Tektronix®

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)
- High speed full-span sweeps (25.0 GHz/sec) for fast setup and discovery
- Standard GPS/GLONASS/Beidou receiver
- Optional tracking generator for gain/loss, antenna and cable measurements
- DataVu-PC software enables multi-unit recording in variable bandwidths
- SignalVu-PC software offers real time signal processing with DPX Spectrum/Spectrogram to minimize time spent finding transient problems
- 27 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.

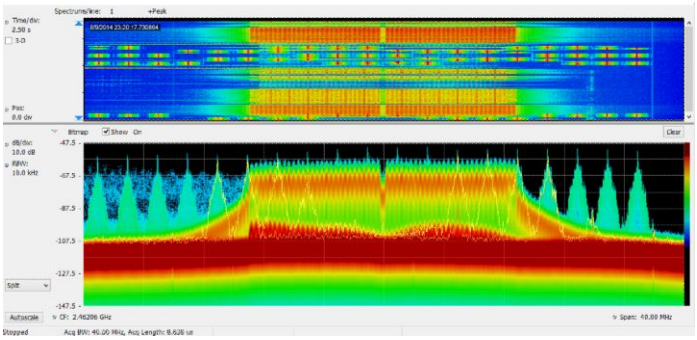
The optional tracking generator enables gain/loss measurements for quick tests of filters, amplifiers, duplexers and other components, and you can add cable and antenna measurements of VSWR, return loss, distance to fault, and cable loss as needed.

SignalVu-PC software offers rich analysis capability for your lab

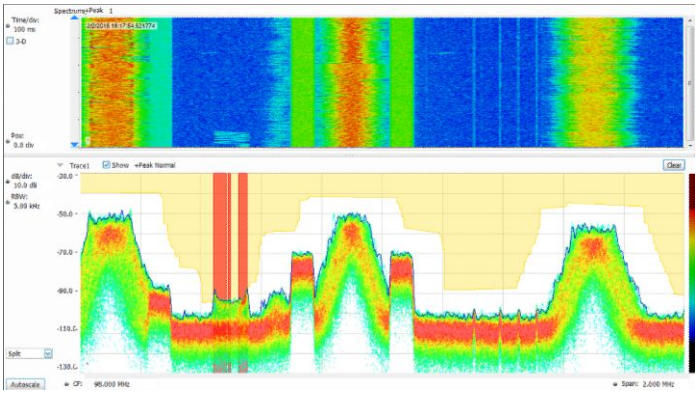
The RSA600 series operates with SignalVu-PC, a powerful program used as the basis of Tek's traditional spectrum analyzers. SignalVu-PC offers a deep analysis capability previously unavailable in low-cost laboratory solutions. Real-time processing of the DPX spectrum/spectrogram is enabled in your PC, 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.

The RSA600A combined with SignalVu-PC offers advanced measurements

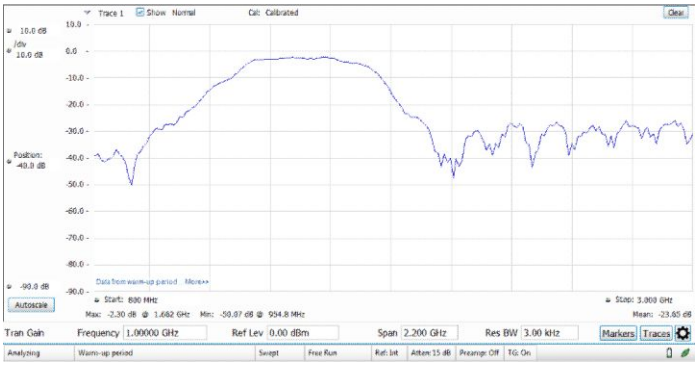
With 40 MHz of real-time bandwidth, the unique DPX spectrum/spectrogram shows you every instance of an interfering or unknown signal, even down to 27 µs in duration. The following image shows a WLAN transmission (green and orange), and the narrow signals that repeat across the screen are a Bluetooth 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.

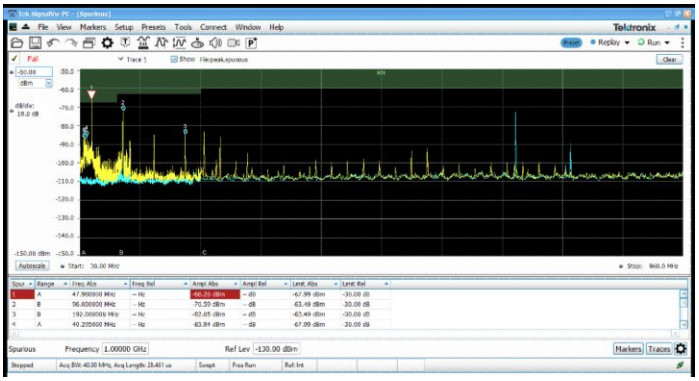


The tracking generator (Option 04 on the RSA600) is controlled via SignalVu-PC. A bandpass filter response from 800 MHz to 3 GHz is shown below. Option SV60 adds return loss, cable loss, and distance to fault.



EMC/EMI

EMI pre-compliance and diagnostic measurements are easy with the instrument and SignalVu-PC. Transducer, antenna, preamplifier, and cable gain/loss can be entered and stored in correction files, and the standard spurious measurement feature of SignalVu-PC can be used to establish limit lines for your test. The following illustration shows a test from 30MHz to 960 MHz against the FCC Part 15 Class A limit shown shaded. The blue trace is the capture of Ambient. Violations are recorded in the results table below the graph. CISPR quasi peak and average detectors can be added with option SVQP.



SignalVu-PC application-specific licenses

SignalVu-PC offers a wealth of application-oriented options available either installed on the instrument, or as a floating license that can be moved between instruments or attached to your PC. Applications include:

- General-purpose modulation analysis (27 modulation types including 16/32/64/256 QAM, QPSK, O-QPSK, GMSK, FSK, APSK)
- EMC/EMI analysis with CISPR peak, quasi-peak, and average detectors
- Buetooth® analysis of Basic Rate, Low Energy, and Bluetooth 5. Some support of 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 and 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.

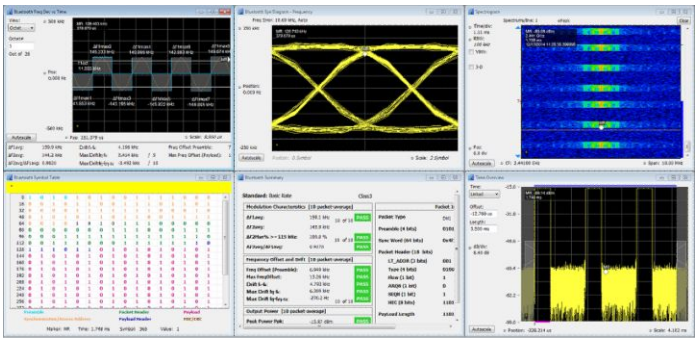
General purpose modulation analysis

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.

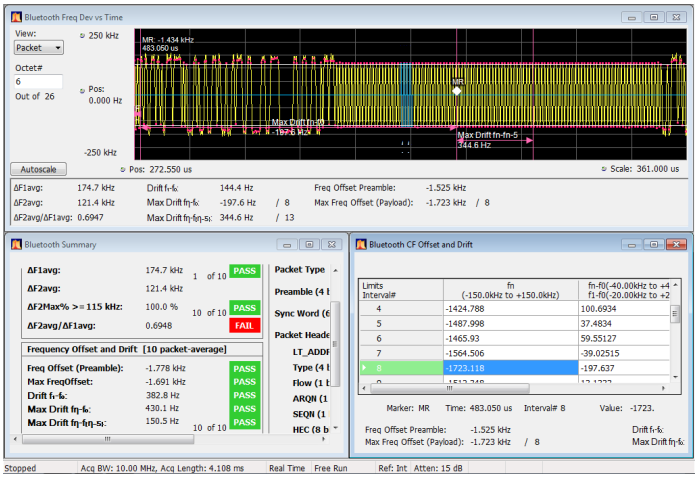
In the illustration above, a 5 GHz carrier modulated with 500 MSymbols/sec pi/4-QPSK is analyzed with the RSA7100A Option B800 and SignalVu-PC application license SVMH. A measurement summary, EVM vs. Time, and constellation display are shown along with the continuous monitoring of the DPX spectrum.

Bluetooth

Two new options have been added to help with Bluetooth SIG standardbase transmitter RF measurements in the time, frequency and modulation domains. Option SV27 supports Basic Rate and Low Energy Transmitter measurements defined by RF.TS.4.2.0 and RF-PHY.TS. 4.2.0 Test Specification. It also demodulates and provides symbol information for Enhanced Data Rate packets. Option SV31 supports Bluetooth 5 standards (LE 1M, LE 2M, LE Coded) and measurements defined in the Core Specification. Both options also decode the physical layer data that is transmitted and color-encode the fields of packet in the Symbol Table for clear identification.

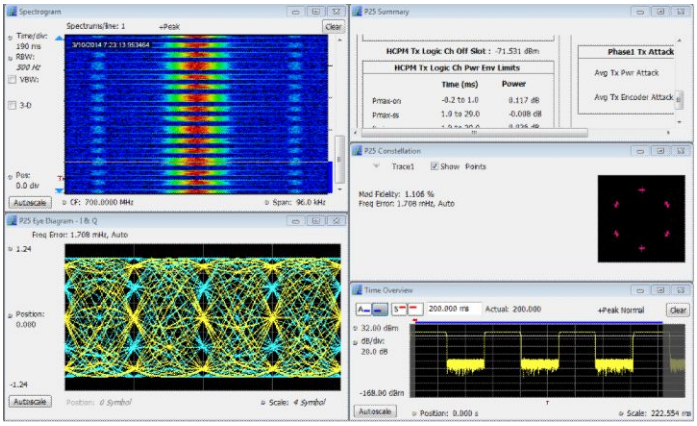


Pass/Fail results are provided with customizable limits. Measurement below shows deviation vs. time, frequency offset and drift and a measurement summary with Pass/Fail results.



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

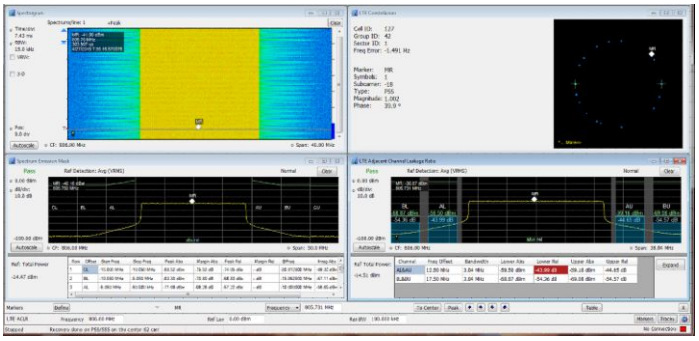
Application SV28 enables the following LTE base station transmitter measurements:

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

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.

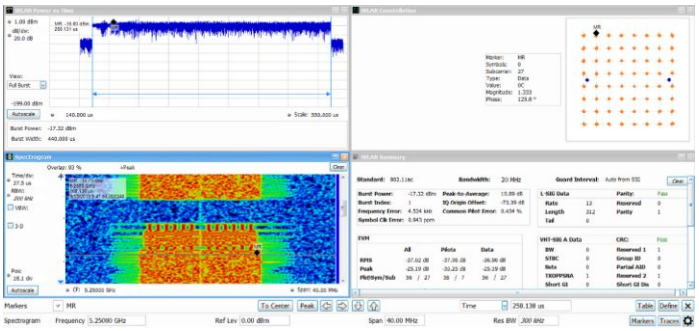
The Cell ID preset displays the Primary Synchronization Signal (PSS) and the Secondary Synchronization Signal (SSS) in a Constellation diagram. It also provides Frequency Error.

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



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.

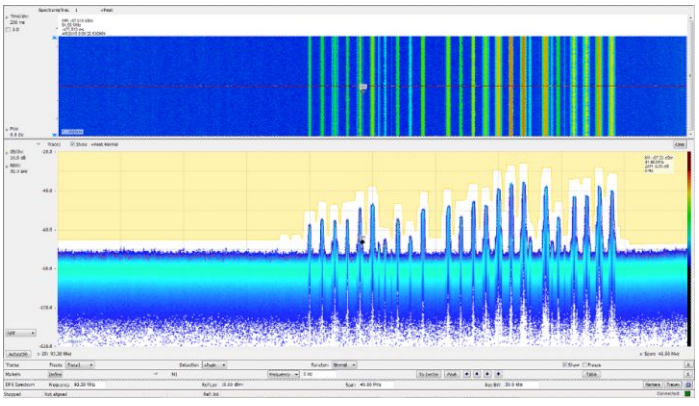


Playback

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

DataVu-PC for multi-instrument recording and analysis of large recordings

DataVu-PC software can control two spectrum analyzers simultaneously with independent settings. This allows you to monitor a wide span, while recording at up to 40 MHz bandwidth at any frequency in the range of the instrument. Once recorded, DataVu-PC can find and mark signals of interest based on amplitude and frequency-mask characteristics, eliminating the need for manual inspection of long recordings. Pulse measurements are available on up to 2,000,000 pulses.

Specifications

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

Frequency

Frequency range

RSA603A	9 kHz to 3 GHz
RSA607A	9 kHz to 7.5 GHz

Frequency marker readout accuracy	±(RE × MF + 0.001 × Span) Hz RE: Reference Frequency Error MF: Marker Frequency [Hz]

Reference frequency accuracy

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	3×10^{-6} (1 year)
Temperature drift	$\pm 0.9 \times 10^{-6}$ (-10 to 60 °C)
External reference input	BNC connector, 50 Ω 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	± 5 ppm
External reference input level	-10 to +10 dBm

GNSS

Accuracy, when locked to GNSS [1]	±0.025 ppm [2]
GNSS Trained Accuracy, when GNSS antenna is disconnected [3] , [4]	±0.025 ppm [5] ±0.08 ppm [6]

RF input

RF input

RF Input Impedance	50 Ω
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)

Maximum RF input level

Maximum DC voltage	±40 V (RF input)
Maximum safe input power	+33 dBm (RF input, 10 MHz to 7.5 GHz, RF Attn ≥ 20 dB) +13 dBm (RF input, 9 kHz to 10 MHz) +20 dBm (RF input, RF Attn < 20 dB)
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)

1 Tested using GPS system.

2 For use to a stability of ±0.025ppm, the unit should be powered on continuously for 2 to 5 days after initial unpacking.

3 Tested using GPS system.

4 For 24 hours continuous operation within temperature limits (see footnotes 5 and 6) after GNSS training. Refer to cumulative error specification if operating in GNSS trained mode beyond 24 hours since last training.

5 For less than 3 °C ambient temperature change after training.

6 For less than 10 °C ambient temperature change after training.

Sweep speed

Full span sweep speed, typical mean [7]	25.0 GHz/sec (RBW = 1 MHz)
	24.7 GHz/sec (RBW = 100 kHz)
	15.7 GHz/sec (RBW = 10 kHz)
	2.0 GHz/sec (RBW = 1 kHz)
Tuning step time via API	2.5 ms

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 ºC to 28 ºC	18 ºC to 28 ºC, typical (95% confidence)	-10 ºC to 55 ºC, 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 ℃ to 28 ℃ , 10 dB RF Attenuator)

Center frequency range	18 ºC to 28 ºC	18 ºC to 28 ºC, typical (95% confidence)	18 ºC to 28 ºC, 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)

7 Measured using a Panasonic Toughpad FZ-G1, Intel® Core™ i5-5300U 2.3GHz Processor, 8GB RAM, 256GB SSD, Windows®7 Pro, power management set to "High Performance". Spectrum display is only measurement on screen.

Amplitude and RF

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 [8]	±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

Trigger

Trigger/Sync input, typical

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

External trigger timing uncertainty

>20 MHz to 40 MHz acquisition bandwidth: ±250 ns

Uncertainty increases as acquisition bandwidth is decreased.

Power trigger

Power trigger, typical

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: ≤ 100 µsec

Power trigger position timing uncertainty

>20 MHz to 40 MHz acquisition bandwidth: ±250 ns

Uncertainty increases as acquisition bandwidth is decreased.

Power trigger level accuracy

±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.

8 Span extents cannot exceed lower frequency limit of the instrument

Noise and distortion

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

3rd Order IM intercept (TOI)	+12 dBm at 2.130 GHz
3rd Order IM intercept (TOI),	
Preamp off, typical	+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)
Preamp on, typical	-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)
3rd Order Inter-modulation distortion	-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.
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

Noise and distortion

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

7.45×10^{-3} radians @ 1 GHz

8.24×10^{-3} radians @ 2 GHz

9.34×10^{-3} 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 [9]

Spurious response

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

Spurious response with signal at half-IF [10]

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)

9 Power supply sidebands, 620-660 kHz: -67 dBc, typical

10 This is an input signal at half of the IF frequency.

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

Tracking generator (Option 04)

Tracking Generator (Option 04)

Frequency range	9 kHz to 3 GHz 9 kHz to 7.5 GHz
Sweep speed, typical mean	0.192 sec/sweep, 101 points, 50 kHz RBW, 980 to 1020 MHz sweep (1.9 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,power management set to "High Performance". Transmission Gain display is only measurement on screen.
Frequency resolution	100 Hz
TG output connector	N type
VSWR	< 1.8:1, 10 MHz to 7.5 GHz, -20 dBm output level
Maximum output power	-3 dBm,10 MHz to 7.5 GHz
Output power level setting range	40 dB, 10 MHz to 7.5 GHz
Output power level step size	1 dB, 10 MHz to 7.5 GHz
Output power level step size accuracy	± 0.5 dB
Output level accuracy	± 1.5 dB, 10 MHz to 7.5 GHz, -20 dBm output level
Harmonics	< -22 dBc, ≥20 MHz
Non-harmonic spurious	< -30 dBc; spurious < 2 GHz from TG output frequency < -25 dBc; spurious ≥ 2 GHz from TG output frequency
Reverse power without damage	40 Vdc, +20 dBm RF

SignalVu-PC standard measurements and performance

Measurements included.

SignalVu-PC/RSA607A key characteristics

Maximum span	40 MHz real-time
	9 kHz - 3 GHz swept
	9 kHz - 7.5 GHz swept
Maximum acquisition time	2.0 s
Minimum IQ resolution	17.9 ns (acquisition BW = 40 MHz)
Tuning Tables	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

Spectrum processing rate (RBW = auto, trace length 801)	≤10,000 spectrums per second
DPX bitmap resolution	201 pixels vertical x 801 pixels horizontal
DPX Spectrogram minimum time resolution [11]	1 ms
	≤10,000 per second (span independent)
Marker information	Amplitude, frequency, signal density

Minimum signal duration for 100% probability of intercept (POI), typical [11]

Minimum signal duration for 100% POI	Test controller
27	Dell Desktop (Windows® 10 Enterprise, Intel® Core™ i7-4790 CPU, 3.6GHz, 8GB RAM, 256GB SSD)
34	Dell Desktop (Windows® 7 Enterprise, Intel® Core™ i7-2600 CPU, 3.4GHz, 8GB RAM, 256GB SSD)
36	Dell Desktop Latitude E6430 (Windows® 10 Enterprise, Intel® Core™ i7-3520M CPU, 2.9GHz, 8GB RAM, 750GB HD)
35	Dell Laptop Precision M4700 (Windows® 8 Enterprise, Intel® Core™ i7-3520M CPU, 2.9GHz, 8GB RAM, 750GB HD)
37	Panasonic ToughPad SAPL-TP-04 (Windows® 7 Pro, Intel® Core™ i5-5300U CPU, 2.3GHz, 8GB RAM, 256GB SSD)

DPX settings: Span=40 MHz, RBW=300 kHz (Auto)

Span range (continuous processing)	1 kHz to 40 MHz
Span range (swept)	Up to maximum frequency range of instrument
Dwell time per step	5 ms to 100 s
Trace processing	Color-graded bitmap, +Peak, -Peak, average
Trace length	801, 2401, 4001, 10401
RBW range	1 kHz to 4.99 MHz

11 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.

SignalVu-PC standard measurements and performance

DPX spectrogram display

Trace detection	+Peak, -Peak, Average(V_{RMS})
Trace length, memory depth	801 (60,000 traces)
	2401 (20,000 traces)
	4001 (12,000 traces)
Time resolution per line	1 ms to 6400 s, user selectable

Spectrum and Spurious display

Traces	Three traces + 1 math trace + 1 trace from spectrogram for Spectrum display; four traces for Spurious display
Trace functions	Normal, Average (VRMS), Max Hold, Min Hold, Average of Logs
Detector	Average (VRMS), Average (of logs), CISPR peak, +Peak, Sample for Spectrum only -Peak; when Option SVQP is enabled, CISPR Quasi Peak and Average
Spectrum trace length	801, 2401, 4001, 8001,10401, 16001, 32001, and 64001 points
RBW range	1.18 Hz to 8 MHz for Spectrum display

Analog modulation analysis (standard)

AM demodulation accuracy, typical	±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
FM demodulation accuracy, typical	±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
PM demodulation accuracy, typical	±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

Signal Strength display

Signal strength indicator	Located at right side of display
Measurement bandwidth	Up to 40 MHz, dependent on span and RBW setting
Tone type	Variable frequency based on received signal strength

Sweep speed

Full-span sweep speed

Full span sweep speed, typical	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
Tuning step time via API	1 ms

SignalVu-PC applications performance summary

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

Carrier frequency range (for modulation and audio measurements)
(1/2 × audio analysis bandwidth) to maximum input frequency

Maximum audio frequency span
10 MHz

FM measurements (Mod. index >0.1)
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

AM measurements
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

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 (µs): 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%

SignalVu-PC applications performance summary

APCO P25 Measurements Application (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.

Bluetooth Measurements Application (SV27xx-SVPC and SV31xx-SVPC)

Supported standards	Bluetooth® 4.2 Basic Rate, Bluetooth® 4.2 Low Energy, Bluetooth® 4.2 Enhanced Data Rate. Bluetooth® 5 when SV31 is enabled.
Measurements	Peak Power, Average Power, Adjacent Channel Power or InBand Emission mask, -20 dB Bandwidth, Frequency Error, Modulation Characteristics including ΔF1avg (11110000), ΔF2avg (10101010), ΔF2 > 115 kHz, ΔF2/ΔF1 ratio, frequency deviation vs. time with packet and octet level measurement information, Carrier Frequency f0, 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
Output power (BR and LE), typical mean	Supported measurements: Average power, peak power Level uncertainty: refer to instrument amplitude and flatness specification Measurement range: signal level > –70 dBm
Modulation characteristics, typical mean	Supported measurements: ΔF_1avg, ΔF_2avg, ΔF_2avg/ ΔF_1avg, ΔF_2max%>=115kHz (basic rate), ΔF_2max%>=115kHz (low energy) Deviation range: ±280 kHz Deviation uncertainty (at 0 dBm): <2 kHz [12] + instrument frequency uncertainty (basic rate) <3 kHz [12] + instrument frequency uncertainty (low energy) Measurement range: Nominal channel frequency ±100 kHz
Initial Carrier Frequency Tolerance (ICFT) (BR and LE), typical mean	Measurement uncertainty (at 0 dBm): <1 kHz [13] + instrument frequency uncertainty Measurement range: Nominal channel frequency ±100 kHz
Carrier Frequency Drift (BR and LE), typical mean	Supported measurements: Max freq. offset, drift f_1- f_0, max drift fn-f_0, max drift fn-f_{n-5} (BR and LE 50 µs) Measurement uncertainty: <1 kHz + instrument frequency uncertainty Measurement range: Nominal channel frequency ±100 kHz
In-band emissions (ACPR) (BR and LE)	Level uncertainty: refer to instrument amplitude and flatness specification

General purpose digital modulation analysis (SVMxx-SVPC)

Modulation formats	BPSK, QPSK, 8PSK, 16QAM, 32QAM, 64QAM, 128QAM, 256QAM, π/2DBPSK, DQPSK, π/4DQPSK, D8PSK, D16PSK, SBPSK, OQPSK, SOQPSK, 16-APSK, 32-APSK, MSK, GFSK, CPM, 2FSK, 4FSK, 8FSK, 16FSK, C4FM
Analysis period	Up to 163,500 samples

12 At nominal power level of 0 dBm

13 At nominal power level of 0 dBm

SignalVu-PC applications performance summary

Measurement filter	Root Raised Cosine, Raised Cosine, Gaussian, Rectangular, IS-95 TX_MEA, IS-95 Base TXEQ_MEA, None
Reference Filter	Gaussian, Raised Cosine, Rectangular, IS-95 REF, None
Filter rolloff factor	α : 0.001 to 1, in 0.001 steps
Measurements	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
Maximum symbol rate	240 M symbols/s
	Modulated signal must be contained entirely within the acquisition bandwidth
Adaptive equalizer	Linear, Decision-Directed, Feed-Forward (FIR) equalizer with coefficient adaptation and adjustable convergence rate. Supports modulation types BPSK, QPSK, OQPSK, DQPSK, π/2DBPSK, π/4DQPSK, 8PSK, D8SPK, D16PSK, 16/32/64/128/256-QAM, 16/32-APSK
QPSK Residual EVM (center frequency = 2 GHz), typical mean	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
256 QAM Residual EVM (center frequency = 2 GHz), typical mean	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)	
Standard Supported	3GPP TS 36.141 Version 12.5
Frame Format supported	FDD and TDD
Measurements and Displays Supported	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 and Secondary Synchronization Signal with Cell ID, Group ID, Sector ID, RS (Reference Signal) Power and Frequency Error.
ACLR with E-UTRA bands (typical, with noise correction)	1st Adjacent Channel 60 dB (RSA607A)
	2nd Adjacent Channel 62 dB (RSA607A)

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

Pulse measurements (SVPxx-SVPC)	
Measurements (nominal)	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 Pulse phase 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.
Minimum pulse width for detection, typical	150 ns
Average ON power at 18 °C to 28 °C, typical	±0.4 dB + absolute amplitude accuracy
	For pulses of 300 ns width or greater, duty cycles of .5 to .001, and S/N ratio ≥ 30 dB

SignalVu-PC applications performance summary

Duty factor, typical	±0.2% of reading
	For pulses of 450 ns width or greater, duty cycles of .5 to .001, and S/N ratio ≥ 30 dB
Average transmitted power, typical	±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
Peak pulse power, typical	±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
Pulse width, typical	±0.25% of reading
	For pulses of 450 ns width or greater, duty cycles of .5 to .001, and S/N ratio ≥ 30 dB

Playback of recorded signals (SV56)	
Playback file type	R3F recorded by RSA306, RSA500, or RSA600
Recorded file bandwidth	40 MHz
File playback controls	General: Play, stop, exit playback
	Location: Begin/end points of playback settable from 0-100%
	Skip: Defined skip size from 73 µs up to 99% of file size
	Live rate: Plays back at 1:1 rate to recording time
	Loop control: Play once, or loop continuously
Memory requirement	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)	
Measurements	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)
Residual EVM - 802.11a/g/j /p (OFDM), 64-QAM, typical	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, ≥16 symbols each
Residual EVM - 802.11b, CCK-11, typical	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)	
Measurements	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)
EVM performance - 802.11n, 64-QAM, typical	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, ≥16 symbols each

SignalVu-PC applications performance summary

WLAN Measurements 802.11ac (SV25xx-SVPC)

Measurements	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)
EVM performance - 802.11ac, 256-QAM, typical	5.8 GHz, 40 MHz BW : -38 dB Input signal level optimized for best EVM, average of 20 bursts, ≥16 symbols each

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

Measurements	Return Loss, Cable Loss, Distance-to-Fault (DTF)
Frequency range	10 MHz to 3 GHz (RSA603A) 10 MHz to 7.5 GHz (RSA607A)
Sweep speed [14]	5 ms/point, Return Loss measurement 5 ms/point, Distance-to-Fault measurement 5 ms/point, Cable Loss measurement
Frequency resolution	500 Hz
Return Loss measurement error	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
Return Loss measurement error at 14 dB Return Loss	±1.5 dB from 10 MHz to 6.8 GHz ±3.0 dB from 6.8 GHz to 7.5 GHz
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 (High power test level. Interferer not included in accuracy assessment.)

[14] 201 point sweep Measured using a Panasonic Toughpad FZ-G1, Intel® Core™ i5-5300U 2.3GHz Processor, 8GB RAM, 256GB SSD, Windows®7 Pro. Return Loss,Cable Loss, or Distance-to-Fault display is the only measurement on screen.

SignalVu-PC applications performance summary

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:

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

Where:

V_p = Cable velocity factor relative to the speed of light

c = Speed of light (m/s)

F_{start} = Sweep start frequency (Hz)

F_{stop} = Sweep stop frequency (Hz)

N = number of sweep points

Distance-to-Fault resolution

RSA603A, (RG-58Vp=0.66): 0.03 m (User Definable)

RSA607A, (RG-58Vp=0.66): 0.01 m (User Definable)

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

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

or

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

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 µS Turn off: 500 µS

Input and output ports

Inputs, outputs, and inferfaces

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

Installation requirements

Maximum power dissipation (fully loaded)	RSA600A: 45 W maximum.
Surge current	2 A peak maximum, at 25 °C (77 °F) for ≤ 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.)

Physical characteristics

Physical characteristics	
Height	75.0 mm (2.95 in)
Width	222.3 mm (8.75 in)
Depth	358.6 mm (14.12 in)
Net weight	2.79 kg (6.15 pounds)

Environmental and safety

Temperature	
Operating	-10 °C to +55 °C (+14 °F to +131 °F)
Non-operating	-51 °C to +71 °C (-60 °F to +160 °F)
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
Altitude	
Operating	Up to 3000 m (9,842 ft.)
Non-operating	Up to 12000 m (39,370 ft.)

Dynamics

Vibration	
Operating	Tektronix Class 3 Random Vibration Test at 0.31 GRMS: 5-500 Hz, 3 Axes at 10 min/axis
Non-Operating	MIL-PRF-28800F Class 3
	2.06 GRMS, 5 500 Hz, 10 minutes per axis, 3 axes (30 minutes total)
Shock	
Operating	Test method per Military Standard MIL-PRF-28800F 1-4
Non-Operating	Exceeds the requirements of Military Standard MIL-PRF-28800F
Handling and transit	
Bench handling, operating	MIL-PRF-28800F Class 3
Transit drop, non-operating	MIL-PRF-28800F Class 2

Ordering information

Instrument models

RSA603A: USB real time spectrum analyzer, 9 kHz - 3.0 GHz, 40 MHz acquisition bandwidth

RSA607A: USB real time spectrum analyzer, 9 kHz - 3.0 GHz, 40 MHz acquisition bandwidth

The RSA600 series instruments require a PC with Windows 7, Windows 8/8.1, or Windows 10, 64-bit operating system and a USB 3.0 connection. 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. A GPS antenna is not included with the instrument. See Accessories for available GPS antennas.

Instrument options

Option	Description
Option 04	Tracking generator, 9 kHz to maximum frequency of instrument

Controller ordered as an option to your instrument	Description
Option CTRL-G1-B	Portable controller, Brazil power, see country list for availability
Option CTRL-G1-C	Portable controller, China power, see country list for availability
Option CTRL-G1-E	Portable controller, Europe power, see country list for availability
Option CTRL-G1-I	Portable controller, India power, see country list for availability
Option CTRL-G1-N	Portable controller, North American power, see country list for availability
Option CTRL-G1-U	Portable controller, UK power, see country list for availability

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 [15]	Li-ion battery, standard capacity
FZ-VZSU88U [15]	Long-life battery pack for Panasonic ToughPad FZ-G1
FZ-BNDLG1BATCHRG[9]	Single battery charger bundle for FZ-G1. 1 charger and 1 adapter
CF-LNDDC120[9]	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

15 Not available in China, Hong Kong, Macau or Mongolia

Licenses

Licenses

A variety of optional, licensed applications are available for purchase for SignalVu-PC. These licenses can be associated with and stored on either your PC or any RSA300 series, RSA500 series, RSA600 series, and RSA7100A spectrum analyzers. Licenses can be purchased as an option to your hardware or separately as a Node-locked or a Floating license.

Contact your local Tektronix Account Manager to purchase a license. If your purchased license is not ordered as an option to your instrument, you will receive an email with a list of the applications purchased and the URL to the Tektronix Product License Web page, where you will create an account and can then manage your licenses using the Tektronix Asset Management System (AMS): http://www.tek.com/products/product-license.

AMS provides an inventory of the license(s) in your account. It enables you to check out or check in a license and view the history of licenses.

Optional applications are enabled by one of the following license types.

License type	Description
Node locked license (NL) purchased as an option to your instrument	This license i s initially assigned to a specific host id, which can be either a PC or an instrument. It can be reassociated to either a PC or another spectrum analyzer two times using Tek AMS. When associated with an instrument, this license is factory-installed on that instrument at the time of manufacture. It will be recognized by any PC operating with SignalVu-PC when the instrument is connected. However, the licensed application is deactivated from the PC if the licensed instrument is disconnected. This is the most common form of licensing, as it simplifies management of your applications.
Node locked license (NL) purchased separately	This license is initially assigned to a specific host id, which can be either a PC or an instrument. It can be reassociated to either a PC or instrument two times using Tek AMS. This license is delivered via email and is associated with either your PC or with an instrument when you install the license. This license should be purchased when you want your license to stay on your PC, or if you have an existing USB instrument on which you would like to install a license.
Floating license(FL) purchased separately	This license can be moved between different host ids, which can be either PCs or instruments. It can be reassociated to different PCs or instruments an unlimited number of times using Tek AMS. This license is delivered via email and is associated with either your PC or with an instrument when you install the license. This is the most flexible license and is recommended in applications where the license needs to be moved frequently.

SignalVu-PC application-specific modules

The following SignalVu-PC license options are available.

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

Application license	Description
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
SV31NL-SVPC	Bluetooth 5 measurements (requires SV27) - Node Locked License
SV31FL-SVPC	Bluetooth 5 measurements (requires SV27) - 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
CONNL-SVPC	SignalVu-PC connection to the MDO4000B series mixed-domain oscilloscopes - Node Locked License
CONFL-SVPC	SignalVu-PC connection 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 (only for offline analysis)
SV30FL-SVPC	WiGig 802.11ad measurements - Floating License (only for offline analysis)
SVQPNL-SVPC	EMI CISPR detectors - Node Locked License
SVQPFL-SVPC	EMI CISPR detectors - 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 RSA600A series.

General purpose RF cables	
012-1738-00	Cable,50 Ω, 40 inch,type-N(m) to type-N(M)
012-0482-00	Cable, 50 Ω, BNC (m) 3 foot (91 cm)
Adapters	
103-0045-00	Adapter, coaxial, 50 Ω type-N(m) to type-BNC(f)
013-0410-00	Adapter, coaxial, 50 Ω type-N (f) to type-N (f)
013-0411-00	Adapter, coaxial, 50 Ω type-N (m) to type-N (f)
013-0412-00	Adapter, coaxial, 50 Ω, type-N(m) to type-N(m)
013-0402-00	Adapter, coaxial, 50 Ω type-N (m) to type-N 7/16(m)
013-0404-00	Adapter, coaxial, 50 Ω type-N(m) to type-7/16 (f)
013-0403-00	Adapter, coaxial, 50 Ω type-N(m) to type DIN 9.5(m)
013-0405-00	Adapter, coaxial, 50 Ω type-N(m) to type-DIN 9.5(f)
013-0406-00	Adapter, coaxial, 50 Ω type-N(m) to type-SMA(f)
013-0407-00	Adapter, coaxial, 50 Ω type-N(m) to type-SMA(m)
013-0408-00	Adapter, coaxial, 50 Ω type-N(m) to type-TNC(f)
013-0409-00	Adapter, coaxial, 50 Ω type-N(m) to type-TNC(m)
Attenuators and 50/75 Ω pads	
013-0422-00	Pad, 50/75 Ω, minimum loss, type-N(m) 50 Ω to type-BNC(f) 75 Ω
013-0413-00	Pad, 50/75 Ω, minimum loss, type-N(m) 50 Ω to type-BNC(m) 75 Ω
013-0415-00	Pad, 50/75 Ω, minimum loss, type-N(m) 50 Ω to type-F(m) 75 Ω
015-0787-00	Pad, 50/75 Ω, minimum loss, type-N(m) 50 Ω to type-F(f) 75 Ω
015-0788-00	Pad, 50/75 Ω, minimum loss, type-N(m) 50 Ω to type-N(f) 75 Ω
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)
Antennas	
119-6609-00	Flexible whip antenna, BNC-Male connector, PVC-coated, approximately 8 inches length. Center of sensitivity approximately 136 MHz, passband 5-1080 MHz,
119-8733-00	Antenna, Active. GPS & GLONASS, magnetic mount, 5M cable, 3V, 8ma SMA connector, RG-174 Cable
119-8734-00	Antenna, Active, GPS and Beidou, magnetic mount, 5M cable, 3V, 8ma SMA connector, RG-174 Cable
Filters, probes, demonstration board, Bias-T	

119-7246-00	Pre-filter, general purpose, 824 MHz to 2500 MHz, type-N (f) connector
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 http://beehive-electronics.com/
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
Chargers, Additional batteries, Cables, Cases	
WFM200BA	Replacement battery pack for RSA500A series
WFM200BC	External battery charger for WFM200BA, charges two batteries
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
RSA5600RACK	Rackmount, RSA500 and RSA600 Series. Holds 1 RSA500A or 2 RSA600A models

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 can be used to improve the factory calibration of the tracking generator when equipped with application SV60-Return loss, VSWR, cable loss, and distance to fault.

These phase-stabilized cables are high performance cables that are phase-stable to +- 2 degrees at 7.5 GHz, with return loss less than -20 dB. Velocity constant is 0.78. Loss at 7.5 GHz specified to be less than -1.05 dB (0.6 m), -1.61 dB (1.0 m), -2.30 dB (1.5m) (all values nominal).

Calibration Kits for one-port measurements

Phase-stabilized cables from Tekronix for cable and antenna measurements

Calibration kits	
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
Phase-stabilized cables	
012-1745-00	Type-N (m) to type-N (f), 5 ft or 1.5 m
012-1746-00	Type-N(m) to type-N(m), 5 ft or 1.5 m
012-1747-00	Type-N(m) to 7/16(f), 60 cm (23.6 in.)
012-1748-00	Type-N(m) to 7/16(f), 3.28 ft or 1 m
012-1749-00	Type-N(m) to 7/16(f), 5 ft or 1.5 m
012-1750-00	Type-N(m) to 7/16(m), 3.28 ft or 1 m
012-1751-00	Type-N(m) to 7/16(m), 5 ft or 1.5 m
012-1752-00	Type-N(m) to 7/16(m), 60 cm (23.6 in.)
012-1753-00	Type-N(m) to DIN 9.5(f), 60 cm (23.6 in.)
012-1754-00	Type-N(m) to DIN 9.5(f), 3.28 ft or 1 m
012-1755-00	Type-N(m) to DIN 9.5(f), 5 ft or 1.5 m
012-1756-00	Type-N(m) to DIN 9.5(m), 3.28 ft or 1 m
012-1757-00	Type-N(m) to DIN 9.5(m), 5 ft or 1.5 m
012-1758-00	Type-N(m) to DIN 9.5(m), 60 cm (23.6 in.)
012-1759-00	Type-N(m) to TNC(f), 3.28 ft or 1 m
012-1760-00	Type-N(m) to TNC(f), 5 ft or 1.5 m
012-1761-00	Type-N(m) to TNC(f), 60 cm (23.6 in.)
012-1762-00	Type-N(m) to TNC(m), 60 cm (23.6 in.)
012-1763-00	Type-N(m) to TNC(m), 3.28 ft or 1 m
012-1764-00	Type-N(m) to TNC(m), 5 ft or 1.5 m
012-1765-00	Type-N(m) to type-N(f), 60 cm (23.6 in.)
012-1766-00	Type-N(m) to type-N(f), 3.28 ft or 1 m
012-1767-00	Type-N(m) to type-N(m), 3.28 ft or 1 m
012-1768-00	Type-N(m) to type-N(m), 60 cm (23.6 in.)
012-1769-00	Type-N(m) to type-SMA(f), 60 cm (23.6 in.)
012-1770-00	Type-N(m) to type-SMA(f), 3.28 ft or 1 m
012-1771-00	Type-N(m) to type-SMA(f), 5 ft or 1.5 m
012-1772-00	Type-N(m) to type-SMA(m) 60 cm (23.6 in.)
012-1773-00	Type-N(m) to type-SMA(m), 3.28 ft or 1 m
012-1774-00	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.

07 Sep 2017 37W-60397-4

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