

# Spectrum Analyzer

## RSA600A Series Laboratory Spectrum Analyzer Datasheet



The RSA600A Series USB spectrum analyzers offer high bandwidth laboratory spectrum analysis in a small, very transportable package.

### Features and benefits

- 9 kHz to 3.0/7.5 GHz frequency range covers a broad range of analysis needs
- 40 MHz acquisition bandwidth enables real time analysis for transient capture and vector analysis
- Amplitude accuracy of 0.2 dB to 3 GHz (95% confidence)
- Standard GPS/GLONASS/Beidou receiver
- Optional tracking generator for gain/loss, antenna and cable measurements
- Streaming capture can be used to record and play back long term events
- SignalVu-PC software offers real time signal processing with DPX Spectrum/Spectrogram to minimize time spent finding transient problems
- 100 µsec minimum signal duration with 100% probability of intercept ensure you see problems first time, every time
- Application programming interface included for development of custom programs
- Accessories including tablet PC, calibration kits, adapters and phase-stable cables offer a complete solution for design, characterization, and manufacturing

### Applications

- Characterization of RF devices, subsystems, and systems
- Manufacturing test
- Mobile field operations

### The RSA600 Series gives you the bandwidth and analysis tools you need to succeed

The RSA600 series brings real-time spectrum analysis and wide analysis bandwidth to solving the problems of engineers who need to characterize, validate and manufacture their designs. The heart of the system is the USB-based RF spectrum analyzer that captures 40 MHz bandwidths with great fidelity. With 70 dB dynamic range and frequency coverage to 7.5 GHz, you can fully characterize wideband signals up to 40 MHz bandwidths. The USB form factor moves the processing power to the PC of your choice, so you decide when you need more processing power or memory.

The optional tracking generator enables gain/loss measurements for quick tests of filters, amplifiers, duplexers and other components, and you can add cable and antenna measurements of VSWR, return loss, distance to fault, and cable loss as needed.

### SignalVu-PC software offers rich analysis capability for your lab

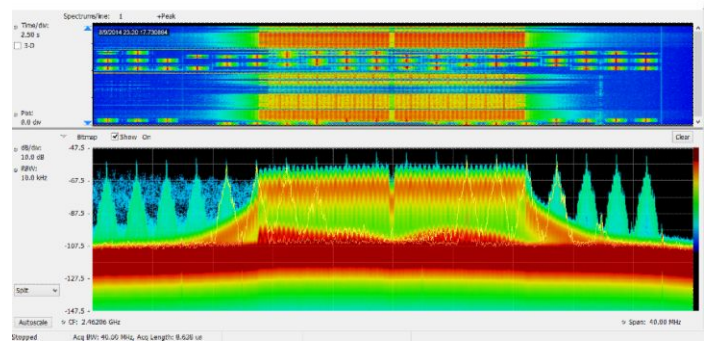
The RSA600 series operates with SignalVu-PC, a powerful program used as the basis of Tek's traditional spectrum analyzers, offering a deep analysis capability previously unavailable in low-cost laboratory solutions. Real-time processing of the DPX spectrum/spectrogram is enabled in your PC, further reducing the cost of hardware. Customers who need programmatic access to the instrument can choose either the SignalVu-PC programmatic interface or use the included application programming interface (API) that provides a rich set of commands and measurements directly. Basic functionality of the free SignalVu-PC program is far from basic. Base version measurements are shown below.

**Measurements and functions included in SignalVu-PC base version**

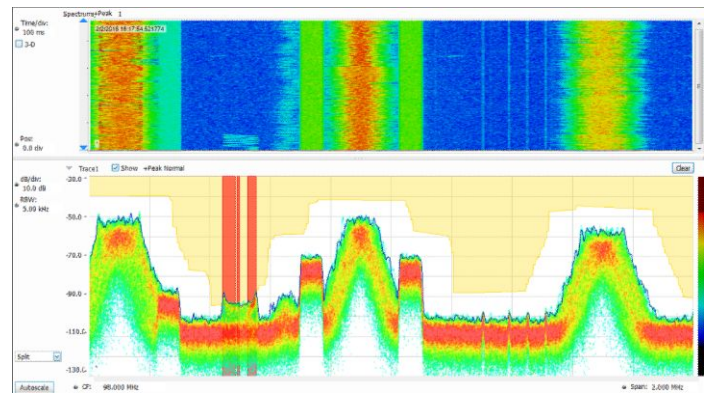
General signal analysis	Description
Spectrum analyzer	Spans from 100 Hz to 7.5 GHz, 3 traces + math and spectrogram trace, 5 markers with power, relative power, integrated power, power density and dBc/Hz functions
DPX spectrum/spectrogram	Real time display of spectrum with 100% probability of intercept of 100 usec signals in up to 40 MHz span
Amplitude, frequency, phase vs. time, RF I and Q vs. time	Basic vector analysis functions
Time overview/navigator	Enables easy setting of acquisition and analysis times for deep analysis in multiple domains
Spectrogram	Analyze and re-analyze your signal in 2-D or 3-D waterfall display
AM/FM listening	Hear and record to file FM and AM signals
Signal recording	Record 40 MHz bandwidth for re-analysis in all domains including real time spectrum analysis (requires application SV56 for Playback)
Analog modulation analysis	Description
AM, FM, PM analysis	Measures key AM, FM, PM parameters
RF measurements	Description
Spurious measurement	User-defined limit lines and regions provide automatic spectrum violation testing across the entire range of the instrument.
Spectrum emission mask	User-set or standards-specific masks.
Occupied bandwidth	Measures 99% power, -x dB down points.
Channel power and ACLR	Variable channel and adjacent/alternate channel parameters.
MCPR	Sophisticated, flexible multi-channel power measurements.
CCDF	Complementary Cumulative Distribution Function plots the statistical variations in signal level.
Signal strength with audio tone	Measures signal strength and displays a spectrum and signal strength bar for interference hunting and signal quality evaluations.

**The RSA600A combined with SignalVu-PC offers advanced measurements**

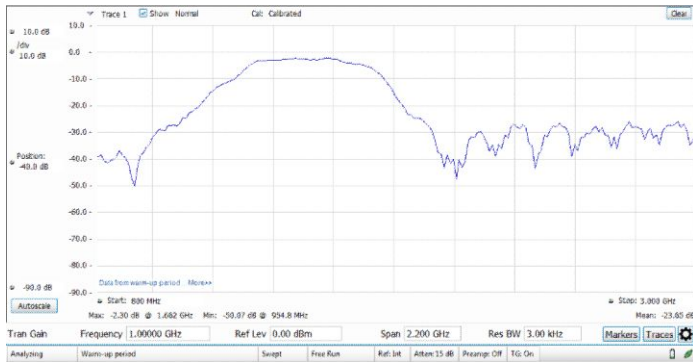
With 40 MHz of real-time bandwidth, the unique DPX spectrum/spectrogram shows you every instance of an interfering or unknown signal, even down to 100  $\mu$ s in duration. The following image shows a WLAN transmission (green and orange), and the narrow signals that repeat across the screen are a Bluetooth access probe. The spectrogram (upper part of the screen) clearly separates these signals in time to show any signal collisions.



Finding unexpected signals is easy with unattended mask monitoring. A mask can be created on the DPX spectrum display, and actions taken upon every violation, including stop, save a picture, save acquisition, or send an audible alert. In the illustration below, a mask violation has occurred in red on the mask, and a picture of the screen was saved as a result. Mask testing can be used for unattended monitoring and when playing back recorded signals, enabling testing for different violations on the same signals.



The tracking generator (Option 04 on the RSA600) is controlled via SignalVu-PC. Here you can enter start-stop frequencies, set number of steps in the span, adjust reference level, and normalize the tracking generator with a calibrate function. A bandpass filter response from 800 MHz to 3 GHz is shown below.



### SignalVu-PC application-specific licenses

SignalVu-PC offers a wealth of application-oriented options including:

- General-purpose modulation analysis (27 modulation types including 16/32/64/256 QAM, QPSK, O-QPSK, GMSK, FSK, APSK)
- Bluetooth® analysis of Low Energy, Basic Rate and Enhanced Data Rate
- P25 analysis of phase I and phase 2 signals
- WLAN analysis of 802.11a/b/g/j/p, 802.11n, 802.11ac
- LTE™ FDD and TDD Base Station (eNB) Cell ID & RF measurements
- Mapping
- Pulse analysis
- AM/FM/PM/Direct Audio Measurement including SINAD, THD
- Playback of recorded files, including complete analysis in all domains
- Signal classification and survey

See the separate SignalVu-PC data sheet for complete details and ordering information. Selected applications are illustrated below.

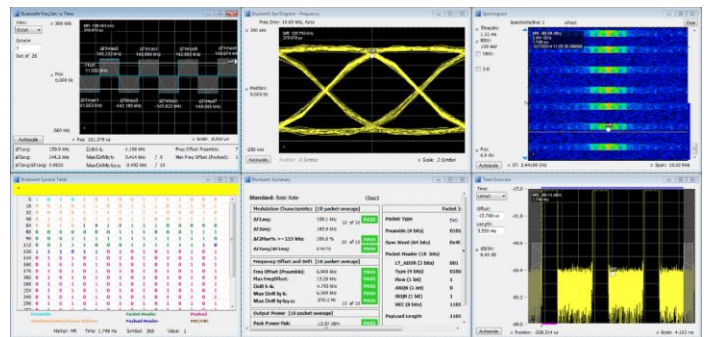
### General purpose modulation analysis

SignalVu-PC application SV21 bundles 27 different modulation types into a single analysis package and offers constellation displays, eye diagrams, symbol tables, trellis diagrams, modulation quality summaries and more. Symbol rates and filter types are adjustable and an internal equalizer is included for signal optimization. The illustration below is of a TETRA-standard signal modulated with pi/4DQPSK modulation at 18.0 ksymbols/sec.



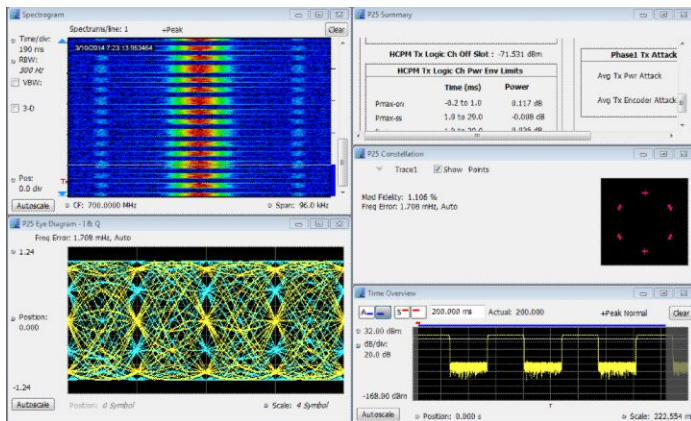
### Bluetooth

With application SV27 you can perform Bluetooth SIG standard-based transmitter RF measurements in the time, frequency, and modulation domains. This application supports Basic Rate and Low Energy Transmitter measurements defined by Bluetooth SIG Test Specification RF.TS.4.1.1 for Basic Rate and RF-PHY.TS.4.1.1 for Bluetooth Low Energy. Application SV27 also automatically detects Enhanced Data Rate packets, demodulates them and provides symbol information. Data packet fields are color encoded in the Symbol table for clear identification. Pass/Fail results are provided with customizable limits and the Bluetooth presets make the different test set-ups push-button. The measurement below shows deviation vs. time, frequency offset and drift, and a measurement summary with pass/fail results.



### APCO 25

SignalVu-PC application SV26 enables analysis of APCO P25 signals. The following image shows a Phase II HCPM signal being monitored for anomalies with the spectrogram while performing transmitter power, modulation, and frequency measurements to the TIA-102 standards specification.



**LTE**

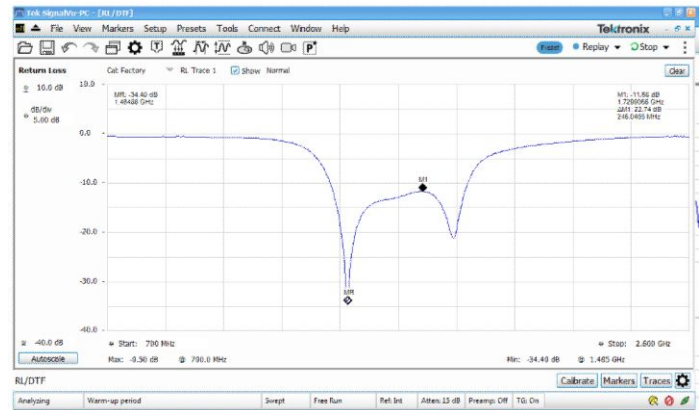
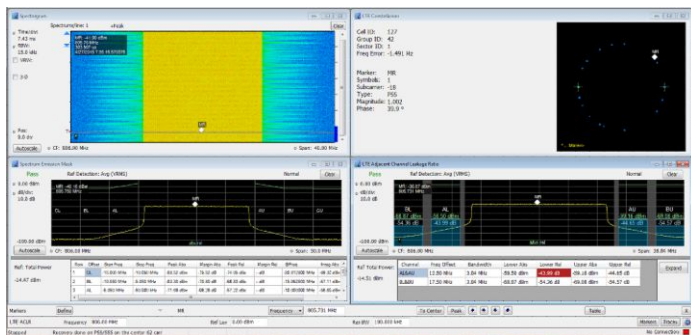
Application SV28 enables the following LTE base station transmitter measurements:

- Cell ID
- Channel power
- Occupied bandwidth
- Adjacent channel leakage ratio (ACLR)
- Spectrum emission mask (SEM)
- Transmitter off power for TDD

The measurements follow the definition in 3GPP TS Version 12.5 and support all base station categories, including picocells and femtocells. Pass/Fail information is reported and all channel bandwidths are supported.

The Cell ID preset displays the Primary Synchronization Signal (PSS) and the Secondary Synchronization Signal (SSS) in a Constellation diagram. It also provides Frequency Error.

The illustration below shows spectral monitoring with the spectrogram display combined with a Cell ID/Constellation, Spectrum Emission Mask and ACLR measurements.

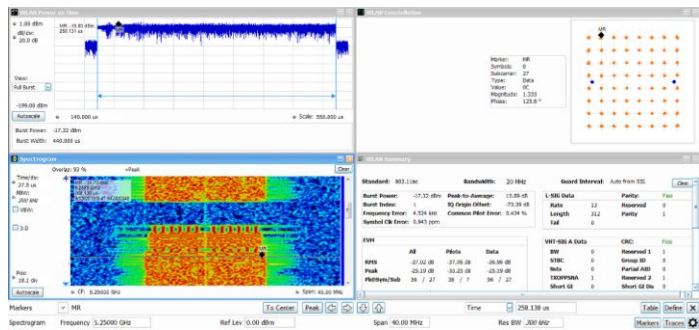


Return Loss/VSWR, distance to fault and cable loss – Perform component characterization tasks easily and cost-effectively. When equipped with the option 04 tracking generator, the RSA500A series with application license SV60xx-SVPC makes one-port measurements on cables, devices and antennas.

Return loss of a bandpass filter measured from 700 MHz to 2.6 GHz. Markers have been placed a 1.48 GHz (-34.4 dB return loss) and at 1.73 GHz (-11.68 dB return loss), indicating the best and worse match in the passband of the filter

**WLAN 802.11a/b/g/j/p/n/ac**

With options SV23, 24 and 25, sophisticated WLAN measurements are easy. On the 802.11ac (20 MHz) signal shown, the spectrogram shows the initial pilot sequence followed by the main signal burst. The modulation is automatically detected as 64 QAM for the packet and displayed as a constellation. The data summary indicates an EVM of -37.02 dB RMS, and burst power is measured at -17.32 dBm. SignalVu-PC applications are available for 802.11a/b/j/g/p, 802.11n, and 802.11ac to 40 MHz bandwidth.

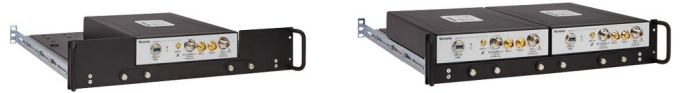
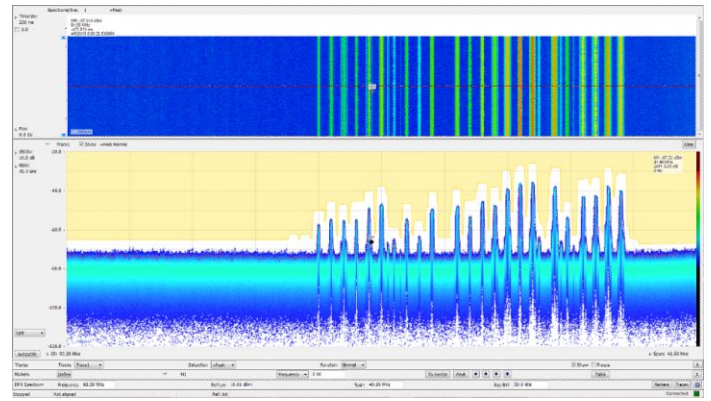


## Playback

Application SV56, Playback of recorded signals, can reduce hours of watching and waiting for a spectral violation to minutes at your desk reviewing recorded data.

Recording length is limited only by storage media size, and recording is a basic feature included in SignalVu-PC. SignalVu-PC application SV56 (Playback) allows for complete analysis by all SignalVu-PC measurements, including DPX Spectrogram. Minimum signal duration specifications are maintained during playback. AM/FM audio demodulation can be performed. Variable span, resolution bandwidth, analysis length, and bandwidth are all available.

In the illustration below, the FM band is being replayed, with a mask applied to detect spectral violations, simultaneous with listening to the FM signal at the center frequency of 92.3 MHz.



Rackmount for 1 or 2 RSA600s

# Specifications

All specifications are guaranteed unless noted otherwise. All specifications apply to all models unless noted otherwise.

## Frequency

<b>Frequency range</b>	
RSA603A	9 kHz to 3 GHz
RSA607A	9 kHz to 7.5 GHz
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<b>Frequency marker readout accuracy</b>	$\pm(\text{RE} \times \text{MF} + 0.001 \times \text{Span}) \text{ Hz}$ RE: Reference Frequency Error MF: Marker Frequency [Hz]
<hr/>	
<b>Reference frequency accuracy</b>	
Initial accuracy at Cal (30 min warm-up)	$\pm 1 \times 10^{-6}$
First year aging, typical	$\pm 1 \times 10^{-6}$ (1 year)
Cumulative error (Initial accuracy + temperature + aging), typical	$3 \times 10^{-6}$ (1 year)
Temperature drift	$\pm 0.9 \times 10^{-6}$ (-10 to 60 °C)
External reference input	BNC connector, 50 $\Omega$ nominal
External reference input frequency	Every 1 MHz from 1 to 20 MHz plus the following: 1.2288 MHz, 2.048 MHz, 2.4576 MHz, 4.8 MHz, 4.9152 MHz, 9.8304 MHz, 13 MHz, and 19.6608 MHz.  The spurious level on the input signal must be less than -80 dBc within 100 kHz offset to avoid on-screen spurious.
External reference input range	$\pm 5 \text{ ppm}$
External reference input level	-10 to +10 dBm

## RF input

<b>RF input</b>	
RF Input Impedance	50 $\Omega$
RF VSWR (RF Attn = 20 dB), typical	< 1.2 (10 MHz to 3 GHz) < 1.5 (>3 GHz to 7.5 GHz)
RF VSWR preamp ON, typical	< 1.5 (10 MHz to 6 GHz, RF ATT=10 dB, preamp on) < 1.7 (> 6 GHz to 7.5 GHz, RF ATT=10 dB, preamp on)
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<b>Maximum RF input level</b>	
Maximum DC voltage	$\pm 40 \text{ V}$ (RF input)
Maximum safe input power	+33 dBm (RF input, 10 MHz to 7.5 GHz, RF Attn $\geq$ 20 dB)  +13 dBm (RF input, 9 kHz to 10 MHz)  +20 dBm (RF input, RF Attn < 20 dB)

## RF input

Maximum safe input power (Preamp On)	+33 dBm (RF input, 10 MHz to 7.5 GHz, RF Attn ≥ 20 dB) +13 dBm (RF input, 9 kHz to 10 MHz)
Maximum measurable input power	+30 dBm (RF input, ≥10 MHz to Fmax, RF ATT Auto) +20 dBm (RF input, <10 MHz, RF ATT Auto)

Input RF attenuator 0 dB to 51 dB (1 dB step)

## Amplitude and RF

### Amplitude and RF flatness

Reference level setting range -170 dBm to +40 dBm, 0.1 dB step, (Standard RF input)

### Amplitude accuracy at all center frequencies

	18 °C to 28 °C	18 °C to 28 °C, typical (95% confidence)	-10 °C to 55 °C, typical
9 kHz ≤ 3.0 GHz	±0.8 dB	±0.2 dB	±1.0 dB
> 3 to 7.5 GHz	±1.5 dB	±0.6 dB	±2.0 dB

### Amplitude Accuracy at All Center Frequencies - Preamp ON (18 °C to 28 °C , 10 dB RF Attenuator)

Center frequency range	18 °C to 28 °C	18 °C to 28 °C, typical (95% confidence)	18 °C to 28 °C, typical
100 kHz to ≤3.0 GHz	±1.0 dB	±0.5 dB	±1.0 dB
> 3 to 7.5 GHz	±1.75 dB	±0.75 dB	±3.0 dB

Preamp gain 27 dB at 2 GHz  
21 dB at 6 GHz (RSA607A)

### Channel response (amplitude and phase deviation), typical

For these specifications, use a flat top window for maximum CW amplitude verification accuracy with the RF attenuator setting at 10 dB.

Characteristic		Description		
Measurement center frequency	Span	Amplitude flatness, typical	Amplitude flatness, RMS, typical	Phase linearity, RMS, typical
9 kHz to 40 MHz	≤40 MHz <sup>1</sup>	±1.0 dB	0.60 dB	
>40 MHz to 4.0 GHz	≤20 MHz	±0.10 dB	0.08 dB	0.3°
>4 GHz to 7.5 GHz	≤20 MHz	±0.35 dB	0.20 dB	0.7°
>40 MHz to 4 GHz	≤40 MHz	±0.15 dB	0.08 dB	0.6°
>4 GHz to 7.5 GHz	≤40 MHz	±0.40 dB	0.20 dB	1.0°

### Channel response (Amplitude flatness)

For these specifications, use a flat top window for maximum CW amplitude verification accuracy with the RF attenuator setting at 10 dB. The specifications are valid for the test center frequencies listed at the end of the table.

Characteristic		Description
Amplitude flatness		
	Span	
	≤20 MHz	±0.5 dB
	≤40 MHz	±0.5 dB
Test center frequencies (in MHz)		21, 30, 500, 1000, 1500, 2000, 2500, 3000, 3500, 3950, 4050, 4500, 4850, 4950, 5500, 5750, 5850, 6200, 6650, 6750, 7000, 7450

<sup>1</sup> Span extents cannot exceed lower frequency limit of the instrument

## Trigger

<b>Trigger/Sync input, typical</b>	Voltage range: TTL, 0.0 V to 5.0 V Trigger level (Schmitt trigger): Positive-going threshold voltage: 1.6 V min, 2.1 V max Negative-going threshold voltage: 1.0 V min., 1.35 V max Impedance: 10 k ohms with schottky clamps to 0 V, +3.4 V
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<b>External trigger timing uncertainty</b>	>20 MHz to 40 MHz acquisition bandwidth: $\pm 250$ ns Uncertainty increases as acquisition bandwidth is decreased.
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### Power trigger

<b>Power trigger, typical</b>	Range: 0 dB to -50 dB from reference level, for trigger levels > 30 dB above the noise floor. Type: Rising or falling edge Trigger re-arm time: $\leq 100$ $\mu$ sec
<b>Power trigger position timing uncertainty</b>	>20 MHz to 40 MHz acquisition bandwidth: $\pm 250$ ns Uncertainty increases as acquisition bandwidth is decreased.
<b>Power trigger level accuracy</b>	$\pm 1.5$ dB for CW signal at tuned center frequency for trigger levels > 30 dB above the noise floor. This specification is in addition to the overall amplitude accuracy uncertainty for SA mode.

## Noise and distortion

All noise and distortion measurements are made with the Preamp off, except where noted.

<b>3rd Order IM intercept (TOI)</b>	+12 dBm at 2.130 GHz
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<b>3rd Order IM intercept (TOI), Preamp off, typical</b>	+10 dBm (9 kHz to 25 MHz) +15 dBm (25 MHz to 3 GHz) +15 dBm (3 GHz to 4 GHz, RSA607A ) +10 dBm (4 GHz to 7.5 GHz, RSA607A)
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<b>Preamp on, typical</b>	-20 dBm (9 kHz to 25 MHz) -15 dBm (25 MHz to 3 GHz) -15 dBm (3 GHz to 4 GHz) -20 dBm (4 GHz to 7.5 GHz, RSA607A)
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<b>3rd Order Inter-modulation distortion</b>	-74 dBc at 2.130 GHz Each signal level -25 dBm at the RF input. 2 MHz tone separation. Attenuator = 0, Reference level = -20 dBm.
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**Noise and distortion**

**3rd Order inter-modulation distortion**

- Preamp off, typical**
- < -70 dBc (10 kHz to 25 MHz)
  - < -80 dBc (25 MHz to 3 GHz)
  - < -80 dBc (3 GHz to 4 GHz)
  - < -70 dBc (4 GHz to 6 GHz, RSA607A)
  - < -70 dBc (6 GHz to 7.5 GHz, RSA607A)
- Each signal level -25 dBm at the RF input. 2 MHz tone separation. Attenuator = 0, Reference level = -20 dBm.
- Preamp on, typical**
- < -70 dBc (9 kHz to 25 MHz)
  - < -80 dBc (25 MHz to 3 GHz)
  - < -80 dBc (3 GHz to 4 GHz)
  - < -70 dBc (4 GHz to 6 GHz, RSA607A)
  - < -70 dBc (6 GHz to 7.5 GHz, RSA607A)
- Each signal level -55 dBm at the RF input. 2 MHz tone separation. Attenuator = 0, Reference level = -50 dBm.

**2nd Harmonic distortion, typical**

- 2nd Harmonic distortion**
- < -75 dBc (40 MHz to 1.5 GHz)
  - < -75 dBc (1.5 GHz to 3.75 GHz, RSA607A)
- 2nd Harmonic distortion, Preamp on**
- < -60 dBc, 40 MHz to 3.75 GHz, input frequency

- 2nd Harmonic distortion intercept (SHI)**
- +35 dBm, 40 MHz to 1.5 GHz, input frequency
  - +35 dBm, 1.5 GHz to 3.75 GHz, input frequency

- 2nd Harmonic distortion intercept (SHI), Preamp on**
- +15 dBm, 40 MHz to 3.75 GHz, input frequency

**Displayed average noise level (DANL)** (Normalized to 1 Hz RBW, with log-average detector)

Frequency range	Preamp on	Preamp on, typical	Preamp off, typical
500 kHz to 1 MHz	-138 dBm/Hz	-145 dBm/Hz	-130 dBm/Hz
1 MHz to 25 MHz	-153 dBm/Hz	-158 dBm/Hz	-130 dBm/Hz
>25 MHz to 1 GHz	-161 dBm/Hz	-164 dBm/Hz	-141 dBm/Hz
>1 GHz to 2 GHz	-159 dBm/Hz	-162 dBm/Hz	-141 dBm/Hz
>2 GHz to 3 GHz	-156 dBm/Hz	-159 dBm/Hz	-138 dBm/Hz
>3 GHz to 4.2 GHz, RSA607A	- dBm/Hz	- dBm/Hz	-138 dBm/Hz
>4.2 GHz to 6 GHz, RSA607A	-159 dBm/Hz	-162 dBm/Hz	-147 dBm/Hz
>6 GHz to 7.5 GHz, RSA607A	-155 dBm/Hz	-158 dBm/Hz	-145 dBm/Hz

**Phase noise**

Phase noise	Offset	1 GHz CF	1 GHz CF (typical)	2 GHz CF (typical)	6 GHz CF, (RSA607A) (typical)	10 MHz (typical)
	10 kHz	-94 dBc/Hz	-97 dBc/Hz	-96 dBc/Hz	-94 dBc/Hz	-120 dBc/Hz
	100 kHz	-94 dBc/Hz	-98 dBc/Hz	-97 dBc/Hz	-96 dBc/Hz	-124 dBc/Hz
	1 MHz	-116 dBc/Hz	-121 dBc/Hz	-120 dBc/Hz	-120 dBc/Hz	-124 dBc/Hz

**Integrated Phase (RMS), typical**

7.45 x 10<sup>-3</sup> radians @ 1 GHz  
 8.24 x 10<sup>-3</sup> radians @ 2 GHz  
 9.34 x 10<sup>-3</sup> radians @ 6 GHz  
 Integrated from 10 kHz to 10 MHz

**Spurious response**

**Residual spurious response (Reference = -30 dBm, RBW = 1 kHz)**

<-75 dBm (500 kHz to 60 MHz), typical  
 < -85 dBm (>60 MHz to 80 MHz), typical  
 <-100 dBm (>80 MHz to 7.5 GHz), typical

**Spurious response with Signal (Image suppression)**

< -65 dBc (10 kHz to < 3 GHz, Ref= -30 dBm, Atten = 10 dB, RF input Level = -30 dBm, RBW = 10 Hz)  
 < -65 dBc (3 GHz to 7.5 GHz, Ref= -30dBm, Atten = 10 dB, RF input Level = -30 dBm, RBW = 10 Hz)

**Spurious response with signal at CF**

Offset ≥ 1 MHz

Frequency	Span ≤40 MHz, swept spans >40 MHz	
		Typical
1 MHz - 100 MHz		-75 dBc
100 MHz - 3 GHz	-72 dBc	-75 dBc
3 GHz - 7.5 GHz (RSA607A)	-72 dBc	-75 dBc

**Spurious response with signal at CF**

(100 kHz ≤ offset <1 MHz, Span=2 MHz):

Frequency P-TYP(PRI)	Typical
1 MHz - 100 MHz	-76 dBc
100 MHz - 3 GHz	-76 dBc
3 GHz - 7.5 GHz (RSA607A)	-74 dBc <sup>2</sup>

**Spurious response with signal at other than CF, typical**

Frequency	Span ≤40 MHz, swept spans >40 MHz
1 MHz – 25 MHz (LF Band)	-73 dBc
25 MHz – 3 GHz	-73 dBc
3 GHz – 7.5 GHz (RSA607A)	-73 dBc

<sup>2</sup> Power supply sidebands, 620-660 kHz: -67 dBc, typical

## Spurious response

Spurious response with signal at half-IF<sup>3</sup>

RSA603A, RSA607A	< -75 dBc, (CF: 30 MHz to 3 GHz, Ref = -30 dBm, Atten = 10 dB, RBW = 10 Hz, Span = 10 kHz) Signal frequency = 2310 MHz, RF input level = -30 dBm
RSA607A	< 77 dBc, (CF 3 G Hz to 7.5 GHz, Ref= -30 dBm, Atten = 10 dB, RBW=10 Hz, Span=10 kHz) RF input Level = -30 dBm

Local oscillator feed-through to input connector, typical	< -70 dBm, preamp off.
	< -90 dBm, preamp on.
	Attenuator = 10 dB.

## Acquisition

IF bandwidth	40 MHz.
A/D converter	14 bits, 112 Ms/s.
Real-Time IF Acquisition Data	112 Ms/s, 16-bit integer samples.

## ACLR

ACLR for 3GPP Down Link, 1 DPCH (2130 MHz)	-57 dB (Adjacent Channel)
	-68 dB w/Noise Correction (Adjacent Channel)
	-57 dB (First Alternate Channel)
	-69 dB w/Noise Correction (First Adjacent Channel)
ACLR LTE	-58 dB (Adjacent Channel)
	-61 dB w/Noise Correction (Adjacent Channel)
	-61 dB (First Alternate Channel)
	-63 dB w/Noise Correction (First Adjacent Channel)

## GPS location

Format	GPS/GLONASS/BeiDou
GPS antenna power	3 V, 100 mA maximum
Time to first fix, maximum	Lock time ranges from 2 sec (hot) to 46 sec (cold start). -130 dBm input signal power.
Horizontal position accuracy	GPS: 2.6 m
	Glonass: 2.6 m
	BeiDou: 10.2 m
	GPS + Glonass: 2.6 m
	GPS + BeiDou: 2.6 m
	Test conditions: 24 hr. static, -130 dBm, full power

<sup>3</sup> This is an input signal at half of the IF frequency.

## Tracking generator (Option 04)

### Tracking Generator (Option 04)

<b>Frequency range</b>	9 kHz to 3 GHz
	9 kHz to 7.5 GHz
<b>Sweep speed</b>	6700 MHz/second, 101 points, 50 kHz RBW (11 mS per point)
	Measured using a Panasonic Toughpad FZ-G1, Intel® Core™ i5-5300U 2.3 GHz Processor, 8 GB RAM, 256 GB SSD, Windows®7 Pro.
<b>Frequency resolution</b>	100 Hz
<b>TG output connector</b>	N type
<b>VSWR</b>	< 1.8:1, 10 MHz to 7.5 GHz, -20 dBm output level
<b>Maximum output power</b>	-3 dBm
<b>Output power level setting range</b>	40 dB
<b>Output power level step size</b>	1 dB
<b>Output power level step size accuracy</b>	± 0.5 dB
<b>Output level accuracy</b>	± 1.5 dB, 10 MHz to 7.5 GHz, -20 dBm output level
<b>Harmonics</b>	< -22 dBc
<b>Non-harmonic spurious</b>	< -30 dBc; spurious < 2 GHz from TG output frequency
	< -25 dBc; spurious ≥ 2 GHz from TG output frequency
<b>Reverse power without damage</b>	40 Vdc, +20 dBm RF
<b>Transmission gain measurement error</b>	Gain of +20 to -40 dB: ±1 dB
<b>Transmission gain measurement dynamic range</b>	70 dB

## Return Loss, Distance-to-Fault, and Cable Loss measurements

### Return Loss, Distance-to-Fault, and Cable Loss measurements

<b>Measurements</b>	Return Loss, Cable Loss, Distance-to-Fault
<b>Frequency range</b>	10 MHz to 3 GHz (RSA603A)
	10 MHz to 7.5 GHz (RSA607A)
<b>Sweep speed<sup>4</sup></b>	5 ms/point, Return Loss measurement
	5 ms/point, Distance-to-Fault measurement
	5 ms/point, Cable Loss measurement
<b>Frequency resolution</b>	500 Hz
<b>Return Loss measurement error</b>	Return Loss of 0 to 15 dB: ±0.5 dB
	Return Loss of 15 to 25 dB: ±1.5 dB
	Return Loss of 25 to 35 dB: ±4.0 dB
<b>Return Loss measurement error at 14 dB Return Loss</b>	±1.5 dB from 10 MHz to 6.8 GHz
	±3.0 dB from 6.8 GHz to 7.5 GHz
	±1.0 dB from 10 MHz to 6.8 GHz
	±2.5 dB from 6.8 GHz to 7.5 GHz

<sup>4</sup> 201 point sweep Measured using a Panasonic Toughpad FZ-G1.

**Return Loss, Distance-to-Fault, and Cable Loss measurements**

**Return Loss measurement range** 50 dB

**Interference immunity** Return Loss Measurement Error within specifications for the following conditions:  
 +5 dBm interferer power within 800 kHz of measurement point  
 +5 dBm interferer power more than 800 kHz away from measurement point

**Distance-to-Fault range** 1500 m or 15 dB one-way cable loss capable, user defined.

Maximum range is a function of the cable velocity factor and the frequency step size as follows:

$$\text{Range} = \left( \frac{V_p \times c}{2} \right) \times \left( \frac{N - 1}{F_{\text{stop}} - F_{\text{start}}} \right)$$

Where:

$V_p$  = Cable velocity factor relative to the speed of light

$c$  = Speed of light (m/s)

$F_{\text{start}}$  = Sweep start frequency (Hz)

$F_{\text{stop}}$  = Sweep stop frequency (Hz)

$N$  = number of sweep points

**Distance-to-Fault resolution** 0.03m (RSA503A, RG-58 ( $V_p=0.66$ )), User Definable 0.01m (RSA507A, RG-58 ( $V_p=0.66$ )), User Definable

Minimum resolution is a function of the cable velocity factor and the frequency step size as follows:

$$\text{Resolution} = \left( \frac{V_p \times c}{2} \right) \times \left( \frac{1}{F_{\text{stop}} - F_{\text{start}}} \right)$$

or

$$\text{Resolution} = \left( \frac{\text{Range}}{N - 1} \right)$$

**SignalVu-PC standard measurements and performance**

<b>Measurements included</b>	<b>General signal analysis</b>	
	Spectrum analyzer	Spans from 1 kHz to 7.5 GHz Three traces plus math and spectrogram trace Five markers with power, relative power, integrated power, power density and dBc/Hz functions
	DPX Spectrum/Spectrogram	Real time display of spectrum with 100% probability of intercept of 100 µsec signals in up to 40 MHz span
	Amplitude, frequency, phase vs. time, RF I and Q vs. time	Basic vector analysis functions
	Time Overview/Navigator	Enables easy setting of acquisition and analysis times for deep analysis in multiple domains
	Spectrogram	Analyze and re-analyze your signal with a 2-D or 3-D waterfall display
	AM/FM listening	Hear, and record to file, FM and AM signals
	<b>Analog modulation analysis</b>	
	AM, FM, PM analysis	Measures key AM, FM, PM parameters
	<b>RF measurements</b>	
	Spurious measurement	User-defined limit lines and regions provide automatic spectrum violation testing across the entire range of the instrument
	Spectrum emission mask	User-defined or standards-specific masks
	Occupied Bandwidth	Measures 99% power, -xB down points
	Channel Power and ACLR	Variable channel and adjacent/alternate channel parameters
	MCPDR	Sophisticated, flexible multi-channel power measurements
	CCDF	Complementary Cumulative Distribution Function plots the statistical variations in signal level

**SignalVu-PC/RSA607A key characteristics**

<b>Maximum span</b>	40 MHz real-time 9 kHz - 3 GHz swept 9 kHz - 7.5 GHz swept
<b>Maximum acquisition time</b>	1.0 s
<b>Minimum IQ resolution</b>	17.9 ns (acquisition BW = 40 MHz)
<b>Tuning Tables</b>	Tables that present frequency selection in the form of standards-based channels are available for the following.  Cellular standards families: AMPS, NADC, NMT-450, PDC, GSM, CDMA, CDMA-2000, 1xEV-DO WCDMA, TD-SCDMA, LTE, WiMax  Unlicensed short range: 802.11a/b/j/g/p/n/ac, Bluetooth  Cordless phone: DECT, PHS  Broadcast: AM, FM, ATSC, DVBT/H, NTSC  Mobile radio, pagers, other: GMRS/FRS, iDEN, FLEX, P25, PWT, SMR, WiMax

**DPX spectrum display**

<b>Spectrum processing rate (RBW = auto, trace length 801)</b>	≤10,000/s
<b>DPX bitmap resolution</b>	201x801
<b>Marker information</b>	Amplitude, frequency, signal density

**SignalVu-PC standard measurements and performance**

<b>Minimum signal duration for 100% probability of detection</b>	100 $\mu$ s Span: 40 MHz, RBW = 300 kHz (Auto)  Due to the non-deterministic execution time of programs running under the Microsoft Windows OS, this specification may not be met when the host PC is heavily loaded with other processing tasks
<b>Span range (continuous processing)</b>	1 kHz to 40 MHz
<b>Span range (swept)</b>	Up to maximum frequency range of instrument
<b>Dwell time per step</b>	50 ms to 100 s
<b>Trace processing</b>	Color-graded bitmap, +Peak, -Peak, average
<b>Trace length</b>	801, 2401, 4001, 10401
<b>RBW range</b>	1 kHz to 4.99 MHz
<hr/>	
<b>DPX spectrogram display</b>	
<b>Trace detection</b>	+Peak, -Peak, Average( $V_{RMS}$ )
<b>Trace length, memory depth</b>	801 (60,000 traces) 2401 (20,000 traces) 4001 (12,000 traces)
<b>Time resolution per line</b>	1 ms to 6400 s, user selectable
<hr/>	
<b>Spectrum display</b>	
<b>Traces</b>	Three traces + 1 math trace + 1 trace from spectrogram for spectrum display
<b>Trace functions</b>	Normal, Average ( $V_{RMS}$ ), Max Hold, Min Hold, Average of Logs
<b>Detector</b>	Average ( $V_{RMS}$ ), Average, CISPR peak, +Peak, -Peak, Sample
<b>Spectrum trace length</b>	801, 2401, 4001, 8001, 10401, 16001, 32001, and 64001 points
<b>RBW range</b>	10 Hz to 8 MHz
<hr/>	
<b>Analog modulation analysis (standard)</b>	
<b>AM demodulation accuracy, typical</b>	$\pm 2\%$ 0 dBm input at center, carrier frequency 1 GHz, 1 kHz/5 kHz input/modulated frequency, 10% to 60% modulation depth 0 dBm input power level, reference level = 10 dBm, Atten=Auto
<b>FM demodulation accuracy, typical</b>	$\pm 1\%$ of span 0 dBm input at center, carrier frequency 1 GHz, 400 Hz/1 kHz input/modulated frequency 0 dBm input power level, reference level = 10 dBm, Atten=Auto
<b>PM demodulation accuracy, typical</b>	$\pm 3\%$ of measurement bandwidth 0 dBm input at center, carrier frequency 1 GHz, 1 kHz/5 kHz input/modulated frequency 0 dBm input power level, reference level = 10 dBm, Atten=Auto
<hr/>	
<b>Signal Strength display</b>	
<b>Signal strength indicator</b>	Located at right side of display
<b>Measurement bandwidth</b>	Up to 40 MHz, dependent on span and RBW setting
<b>Tone type</b>	Variable frequency based on received signal strength

## Sweep speed

### Full-span sweep speed

<b>Full span sweep speed, typical</b>	5500 MHz/sec (RBW = 1 MHz)
	5300 MHz/sec (RBW = 100 kHz)
	3700 MHz/sec (RBW = 10 kHz)
	950 MHz/sec (RBW = 1 kHz)

Measured using a Panasonic Toughpad FZ-G1, Intel® Core™ i5-5300U 2.3 GHz Processor, 8 GB RAM, 256 GB SSD, Windows®7 Pro.

Spectrum display is only measurement on screen

<b>Tuning step time via API</b>	1 ms
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## SignalVu-PC applications performance summary

### AM/FM/PM and direct audio measurement (SVAx-SVPC)

<b>Carrier frequency range (for modulation and audio measurements)</b>	(1/2 × audio analysis bandwidth) to maximum input frequency
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<b>Maximum audio frequency span</b>	10 MHz
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<b>FM measurements (Mod. index &gt;0.1)</b>	Carrier Power, Carrier Frequency Error, Audio Frequency, Deviation (+Peak, -Peak, Peak-Peak/2, RMS), SINAD, Modulation Distortion, S/N, Total Harmonic Distortion, Total Non-harmonic Distortion, Hum and Noise
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<b>AM measurements</b>	Carrier Power, Audio Frequency, Modulation Depth (+Peak, -Peak, Peak-Peak/2, RMS), SINAD, Modulation Distortion, S/N, Total Harmonic Distortion, Total Non-harmonic Distortion, Hum and Noise
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**SignalVu-PC applications performance summary**

**PM measurements** Carrier Power, Carrier Frequency Error, Audio Frequency, Deviation (+Peak, -Peak, Peak-Peak/2, RMS), SINAD, Modulation Distortion, S/N, Total Harmonic Distortion, Total Non-harmonic Distortion, Hum and Noise

**Audio filters** Low pass, kHz: 0.3, 3, 15, 30, 80, 300, and user-entered up to 0.9 × audio bandwidth

High pass, Hz: 20, 50, 300, 400, and user-entered up to 0.9 × audio bandwidth

Standard: CCITT, C-Message

De-emphasis (us): 25, 50, 75, 750, and user-entered

File: User-supplied .TXT or .CSV file of amplitude/frequency pairs. Maximum 1000 pairs

Performance characteristics, typical	Conditions: Unless otherwise stated, performance is given for: Modulation rate = 5 kHz AM depth: 50% PM deviation 0.628 Radians			
	FM	AM	PM	Conditions
Carrier Power accuracy	Refer to instrument amplitude accuracy			
Carrier Frequency accuracy	± 0.5 Hz + (transmitter frequency × ref. freq. error)	Refer to instrument frequency accuracy	± 0.2 Hz + (transmitter frequency × ref. freq. error)	FM deviation: 1 kHz / 10 kHz
Depth of Modulation accuracy	NA	± 0.2%+(0.01 * measured value)	NA	Rate: 1 kHz to 100kHz Depth: 10% to 90%
Deviation accuracy	± (1% × (rate + deviation)+50 Hz)	NA	± 100% * (0.01 + (measured rate/1 MHz))	FM Rate: 1 kHz to 1 MHz
Rate accuracy	± 0.2 Hz	± 0.2 Hz	± 0.2 Hz	FM deviation: 1 kHz to 100 kHz
Residual THD	0.10%	0.13%	0.1%	FM Deviation: 5 kHz Rate: 1 kHz to 10 kHz Depth: 50%
Residual SINAD	43 dB	58 dB	40 dB	Deviation 5 kHz Rate: 1 kHz to 10 kHz Depth: 50%

**APCO P25 Measurements (SV26xx-SVPC)**

**Measurements** RF output power, operating frequency accuracy, modulation emission spectrum, unwanted emissions spurious, adjacent channel power ratio, frequency deviation, modulation fidelity, frequency error, eye diagram, symbol table, symbol rate accuracy, transmitter power and encoder attack time, transmitter throughput delay, frequency deviation vs. time, power vs. time, transient frequency behavior, HCPM transmitter logical channel peak adjacent channel power ratio, HCPM transmitter logical channel off slot power, HCPM transmitter logical channel power envelope, HCPM transmitter logical channel time alignment, cross-correlated markers

**Modulation fidelity, typical** CF = 460 MHz, 815 MHz  
 C4FM ≤ 1.0%  
 HCPM ≤ 0.5%  
 HDQPSK ≤ 0.25%  
 Input signal level is optimized for best modulation fidelity.

## SignalVu-PC applications performance summary

### Bluetooth Measurements (SV27xx-SVPC)

<b>Modulation formats</b>	Basic Rate, Bluetooth Low Energy, Enhanced Data Rate - Revision 4.1.1 Packet types: DH1, DH3, DH5 (BR), Reference (LE)
<b>Measurements</b>	Peak Power, Average Power, Adjacent Channel Power or InBand Emission mask, -20 dB Bandwidth, Frequency Error, Modulation Characteristics including $\Delta F1_{avg}$ (11110000), $\Delta F2_{avg}$ (10101010), $\Delta F2 > 115$ kHz, $\Delta F2/\Delta F1$ ratio, frequency deviation vs. time with packet and octet level measurement information, Carrier Frequency $f_0$ , Frequency Offset (Preamble and Payload), Max Frequency Offset, Frequency Drift $f_1-f_0$ , Max Drift Rate $f_n-f_0$ and $f_n-f_{n-5}$ , Center Frequency Offset Table and Frequency Drift table, color-coded Symbol table, Packet header decoding information, eye diagram, constellation diagram
<b>Output power, In-band emissions and ACP</b>	Level uncertainty: refer to instrument amplitude and flatness specification Measurement range: signal level $> -70$ dBm
<b>Modulation characteristics</b>	Deviation range: $\pm 280$ kHz Deviation uncertainty (at 0 dBm) $< 2$ kHz <sup>5</sup> + instrument frequency uncertainty (basic rate) $< 3$ kHz <sup>5</sup> + instrument frequency uncertainty (low energy) Measurement range: Nominal channel frequency $\pm 100$ kHz
<b>Initial Carrier Frequency Tolerance (ICFT)</b>	Measurement uncertainty (at 0 dBm): $< 1$ kHz + instrument frequency uncertainty Measurement range: Nominal channel frequency $\pm 100$ kHz
<b>Carrier Frequency Drift</b>	Measurement uncertainty: $< 1$ kHz + instrument frequency uncertainty Measurement range: Nominal channel frequency $\pm 100$ kHz

### General purpose digital modulation analysis (SVMxx-SVPC)

<b>Modulation formats</b>	BPSK, QPSK, 8PSK, 16QAM, 32QAM, 64QAM, 256QAM, PI/2DBPSK, DQPSK, PI/4DQPSK, D8PSK, D16PSK, SBPSK, OQPSK, SOQPSK, MSK, GFSK, CPM, 2FSK, 4FSK, 8FSK, 16FSK, C4FM
<b>Analysis period</b>	Up to 81,000 samples
<b>Measurement filter</b>	Root Raised Cosine, Raised Cosine, Gaussian, Rectangular, IS-95 TX_MEA, IS-95 Base TXEQ_MEA, None
<b>Reference Filter</b>	Gaussian, Raised Cosine, Rectangular, IS-95 REF, None
<b>Filter rolloff factor</b>	$\alpha$ : 0.001 to 1, in 0.001 steps
<b>Measurements</b>	Constellation, Demod I&Q vs. Time, Error Vector Magnitude (EVM) vs. Time, Eye Diagram, Frequency Deviation vs. Time, Magnitude Error vs. Time, Phase Error vs. Time, Signal Quality, Symbol Table, Trellis Diagram
<b>Symbol rate range</b>	1 k symbols/s to 40 M symbols/s  Modulated signal must be contained entirely within the acquisition bandwidth
<b>Adaptive equalizer</b>	Linear, Decision-Directed, Feed-Forward (FIR) equalizer with coefficient adaptation and adjustable convergence rate. Supports modulation types BPSK, QPSK, OQPSK, $\pi/2$ -DBPSK, $\pi/4$ -DQPSK, 8-PSK, 8-DSPK, 16-DPSK, 16/32/64/128/256-QAM

<sup>5</sup> At nominal power level of 0 dBm

**SignalVu-PC applications performance summary**

<b>QPSK Residual EVM (center frequency = 2 GHz), typical</b>	0.6 % (100 kHz symbol rate)
	0.8 % (1 MHz symbol rate)
	0.8 % (10 MHz symbol rate)
	0.8 % (30 MHz symbol rate)
	400 symbols measurement length, 20 Averages, normalization reference = maximum symbol magnitude
<b>256 QAM Residual EVM (center frequency = 2 GHz), typical</b>	0.6 % (10 MHz symbol rate)
	0.7 % (30 MHz symbol rate)
	400 symbols measurement length, 20 Averages, normalization reference = maximum symbol magnitude

**LTE Downlink RF measurements (SV28xx-SVPC)**

<b>Standard Supported</b>	3GPP TS 36.141 Version 12.5
<b>Frame Format supported</b>	FDD and TDD
<b>Measurements and Displays Supported</b>	Adjacent Channel Leakage Ratio (ACLR), Spectrum Emission Mask (SEM), Channel Power, Occupied Bandwidth, Power vs. Time showing Transmitter OFF power for TDD signals and LTE constellation diagram for Primary Synchronization Signal, Secondary Synchronization Signal with Cell ID, Group ID, Sector ID and Frequency Error.
<b>ACLR with E-UTRA bands (typical, with noise correction)</b>	1st Adjacent Channel 60 dB (RSA607A)
	2nd Adjacent Channel 62 dB (RSA607A)

**Mapping (MAPxx-SVPC)**

<b>Supported map types</b>	Pitney Bowes MapInfo (*.mif), Bitmap (*.bmp), Open Street Maps (.osm)
<b>Saved measurement results</b>	Measurement data files (exported results)
<b>Map file used for the measurements</b>	Google Earth KMZ file
<b>Recallable results files (trace and setup files)</b>	MapInfo-compatible MIF/MID files

**Pulse measurements (SVPxx-SVPC)**

<b>Measurements (nominal)</b>	Pulse-Ogram™ waterfall display of multiple segmented captures, with amplitude vs time and spectrum of each pulse. Pulse frequency, Delta Frequency, Average on power, Peak power, Average transmitted power, Pulse width, Rise time, Fall time, Repetition interval (seconds), Repetition interval (Hz), Duty factor (%), Duty factor (ratio), Ripple (dB), Ripple (%), Droop (dB), Droop (%), Overshoot (dB), Overshoot (%), Pulse- Ref Pulse frequency difference, Pulse- Ref Pulsephase difference, Pulse- Pulse frequency difference, Pulse- Pulse phase difference, RMS frequency error, Max frequency error, RMS phase error,Max phase error, Frequency deviation, Phase deviation, Impulse response (dB),Impulse response (time), Time stamp.
<b>Minimum pulse width for detection</b>	150 ns
<b>Average ON power at 18 °C to 28 °C, typical</b>	±0.3 dB + absolute amplitude accuracy For pulses of 300 ns width or greater, duty cycles of .5 to .001, and S/N ratio ≥ 30 dB
<b>Duty factor, typical</b>	±0.2% of reading For pulses of 450 ns width or greater, duty cycles of .5 to .001, and S/N ratio ≥ 30 dB
<b>Average transmitted power, typical</b>	±0.5 dB + absolute amplitude accuracy For pulses of 300 ns width or greater, duty cycles of .5 to .001, and S/N ratio ≥ 30 dB
<b>Peak pulse power, typical</b>	±1.2 dB + absolute amplitude accuracy For pulses of 300 ns width or greater, duty cycles of .5 to .001, and S/N ratio ≥ 30 dB
<b>Pulse width, typical</b>	±0.25% of reading For pulses of 450 ns width or greater, duty cycles of .5 to .001, and S/N ratio ≥ 30 dB

## SignalVu-PC applications performance summary

### Playback of recorded signals (SV56)

<b>Playback file type</b>	R3F recorded by RSA306, RSA500, or RSA600
<b>Recorded file bandwidth</b>	40 MHz
<b>File playback controls</b>	General: Play, stop, exit playback Location: Begin/end points of playback settable from 0-100% Skip: Defined skip size from 73 $\mu$ s up to 99% of file size Live rate: Plays back at 1:1 rate to recording time Loop control: Play once, or loop continuously
<b>Memory requirement</b>	Recording of signals requires storage with write rates of 300 MB/sec. Playback of recorded files at live rates requires storage with read rates of 300 MB/sec.

### WLAN Measurements, 802.11a/b/g/j/p (SV23xx-SVPC)

<b>Measurements</b>	WLAN power vs. time; WLAN symbol table; WLAN constellation; spectrum emission mask; error vector magnitude (EVM) vs. symbol (or time), vs subcarrier (or frequency); mag error vs symbol (or time), vs. subcarrier (or frequency); phase error vs symbol (or time), vs. subcarrier (or frequency); channel frequency response vs. symbol (or time), vs. subcarrier (or frequency); spectral flatness vs. symbol (or time), vs. subcarrier (or frequency)
<b>Residual EVM - 802.11a/g/j /p (OFDM), 64-QAM, typical</b>	2.4 GHz, 20 MHz BW: -39 dB 5.8 GHz, 20 MHz BW: -38 dB Input signal level optimized for best EVM, average of 20 bursts, $\geq$ 16 symbols each
<b>Residual EVM - 802.11b, CCK-11, typical</b>	2.4 GHz, 11 Mbps: 1.3 % Input signal level optimized for best EVM, average of 1,000 chips, BT = .61

### WLAN Measurements 802.11n (SV24xx-SVPC)

<b>Measurements</b>	WLAN power vs. time; WLAN symbol table; WLAN constellation; spectrum emission mask; error vector magnitude (EVM) vs. symbol (or time), vs subcarrier (or frequency); mag error vs symbol (or time), vs. subcarrier (or frequency); phase error vs symbol (or time), vs. subcarrier (or frequency); channel frequency response vs. symbol (or time), vs. subcarrier (or frequency); spectral flatness vs. symbol (or time), vs. subcarrier (or frequency)
<b>EVM performance - 802.11n, 64-QAM, typical</b>	2.4 GHz, 40 MHz BW: -38 dB 5.8 GHz, 40 MHz BW: -38 dB Input signal level optimized for best EVM, average of 20 bursts, $\geq$ 16 symbols each

### WLAN Measurements 802.11ac (SV25xx-SVPC)

<b>Measurements</b>	WLAN power vs. time; WLAN symbol table; WLAN constellation; spectrum emission mask; error vector magnitude (EVM) vs. symbol (or time), vs subcarrier (or frequency); mag error vs symbol (or time), vs. subcarrier (or frequency); phase error vs symbol (or time), vs. subcarrier (or frequency); channel frequency response vs. symbol (or time), vs. subcarrier (or frequency); spectral flatness vs. symbol (or time), vs. subcarrier (or frequency)
<b>EVM performance - 802.11ac, 256-QAM, typical</b>	5.8 GHz, 40 MHz BW : -38 dB Input signal level optimized for best EVM, average of 20 bursts, $\geq$ 16 symbols each

## 28 Volt noise source drive

### 28 Volt noise source drive output

Output Level	28 VDC @ 140 mA
Output voltage turn ON/OFF time	Turn on: 100 $\mu$ S Turn off: 500 $\mu$ S

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## Input and output ports

### Inputs, outputs, and interfaces

RF input	N type, female
External frequency reference input	BNC, female
Trigger/Sync input	BNC, female
Tracking Generator Source Output	N type, female
GPS Antenna	SMA, female
USB Device Port	USB 3.0 – Type A
USB Status LED	LED, dual color red/green  LED states:  Steady Red: USB power applied, or resetting  Steady Green: Initialized, ready for use  Blinking Green: Transferring data to host

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## Installation requirements

Maximum power dissipation (fully loaded)	RSA600A: 45 W maximum.
Surge current	2 A peak maximum, at 25 °C (77 °F) for $\leq$ 5 line cycles, after the product has been turned off for at least 30 seconds.
Cooling clearance	Bottom, top 0 mm (0 in.) with feet installed 6.3 mm (0.25 in.) without feet installed  Sides 0 mm (0 in.) Rear: 38.1 mm (1.5 in.)

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## Physical characteristics

### Physical characteristics

<b>Width</b>	222.3 mm (8.75 in)
<b>Height</b>	75.0 mm (2.95 in)
<b>Length</b>	358.6 mm (14.12 in)
<b>Net weight</b>	2.79 kg (6.15 pounds)

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## Environmental and safety

### Temperature

<b>Operating</b>	-10 °C to +55 °C (+14 °F to +131 °F)
<b>Non-operating</b>	-51 °C to +71 °C (-60 °F to +160 °F)

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### Humidity

MIL-PRF-28800F Class 2

Operating:

5% to 95±5%RH (relative humidity) in the temperature range of +10 °C to 30 °C (+50 °F to 86 °F)

5% to 75±5% RH above +30 °C to 40 °C (+86 °F to 104 °F)

5% to 45±5% RH above +40 °C up to +55 °C (+86 °F to +131 °F)

<10 °C (+50 °F) humidity is uncontrolled; non-condensing

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### Altitude

<b>Operating</b>	Up to 3000 m (9,842 ft.)
<b>Non-operating</b>	Up to 12000 m (39,370 ft.)

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## Dynamics

### Vibration

<b>Operating</b>	Tektronix Class 3 Random Vibration Test at 0.31 GRMS: 5-500 Hz, 3 Axes at 10 min/axis
<b>Non-Operating</b>	MIL-PRF-28800F Class 3 2.06 GRMS, 5 500 Hz, 10 minutes per axis, 3 axes (30 minutes total)

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### Shock

<b>Operating</b>	Test method per Military Standard MIL-PRF-28800F 1-4
<b>Non-Operating</b>	Exceeds the requirements of Military Standard MIL-PRF-28800F

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### Handling and transit

<b>Bench handling, operating</b>	MIL-PRF-28800F Class 3
<b>Transit drop, non-operating</b>	MIL-PRF-28800F Class 2

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## Ordering information

### Models

#### RSA600A Series

USB Spectrum Analyzer, 40 MHz acquisition bandwidth.

The RSA600 requires a PC with Windows 7, Windows 8/8.1, or Windows 10, 64-bit operating system. A USB 3.0 connection is required for operation of the RSA600. 8 GB RAM and 20 GB free drive space is required for installation of SignalVu-PC. For full performance of the real time features of the RSA600, an Intel Core i7 4th generation processor is required. Processors of lower performance can be used, with reduced real-time performance. Storage of streaming data requires that the PC be equipped with a drive capable of streaming storage rates of 300 MB/sec.

**Includes:** USB 3.0 cable (2 M), A-A connection, screw lock, quick-start manual (printed), connector covers, power cord, (see power plug options), USB memory device with SignalVu-PC, API and documentation files.

Item	Description
RSA603A	USB real time spectrum analyzer, 9 kHz – 3.0 GHz, 40 MHz acquisition bandwidth
Option 04	Tracking generator, 10 MHz – 3.0 GHz
RSA607A	USB real time spectrum analyzer, 9 kHz – 7.5 GHz, 40 MHz acquisition bandwidth
Option 04	Tracking generator, 10 MHz – 7.5 GHz
RSA5600RACK	Rackmount, RSA500 and RSA600 Series. Holds 1 RSA500A or 2 RSA600A models

### Options

#### RSA600A power plug options

Opt. A0	North America power plug (115 V, 60 Hz)
Opt. A1	Universal Euro power plug (220 V, 50 Hz)
Opt. A2	United Kingdom power plug (240 V, 50 Hz)
Opt. A3	Australia power plug (240 V, 50 Hz)
Opt. A4	North America power plug (240 V, 50 Hz)
Opt. A5	Switzerland power plug (220 V, 50 Hz)
Opt. A6	Japan power plug (100 V, 50/60 Hz)
Opt. A10	China power plug (50 Hz)
Opt. A11	India power plug (50 Hz)
Opt. A12	Brazil power plug (60 Hz)
Opt. A99	No power cord

#### RSA600A language options

Opt. L0	English manual
Opt. L1	French manual
Opt. L2	Italian manual
Opt. L3	German manual
Opt. L4	Spanish manual
Opt. L5	Japanese manual

Opt. L6	Portuguese manual
Opt. L7	Simplified Chinese manual
Opt. L8	Traditional Chinese manual
Opt. L9	Korean manual
Opt. L10	Russian manual
Opt. L99	No manual

### **RSA600A service options**

Opt. C3	Calibration Service 3 Years
Opt. C5	Calibration Service 5 Years
Opt. D1	Calibration Data Report
Opt. D3	Calibration Data Report 3 Years (with Opt. C3)
Opt. D5	Calibration Data Report 5 Years (with Opt. C5)
Opt. R5	Repair Service 5 Years (including warranty)

### **Warranty**

- RSA600 series warranty: 3 years.
- FZ-G1 tablet: 3-year warranty with Business Class Support (provided by Panasonic in region of purchase).



## Tablet

### Tablet controller available

A tablet controller intended for portable applications using the Tektronix RSA306B and RSA500A series spectrum analyzers can also be used with the RSA600A series. The Panasonic ToughPad FZ-G1 is available in limited geographies from Tektronix as shown in the ordering information below.

Item	Description	Regional availability
FZ-G1-N	Controller for USB Spectrum Analyzers, Panasonic ToughPad FZ-G1. Includes tablet, battery, digitizer pen and tether, battery charger with power cord.	Canada, Columbia, Ecuador, Mexico, Philippines, Singapore, United States
FZ-G1F	Controller for USB Spectrum Analyzers, Panasonic ToughPad FZ-G1. Includes tablet, digitizer pen and tether, battery charger with power cord	China
FZ-G1-I	Controller for USB Spectrum Analyzers, Panasonic ToughPad FZ-G1. Includes tablet, battery, digitizer pen and tether, battery charger with power cord	India
FZ-G1-E	Controller for USB Spectrum Analyzers, Panasonic ToughPad FZ-G1. Includes tablet, battery, digitizer pen and tether, battery charger with power cord.	Austria, Baltic States, Belgium, Bosnia, Bulgaria, Chile, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Indonesia, Ireland, Italy, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, South Africa, Spain, Sweden, Thailand, Turkey
FZ-G1-U	Controller for USB Spectrum Analyzers, Panasonic ToughPad FZ-G1. Includes tablet, battery, digitizer pen and tether, battery charger with power cord.	Egypt, Kenya, Malaysia, United Kingdom
FZ-G1-B	Controller for USB Spectrum Analyzers, Panasonic ToughPad FZ-G1. Includes tablet, battery, digitizer pen and tether, battery charger with power cord	Brazil
FZ-G1-J	Controller for USB Spectrum Analyzers, Panasonic ToughPad FZ-G1. Includes tablet, battery, digitizer pen and tether, battery charger with power cord	Japan

### Panasonic FZ-G1 accessories

Item	Description
FZ-VZSU84U <sup>6</sup>	Li-ion battery, standard capacity
FZ-VZSU88U <sup>6</sup>	Long-life battery pack for Panasonic ToughPad FZ-G1
FZ-BNDLG1BATCHR9	Single battery charger bundle for FZ-G1. 1 charger and 1 adapter
CF-LNDDC120 <sup>9</sup>	Lind 120 W 12-32 Volt input vehicle adapter for Tough Pad and RSA500A
TBCG1AONL-P	Panasonic Toughmate always on case for FZ-G1
TBCG1XSTP-P	Infocase Toughmate X-strap for Panasonic FZ-G1

<sup>6</sup> Not available in China, Hong Kong, Macau or Mongolia

## Licenses

### SignalVu-PC application-specific modules

Application license	Description
SVANL-SVPC	AM/FM/PM/Direct Audio Analysis - Node Locked License
SVAFL-SVPC	AM/FM/PM/Direct Audio Analysis - Floating License
SVTNL-SVPC	Settling Time (frequency and phase) measurements - Node Locked License
SVTFL-SVPC	Settling Time (frequency and phase) measurements - Floating License
SVMNL-SVPC	General Purpose Modulation Analysis to work with analyzer of acquisition bandwidth <= 40 MHz or MDO - Node Locked License
SVMFL-SVPC	General Purpose Modulation Analysis to work with analyzer of acquisition bandwidth <= 40 MHz or MDO- Floating License
SVPNL-SVPC	Pulse Analysis to work with analyzer of acquisition bandwidth <= 40 MHz or MDO - Node Locked License
SVPFL-SVPC	Pulse Analysis to work with analyzer of acquisition bandwidth <= 40 MHz or MDO- Floating License
SVONL-SVPC	Flexible OFDM Analysis - Node Locked License
SVOFL-SVPC	Flexible OFDM Analysis - Floating License
SV23NL-SVPC	WLAN 802.11a/b/g/j/p measurement - Node Locked License
SV23FL-SVPC	WLAN 802.11a/b/g/j/p measurement - Floating License
SV24NL-SVPC	WLAN 802.11n measurement (requires SV23) - Node Locked License
SV24FL-SVPC	WLAN 802.11n measurement (requires SV23) - Floating License
SV25NL-SVPC	WLAN 802.11ac measurement to work with analyzer of acquisition bandwidth <= 40 MHz (requires SV23 and SV24) or MDO - Node Locked License
SV25FL-SVPC	WLAN 802.11ac measurement to work with analyzer of acquisition bandwidth <= 40 MHz (requires SV23 and SV24) or MDO - Floating License
SV26NL-SVPC	APCO P25 measurement - Node Locked License
SV26FL-SVPC	APCO P25 measurement - Floating License
SV27NL-SVPC	Bluetooth measurement to work with analyzer of acquisition bandwidth <= 40 MHz or MDO - Node Locked License
SV27FL-SVPC	Bluetooth measurement to work with analyzer of acquisition bandwidth <= 40 MHz or MDO- Floating License
MAPNL-SVPC	Mapping - Node Locked License
MAPFL-SVPC	Mapping - Floating License
SV56NL-SVPC	Playback of recorded files - Node Locked License
SV56FL-SVPC	Playback of recorded files - Floating License
SV60NL-SVPC	Return loss, VSWR, cable loss, and distance to fault - Node Locked License
SV60FL-SVPC	Return loss, VSWR, cable loss, and distance to fault - Floating License
CONNL-SVPC	SignalVu-PC live link to the MDO4000B series mixed-domain oscilloscopes - Node Locked License
CONFL-SVPC	SignalVu-PC live link to the MDO4000B series mixed-domain oscilloscopes - Floating License
SV2CNL-SVPC	WLAN 802.11a/b/g/j/p/n/ac and live link to MDO4000B to work with analyzer of acquisition bandwidth <= 40 MHz - Node Locked License
SV2CFL-SVPC	WLAN 802.11a/b/g/j/p/n/ac and live link to MDO4000B to work with analyzer of acquisition bandwidth <= 40 MHz - Floating License
SV28NL-SVPC	LTE Downlink RF measurement to work with analyzer of acquisition bandwidth <= 40 MHz or MDO - Node Locked License
SV28FL-SVPC	LTE Downlink RF measurement to work with analyzer of acquisition bandwidth <= 40 MHz or MDO - Floating License
SV54NL-SVPC	Signal survey and classification - Node Locked License
SV54FL-SVPC	Signal survey and classification - Floating License
SV60NL-SVPC	Return loss, distance to fault, VSWR, cable loss - Node Locked License (requires Option 04 on RSA500A/600A)
SV60FL-SVPC	Return loss, distance to fault, VSWR, cable loss - Floating License (requires Option 04 on RSA500A/600A)
SV30NL-SVPC	WiGig 802.11ad measurements - Node Locked License

Application license	Description
SV30FL-SVPC	WiGig 802.11ad measurements - Floating License
EDUFL-SVPC	Education-only version of all modules for SignalVu-PC - Floating License

## Recommended accessories

Tektronix offers a wide variety of adapters, attenuators, cables, impedance converters, antennas and other accessories for the RSA600 series.

### General purpose RF cables

012-1738-00	Cable, 50 $\Omega$ , 40 inch, type-N(m) to type-N(M)
012-0482-00	Cable, 50 $\Omega$ , BNC (m) 3 foot (91 cm)

### Adapters

103-0045-00	Adapter, coaxial, 50 $\Omega$ type-N(m) to type-BNC(f)
013-0410-00	Adapter, coaxial, 50 $\Omega$ type-N (f) to type-N (f)
013-0411-00	Adapter, coaxial, 50 $\Omega$ type-N (m) to type-N (f)
013-0412-00	Adapter, coaxial, 50 $\Omega$ , type-N(m) to type-N(m)
013-0402-00	Adapter, coaxial, 50 $\Omega$ type-N (m) to type-N 7/16(m)
013-0404-00	Adapter, coaxial, 50 $\Omega$ type-N(m) to type-7/16 (f)
013-0403-00	Adapter, coaxial, 50 $\Omega$ type-N(m) to type DIN 9.5(m)
013-0405-00	Adapter, coaxial, 50 $\Omega$ type-N(m) to type-DIN 9.5(f)
013-0406-00	Adapter, coaxial, 50 $\Omega$ type-N(m) to type-SMA(f)
013-0407-00	Adapter, coaxial, 50 $\Omega$ type-N(m) to type-SMA(m)
013-0408-00	Adapter, coaxial, 50 $\Omega$ type-N(m) to type-TNC(f)
013-0409-00	Adapter, coaxial, 50 $\Omega$ type-N(m) to type-TNC(m)

### Attenuators and 50/75 $\Omega$ pads

013-0422-00	Pad, 50/75 $\Omega$ , minimum loss, type-N(m) 50 $\Omega$ to type-BNC(f) 75 $\Omega$
013-0413-00	Pad, 50/75 $\Omega$ , minimum loss, type-N(m) 50 $\Omega$ to type-BNC(m) 75 $\Omega$
013-0415-00	Pad, 50/75 $\Omega$ , minimum loss, type-N(m) 50 $\Omega$ to type-F(m) 75 $\Omega$
015-0787-00	Pad, 50/75 $\Omega$ , minimum loss, type-N(m) 50 $\Omega$ to type-F(f) 75 $\Omega$
015-0788-00	Pad, 50/75 $\Omega$ , minimum loss, type-N(m) 50 $\Omega$ to type-N(f) 75 $\Omega$
011-0222-00	Attenuator, fixed, 10 dB, 2 W, DC-8 GHz, type-N(f) to type-N(f)
011-0223-00	Attenuator, fixed, 10 dB, 2 W, DC-8 GHz, type-N(m) to type-N(f)
011-0224-00	Attenuator, fixed, 10 dB, 2 W, DC-8 GHz, type-N(m) to type-N(m)
011-0228-00	Attenuator, fixed, 3 dB, 2 W, DC-18 GHz, type-N(m) to type-N(f)
011-0225-00	Attenuator, fixed, 40 dB, 100 W, DC-3 GHz, type-N(m) to type-N(f)
011-0226-00	Attenuator, fixed, 40 dB, 50 W, DC-8.5 GHz, type-N(m) to type-N(f)

### Filters, probes, demonstration board

119-7246-00	Pre-filter, general purpose, 824 MHz to 2500 MHz, type-N (f) connector
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119-7426	Pre-filter, general purpose, 2400 MHz to 6200 MHz, type-N (f) connector
119-4146-00	EMCO E/H-field probes
E/H field probes, lower cost alternative	Available from Beehive <a href="http://beehive-electronics.com/">http://beehive-electronics.com/</a>
RSA-DKIT	RSA Version 3 demo board with N-BNC adapter, case, antenna, instructions
011-0227-00	Bias-T, type N(m) RF, type N(f) RF+DC, BNC(f) Bias, 1 W, 0.5 A, 2.5 MHz-6 GHz
<b>Chargers, Additional batteries, Cables, Cases</b>	
WFMBA200	Replacement battery pack for RSA500A series
WFMBC200	External battery charger for WFMBA200, charges two batteries
CF-LNDDC120	Lind 120 W 12-32 Volt input vehicle adapter for RSA500A series and Panasonic Tough Pad (not available in China)
016-2109-01	Additional soft carry-case with shoulder strap
174-6810-00	Additional USB 3.0 cable (2 M), A-A connection, screw lock

### Tracking generator accessories

A variety of calibration kits and phase-stabilized cables are available for the RSA600 tracking generator when used with the optional cable and antenna measurements software.



Calibration Kits for one-port measurements



Phase-stabilized cables from Tekronix for cable and antenna measurements

CALOSLNM	Calibration kit, 3-in-1, open, short, load, DC to 6 GHz, Type-N(m), 50 ohm
CALOSLNF	Calibration kit, 3-in-1, open, short, load, DC to 6 GHz, Type-N(f), 50 ohm
CALOSLNF	Calibration kit, 3-in-1, open, short, load, DC to 6 GHz, 7/16 DIN(m)
CALOSL716F	Calibration kit, 3-in-1, open, short, load, DC to 6 GHz, 7/16 DIN(f)
CALSOLT35F	Calibration kit, 4-in-1 3.5 mm (f) short, open, load, through, 13 GHz
CALSOLT35M	Calibration kit, 4-in-1 3.5 mm (m) short, open, load, through, 13 GHz
CALSOLTNF	Calibration kit, 4-in-1 type-N (f) short, open, load, through, 9 GHz
CALSOLTNM	Calibration kit, 4-in-1 type-N (m) short, open, load, through, 9 GHz
CALSOLT716F	Calibration kit, 4-in-1 7/16 (f) short, open, load, through, 6 GHz
CALSOLT716M	Calibration kit, 4-in-1 7/16 (m) short, open, load, through, 6 GHz
012-1745-00	Cable, rugged, phase-stable, type-N (m) to type-N (f), 5 ft or 1.5 m
012-1746-00	Cable, rugged, phase-stable, type-N(m) to type-N(f), 3.28 ft or 1 m
012-1747-00	Cable, rugged, phase-stable, type-N(m) to 7/16(f), 60 cm (23.6 in.)

012-1748-00	Cable, rugged, phase-stable, type-N(m) to 7/16(f), 3.28 ft or 1 m
012-1749-00	Cable, rugged, phase-stable, type-N(m) to 7/16(f), 5 ft or 1.5 m
012-1750-00	Cable, rugged, phase-stable, type-N(m) to 7/16(m), 3.28 ft or 1 m
012-1751-00	Cable, rugged, phase-stable, type-N(m) to 7/16(m), 5 ft or 1.5 m
012-1752-00	Cable, rugged, phase-stable, type-N(m) to 7/16(m), 60 cm (23.6 in.)
012-1753-00	Cable, rugged, phase-stable, type-N(m) to DIN 9.5(f), 60 cm (23.6 in.)
012-1754-00	Cable, rugged, Phase-stable, type-N(m) to DIN 9.5(f), 3.28 ft or 1 m
012-1755-00	Cable, rugged, phase-stable, type-N(m) to DIN 9.5(f), 5 ft or 1.5 m
012-1756-00	Cable, rugged, phase-stable, type-N(m) to DIN 9.5(m), 3.28 ft or 1 m
012-1757-00	Cable, rugged, phase-stable, type-N(m) to DIN 9.5(m), 5 ft or 1.5 m
012-1758-00	Cable, rugged, phase-stable, type-N(m) to DIN 9.5(m), 60 cm (23.6 in.)
012-1759-00	Cable, rugged, phase-stable, type-N(m) to TNC(f), 3.28 ft or 1 m
012-1760-00	Cable, rugged, phase-stable, type-N(m) to TNC(f), 5 ft or 1.5 m
012-1761-00	Cable, rugged, phase-stable, type-N(m) to TNC(f), 60 cm (23.6 in.)
012-1762-00	Cable, rugged, phase-stable, type-N(m) to TNC(m), 60 cm (23.6 in.)
012-1763-00	Cable, rugged, phase-stable, type-N(m) to TNC(m), 3.28 ft or 1 m
012-1764-00	Cable, rugged, phase-stable, type-N(m) to TNC(m), 5 ft or 1.5 m
012-1765-00	Cable, rugged, phase-stable, type-N(m) to type-N(f), 60 cm (23.6 in.)
012-1766-00	Cable, rugged, phase-stable, type-N(m) to type-N(f), 3.28 ft or 1 m
012-1767-00	Cable, rugged, phase-stable, type-N(m) to type-N(m), 3.28 ft or 1 m
012-1768-00	Cable, rugged, phase-stable, type-N(m) to type-N(m), 60 cm (23.6 in.)
012-1769-00	Cable, rugged, phase-stable, type-N(m) to type-SMA(f), 60 cm (23.6 in.)
012-1770-00	Cable, rugged, phase-stable, type-N(m) to type-SMA(f), 3.28 ft or 1 m
012-1771-00	Cable, rugged, phase-stable, type-N(m) to type-SMA(f), 5 ft or 1.5 m
012-1772-00	Cable, rugged, phase-stable, type-N(m) to type-SMA(m) 60 cm (23.6 in.)
012-1773-00	Cable, rugged, phase-stable, type-N(m) to type-SMA(m), 3.28 ft or 1 m
012-1774-00	Cable, rugged, phase-stable, type-N(m) to type-SMA(m), 5 ft or 1.5 m



Tektronix is registered to ISO 9001 and ISO 14001 by SRI Quality System Registrar.



Product(s) complies with IEEE Standard 488.1-1987, RS-232-C, and with Tektronix Standard Codes and Formats.



Product Area Assessed: The planning, design/development and manufacture of electronic Test and Measurement instruments.

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**For Further Information.** Tektronix maintains a comprehensive, constantly expanding collection of application notes, technical briefs and other resources to help engineers working on the cutting edge of technology. Please visit [www.tek.com](http://www.tek.com).

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