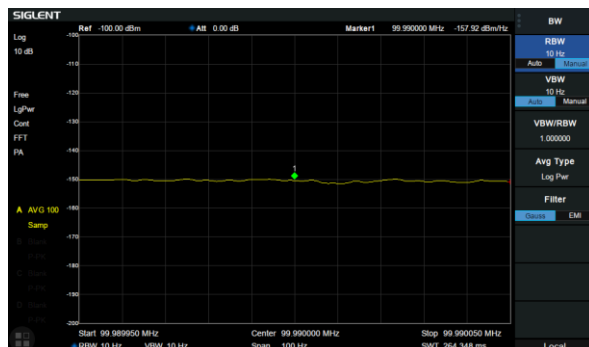
Minimum 1 Hz Resolution Bandwidth (RBW)



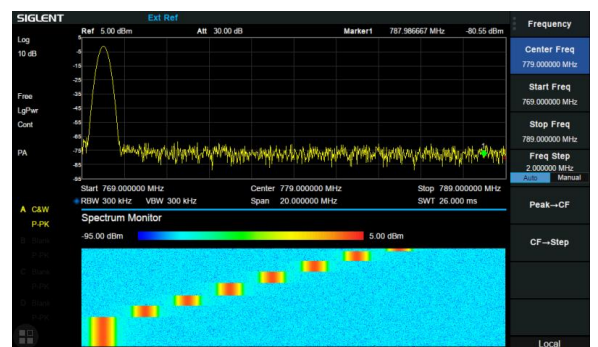
ACPR in Advanced Measurement Kit



-161 dBm/Hz Displayed Average Noise Level

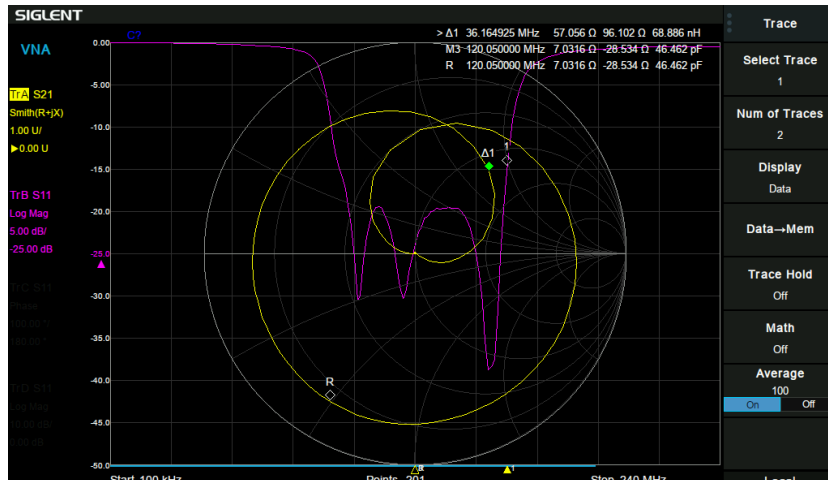


Monitor in Advanced Measurement Kit



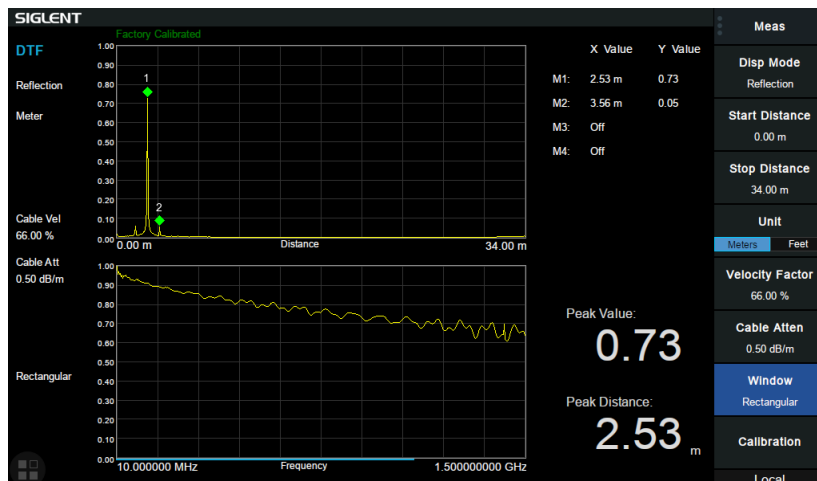
## Vector Network Analyzer Mode

100k-3.2GHz Vector S11 and S21 measurement, Multi Formats Overlay Display.



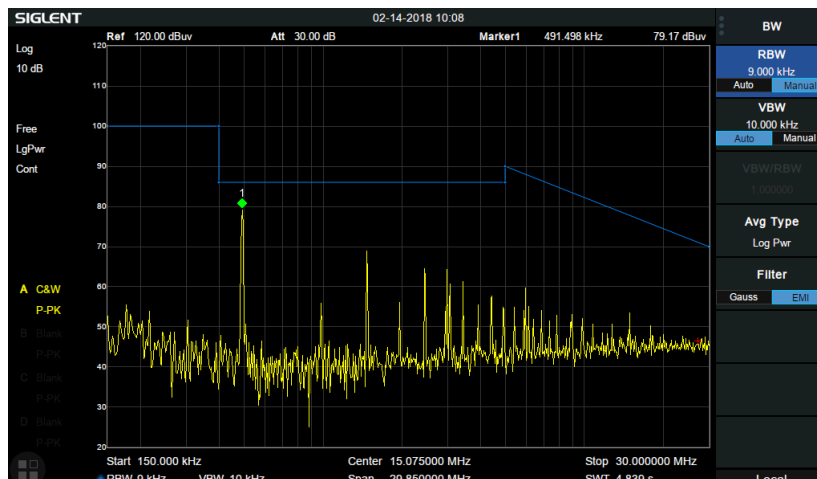
## Distance to Fault Mode

Cable and Antenna Test based on Timing Domain Analysis



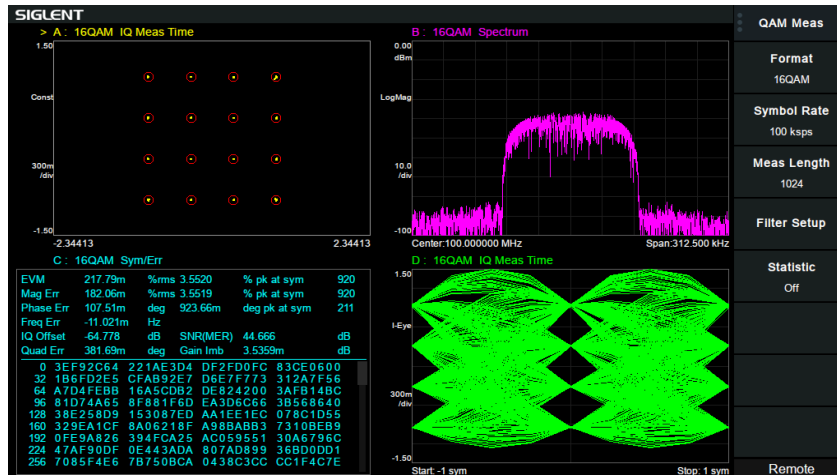
## EMI Test Kit

CISPR 16-1-1 EMI filter and Quasi-peak Detector , Log scale and limit line



## Modulation Analysis Mode

AM/FM,ASK/FSK/PSK/MSK/QAM Vector Signal Modulation Analysis



## Accessories

Utility Kit



Near Field Probe Set



USB-GPIB Adaptor



50  $\Omega$  Mechanical Calibration Kit



6U Rack Mount



Soft Carrying Bag



## 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 at room temperature (approximately 25°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.

## Mode

| Mode                    |
|-------------------------|
| Spectrum Analyzer       |
| Vector Network Analyzer |
| Distance To Fault       |
| Modulation Analysis     |

## Spectrum Analyzer Mode

### Frequency and Time Characteristic

| Frequency                                  |                                                                                                                         |               |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|---------------|
|                                            | SVA1015X                                                                                                                | SVA1032X      |
| Frequency range                            | 9 kHz-1.5 GHz                                                                                                           | 9 kHz-3.2 GHz |
| Frequency resolution                       | 1 Hz                                                                                                                    |               |
| Frequency Span                             |                                                                                                                         |               |
| Range                                      | 0 Hz, 100 Hz to Max Frequency                                                                                           |               |
| Accuracy                                   | ± Span / (number of display points - 1)                                                                                 |               |
| Internal Reference Source                  |                                                                                                                         |               |
| Reference frequency                        | 10.000000 MHz                                                                                                           |               |
| Reference frequency accuracy / uncertainty | ± [(time since last adjustment × frequency aging rate) + temperature stability + initial 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                                                                                   |               |
| Marker                                     |                                                                                                                         |               |
| Marker resolution                          | Span / (number of display points - 1)                                                                                   |               |
| Marker uncertainty                         | ± [frequency indication × reference frequency uncertainty + 1% × span + 10% × resolution bandwidth + marker resolution] |               |
| Freq Counter resolution                    | 0.01 Hz                                                                                                                 |               |
| Bandwidths                                 |                                                                                                                         |               |
| 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 ~ 1 MHz, in 1-3-10 sequence                                                                                        |               |
| VBW uncertainty                            | <5%                                                                                                                     |               |
| Sweep and Trigger                          |                                                                                                                         |               |
| Sweep time                                 | 1 ms to 3200 s                                                                                                          |               |
| Sweep mode                                 | RBW = 100 Hz ~ 1 MHz, Sweep<br>RBW = 1 Hz ~ 10 kHz, FFT                                                                 |               |
| Sweep rule                                 | Single, Continuous                                                                                                      |               |
| Trigger source                             | Free, Video, External                                                                                                   |               |
| External trigger                           | 5V TTL level, Rising edge/Falling edge                                                                                  |               |

## Amplitude Accuracy and Range Specifications

| Amplitude and Level                 |                 |                                                                                                          |                           |
|-------------------------------------|-----------------|----------------------------------------------------------------------------------------------------------|---------------------------|
| Measurement range                   |                 | DANL to +10 dBm, 100 kHz ~ 1 MHz, preamplifier off<br>DANL to +20 dBm, 1 MHz ~ 3.2 GHz, preamplifier off |                           |
| Reference level                     |                 | -200 dBm to +30 dBm, 1 dB steps                                                                          |                           |
| Preamplifier                        |                 | 20 dB (nom.)                                                                                             |                           |
| Input attenuation                   |                 | SVA1015X                                                                                                 | SVA1032X                  |
|                                     |                 | 0 ~ 30 dB, 1 dB steps                                                                                    | 0 ~ 50 dB, 1 dB steps     |
| Maximum input DC voltage            |                 | +/- 50 V <sub>DC</sub>                                                                                   |                           |
| Maximum average 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) |                 |                                                                                                          |                           |
|                                     |                 | SVA1015X                                                                                                 | SVA1032X                  |
|                                     |                 | 20 °C to 30 °C, attenuation = 0 dB, sample detector, trace average > 50, Normalized to 1 Hz, TG off      |                           |
| Preamp off                          | 100 kHz ~1 MHz  | -101 dBm, -107 dBm (typ.)                                                                                | -107 dBm, -111 dBm (typ.) |
|                                     | 1 MHz~10 MHz    | -124 dBm, -130 dBm (typ.)                                                                                | -132 dBm, -136 dBm (typ.) |
|                                     | 10 MHz~200 MHz  | -128 dBm, -134 dBm (typ.)                                                                                | -137 dBm, -141 dBm (typ.) |
|                                     | 200 MHz~1.5 GHz | -121 dBm, -127 dBm (typ.)                                                                                | -135 dBm, -139 dBm (typ.) |
|                                     | 1.5 GHz~3.2 GHz |                                                                                                          | -126 dBm, -132 dBm (typ.) |
| Preamp on                           | 100 kHz ~1 MHz  | -120 dBm, -128 dBm (typ.)                                                                                | -132 dBm, -137 dBm (typ.) |
|                                     | 1 MHz~10 MHz    | -147 dBm, -152 dBm (typ.)                                                                                | -148 dBm, -154 dBm (typ.) |
|                                     | 10 MHz~200 MHz  | -150 dBm, -156 dBm (typ.)                                                                                | -156 dBm, -161 dBm (typ.) |
|                                     | 200 MHz~1.5 GHz | -142 dBm, -148 dBm (typ.)                                                                                | -155 dBm, -158 dBm (typ.) |
|                                     | 1.5 GHz~3.2 GHz |                                                                                                          | -145 dBm, -149 dBm (typ.) |
| Phase Noise                         |                 |                                                                                                          |                           |
|                                     |                 | 20 °C to 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              |                 | 1 dB to 200 dB                                                                                           |                           |
| Linear level axis                   |                 | 0 to reference level                                                                                     |                           |
| Units of level axis                 |                 | dBm, dBmV, dBμV, dBμA, Volt, Watt                                                                        |                           |
| Number of display points            |                 | 751                                                                                                      |                           |
| Number of traces                    |                 | 4                                                                                                        |                           |
| Trace detectors                     |                 | Positive-peak, Negative-peak, Sample, Normal, Average(Voltage/RMS/Video), Quasi-peak                     |                           |
| Trace functions                     |                 | Clear write, Max Hold, Min Hold, View, Blank, Average, Math                                              |                           |

| Frequency Response                         |                                                                                                                                                                                      |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                            | 20 °C to 30 °C, 30% to 70% relative humidity, att = 20 dB, relative to fc = 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 | Logarithmic resolution, relative to RBW = 10 kHz<br>± 0.2 dB (nom.)                                                                                                                  |
| Input attenuation switching uncertainty    | 20 °C to 30 °C, fc = 50 MHz, preamp off, relative to att = 20 dB<br>± 0.5 dB                                                                                                         |
| Absolute amplitude accuracy                | 20 °C to 30 °C, fc = 50 MHz, RBW = VBW = 1 kHz, att = 20 dB, peak detector, 95% reliability<br>±0.4 dB, input signal -20 dBm, Preamp off<br>±0.5 dB, input signal -40 dBm, Preamp on |
| Total amplitude accuracy                   | SVA1015X SVA1032X                                                                                                                                                                    |
|                                            | 20 °C to 30 °C, fc>100 kHz, input signal -50 dBm ~ 0 dBm, att = 20 dB, RBW=VBW=1 kHz, peak detector, preamp off, 95% reliability<br>± 1.2 dB ± 0.7 dB                                |
| RF input VSWR                              | Att = 10 dB, 1 MHz~3.2 GHz<br><1.5 (nom.)                                                                                                                                            |
| Distortion and Spurious Responses          |                                                                                                                                                                                      |
| Second harmonic distortion (SHI)           | 20 °C to 30 °C, fc ≥ 50 MHz, mixer level -20 dBm, att = 0 dB, preamp off<br>-65 dBc / +45 dBm (nom.)                                                                                 |
| Third-order intercept (TOI)                | SVA1015X SVA1032X                                                                                                                                                                    |
|                                            | 20 °C to 30 °C, fc ≥ 50 MHz, two -20 dBm tones spaced by 100 kHz, att = 0 dB, preamp off<br>+8 dBm (typ.) +10 dBm (typ.)                                                             |
| 1dB gain compression                       | 20 °C to 30 °C, fc ≥ 50 MHz, att = 0 dB, preamp off<br>> -5 dBm (nom.)                                                                                                               |
| Residual response                          | 20 °C to 30 °C, input terminated = 50 Ω, att = 0 dB<br>< -90 dBm                                                                                                                     |
| Input related spurious                     | 20 °C to 30 °C, mixer level = -30 dBm<br><-65 dBc                                                                                                                                    |

## Tracking Generator

| Frequency Parameter        |                              |                 |
|----------------------------|------------------------------|-----------------|
| Frequency Range            | SVA1015X                     | SVA1032X        |
|                            | 5 MHz~1.5 GHz                | 100 kHz~3.2 GHz |
| Frequency resolution       | 1 Hz, Zero Span              |                 |
| RBW                        | 100 Hz ~ 1 MHz, sweep mode   |                 |
| Power Parameter            |                              |                 |
| Output level               | -20 dBm ~ 0 dBm              |                 |
| Output level resolution    | 1 dB                         |                 |
| Output flatness            | +/-3 dB (nom.)               |                 |
| Normalization Trace        | Ref A/B/C->D                 |                 |
| VSWR                       | < 2 (nom.)                   |                 |
| Connector and Impedence    | N-type female, 50 Ω          |                 |
| Average safe reverse power | Total : 30 dBm (1 W)         |                 |
| Maximum safe reverse level | Voltage: ±50 V <sub>DC</sub> |                 |

## EMI Filter and Quasi-Peak Detector Kit (Option SVA1000X-DTF)

| Measurement             |                                                        |
|-------------------------|--------------------------------------------------------|
| EMI filter RBW(-6dB)    | 200 Hz, 9 kHz, 120 kHz, 1MHz (following CISPR 16-1-1)  |
| Detector                | Peak, Average, RMS, Quasi-peak(following CISPR 16-1-1) |
| QPD Dwell time          | 0 us ~ 10 s                                            |
| PC Application Software | EasySpectrum EMI pre-compliance test Software          |
| Frequency axis          | Linear, Logarithmic                                    |

## Advanced Measurement Kit (Option SVA1000X-AMK)

| Power Measurement                  |                                                                |
|------------------------------------|----------------------------------------------------------------|
| CHP, Channel Power                 | Channel Power, Power Spectral Density                          |
| ACPR, Adjacent Channel Power Ratio | Main CH Power, Left channel power, Right channel power         |
| OBW, Occupied Bandwidth            | Occupied Bandwidth, Transmit Frequency Error                   |
| T-Power, Time Domain Power         | Zero Span Integrated Power                                     |
| CNR, Carrier Noise Ratio           | C/N, Noise Power                                               |
| Non-Linear Measurement             |                                                                |
| Harmonic measurement               | Max Harmonic number 10                                         |
| TOI, Third-Order Intercept         | Measure the third-order products and intercepts from two tones |
| Spectrum Monitor Measurement       |                                                                |
| Spectrogram                        |                                                                |

## Vector Network Analyzer Mode

### Vector Network Analyzer

| Stimulus and Measurement   |                                                                                                                                                       |                   |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| Frequency Range            | SVA1015X                                                                                                                                              | SVA1032X          |
|                            | 10 MHz ~ 1.5 GHz                                                                                                                                      | 100 kHz ~ 3.2 GHz |
| Measurement                | S11, S21                                                                                                                                              |                   |
| IFBW                       | 10 kHz                                                                                                                                                |                   |
| Port1 Stimulus Power       | -5 dBm (Nom.)                                                                                                                                         |                   |
| Format                     | Lin Mag, Log Mag, Phase, Group Delay, SWR, Smith Chart (Lin/Phase, Log/Phase, Real/Imag, R+j*X, G+j*B), Polar Chart (Lin/Phase, Log/Phase, Real/Imag) |                   |
| Sweep Points               | 101~751, default 201                                                                                                                                  |                   |
| Trace                      | 4 traces, Mem, Math, Hold, Overlay                                                                                                                    |                   |
| Marker                     | 6+Ref                                                                                                                                                 |                   |
| Calibration                |                                                                                                                                                       |                   |
| Directivity of Calibration | S11, Log mag, Average=50, >50MHz                                                                                                                      |                   |
|                            | > 40 dB                                                                                                                                               |                   |
| Dynamic Range              | S21, IFBW=10 kHz, Port1 level=-5 dBm, Log Mag, Average=50                                                                                             |                   |
|                            | 100 kHz ~ 10 MHz                                                                                                                                      | 75 dB             |
|                            | 10 MHz ~ 1.5 GHz                                                                                                                                      | 60 dB             |
|                            | 1.5 GHz ~ 3.2 GHz                                                                                                                                     | 55 dB             |
| Trace Noise                | 10 kHz RBW, Log mag, Average=50, >10MHz                                                                                                               |                   |
|                            | < 0.1 dB rms                                                                                                                                          |                   |
| Calibration                | Full 1-Port(OSL), Open Response, Short Response                                                                                                       |                   |
|                            | Response Through, Enhanced Response,                                                                                                                  |                   |
| Mechanical Calibration Kit | Open, Short, Load, Through; User Cal Kit                                                                                                              |                   |
| Port Extensions            | Port 1, Port 2, Auto Open Port 1                                                                                                                      |                   |
| System Z0                  | 50 Ω                                                                                                                                                  |                   |
| Velocity Factor            | 0.1~1                                                                                                                                                 |                   |

## Distance to Fault Mode

### Distance to Fault Mode (Option SVA1000X-DTF)

| Measurement               |                                                                                                           |                   |
|---------------------------|-----------------------------------------------------------------------------------------------------------|-------------------|
| Frequency Range           | SVA1015X                                                                                                  | SVA1032X          |
|                           | 10 MHz ~ 1.5 GHz                                                                                          | 100 kHz ~ 3.2 GHz |
| Maximum Distance (meters) | $(7.68 \times 10^{10} \times \text{Velocity Factor}) / (\text{start freq} - \text{stop freq}(\text{Hz}))$ |                   |
| Resolution (meters)       | $(1.50 \times 10^8 \times \text{Velocity Factor}) / (\text{start freq} - \text{stop freq}(\text{Hz}))$    |                   |
| Windows                   | Rectangular, Hamming                                                                                      |                   |
| Calibration               | S11, Full 1-Port(OSL)                                                                                     |                   |
| Velocity Factor           | 0.1~1                                                                                                     |                   |

## Modulation Analysis Mode

| Common Parameter       |                           |                  |
|------------------------|---------------------------|------------------|
| Frequency range        | SVA1015X                  | SVA1032X         |
|                        | 2 MHz to 1.5 GHz          | 2 MHz to 3.2 GHz |
| Carrier Power Accuracy | ±2 dB (nom.)              |                  |
| Carrier Power Range    | -30 dBm to +20 dBm (nom.) |                  |

### Analog Modulation Analysis (Option SVA1000X-AMA)

| AM                     |                               |                         |
|------------------------|-------------------------------|-------------------------|
| Modulation rate range  | 20 Hz to 100 kHz              |                         |
| Accuracy               | 1 Hz (nom.)                   | Modulation rate < 1 kHz |
|                        | < 0.1% modulation rate (nom.) | Modulation rate ≥ 1 kHz |
| Modulation depth range | 5% to 95%                     |                         |
| Accuracy               | ±4% (nom.)                    |                         |
| FM                     |                               |                         |
| Modulation rate range  | 20 Hz to 200 kHz              |                         |
| Accuracy               | 1 Hz (nom.)                   | Modulation rate < 1 kHz |
|                        | < 0.1% modulation rate (nom.) | Modulation rate ≥ 1 kHz |
| Frequency deviation    | 1 kHz to 400 kHz              |                         |
| Accuracy               | ±4% (nom.)                    |                         |

### Digital Modulation Analysis (Option SVA1000X-DMA)

| Measurement     |                                                                                                                                                                       |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Modulation Type | ASK: 2ASK;<br>FSK: 2,4,8,16 level;<br>MSK: GMSK;<br>PSK: BPSK,QPSK,OQPSK,8PSK;<br>DPSK: DBPSK, DQPSK, D8PSK, $\pi/4$ -DQPSK, $\pi/8$ -D8PSK;<br>QAM: 16,32,64,128,256 |
| Meas Length     | 16 to 4096                                                                                                                                                            |
| Points/Symbol   | 4,6,8,10,12,14,16                                                                                                                                                     |
| Symbol Rate     | 1 ksps to 2.5 Msps, Symbol Rate* Points/Symbol ≤ 10 Msps                                                                                                              |

| Filter             |                                                                                                                                                                                  |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Meas/Ref Filter    | Nyquist, Squrt Nyquist, Gauss, Half Sine, Rectangular                                                                                                                            |
| Length             | 2 to 128                                                                                                                                                                         |
| Alpha/BT           | Alpha 0.01 ~ 1, BT 0.01 ~ 10                                                                                                                                                     |
| Trace              |                                                                                                                                                                                  |
| Trace Data         | IQ Meas Time, IQ Meas Spectrum,<br>IQ Ref Time, IQ Ref Spectrum,<br>Time, Spectrum,<br>Symbol Error Chart,<br>Err Vector Time, Err Vector Spectrum,<br>IQ Mag Err, IQ Phase Err, |
| Layout             | Single, Stacked 2, Grid 1 2, Grid 2*2                                                                                                                                            |
| Trace Formats      | Log mag, Lin mag, Real, Imag,<br>I-Q, Constellation, I-sys, Q-eye,<br>Wrap Phase, Unwrap Phase, Trellis eye                                                                      |
| Symbol Error Chart |                                                                                                                                                                                  |
| PSK/DPSK/MSK/QAM   | EVM (rms EVM, peak EVM), Magnitude error,<br>Phase error, IQ offset, Carrier offset, SNR Quadrature error,<br>Gain imbalance(not support for MSK),                               |
| ASK                | ASK Error, ASK depth, carrier offset                                                                                                                                             |
| FSK                | FSK Error, Magnitude error, FSK deviation, carrier offset                                                                                                                        |

## Inputs and Outputs

| Front Panel               |                                                                                                                                                                   |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RF input, Port 2          | N-type female, 50 $\Omega$ (nom.)                                                                                                                                 |
| TG Source, Port 1         | N-type female, 50 $\Omega$ (nom.)                                                                                                                                 |
| USB host                  | USB-A plug, version 2.0                                                                                                                                           |
| Ear Phone Jack            | 3.5 mm                                                                                                                                                            |
| Rear Panel                |                                                                                                                                                                   |
| USB device                | USB-B plug, version 2.0                                                                                                                                           |
| LAN                       | 10/100 Base, RJ-45                                                                                                                                                |
| 10 MHz reference output   | 10 MHz, >0 dBm, BNC-type female, 50 $\Omega$ (nom.)                                                                                                               |
| 10 MHz reference input    | 10 MHz, -5 to +10 dBm, BNC-type female, 50 $\Omega$ (nom.)                                                                                                        |
| External trigger input    | 5V TTL level, BNC-type female, 10 k $\Omega$                                                                                                                      |
| Remote Control            |                                                                                                                                                                   |
| Communication Interface   | LAN, USB Device, USB Host (USB-GPIB adaptor)                                                                                                                      |
| Remote Control Capability | SCPI / Labview / IVI based on USB-TMC / VXI-11 / Socket / Telnet;<br>NI-MAX;<br>Web Browser (HTML 5 Supported);<br>Easy Spectrum software;<br>File Explorer (FTP) |

## General Specification

| Structure                                                                                               |                                                                                                                      |
|---------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| Dimensions                                                                                              | 393 mm × 207 mm × 116.5 mm (W×H×D)                                                                                   |
| Weight                                                                                                  | Net: 4.40 kg (9.7 lb); Shipping: 5.20 kg                                                                             |
| Display                                                                                                 | TFT LCD, 1024 × 600, 10.1 inch multi-touch screen                                                                    |
| Storage                                                                                                 | Internal (Flash) 256 MB, external (USB storage device) 32 GB                                                         |
| Working Environment                                                                                     |                                                                                                                      |
| Source                                                                                                  | AC voltage range: 100-240 V, 50/60 Hz or 100-120 V 400 Hz;<br>Power consumption 35: W                                |
| Temperature                                                                                             | Working temperature: 0 °C to 40 °C,<br>Storage temperature: -20 °C to 70 °C                                          |
| Humidity                                                                                                | 0 °C to 30 °C, ≤ 95% Relative humidity<br>30 °C to 50 °C, ≤ 75% Relative humidity                                    |
| Altitude                                                                                                | Operating: less than 3 km                                                                                            |
| Electromagnetic Compatibility                                                                           |                                                                                                                      |
| EN 61326-1: 2013 /<br>EN 61000-3-2: 2014                                                                | Class A(The active input power of the EUT is less than 75 W.<br>According to EN 61000-3-2, no limits are necessary.) |
| EN 61000-3-3: 2013                                                                                      | Plt: 0.65 Pst: 1.00, dmax: 4.00 % dc: 3.00 %<br>dt Lim: 3.30 % dt>Lim: 500ms                                         |
| IEC 61000-4-2: 2008                                                                                     | AD ±8.0 kV, CD ±4.0 kV                                                                                               |
| IEC 61000-4-3: 2006 +<br>A1: 2007 + A2: 2010                                                            | 80 MHz to 1000 MHz: 10V/m, 1.4 GHz to 2.0 GHz:3 V/m,<br>2.0 GHz to 2.7 GHz:1V/m                                      |
| IEC 61000-4-4: 2004 +<br>A1: 2010                                                                       | AC Line:±2.00 kV                                                                                                     |
| IEC 61000-4-5: 2005                                                                                     | Line to Line: 1.0 kV, Line to Earth: 2.0 kV                                                                          |
| IEC 61000-4-6: 2008                                                                                     | 0.15-80 MHz:3 V 1 KHz 80% AM                                                                                         |
| IEC 61000-4-8: 2009                                                                                     | 30 A/m, 50/60 Hz                                                                                                     |
| IEC 61000-4-11: 2004                                                                                    | Voltage Dips:0%/0.5P; 40%/10P; 70%/25P;<br>Short Interruptions Test Level%UT: 0%/250P                                |
| Safety                                                                                                  |                                                                                                                      |
| IEC 61010-1:2010/EN 61010-1:2010                                                                        |                                                                                                                      |
| CAN/CSA-C22.2 No.61010-1:2012, CAN/CSA-C22.2 No.61010-2-30:2012,<br>UL 61010-1:2012, UL 61010-2-30:2012 |                                                                                                                      |
| RoHS                                                                                                    |                                                                                                                      |
| 2011/65/EU                                                                                              |                                                                                                                      |

## Ordering Information

| Product                         |  | Description                                                                                                                             | Order Number |                                                                                                       |              |
|---------------------------------|--|-----------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------------------------------------------------------------------------------------------------|--------------|
| Product Code                    |  | Spectrum & Vector Network Analyzer, 1.5 GHz                                                                                             | SVA1015X     |                                                                                                       |              |
|                                 |  | Spectrum & Vector Network Analyzer, 3.2 GHz                                                                                             | SVA1032X     |                                                                                                       |              |
| Standard Accessories            |  | Quick Start, USB Cable, Power Cord                                                                                                      |              |                                                                                                       |              |
| Common Options                  |  | Advanced Measurement Kit                                                                                                                | SVA1000X-AMK |                                                                                                       |              |
|                                 |  | Utility Kit:<br>N(M)-SMA(M) cable, N(M)-N(M) cable,<br>N(M)-BNC(F) adaptor (2 pcs),<br>N(M)-SMA(F) adaptor (2 pcs),<br>10 dB attenuator | UKitSSA3X    |                                                                                                       |              |
|                                 |  | N(M)-SMA(M) cable, 70cm, 6 GHz                                                                                                          | N-SMA-6L     |                                                                                                       |              |
|                                 |  | N(M)-N(M) cable, 70cm, 6 GHz                                                                                                            | N-N-6L       |                                                                                                       |              |
|                                 |  | N(M)-BNC(M) cable, 70cm, 2 GHz                                                                                                          | N-BNC-2L     |                                                                                                       |              |
|                                 |  | USB-GPIB Adaptor                                                                                                                        | USB-GPIB     |                                                                                                       |              |
|                                 |  | Soft carrying bag                                                                                                                       | BAG-S2       |                                                                                                       |              |
|                                 |  | 6U Rack Mount Kit                                                                                                                       | SSA-RMK      |                                                                                                       |              |
|                                 |  | EMI test Options                                                                                                                        |              | EMI Measurement Kit:<br>EMI Filter and Quasi Peak Detector,<br>EMI test Mode in EasySpectrum Software | SVA1000X-EMI |
|                                 |  |                                                                                                                                         |              | 300 kHz~3 GHz Near Field Probe Kit:<br>3 H-probes (20/ 10/ 5 mm), 1 E-probe (5 mm)                    | SRF5030T     |
|                                 |  |                                                                                                                                         |              |                                                                                                       |              |
| Vector Network Analysis Options |  | Distance To Fault                                                                                                                       | SVA1000X-DTF |                                                                                                       |              |
|                                 |  | 50 Ω N-type Mechanical Calibration Kit:<br>Open(M), Short(M), Match(M), Through(F-F), 3.5 GHz                                           | F503ME       |                                                                                                       |              |
| Modulation                      |  | ASK, FSK, MSK, PSK, QAM                                                                                                                 | SVA1000X-DMA |                                                                                                       |              |
| Analysis Options                |  | AM, FM                                                                                                                                  | SVA1000X-AMA |                                                                                                       |              |

## About SIGLENT

SIGLENT is an international high-tech company, concentrating on R&D, sales, production and services of electronic test & measurement instruments.

SIGLENT first began developing digital oscilloscopes independently in 2002. After more than a decade of continuous development, SIGLENT has extended its product line to include digital oscilloscopes, function/arbitrary waveform generators, RF generators, digital multimeters, DC power supplies, spectrum analyzers, vector network analyzers, isolated handheld oscilloscopes, electronic load and other general purpose test instrumentation. Since its first oscilloscope, the ADS7000 series, was launched in 2005, SIGLENT has become the fastest growing manufacturer of digital oscilloscopes. We firmly believe that today SIGLENT is the best value in electronic test & measurement.

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