

# SSA3000X Series Spectrum Analyzer



SSA3032X

SSA3021X

## General Description

Siglent's SSA3000X series of spectrum analyzers have a frequency range of 9 kHz to 2.1 GHz / 3.2 GHz. With their light weight, small size, and friendly user interface, the SSA3000X offer a bright easy to read display, powerful and reliable automatic measurements, and plenty of powerful features. Applications include broadcast monitoring/evaluation, site surveying, EMI pre-compliance, research and development, education, production, and maintenance.

## Features and Benefits

- ⚡ All-Digital IF Technology
- ⚡ Frequency Range from 9 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.)
- ⚡ Total Amplitude Accuracy < 0.7 dB
- ⚡ 1 Hz Minimum Resolution Bandwidth (RBW)
- ⚡ Standard Preamplifier
- ⚡ Up to 3.2 GHz Tracking Generator Kit (Opt.)
- ⚡ Reflection Measurement Kit (Opt.)
- ⚡ Advanced Measurement Kit (Opt.)
- ⚡ EMI Pre-compliance Test Kit (Opt.)
- ⚡ 10.1 Inch WVGA ( 1024x600 ) Display

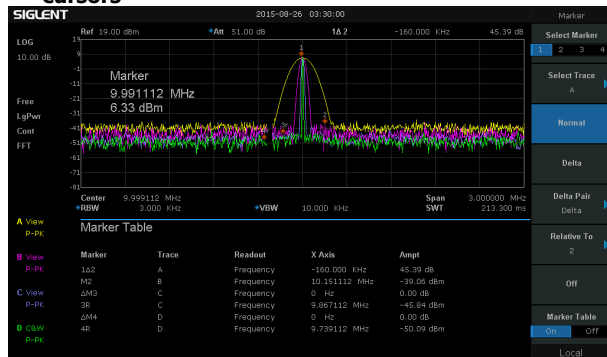


## Model and Main index

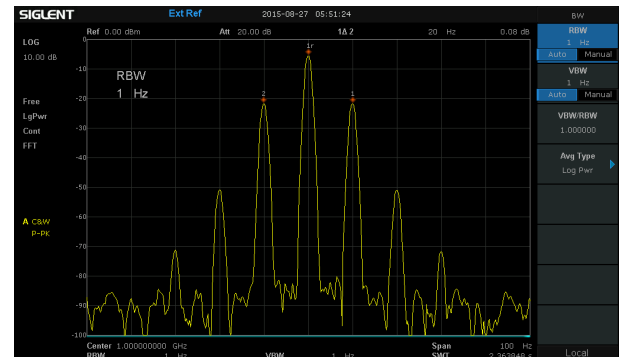
| Model                         | SSA3032X                              | SSA3021X                              |
|-------------------------------|---------------------------------------|---------------------------------------|
| Frequency Range               | 9 kHz~3.2 GHz                         | 9 kHz~2.1 GHz                         |
| Resolution Bandwidth          | 1 Hz~1 MHz, in 1-3-10 sequence        | 1 Hz~1 MHz, in 1-3-10 sequence        |
| Displayed Average Noise Level | -161 dBm/Hz, Normalize to 1 Hz (typ.) | -161 dBm/Hz, Normalize to 1 Hz (typ.) |
| Phase Noise                   | < -98 dBc/Hz@1 GHz, 10 kHz offset     | < -98 dBc/Hz@1 GHz, 10 kHz offset     |
| Amplitude Precision           | < 0.7 dB                              | < 0.7 dB                              |

## Design features

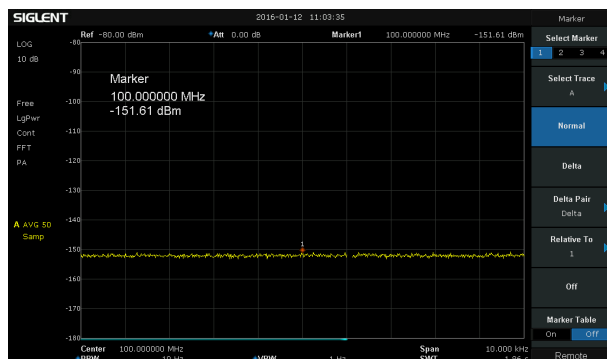
### Easy to operate, Support four independent traces and cursors



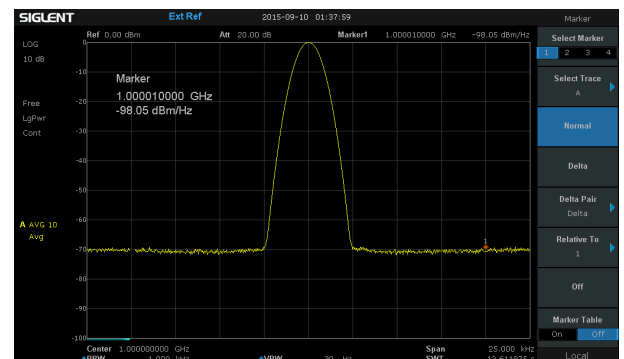
### 1 Hz Minimum Resolution Bandwidth (RBW)



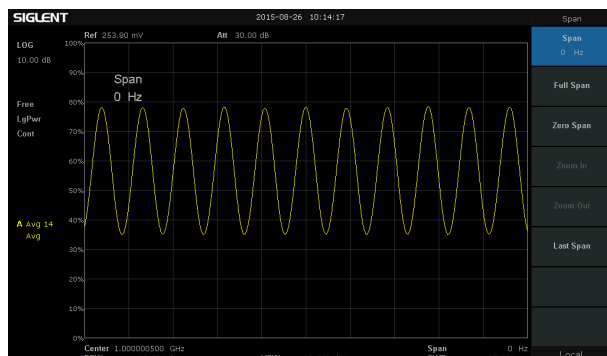
### -151 dBm Displayed Average Noise Level (RBW=10 Hz)



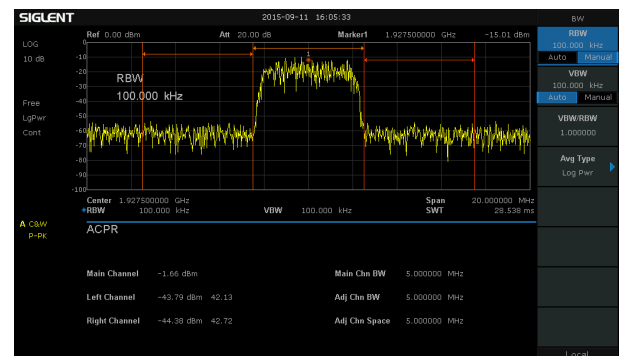
### Phase noise -98 dBc/Hz@ 1 GHz, offset 10 kHz



### Zero span and demodulation capabilities

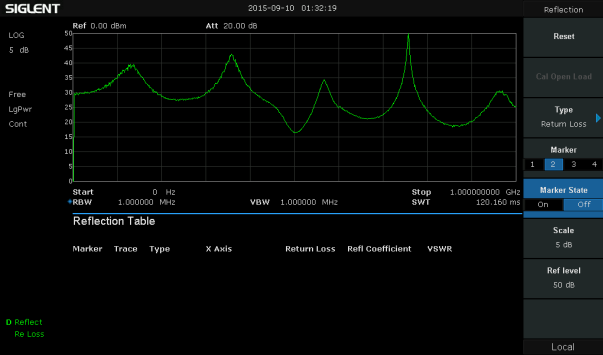


### Advanced measurement kit (AMK-SSA3000X) includes on-screen ACPR measurements

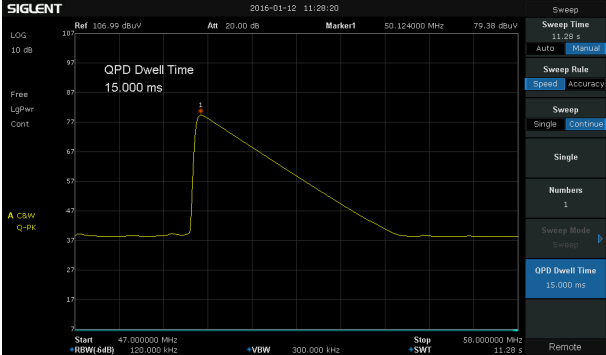


Design features

On-screen VSWR/Return Loss measurements with the reflection measurement option (REFL-SSA3000X)



EMI filter and Quasi-Peak detector following CISPR 16 (EMI-SSA3000X)



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 temperatures from 5 to 45°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

| Frequency Characteristic       |                                                                                                                         |                         |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------|-------------------------|
|                                | SSA3032X                                                                                                                | SSA3021X                |
| Frequency                      |                                                                                                                         |                         |
| Frequency range                | 9 kHz-3.2 GHz                                                                                                           | 9 kHz-2.1 GHz           |
| Frequency resolution           | 1 Hz                                                                                                                    | 1 Hz                    |
| Frequency Span                 |                                                                                                                         |                         |
| Range                          | 0 Hz, 100 Hz to 3.2 GHz                                                                                                 | 0 Hz, 100 Hz to 2.1 GHz |
| Accuracy                       | ± Span / (number of sweep points - 1)                                                                                   |                         |
| Internal Reference Source      |                                                                                                                         |                         |
| Reference frequency            | 10.000000 MHz                                                                                                           |                         |
| frequency reference accuracy   | ± [(time since last adjustment × frequency aging rate) + temperature stability + 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 sweep points - 1)                                                                                     |                         |
| Marker uncertainty             | ± [frequency indication × frequency reference uncertainty + 1% × span + 10% × resolution bandwidth + marker resolution] |                         |
| Frequency counter resolution   | 1 Hz                                                                                                                    |                         |
| Frequency counter uncertainty  | ± [frequency indication × frequency reference accuracy + counter resolution]                                            |                         |
| 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 ~3 MHz, in 1-3-10 sequence                                                                                         |                         |
| VBW uncertainty                | <5%                                                                                                                     |                         |

\*The DANL with RBW set to 1 or 3 Hz will be similar to 10 Hz.

## Amplitude Characteristic

### 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          | -100 dBm to +30 dBm, 1 dB steps                                                                      |
| Preamplifier             | 20 dB (nom.), 9 kHz~3.2 GHz                                                                          |
| Input attenuation        | 0~51 dB, 1 dB steps                                                                                  |
| Maximum input DC voltage | +/- 50 V <sub>DC</sub>                                                                               |
| Maximum average RF power | 30 dBm, 3 minutes, $f_c \geq 10$ MHz, attenuation >20 dBm, preamp off                                |
| Maximum damage level     | 33 dBm, $f_c \geq 10$ MHz, attenuation >20 dBm, preamp off                                           |

### Displayed Average Noise Level (DANL)

|            |                                                                      |                           |                           |
|------------|----------------------------------------------------------------------|---------------------------|---------------------------|
|            | 20 °C ~30 °C ,attenuation = 0 dB, sample detector, trace average >50 |                           |                           |
|            |                                                                      | RBW=10 Hz                 | Normalization to 1 Hz     |
| Preamp off | 9 kHz~100 kHz                                                        | -100 dBm (nom.)           | -110 dBm (nom.)           |
|            | 100 kHz ~1 MHz                                                       | -97 dBm, -101 dBm (typ.)  | -107 dBm, -111 dBm (typ.) |
|            | 1 MHz~10 MHz                                                         | -122 dBm, -126 dBm (typ.) | -132 dBm, -136 dBm (typ.) |
|            | 10 MHz~200 MHz                                                       | -127 dBm, -131 dBm (typ.) | -137 dBm, -141 dBm (typ.) |
|            | 200 MHz~2.1 GHz                                                      | -125 dBm, -129 dBm (typ.) | -135 dBm, -139 dBm (typ.) |
|            | 2.1 GHz~3.2 GHz                                                      | -116 dBm, -122 dBm (typ.) | -126 dBm, -132 dBm (typ.) |
| Preamp on  | 9 kHz~100 kHz                                                        | -107 dBm (nom.)           | -117 dBm (nom.)           |
|            | 100 kHz ~1 MHz                                                       | -122 dBm, -127 dBm (typ.) | -132 dBm, -137 dBm (typ.) |
|            | 1 MHz~10 MHz                                                         | -138 dBm, -144 dBm (typ.) | -148 dBm, -154 dBm (typ.) |
|            | 10 MHz~200 MHz                                                       | -146 dBm, -151 dBm (typ.) | -156 dBm, -161 dBm (typ.) |
|            | 200 MHz~2.1 GHz                                                      | -145 dBm, -148 dBm (typ.) | -155 dBm, -158 dBm (typ.) |
|            | 2.1 GHz~3.2 GHz                                                      | -135 dBm, -139 dBm (typ.) | -145 dBm, -149 dBm (typ.) |

### Phase Noise

|             |                                                                                                                                                      |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
|             | 20 °C ~30 °C , $f_c = 1$ GHz                                                                                                                         |
| Phase noise | <-95 dBc/Hz @10 kHz offset, <-98 dBc/Hz (typ.)<br><-96 dBc/Hz @100 kHz offset, <-97 dBc/Hz (typ.)<br><-115 dBc/Hz @1 MHz offset, <-117 dBc/Hz (typ.) |

### Level Display

|                          |                                                                                                          |
|--------------------------|----------------------------------------------------------------------------------------------------------|
| Logarithmic level axis   | 10 dB to 200 dB                                                                                          |
| Linear level axis        | 0 to reference level                                                                                     |
| Units of level axis      | dBm, dBmV, dBμV, dBμA, V, W                                                                              |
| Number of display points | 751                                                                                                      |
| Number of traces         | 4                                                                                                        |
| Trace detectors          | Positive-peak, Negative-peak, Sample, Normal, Average (Voltage/RMS/Video) , Quasi-peak (with EMI option) |
| Trace functions          | Clear write, Max Hold, Min Hold, View, Blank, Average                                                    |

### Frequency Response

|            |                                                                                                |
|------------|------------------------------------------------------------------------------------------------|
|            | 20 °C to 30 °C , 30% to 70% relative humidity, attenuation = 20 dB, reference frequency 50 MHz |
| Preamp off | ±0.8 dB,<br>±0.4 dB, (typ.)                                                                    |
| Preamp on  | ±0.9 dB,<br>±0.5 dB, (typ.)                                                                    |

### Error and Accuracy

|                                            |                                                                                                                                                                                 |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Resolution bandwidth switching uncertainty | 10 kHz RBW<br>Logarithmic resolution ±0.2 dB, linear resolution ±0.01, nominal                                                                                                  |
| Input attenuation switching uncertainty    | 20 °C to 30 °C , $f_c = 50$ MHz, preamp off, Relative to 20 dB, 1 to 51 dB attenuation<br>±0.5 dB                                                                               |
| Absolute amplitude accuracy                | 20 °C to 30 °C , $f_c = 50$ MHz, RBW = 1 kHz, VBW = 1 kHz, peak detector, attenuation = 20 dB, 95th percentile reliability                                                      |
|                                            | preamp off ±0.4 dB, input signal -20 dBm<br>preamp on ±0.5 dB, input signal -40 dBm                                                                                             |
| Total amplitude accuracy                   | 20 °C to 30 °C , $f_c > 100$ kHz, input signal -50 dBm~0 dBm, RBW = 1 kHz, VBW = 1 kHz, peak detector, attenuation = 20 dB, preamp off, 95th percentile reliability<br>± 0.7 dB |
| RF input VSWR                              | input attenuation 10 dB, 1 MHz~3.2 GHz<br><1.5, nom                                                                                                                             |

**Amplitude Characteristic****Distortion and Spurious Responses**

|                            |                                                                                                                               |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Second harmonic distortion | fc≥50 MHz, mixer level -30dBm, attenuation = 0 dB, preamp off, 20 ℃ to 30 ℃ , typ.<br>-65 dBc                                 |
| Third-order intercept      | fc≥50 MHz, two -20 dBm tones at input mixer spaced by 100 kHz, attenuation = 0 dB, preamp off, 20 ℃ to 30 ℃ , typ.<br>+10 dBm |
| 1dB Gain Compression       | fc≥50 MHz, attenuation = 0 dB, preamp off, 20 ℃ to 30 ℃ , nom.<br>>-5 dBm                                                     |
| Residual response          | input terminated = 50 Ω,attenuation = 0 dB, 20 ℃ to 30 ℃ , typ.<br><-90 dBm                                                   |
| Input related spurious     | Mixer level = -30 dBm, 20 ℃ to 30 ℃<br><-65 dBc                                                                               |

**Sweep and Trigger**

|                  |                                         |                 |
|------------------|-----------------------------------------|-----------------|
| Sweep time       | 1 ms to 3000 s                          |                 |
| Sweep accuracy   | Accuracy, Speed                         |                 |
| Sweep mode       | Sweep                                   | FFT             |
|                  | RBW=30 Hz~1 MHz                         | RBW=1 Hz~10 kHz |
| Sweep rule       | Single, Continuous                      |                 |
| Trigger source   | Free, Video, External                   |                 |
| External trigger | 5 V TTL level, rising edge/falling edge |                 |

**Tracking Generator (Option)**

|                              |                                           |                 |
|------------------------------|-------------------------------------------|-----------------|
|                              | SSA3032X                                  | SSA3021X        |
| Frequency range              | 100 kHz~3.2 GHz                           | 100 kHz~2.1 GHz |
| RBW                          | 30 Hz~1 MHz, only sweep mode              |                 |
| Output level                 | -20 dBm~0 dBm                             |                 |
| Output level resolution      | 1 dB                                      |                 |
| Output flatness              | +/-3 dB                                   |                 |
| Output maximum reverse level | Mean power:30 dBm,DC: ±50 V <sub>DC</sub> |                 |

**EMI Receiver Measurement (Option)**

|                             |                                               |
|-----------------------------|-----------------------------------------------|
| Resolution bandwidth (6 dB) | 200 Hz,9 kHz,120 kHz                          |
| Detector                    | Quasi-peak (following CISPR 16-1-1)           |
| Dwell time                  | 0 us~10 s                                     |
| PC Application Software     | EasySpectrum EMI pre-compliance test Software |

**Reflection Measurement (Option)**

|          |                                        |
|----------|----------------------------------------|
| Function | VSWR, Return loss, Reflect coefficient |
|----------|----------------------------------------|

**Advanced Measurement (Option)**

|          |                                                                                                                                            |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Function | Channel power,<br>Adjacent channel power ratio,<br>Time domain power,<br>Occupied bandwidth,<br>Third-order intercept,<br>Spectrum monitor |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------|

**External input and external output**

|                         |                                                  |
|-------------------------|--------------------------------------------------|
| Front panel RF input    | 50 $\Omega$ , N-female                           |
| Front panel TG output   | 50 $\Omega$ , N-female                           |
| 10 MHz reference output | 10 MHz, >0 dBm, 50 $\Omega$ , BNC-female         |
| 10 MHz reference input  | 10 MHz, -5 dBm~+10 dBm, 50 $\Omega$ , BNC-female |
| External Trigger input  | 1 k $\Omega$ , 5 V TTL , BNC-female              |

**Communication Interface**

|            |                                 |
|------------|---------------------------------|
| USB Host   | USB-A 2.0 +                     |
| USB Device | USB-B 2.0                       |
| LAN        | LAN (VXI11), 10/100 Base, RJ-45 |

**General Specification**

|             |                                                                                                                                                                  |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Display     | TFT LCD, 1024×600(waveform area 751×501), 10.1 inch                                                                                                              |
| Storage     | Internal (Flash) 256 MByte, External (USB storage device) 32 GByte                                                                                               |
| Source      | Input voltage range (AC) 100 V~240 V, AC frequency supply 45 Hz~440 Hz, Power consumption 30 W                                                                   |
| Temperature | Working temperature 0 $^{\circ}\text{C}$ to 50 $^{\circ}\text{C}$ , Storage temperature -20 $^{\circ}\text{C}$ to 70 $^{\circ}\text{C}$                          |
| Humidity    | 0 $^{\circ}\text{C}$ to 30 $^{\circ}\text{C}$ , $\leq 95\%$ Relative humidity;<br>30 $^{\circ}\text{C}$ to 50 $^{\circ}\text{C}$ , $\leq 75\%$ Relative humidity |
| Dimensions  | 393 mm×207 mm×116.5 mm (W×H×D)                                                                                                                                   |
| Weight      | Contain tracking generator 4.60 kg (10.1 lb)                                                                                                                     |

**Electromagnetic Compatibility and Safety**

|                   |                 |
|-------------------|-----------------|
| EMC               | EN 61326-1:2013 |
| Electrical safety | EN 61010-1:2010 |

Ordering Information

| Product Description         | SSA3000X Spectrum Analyzer                                                                                                           | Order Number  |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Product code                | Spectrum Analyzer, 9 kHz~3.2 GHz                                                                                                     | SSA3032X      |
|                             | Spectrum Analyzer, 9 kHz~2.1 GHz                                                                                                     | SSA3021X      |
| Standard configurations     | A Quick Start, A USB Cable, A CD (Including Quick Start, Data Sheet and Application Software) , A Calibration Certificate            | QG-SSA3000X   |
| Utility Options             | Tracking Generator Kit                                                                                                               | TG-SSA3000X   |
|                             | Advanced Measurement Kit                                                                                                             | AMK-SSA3000X  |
|                             | Utility Kit:<br>N(M)-SMA(M) cable<br>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                                                                                                                    | N-SMA-6L      |
|                             | N(M)-N(M) cable                                                                                                                      | N-N-6L        |
|                             | N(M)-BNC(M) cable                                                                                                                    | N-BNC-2L      |
|                             | Soft carrying bag                                                                                                                    | BAG-SCC       |
|                             | Rack Mount Kit                                                                                                                       | SSA-RMK       |
|                             |                                                                                                                                      |               |
| EMI Options                 | EMI Measurement Kit:<br>EMI Filter and Quasi Peak Detector,<br>EMI test option in EasySpectrum Software                              | EMI-SSA3000X  |
|                             | Near Field Probe:H field probe sets(25 mm, 10 mm, 5 mm, 2mm), 30 MHz~3.0 GHz                                                         | SRF5030       |
|                             | Near Field Probe:H field probe sets(20 mm, 10 mm, 5 mm) , E field probe (5 mm), 300 kHz~3.0 GHz                                      | SRF5030T      |
| Reflect Measurement Options | Tracking Generator Kit                                                                                                               | TG-SSA3000X   |
|                             | Reflect Measurement Kit                                                                                                              | Refl-SSA3000X |
|                             | VSWR Bridge Kit: including Refl-SSA3000X<br>VSWR Bridge(1 MHz~2 GHz)<br>N(M)-N(M) adaptor(2 pcs)                                     | RBSSA3X20     |



# SSA3000X Series Spectrum Analyzer



## 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, digital multimeters, DC power supplies, spectrum analyzers, isolated handheld oscilloscopes 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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