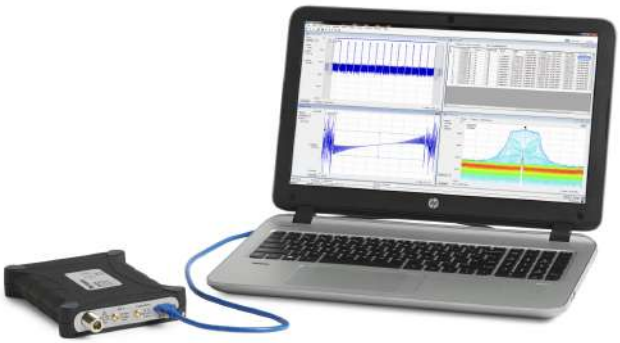
Tektronix®

RSA306B Spectrum Analyzer Datasheet

RSA306B USB Real Time Spectrum Analyzer Datasheet



The RSA306B uses your PC and Tektronix SignalVu-PC™ RF Signal Analysis Software to provide real time spectrum analysis, streaming capture and deep signal analysis capabilities for signals from 9 kHz to 6.2 GHz, all in a low-cost, highly portable package that is ideal for field, factory, or academic use.

Key performance specifications

- 9 kHz to 6.2 GHz frequency range covers a broad range of analysis needs
- +20 dBm to -160 dBm measurement range
- Mil-Std 28800 Class 2 environmental, shock and vibration specifications for use in harsh conditions
- Fast sweeps (2 per second) over entire 6.2 GHz span for quick detection of unknown signals
- Acquisition bandwidth of 40 MHz enables wideband vector analysis of modern standards
- Minimum signal duration as short as 15 µsec captured with 100% probability of intercept

Key features

- Full-featured spectrum analysis capability with included Tektronix SignalVu-PC™ software
- Signal analysis performance improves by pairing the USB RSA306B with more powerful host computers
- 17 spectrum and signal analysis measurement displays enable dozens of measurement types
- Time-qualified triggers enable capture of events at desired pulse widths, ideal for capturing dynamic test environments
- Frequency mask triggers facilitate definition of a spectrum mask to capture events or signal anomalies based on their frequency and amplitude
- DPX density trigger lets you analyze and measure infrequent or elusive RF events by defining a spectrum measurement box then based on how frequently the instrument detects RF power within this box, it can trigger to capture the signal
- Options for mapping, modulation analysis, WLAN, LTE, and Bluetooth standards support, pulse measurements, playback of recorded files, signal survey, and frequency/phase settling
- EMC/EMI pre-compliance and troubleshooting - CISPR detectors, predefined standards, limit lines, easy accessory setup, ambient capture, failure analysis, and report generation
- DataVu-PC software enables multi-unit recording in variable bandwidths
- Real time Spectrum/Spectrogram display to minimize time spent on transient and interference hunting
- Application programming interface (API) included for Microsoft Windows and Linux environments
- MATLAB instrument driver for use with Instrument Control Toolbox
- Streaming capture records long-term events
- Three year warranty

Applications

- Academics/education
- Maintenance, installation and repair in the factory or field
- Value-conscious design and manufacturing
- Interference hunting

The RSA306B: a new class of instrument

The RSA306B offers full featured spectrum analysis and deep signal analysis at a very attractive price. Using a fast USB3 interface and a user's computer, the RSA306B separates signal acquisition from measurement, dramatically lowering the cost of instrument hardware. The data analysis, storage, and replay is performed on your personal computer, tablet, or laptop. Managing the PC separately from the acquisition hardware makes computer upgrades easy, and minimizes IT management issues.

SignalVu-PC™ software and an API for deep analysis and fast programmatic interaction

The RSA306B operates with SignalVu-PC, a powerful program that is the basis of Tektronix performance signal analyzers. SignalVu-PC offers a deep analysis capability previously unavailable in value-priced 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. The API supports simultaneous control of up to four devices and is compatible with both Windows and Linux operating systems, enabling flexible and scalable deployments. A MATLAB driver for the API is available, enabling operation with MATLAB and the Instrument Control Toolbox.

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.

Measurements included in SignalVu-PC base version

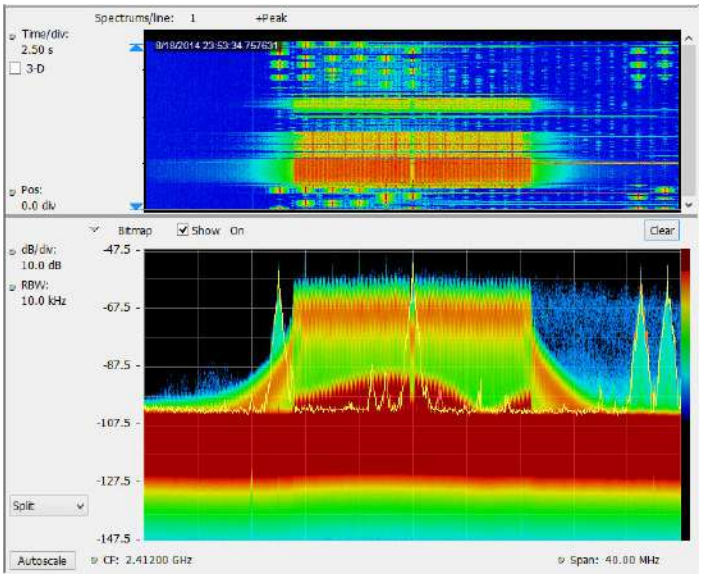
Basic functionality of the free SignalVu-PC program is far from basic. The table below summarizes the measurements included in the free SignalVu-PC software.

General signal analysis	
Spectrum analyzer	Spans from 1 kHz to 6.2 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 15 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
Analog modulation analysis	
AM, FM, PM analysis	Measures key AM, FM, PM parameters
RF measurements	
Spurious measurement	User-defined limit lines and regions provide automatic spectrum violation testing across the entire range of the instrument; Four traces can be saved and recalled; CISPR Quasi-Peak and Average detectors available with option SVQP
Spectrum emission mask	User-defined or standards-specific masks
Occupied Bandwidth	Measures 99% power, -xdB 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

Table continued…

The RSA306B with SignalVu-PC offers basic and advanced measurements for field and lab

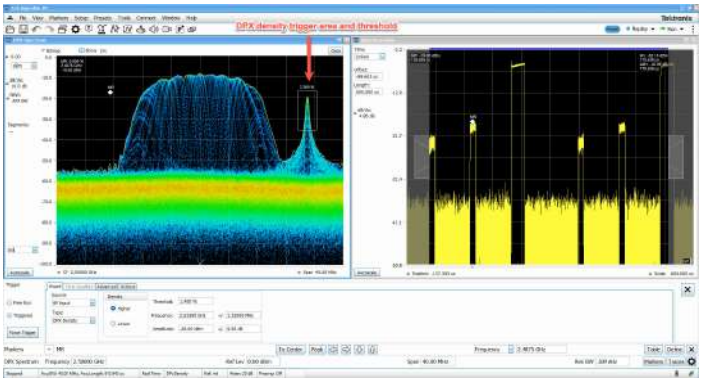
See what you've never seen before: The 40 MHz real time bandwidth of the RSA306B combined with the processing power of SignalVu-PC shows you every signal, even down to 15 µs in duration when a high performance PC is used. The following image shows a WLAN transmission (green and orange), and the narrow 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.



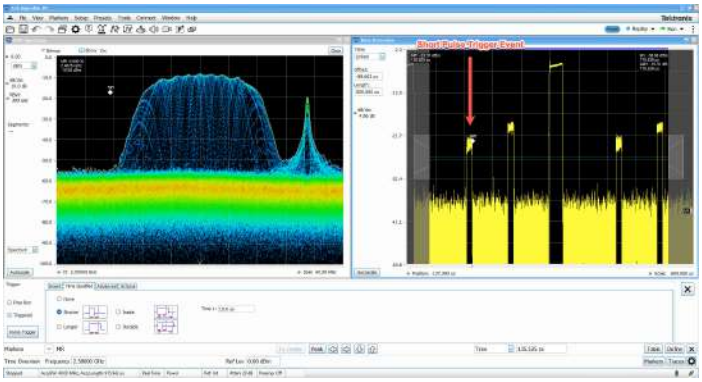
Advanced Triggers

SignalVu's advanced triggers simplify the task of acquiring pulsed, transient, or unexpected RF signals, as well as elusive, over-the-air RF signals in the field. Use the Time Qualified Trigger to specify the duration of a pulse or signal event to trigger an acquisition. Enable DPX Density Trigger to activate a capture only when a signal appears in a certain area of the spectrum with a specific amount of power and duration.

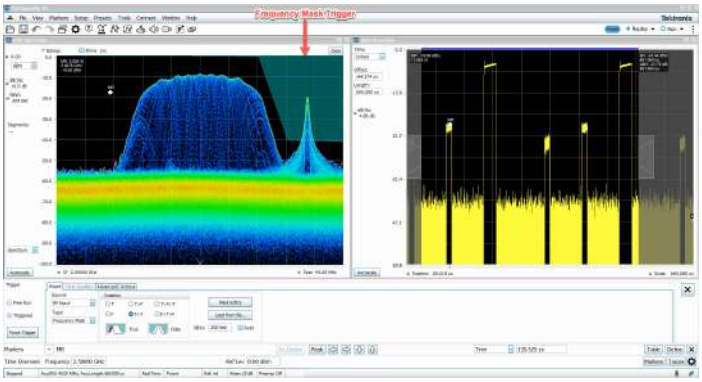
Define a Frequency Mask Trigger to capture only signals that appear in or outside of this predefined area.



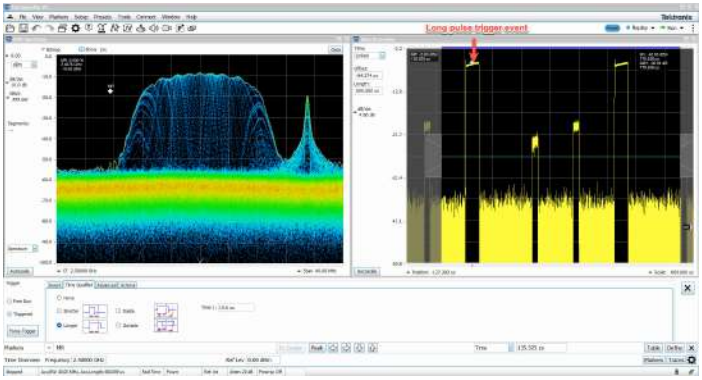
Density trigger threshold



Time qualified short pulse



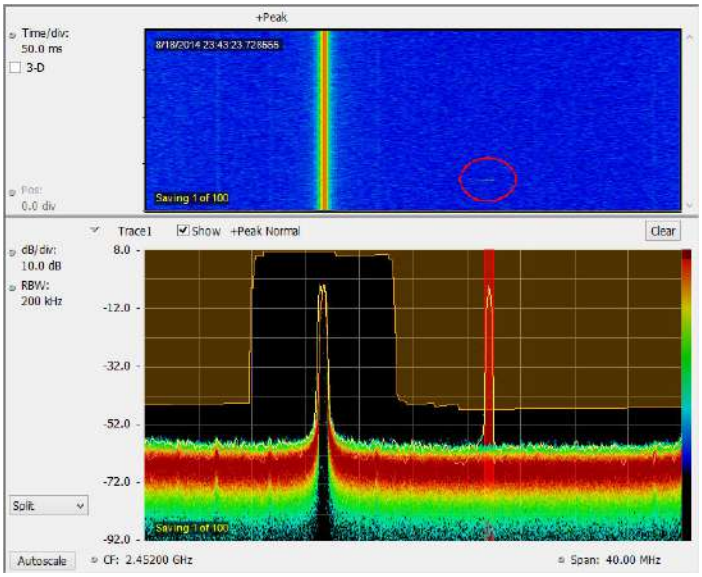
Frequency mask trigger



Time qualified long pulse

Spectrum monitoring

Monitoring has never been easier. Spectrum mask testing captures detail of transients found in the frequency domain, such as intermittent interference. Mask testing can be set to stop acquisition, save acquisition, save a picture, and send an audible alert. The following image shows a spectrum mask (in orange on the spectrum display) created to monitor a band of frequencies for violations. A single transient of 125 µs duration has occurred that violated the mask, with the violation shown in red. The transient is clearly seen on the spectrogram above the red violation area (circled).

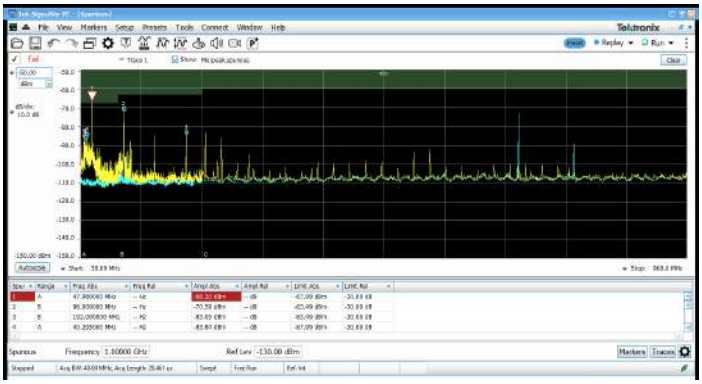


EMC/EMI

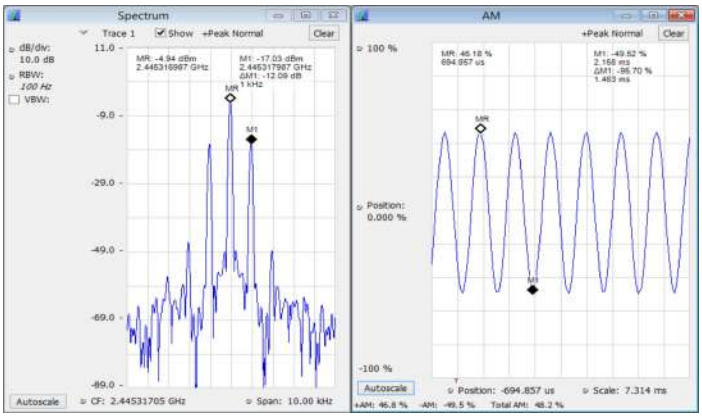
EMI pre-compliance and diagnostic measurements are easy with the RSA306B and SignalVu-PC. Transducer, antenna, preamplifier, and cable gain/loss can be entered and stored in correction files, and the standard spurious measurement feature of SignalVu-PC can be used to establish limit lines for your test. 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.

The EMC pre-compliance solution can be added with option EMCVU. It supports many predefined limit lines. It also adds a wizard for easy setup of recommended antennas, LISN, and other EMC accessories with a one-button

push. When using the new EMC-EMI display, you can accelerate the test by applying the time consuming quasi peak only on failures. This display also provides a push-button ambient measurement. The Inspect tool lets you measure frequencies of interest locally, removing the need for scanning.



Analysis of AM and FM signals is standard in SignalVu-PC. The following screen shot shows a 1 kHz tone amplitude modulating a carrier to 48.9% total AM. Markers are used on the spectrum display to measure the modulation sideband at 1 kHz offset, 12.28 dB down from the carrier. The same signal is simultaneously viewed in the modulation display, showing AM versus time, with +Peak, -Peak and Total AM measurements. Advanced measurements for analog audio modulation including SINAD, THD and modulation rate are available in Option SVA.

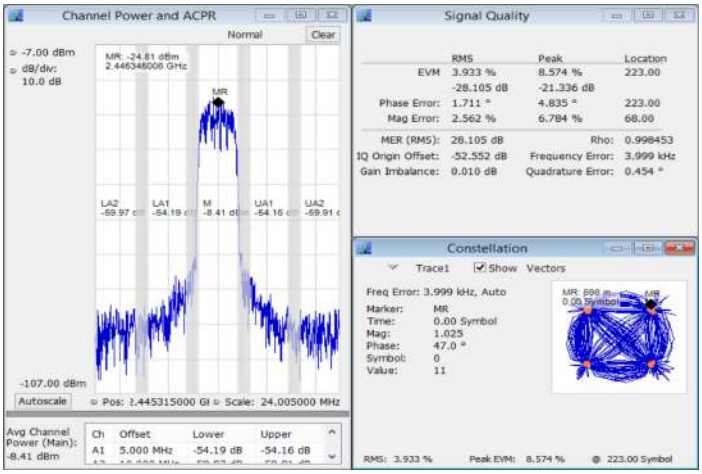


SignalVu-PC application-specific licenses

SignalVu-PC offers a wealth of application-oriented measurement and analysis licenses including:

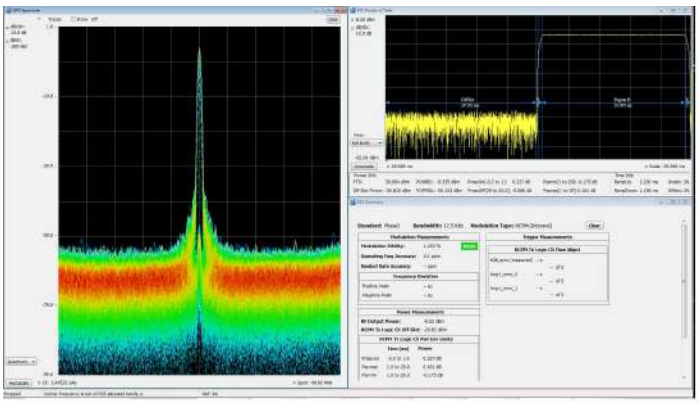
- General-purpose digital modulation analysis (SVM) supporting 26 modulation types from FSK to 1024QAM
- EMC/EMI analysis with CISPR peak, quasi-peak, and average detectors
- P25 analysis of phase I and phase 2 signals
- WLAN analysis of 802.11a/b/g/j/p, 802.11n, 802.11ac
- LTE™ FDD and TDD Base Station (eNB) Cell ID & RF measurements
- 5G New Radio (NR) uplink/downlink RF power, Power dynamics, Signal quality, and Emissions measurements
- Bluetooth® analysis of Basic Rate, Low Energy, and Bluetooth 5. Some support of Enhanced Data Rate
- Mapping and signal strength
- 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

Any of these licenses above enable SignalVu's advanced triggering capabilities: Time qualified, DPX density, and Frequency mask triggers. Modulation analysis application SVM enables multiple displays of modulation quality. The following screen shot shows the standard Channel Power/ACLR measurement combined with a constellation display and vector signal quality measurements on a QPSK signal.



APCO P25

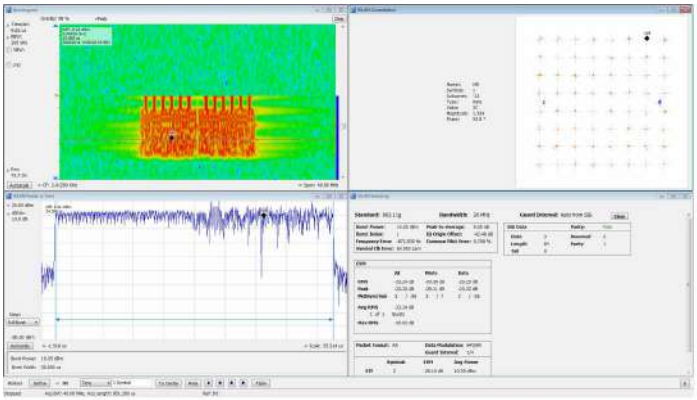
SignalVu-PC application SV26 enables quick, standards-based transmitter health checks on APCO P25 signals. The following image shows a Phase II signal being monitored for anomalies with the spectrum analyzer while performing transmitter power, modulation and frequency measurements.



WLAN

Sophisticated WLAN measurements are easy. On the 802.11g signal shown below, 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 -33.24 dB RMS, and burst power is measured at 10.35 dBm. SignalVu-PC

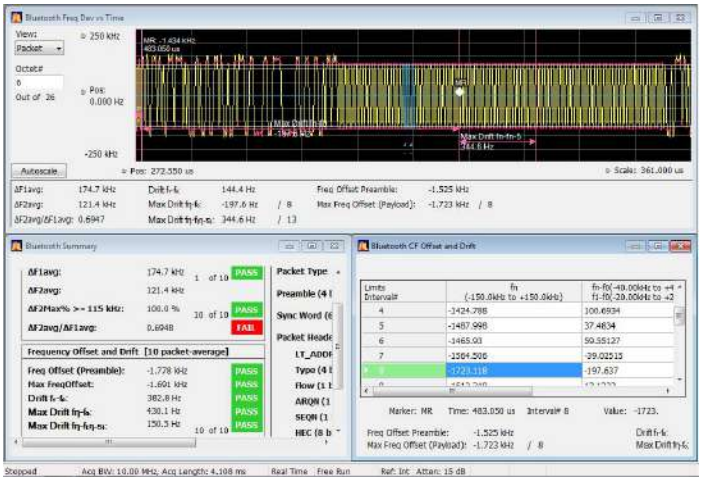
applications are available for 802.11a/b/j/g/p, 802.11n and 802.11ac to 40 MHz bandwidth.



Bluetooth

Two new options have been added to help with Bluetooth SIG standard-base 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.



LTE

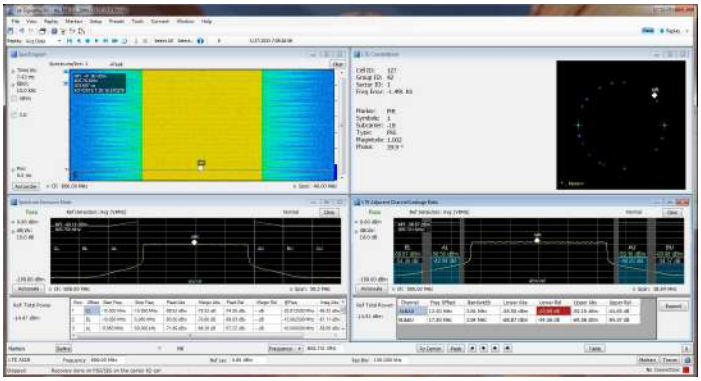
Application SV28 enables the following LTE base station transmitter measurements:

- Cell ID
- Channel Power
- Occupied Bandwidth
- Adjacent Channel Leakage Ratio (ACLR)
- Spectrum Emission Mask (SEM)
- Transmitter Off Power for TDD
- Reference Signal (RS) Power

There are four presets to accelerate pre-compliance testing and determine the Cell ID. These presets are defined as Cell ID, ACLR, SEM, Channel Power and TDD Toff 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 ACLR preset measures the E-UTRA and the UTRA adjacent channels, with different chip rates for UTRA. ACLR also supports Noise Correction based on the noise measured when there is no input. Both ACLR and SEM will operate in swept mode (default) or in faster single acquisition (real-time) when the measurement bandwidth required is less than 40 MHz.



5G NR modulation analysis and measurements option

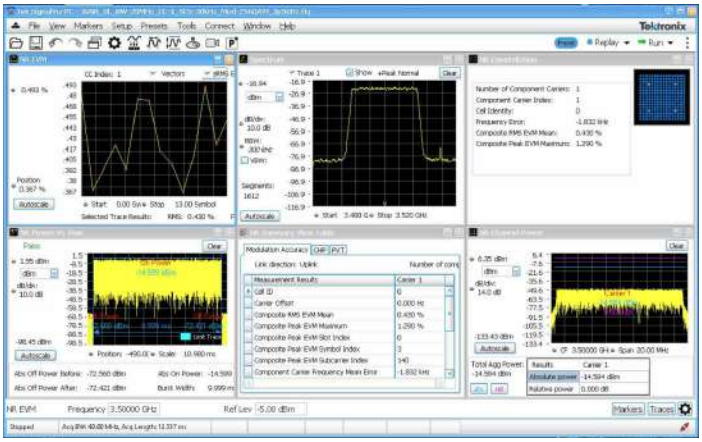
5G NR is among the growing set of signal standards, applications, and modulation types supported.

The 5G NR analysis option provides comprehensive analysis capabilities in the frequency, time, and modulation domains for signals based on the 3GPP's 5G NR specification.

By configuring result traces of spectrum, acquisition time, and NR specific modulation quality (e.g, EVM, frequency error, I/Q error) traces and tables, engineers can identify overall signal characteristics and troubleshoot intermittent error peaks or repeated synchronization failures.

Error Vector Magnitude (EVM) is a figure of merit used to describe signal quality. It does this by measuring the difference on the I/Q plane between the ideal constellation point of the given symbol versus the actual measured point. It can be measured in dB or % of the ideal subsymbol, normalized to the average QAM power received, and display constellation of symbols vs ideal symbol. The EVM vs Symbol or EVM vs Time gives the EVM of OFDM symbols present in the number of symbols considered or the time within a slot.

For automated testing, SCPI remote interfaces are available to accelerate design, which enables the quick transition to the design verification and manufacturing phases.



Constellation, Summary View, CHP, and SEM displays supported in option 5G NR

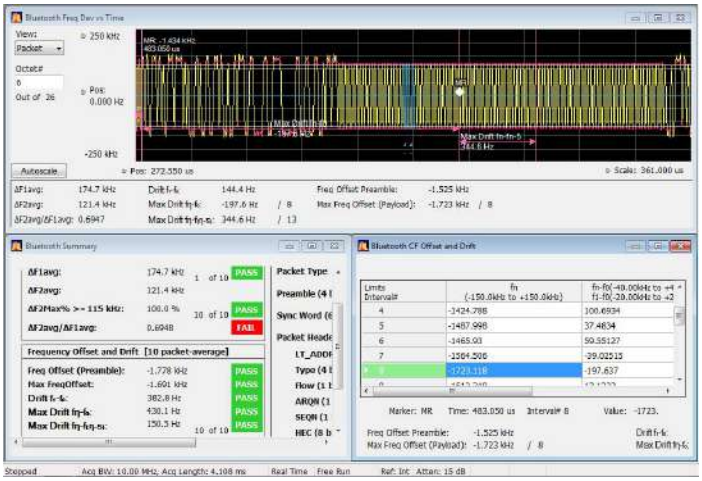
5G NR transmitter measurements core supported features

5G NR option (5GNRNL-SVPC) supports 5G NR modulation analysis measurements according to Release 15 and Release 16 of 3GPP's TS38 specification, including:

- Analysis of uplink and downlink frame structures
- 5G NR measurements and displays including
- Modulation Accuracy (ModAcc)
- Channel Power (CHP)
- Adjacent Channel Power (ACP)
- Spectrum Emission Mask (SEM)
- Occupied Bandwidth (OBW)
- Power Vs Time (PVT)[1]
- Error Vector Magnitude (EVM)
- Summary table with all scalar results for ModAcc, SEM, CHP, ACP, OBW, PVT, and EVM measurements
- In-depth analysis and troubleshooting with coupled measurements across domains, use multiple markers to correlate results to find root-cause.
- Saves reports in CSV format with configuration parameters and measurement results
- Configurable parameters of PDSCH or PUSCH for each component carrier
- For downlink, supported test models for FDD and TDD per 3GPP specifications

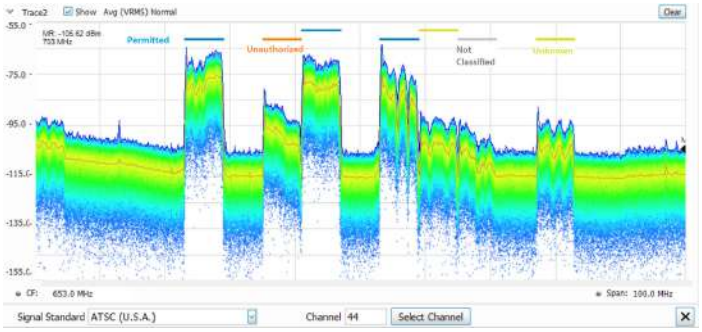
Mapping

The SignalVu-PC MAP application enables interference hunting and location analysis. Locate interference with an azimuth function that lets you draw a line or an arrow on a mapped measurement to indicate the direction your antenna was pointing when you take a measurement. You can also create and display measurement labels.



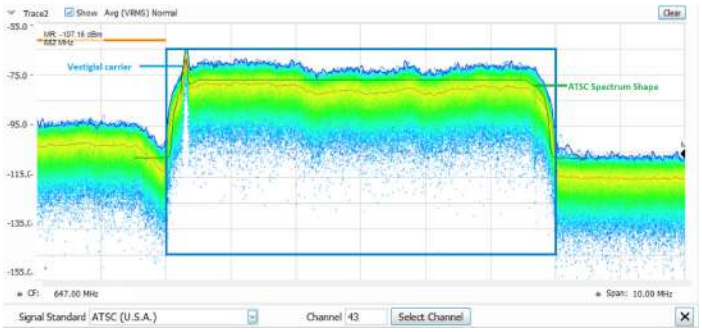
Signal survey/classification

The signal classification application (SV54) enables expert systems guidance to aid the user in classifying signals. It provides graphical tools that allow you to quickly create a spectral region of interest, enabling you to classify and sort signals efficiently. The spectral profile mask, when overlaid on top of a trace, provides signal shape guidance, while frequency, bandwidth, channel number, and location are displayed allowing for quick checks. WLAN, GSM, W-CDMA, CDMA, Bluetooth standard and enhanced data rate, LTE FDD and TDD, and ATSC signals can be quickly and simply classified. Databases can be imported from your H500/RSA2500 signal database library for easy transition to the new software base.



Above is a typical signal survey. This survey is of a portion of the TV broadcast band, and 7 regions have been declared as either Permitted, Unknown, or Unauthorized, as indicated by the color bars for each region.

[1] PVT supports Uplink frame structure only.

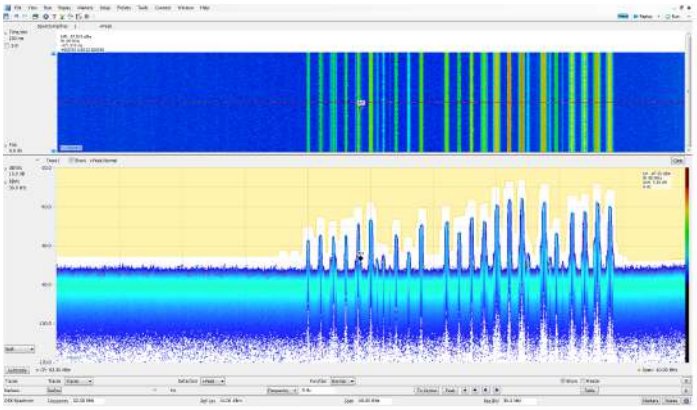


In this illustration, a single region has been selected. Since we have declared this to be an ATSC video signal, the spectrum mask for the ATSC signal is shown overlaid in the region. The signal is a close match to the spectrum mask, including the vestigial carrier at the lower side of the signal, characteristic of ATSC broadcasts.

SignalVu-PC with mapping can be used to manually indicate the azimuth of a measurement made in the field, greatly aiding in triangulation efforts. The addition of a smart antenna able to report its direction to SignalVu-PC automates this process. Automatically plotting the azimuth/bearing of a measurement during interference hunting can greatly speed the time spent searching for the source of interference. Tektronix recommends the Alaris DF-A0047 handheld direction finding antenna with frequency coverage from 20 MHz -8.5 GHz (optional 9 kHz-20 MHz) as part of a complete interference hunting solution. Azimuth information and the selected measurement is automatically recorded on the SignalVu-PC Map just by releasing the control button on the antenna. Full specifications for the DF-A0047 antenna are available in a separate antenna datasheet available on www.Tektronix.com.

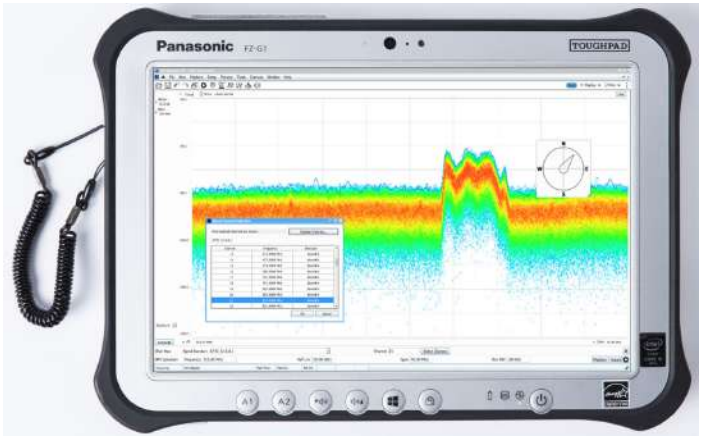
Playback

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. Frequency mask testing can be performed on recorded signals up to 40 MHz in span, with actions on mask violation including beep, stop, save trace, save picture, and save data. Portions of the playback can be selected and looped for repeat examination of signals of interest. Playback can be skip-free, or time gaps can be inserted to reduce review time. A Live Rate playback ensures fidelity of AM/FM demodulation and provides a 1:1 playback vs. actual time. Clock time of the recording is displayed in the spectrogram markers for correlation to real world events. 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.



Instrument controller for USB spectrum analyzers

For field operations, a complete solution requires a Windows Tablet or laptop for instrument operation, record keeping and communication. Tektronix recommends Panasonic rugged computers for controlling the RSA306B and as a standalone unit.



The Panasonic rugged computers are sold separately and are available for purchase from Panasonic at *connect.na.panasonic.com/toughbook/rugged-computers* and a variety of third party vendors.

Recommended specifications of the instrument controller

- Windows 10 or Windows 11 Pro 64-bit operating system
- Intel® Core i5-6300U vPro TM 2.4-3.0 GHz Processor
- 8 GB RAM
- 256 GB Solid State Drive
- 10.1" (25.6 cm) Daylight-readable screen
- 10-point Multi Touch+ Digitizer screen plus included pen interface
- USB 3.0 + HDMI Ports, 2nd USB Port
- Wi-Fi, Bluetooth® and 4G LTE Multi Carrier Mobile Broadband with Satellite GPS

Specifications

All specifications are guaranteed unless noted otherwise.

Frequency

RF input frequency range	9 kHz to 6.2 GHz
Frequency reference accuracy	
Initial accuracy at calibration	±3 ppm + aging (after 20 minute warmup at 18 °C to 28 °C ambient)
Accuracy, typical	±20 ppm + aging (after 20 minute warm up at -10 °C to 55 °C ambient)
Aging, typical	± 3 x 10^{-6} (1st year), ±1 x 10^{-6}/year thereafter
External frequency reference input	
Input frequency range	10 MHz ±10 Hz
Input level range	-10 dBm to +10 dBm sinusoid
Impedance	50 Ω
Center frequency resolution	
Block IQ samples	1 Hz
Streamed ADC samples	500 kHz

Amplitude

RF input impedance	50 Ω
RF input VSWR (typical)	≤ 1.8:1 (10 MHz to 6200 MHz, reference level ≥ +10 dBm) (Equivalent Return Loss: ≥11 dB)
Maximum RF input level without damage	
DC voltage	±40 V_{DC}
Reference level ≥ –10 dBm	+23 dBm (continuous or peak)
Reference level < –10 dBm	+15 dBm (continuous or peak)
Maximum RF input operating level	The maximum level at the RF input for which the instrument will meet its measurement specifications.
Center frequency < 22 MHz (low-frequency path)	+15 dBm
Center frequency ≥22 MHz (RF path)	+20 dBm

Amplitude accuracy at all center frequencies

Center frequency	Warranted (18 °C to 28 °C)	Typical (95% confidence) (18 °C to 28 °C)	Typical (-10 °C to 55 °C)
9 kHz - < 3 GHz	±1.2 dB	±0.8 dB	±1.0 dB
≥ 3 GHz - 6.2 GHz	±1.65 dB	±1.0 dB	±1.5 dB

Reference level +20 dBm to -30 dBm, alignment run prior to testing.

Applies to corrected IQ data, with signal to noise ratios > 40 dB.

The above specifications apply when operated and stored at the average factory calibration absolute humidity conditions (8 grams of water per cubic meter of air). Additional humidity specifications are provided in the Specifications and Performance Verification Technical Reference.

Intermediate frequency and acquisition system

IF bandwidth 40 MHz

ADC sample rate and bit width 112 Ms/s, 14 bits

Real-time IF acquisition data (uncorrected)

112 Ms/s, 16-bit integer real samples

40 MHz BW, 28 ±0.25 MHz Digital IF, uncorrected. Corrected values are stored with saved files

Block streaming data at an average rate of 224 MB/s

Block baseband acquisition data (corrected)

Maximum acquisition time 1 second

Bandwidths ≤ 40 /(2^N) MHz, 0 Hz Digital IF, N ≥ 0

Sample rates ≤ 56 / (2^N) Msps, 32-bit float complex samples, N ≥ 0

Channel amplitude flatness

Reference level +20 dBm to -30 dBm, alignment run before testing. Applies to corrected IQ data, with signal to noise ratios >40 dB.

Center frequency range	Warranted	Typical
	18 ºC to 28 ºC	
24 MHz to 6.2 GHz	±1.0 dB	±0.4 dB
22 MHz to 24 MHz	±1.2 dB	±1.0 dB
	-10 ºC to 55 ºC	
24 MHz to 6.2 GHz	---	±0.5 dB
22 MHz to 24 MHz	---	±2.5 dB

Trigger

Trigger/sync input

Voltage range TTL, 0.0 V – 5.0 V

Trigger level, positive-going threshold voltage 1.6 V minimum; 2.1 V maximum

Trigger level, negative-going threshold voltage	1.0 V minimum; 1.35 V maximum
Impedance	10 kΩ

Trigger events	Power Level within Span (IF power trigger) Frequency mask (Host) Time-qualified level (Host) DPX density (Host)

IF power trigger

Threshold 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 µs

Frequency mask and DPX density trigger

Frequency mask trigger mask point horizontal resolution	< 0.13 % of span
Frequency mask trigger level range	0 to -80 dB from reference level
Frequency mask trigger level resolution	0.1 dB
Frequency mask trigger level accuracy (with respect to reference level)	±(Channel Response Flatness + 2.5 dB) for mask levels ≥ -50 dB from reference level and >30 dB above the noise floor
Frequency mask trigger timing uncertainty	±(0.5*Spectrum time)
DPX density trigger area of interest range	2 to 801 pixels (horizontal) x 2 to 201 pixels (vertical)

Noise and distortion

Displayed Average Noise Level (DANL)

Reference level = -50 dBm, input terminated with 50 Ω load, log-average detection (10 averages). SignalVu-PC Spectrum measurements with Span > 40 MHz may use LF or RF path in the first segment of the spectrum sweep.

Center frequency	Frequency range	DANL (dBm/Hz)	DANL (dBm/Hz), typical
< 22 MHz (LF path)	100 kHz - 42 MHz	≤-130	-133

Table continued…

Center frequency	Frequency range	DANL (dBm/Hz)	DANL (dBm/Hz), typical
≥ 22 MHz (RF path)	2 MHz - <5 MHz	≤-145	≤-148
	5 MHz - <1.0 GHz	≤-161	≤-163
	1.0 GHz - <1.5 GHz	≤-160	≤-162
	1.5 GHz - <2.5 GHz	≤-157	≤-159
	2.5 GHz - <3.5 GHz	≤-154	≤-156
	3.5 GHz - <4.5 GHz	≤-152	≤-155
	4.5 GHz - 6.2 GHz	≤-149	≤-151

Phase noise

Phase noise measured with 1 GHz CW signal at 0 dBm.

The following table entries are in dBc/Hz units.

	Center frequency				
Offset	**1 GHz**	**10 MHz (typical)**	**1 GHz (typical)**	**2.5 GHz (typical)**	**6 GHz (typical)**
1 kHz	≤-84	≤-115	≤-89	≤-78	≤-83
10 kHz	≤-84	≤-122	≤-87	≤-84	≤-85
100 kHz	≤-88	≤-126	≤-93	≤-92	≤-95
1 MHz	≤-118	≤-127	≤-120	≤-114	≤-110

Residual spurious response, typical

(Reference level ≤ -50 dBm, RF input terminated with 50 Ω load)

CF range 9 kHz - < 1 GHz < -100 dBm

CF range 1 GHz - < 3 GHz < -95 dBm

CF range 3 GHz - 6.2 GHz < -90 dBm

With these exceptions for LO related spurs
< -80 dBm: 2080-2120 MHz
< -80 dBm: 3895-3945 MHz
< -85 dBm: 4780-4810 MHz

Residual FM < 10 Hz_{P-P} (95% confidence)

3RD order IM distortion

Two CW signals, 1 MHz separation, each input signal level 5 dB below the reference level setting at the RF input Reference level at-15 dBm disables Preamp; reference level at -30 dBm enables Preamp.

Center frequency 2130 MHz
≤ -63 dBc at reference level -15 dBm, 18 ºC to 28 ºC
≤ -63 dBc, at reference level -15 dBm, -10 ºC to 55 ºC, typical
≤ -63 dBc, at reference level -30 dBm, typical

40 MHz to 6.2 GHz, typical
< -58 dBc at reference level = -10 dBm
< -50 dBc at reference level = -50 dBm

3RD order intercept (TOI)

Center frequency 2130 MHz ≥ +13 dBm at reference level -15 dBm, 18 ºC to 28 ºC

≥ +13 dBm, at reference level -15 dBm, -10 ºC to 55 ºC, typical
≥ -2 dBm, at reference level -30 dBm, typical

40 MHz to 6.2 GHz, typical

+14 dBm at reference level -10 dBm
-30 dBm at reference level -50 dBm

2ND harmonic distortion, typical

< -55 dBc, 10 MHz to 300 MHz, reference level = 0 dBm
< -60 dBc, 300 MHz to 3.1 GHz, reference level = 0 dBm
< -50 dBc, 10 MHz to 3.1 GHz, reference level = -40 dBm
Exception: < -45 dBc in the range 1850-2330 MHz

2ND harmonic intercept (SHI)

+55 dBm, 10 MHz to 300 MHz, reference level = 0 dBm
+60 dBm, 300 MHz to 3.1 GHz, reference level = 0 dBm
+10 dBm, 10 MHz to 3.1 GHz, reference level = -40 dBm (Exception: +5 dBm in the range 1850-2330 MHz)

Input related spurious response (SFDR)

Input frequencies at ≤ 6.2 GHz and 18 - 28 ºC

Level	Center frequency range
Spurious responses due to the following mechanisms: RFx2*LO1, 2RFx2*LO1, RFx3LO1, RFx5LO1, RF to IF feedthrough, IF2 image	
≤ -60 dBc	≤ 6200 MHz
Spurious responses due to 1st IF images (RFxLO1)	
≤ -60 dBc	< 2700 MHz
≤ -50 dBc	2700 - 6200 MHz

With these exceptions at ≤ 6.2 GHz and 18 - 28 ºC, typical

Type	Level	Center frequency range
IF feedthrough	≤ -45 dBc	1850 - 2700 MHz
1st IF image	≤ -55 dBc	1850 - 1870 MHz
	≤ -35 dBc	3700 - 3882 MHz
	≤ -35 dBc	5400 - 5700 MHz
2nd IF image	≤ -50 dBc	22 - 1850 MHz
	≤ -50 dBc	4175 - 4225 MHz
RFx2LO	≤ -50 dBc	4750 - 4810 MHz
2RFx2LO	≤ -50 dBc	3900 - 3840 MHz
RFx3LO	≤ -45 dBc	4175 - 4225 MHz

Spurious responses due to ADC images at 18 - 28 ºC

Level	Center frequency range
≤ -60 dBc	Offset from center frequency > 56 MHz
≤ -50 dBc	56 MHz ≥ offset from center frequency ≥ 36 MHz

Local oscillator feedthrough to input connector	< -75 dBm at reference level = -30 dBm

Audio output

Audio output (from SignalVu-PC or application programming interface)

Types	AM, FM
IF bandwidth range	Five selections, 8 kHz – 200 kHz
Audio output frequency range	50 Hz – 10 kHz
PC audio output	16 bits at 32 ks/s
Audio file output format	.wav format, 16 bit, 32 ks/s

SignalVu-PC base performance summary

SignalVu-PC/RSA306B key characteristics

Maximum span	40 MHz real-time 9 kHz - 6.2 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

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

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

DPX spectrum display

Spectrum processing rate (RBW = auto, trace length 801)	≤10,000 spectrums per second (span independent)
DPX bitmap resolution	201 pixels vertical x 801 pixels horizontal

DPX Spectrogram minimum time resolution[2]

1 ms

≤10,000 per second (span independent)

Marker information

Amplitude, frequency, signal density

Minimum signal duration for 100% probability of intercept (POI), typical[2]

Minimum signal duration for 100% POI	Test controller
27	Dell Desktop (Windows® 10 Enterprise, Intel® Core™ i7-4790 CPU, 3.6 GHz , 8 GB RAM, 256 GB SSD)
34	Dell Desktop (Windows® 7 Enterprise, Intel® Core™ i7-2600 CPU, 3.4 GHz, 8 GB RAM, 256 GB SSD)
36	Dell Desktop Latitude E6430 (Windows® 10 Enterprise, Intel® Core™ i7-3520 M CPU, 2.9 GHz, 8 GB RAM, 750 GB HD)
35	Dell Laptop Precision M4700 (Windows® 8 Enterprise, Intel® Core™ i7-3520M CPU, 2.9 GHz, 8 GB RAM, 750 GB HD)
37	Panasonic ToughPad SAPL-TP-04 (Windows® 7 Pro, Intel® Core™ i5-5300U CPU, 2.3 GHz, 8 GB RAM, 25 6 GB SSD)

Span range (continuous processing)

1 kHz to 40 MHz

Span range (swept)

Up to maximum frequency range of instrument

Dwell time per step

50 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

Full span sweep speed

1 MHz	100 kHz	10 kHz	1 kHz
16.5 GHz/sec	16.5 GHz/sec	13.7 GHz/sec	1.9 GHz/sec

Related information

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 only measurement on screen.

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

[2] 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.

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
FM demodulation accuracy, typical	±3% 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
PM demodulation accuracy, typical	±1% 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

SignalVu-PC application licenses

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
Direct audio measurements	Signal power, Audio frequency (+Peak, -Peak, Peak-Peak/2, RMS), SINAD, Modulation distortion, S/N, Total harmonic distortion, Total non-harmonic distortion, Hum and Noise (Direct audio measurements are limited to >9 kHz by input frequency)

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**
Carrier power accuracy	Refer to instrument amplitude accuracy		
Carrier frequency accuracy	± 7 Hz + (transmitter frequency × ref. freq. error)	Refer to instrument frequency accuracy	± 2 Hz + (transmitter frequency × ref. freq. error)
Depth of modulation accuracy	NA	± 0.5%	NA

Table continued…

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**
Deviation accuracy	± (2% × (rate + deviation))	NA	± 3%
Rate accuracy	± 0.2 Hz	± 0.2 Hz	± 0.2 Hz
Residual THD	0.5%	0.5%	NA
Residual SINAD	49 dB 40 dB	56 dB	42 dB

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	±1.0 dB + absolute amplitude accuracy For pulses of 300 ns width or greater, duty cycles of .5 to .001, and S/N ratio ≥ 30 dB
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	±1.0 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	±1.5 dB + absolute amplitude accuracy For pulses of 300 ns width or greater, duty cycles of .5 to .001, and S/N ratio ≥ 30 dB
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

General-purpose digital modulation analysis (SVMxx- SVPC)

Modulation formats	BPSK, QPSK, 8PSK, 16QAM, 32QAM, 64QAM, 128QAM, 256QAM, 1024QAM, π/2DBPSK, DQPSK, π/4DQPSK, D8PSK, D16PSK, SBPSK, OQPSK, SOQPSK, 16-APSK, 32-APSK, MSK, CPM, 2FSK, 4FSK, 8FSK, 16FSK, C4FM
Analysis period	Up to 163,500 samples
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, 16/32/64/128/256/1024-QAM, 16/32-APSK
QPSK Residual EVM (center frequency = 2 GHz), typical mean	1.1 % (100 kHz symbol rate) 1.1 % (1 MHz symbol rate) 1.2 % (10 MHz symbol rate) 2.5 % (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	0.8 % (10 MHz symbol rate) 1.5 % (30 MHz symbol rate) 400 symbols measurement length, 20 Averages, normalization reference = maximum symbol magnitude

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: -38 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: 2.0 % 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: -35 dB 5.8 GHz, 40 MHz BW: -35 dB Input signal level optimized for best EVM, average of 20 bursts, ≥16 symbols each

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: -35 dB Input signal level optimized for best EVM, average of 20 bursts, ≥16 symbols each

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	C4FM = 1.3% HCPM = 0.8% HDQPSK = 2.5% 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 f1-f0, Max Drift Rate fn-f0 and fn-fn-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: ΔF1avg, ΔF2avg, ΔF2avg/ ΔF1avg, ΔF2max%>=115kHz (basic rate), ΔF2max%>=115kHz (low energy) Deviation range: ±280 kHz Deviation uncertainty (at 0 dBm): • 2 kHz + instrument frequency uncertainty (basic rate) • 3 kHz + 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 2 + instrument frequency uncertainty Measurement range: Nominal channel frequency ±100 kHz
Carrier Frequency Drift (BR and LE), typical mean	Supported measurements: Max freq. offset, drift f1- f0, max drift fn-f0, max drift fn-fn-5 (BR and LE 50 µs) Measurement uncertainty: <2 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

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 2nd Adjacent Channel 62 dB

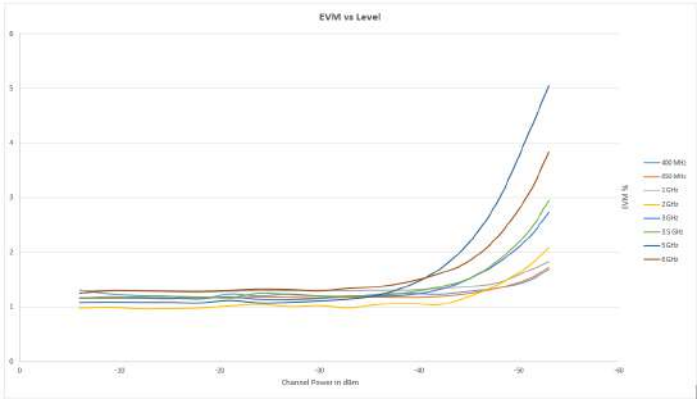
5G NR Uplink/Downlink measurements (5GNRNL-SVPC)

Standard supported	TS 38.141-1 for BS and 38.521-1 for UE
Modulation accuracy	Sec 6.5.2 for BS and Sec 6.4.2 for UE.
ACP	Sec 6.6.3 for BS and Sec 6.5.2.4 for UE
Frame format supported	Uplink (FDD and TDD) Downlink (FDD and TDD)
Measurements and displayssupported	Channel Power (CHP), Adjacent Channel Power (ACP), Power Vs Time (PVT)1, Modulation Accuracy (including Error Vector Magnitude (EVM), Frequency Error, IQ Error), EVM vs. Symbol, Occupied Bandwidth (OBW), Spectral Emission Mask (SEM), Constellation Diagram, and summary table with scalar results.

EVM (typical)

20 MHz 1CC, 256QAM UL, 30 kHz subcarrier spacing							
400 MHz	650 MHz	1 GHz	2 GHz	3 GHz	3.5 GHz	5 GHz	6 GHz
1.15%	1.15%	1.28%	0.97%	1.13%	1.16%	1.08%	1.25%

<-37.4dB rms EVM from 400MHz to 6GHz for 20MHz CC1, 256QAM, -6dBm to -33dBm channel power, within -1dB of full scale.



ACLR (typical)	<-48dBc for <6GHz for 20MHz CC1, 256QAM, -6dBm to -27dBm channel power, within -1dB of full scale.

EMC pre-compliance and troubleshooting (EMCVUxx-SVPC)

Standards	EN55011, EN55012, EN55013, EN55014, EN55015, EN55025, EN55032, EN60601, DEF STAN, FCC Part 15, FCC Part18, IEC 61000-6-3, and MIL-STD 461G
Features	EMC-EMI display, Wizard to setup accessories and limit lines, Inspect, Harmonic Markers, Level Target, Compare Traces, Measure Ambient, Report generation, Re-measure Spot
Detectors	+Peak, Avg, Avg (of logs), Avg (VRMS), CISPR QuasiPeak, CISPR Peak, CISPR Average, CISPR Average of Logs, MIL +Peak, DEF STAN Avg, DEF STAN Peak
Limit lines	Up to 3 Limit Lines with corresponding margins
Resolution BW	Set per standard or user definable

Dwell time	Set per standard or user definable
Report format	PDF, HTML, MHT,RTF, XLSX, Image File format
Accessory type	Antenna, Near Field Probe, Cable, Amplifier, Limiter, Attenuator, Filter, Other
Correction format	Gain/Loss Constant, Gain/loss table, Antenna Factor
Traces	Save/recall up to 5 traces, Math trace (trace1 minus trace2), Ambient trace

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

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.

Inputs, outputs, inferfaces, power consumption

RF input	Type N, female (RSA306B)
External frequency reference input	SMA, female
Trigger/sync input	SMA, female
Status indicator	LED, dual color red/green
USB device port	USB 3.0 - Micro-B, can mate with locking thumbscrews
Power consumption	Per USB 3.0 SuperSpeed requirements: 5.0 V, ≤ 900 mA (nominal)

Physical characteristics

Dimensions

Dimensions	RSA306B
Height	31.9 mm (1.25 in)
Width	190.5 mm (7.5 in)
Depth	139.7 mm (5.5 in)

Weight RSA306B: 750 g (1.65 lbs)

Regulatory

Regional certifications Europe: EN61326
Australia/New Zealand: AS/NZS 2064

EMC emissions EN61000-3-2, EN61000-3-3, EN61326-2-1

EMC immunity EN61326–1/2, IEC61000-4-2/3/4/5/6/8/11

Environmental performance

Temperature

Operating -10 °C to +55 °C (+14 °F to +131 °F)

Nonoperating -51 °C to +71 °C (-60 °F to +160 °F)

Humidity (operating) 5% to 75% ±5% relative humidity (RH) from +30 °C to +40 °C (+86 °F to 104 °F)
5% to 45% RH above +40 °C to +55 °C (+86 °F to +131 °F)

Altitude

Operating Up to 9,144 meters (30,000 feet)

Nonoperating 15,240 meters (50,000 feet)

Dynamics[3]

Mechanical shock, operating Half-sine mechanical shocks, 30 g peak amplitude, 11 µs duration, three drops in each direction of each axis (18 total)

Random vibration, nonoperating 0.030 g^2/Hz, 10-500 Hz, 30 minutes per axis, three axes (90 minutes total)

Handling and transit[3]

Bench handling, operating Per MIL-PRF-28800F Class 2 operating: Rotational-edge-drops of appropriate edges on appropriate sides of the equipment

Transit drop, nonoperating Per MIL-PRF-28800F Class 2 nonoperating: Transit drops onto six faces and four corners of the equipment, from a height of 30 cm (11.8 in.) for a total of 10 impacts

[3] Not guaranteed when plastic case is removed.

Ordering information

Models

RSA306B	USB real time spectrum analyzer, 9 kHz - 6.2 GHz, 40 MHz acquisition bandwidth. The RSA306B requires a PC with Windows 10 or Windows 11, 64-bit operating system. A USB 3.0 connection is required for operation of the RSA306B. 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 RSA306B, an Intel Core i7 4th generation or greater 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.

SignalVu-PC application-specific licenses

SignalVu-PC-SVE requires the Microsoft Windows 10 or Windows 11, 64-bit operating system. The base software is free, included with the instrument, and is also available to download from *www.tektronix.com/downloads*.

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 NL or a FL 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): *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 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 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 another spectrum analyzer 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.
FL 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 either a PC or another spectrum analyzer 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 is the most flexible license and is recommended in applications where the license needs to be moved frequently.

The following SignalVu-PC application licenses are available and add functionality and value to your measurement solution.

Application license	License type	Description
SVANL-SVPC	Node locked	AM/FM/PM/Direct Audio analysis
SVAFL-SVPC	Floating license	

Table continued…

Application license	License type	Description
SVTNL-SVPC	Node locked	Settling Time (frequency and phase) measurements
SVTFL-SVPC	Floating license	
SVMNL-SVPC	Node locked	General purpose digital modulation analysis
SVMFL-SVPC	Floating license	
SVPNL-SVPC	Node locked	Advanced pulse radar analysis
SVPFL-SVPC	Floating license	
SVONL-SVPC	Node locked	Flexible OFDM analysis
SVOFL-SVPC	Floating license	
SV23NL-SVPC	Node locked	WLAN 802.11a/b/g/j/p measurements
SV23FL-SVPC	Floating license	
SV24NL-SVPC	Node locked	WLAN 802.11n measurements (requires SV23)
SV24FL-SVPC	Floating license	
SV25NL-SVPC	Node locked	WLAN 802.11ac measurements (requires SV23 and SV24)
SV25FL-SVPC	Floating license	
SV26NL-SVPC	Node locked	APCO P25 measurements
SV26FL-SVPC	Floating license	
SV27NL-SVPC	Node locked	Bluetooth® 4.2 measurements
SV27FL-SVPC	Floating license	
SV31NL-SVPC	Node locked	Bluetooth® 5 measurements (requires SV27)
SV31FL-SVPC	Floating license	
MAPNL-SVPC	Node locked	Mapping
MAPFL-SVPC	Floating license	
SV54NL-SVPC	Node locked	Signal survey and classification
SV54FL-SVPC	Floating license	
SV56NL-SVPC	Node locked	Playback of recorded files
SV56FL-SVPC	Floating license	
SV60NL-SVPC	Node locked	Return loss, VSWR, cable loss, and distance to fault (requires option 04 on RSA500A/600A)
SV60FL-SVPC	Floating license	
CONNL-SVPC	Node locked	Live connection and base SignalVu-PC VSA measurements using the 5 or 6 Series MSO or LPD64 (requires opt. SV-RFVT)
CONFL-SVPC	Floating license	
SV2CNL-SVPC	Node locked	Bundle of WLAN 802.11a/b/g/j/p/n/ac (SV23, SV24, and SV25) and live Connect (CON) to 5/6 Series B MSO or LPD64 (requires opt. SV-RFVT)
SV2CFL-SVPC	Floating license	
SV28NL-SVPC	Node locked	LTE Downlink RF measurements
SV28FL-SVPC	Floating license	
5GNRNL-SVPC	Node locked	5G NR Uplink/Downlink RF Power, Bandwidth, Demodulation, and Error Vector Magnitude Measurements[4]
SVQPNL-SVPC	Node locked	EMI CISPR detectors
SVQPFL-SVPC	Floating license	

Table continued…

[4] The 5GNR license is available as a standalone item, not as an option to your hardware, therefore it is considered a post-purchase upgrade and not installed at the time of purchase of the instrument.

Application license	License type	Description
EMCVUNL-SVPC	Node locked	EMC pre-compliance and troubleshooting (includes EMI CISPR detectors)
EMCVUFL-SVPC	Floating license	
EDUFL-SVPC	Floating license	Education only version with all SignalVu-PC modules except 5GNR

Standard accessories

174-6796-xx	USB 3.0 locking cable (1 M)
063-4543-xx	SignalVu-PC software, documentation
071-3323-xx	Printed safety/installation manual (English)

Warranties

RSA306B	3 years

Service options for RSA306B

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. R3	Repair Service 3 Years (including warranty)
Opt. R5	Repair Service 5 Years (including warranty)

Recommended accessories

Cables

174-6949-00	USB 3.0 locking cable, 0.5 m (half-length compared to USB cable shipped with the unit)
012-1738-00	Cable,50 Ohm, 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 Ohm Type-N(m) to Type BNC(f)
013-0410-00	Adapter, Coaxial, 50 Ohm Type-N (f) to Type-N (f)
013-0411-00	Adapter, Coaxial, 50 Ohm Type-N (m) to Type-N (f)
013-0412-00	Adapter, Coaxial, 50 Ohm, Type-N(m) to Type-N(m)
013-0402-00	Adapter, Coaxial, 50 Ohm Type-N (m) to Type-N 7/16(m)
013-0404-00	Adapter, Coaxial, 50 Ohm Type-N(m) to Type-7/16 (f)
013-0403-00	Adapter, Coaxial, 50 Ohm Type-N(m) to Type DIN 9.5(m)
013-0405-00	Adapter, Coaxial, 50 Ohm Type-N(m) to Type-DIN 9.5(f)
013-0406-00	Adapter, Coaxial, 50 Ohm Type-N(m) to Type-SMA(f)
013-0407-00	Adapter, Coaxial, 50 Ohm Type-N(m) to Type-SMA(m)
013-0408-00	Adapter, Coaxial, 50 Ohm Type-N(m) to Type-TNC(f)

013-0409-00	Adapter, Coaxial, 50 Ohm Type-N(m) to Type-TNC(m)

Attenuators and 50/75 Ω pads

013-0422-00	Pad, 50/75 Ohm, Minimum Loss, Type-N(m) 50 Ohm to Type-BNC(f) 75 Ohm
013-0413-00	Pad, 50/75 Ohm, Minimum Loss, Type-N(m) 50 Ohm to Type-BNC(m) 75 Ohm
013-0415-00	Pad, 50/75 Ohm, Minimum Loss, Type-N(m) 50 Ohm to Type-F(m) 75 Ohm
015-0787-00	Pad, 50/75 Ohm, Minimum Loss, Type-N(m) 50 Ohm to Type-F(f) 75 Ohm
015-0788-00	Pad, 50/75 Ohm, Minimum Loss, Type-N(m) 50 Ohm to Type-N(f) 75 Ohm
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
DF-A0047 [5]	Directional Antenna, 20-8500 MHz, with electronic compass and preamp, available from *www.alarisantennas.com*
DF-A0047-01[5]	Frequency range extension for DF-A0047 directional antenna, 9 kHz-20 MHz, available only from *www.alarisantennas.com*
DF-A0047-C1[5]	Includes DF-A0047 antenna and DF-A0047-01 extension, available only from *www.alarisantennas.com*
016-2107-00[5]	Transit case for DF-A0047 and DF-A0047-01, comes standard with purchase of DF-A0047, separately available only from *www.alarisantennas.com*
119-6594-00	Yagi Antenna, 825-896 MHz, Forward Gain (over half-wave dipole): 10 dB
119-6595-00	Yagi Antenna, 895-960 MHz, Forward Gain (over half-wave dipole): 10 dB
119-6596-00	Yagi Antenna, 1710-1880 MHz, Forward Gain (over half-wave dipole): 10.2 dB
119-6597-00	Yagi Antenna, 1850-1990 MHz, Forward Gain (over half-wave dipole): 9.3 dB
119-6970-00	Magnetic mount antenna, 824 MHz to 2170 MHz (requires adapter 103-0449-00)

EMC accessories

EMI-NF-PROBE	Near Field Probe set (Tekbox TBPS01)

Filters, probes, demonstration board

119-7246-00	Pre-filter, general purpose, 824 MHz to 2500 MHz, Type-N (f) connector
119-7426-00	Pre-filter, general purpose, 2400 MHz to 6200 MHz, Type-N (f) connector
119-4146-00	EMCO E/H-field probes. N-BNC adapter (103-0045-00) and 3 foot BNC cable (012-0482-00) recommended for use with probe kit
E/H field probes, lower cost alternative	Available from Beehive *www. http://beehive-electronics.com/* (N-BNC adapter (103-0045-00) and 3 foot BNC cable (012-0482-00) recommended for use with probe kit)
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

[5] Not available in China, Japan, New Zealand, Australia, Korea, Russia, Belarus, Kazakhstan

Tektronix is registered to ISO 9001:2015 and ISO 14001:2015.

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

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ASEAN / Australasia (65) 6356 3900
Belgium 00800 2255 4835*
Central East Europe and the Baltics +41 52 675 3777
Finland +41 52 675 3777
Hong Kong 400 820 5835
Japan 81 (120) 441 046
Middle East, Asia, and North Africa +41 52 675 3777
People's Republic of China 400 820 5835
Republic of Korea +82 2 565 1455
Spain 00800 2255 4835*
Taiwan 886 (2) 2656 6688

Austria 00800 2255 4835*
Brazil +55 (11) 3759 7627
Central Europe & Greece +41 52 675 3777
France 00800 2255 4835*
India 000 800 650 1835
Luxembourg +41 52 675 3777
The Netherlands 00800 2255 4835*
Poland +41 52 675 3777
Russia & CIS +7 (495) 6647564
Sweden 00800 2255 4835*
United Kingdom & Ireland 00800 2255 4835*

Balkans, Israel, South Africa and other ISE Countries +41 52 675 3777
Canada 1 800 833 9200
Denmark +45 80 88 1401
Germany 00800 2255 4835*
Italy 00800 2255 4835*
Mexico, Central/South America & Caribbean 52 (55) 56 04 50 90
Norway 800 16098
Portugal 80 08 12370
South Africa +41 52 675 3777
Switzerland 00800 2255 4835*
USA 1 800 833 9200

* European toll-free number. If not accessible, call: +41 52 675 3777

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*.

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