



Brochure

VIAVI Ranger

Vector Signal Analyzer and Generator

The operation took days to set up, equipment deployed, the capture conditions were met, and the recording hardware triggered – now the analyst's review the data only to discover that the event everyone wanted to capture happened 3 seconds after the recording hardware hit its memory limit and stopped. Never let this scenario happen again!

The VIAVI Solutions Ranger line of products provide live analysis or offline forensic RF post-processing in a compact all-in-one solution, featuring massive recording memory depth with contiguous and sequential recording and playback modes. Moreover, Signal WorkShop™ RF laboratory environment assists users in finding and diagnosing the toughest RF issues through its simultaneous time, spectral, and historical spectrogram displays (SVT and SVT File). This gives users the ability to pinpoint and isolate signals out of cluttered RF environments through its extensive frequency-selective modulation-domain analysis tools. Not only that, but users can also recreate entire RF environments using Signal WorkShop™ waveform creation (VSS) and waveform playback (VSP) interfaces, including multi-carrier / multi-standard scenarios, utilizing its built-in resampling engine.

At A Glance

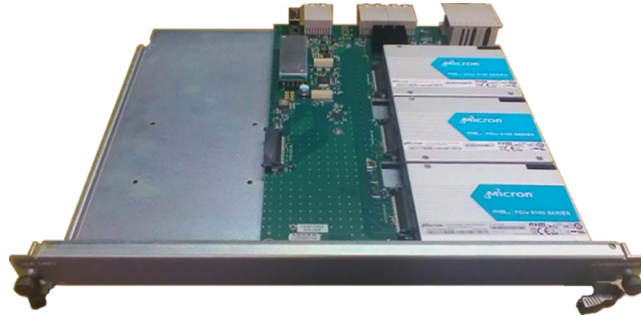
- Record Time: more than 2.5 hours with 200 MHz IBW, continuous streaming to a single capture (using mA-3A01 mass storage device)
- Frequency Range
 - VSG: 100 kHz to 6 GHz
 - VSA: 100 kHz to 6 GHz, 100 kHz to 30 GHz
- IBW
 - 200 MHz (250M samples / sec)
 - Integer decimation to 10 kHz (12.5k samples / sec)
- Powerful, unified software interface: Signal WorkShop™
 - Signal View Toolkit (SVT)
 - Live signal monitoring
 - Precision GPS timestamped captures
 - Software, external TTL, and GPS time triggering features
 - SVT File
 - Extensive post-capture analysis capabilities including Pulse, PSK, QAM, AM, FM, PM, and more
 - Vector Signal Simulator (VSS)
 - Create and playback a wide range of signals
 - Create composite multi-standard / multi-carrier environments by combining waveforms of different technologies and bandwidths
 - Vector Signal Player (VSP)
 - Play back recordings, single waveforms, or whole composite environments
 - External Playback Triggering
- Compact size: 4U x 19" rack-mountable chassis
- Rugged: 30 G Shock, MIL-28800 Class 3



Wide Bandwidth / Deep Memory

Ranger has more than 9.6 TB of raid 0 memory that it can stream full bandwidth data into (capture) or out of (generate). Practical record time examples include:

- 2.5 hours at 200 MHz IBW (250M samp / sec)
- 25 hours at 20 MHz IBW (25M samp / sec)
- 10 days at 2 MHz IBW (2.5M samp / sec)



Signal WorkShop™

Signal WorkShop is a fully integrated waveform creation, generation, signal capture, and post-capture analysis software suite designed to assist in finding and / or solving the toughest RF communications signal quality, spectral monitoring, interference, and environmental RF issues. Used in combination with the VIAVI Solutions configurable modular platform (CMP) AXIe-based system components, it becomes a full-featured, general purpose RF analysis tool that combines live and off-line signal simulation and analysis functionality, capable of capturing and / or reconstructing entire RF environments.

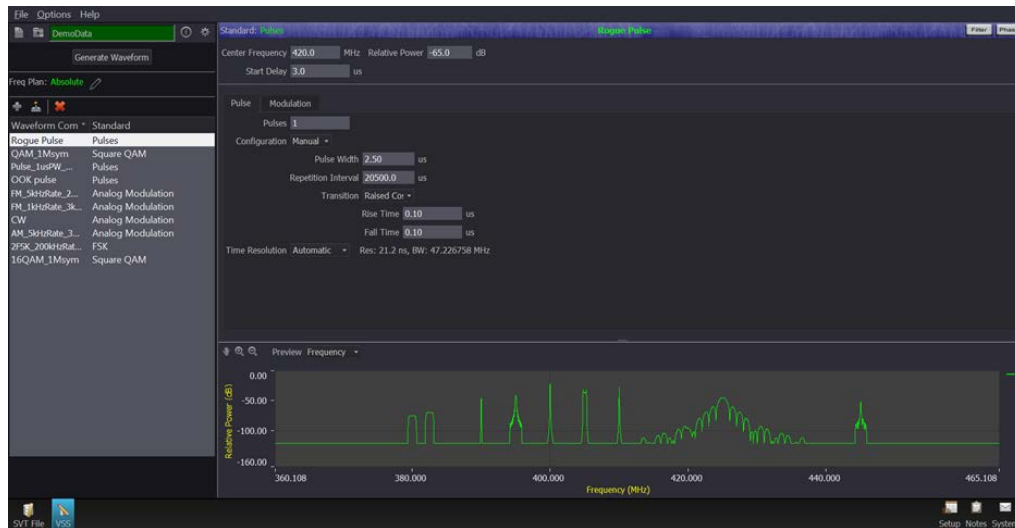
Signal WorkShop consists of four primary components: our waveform creation tool, Vector Signal Simulator (VSS), the arbitrary RF waveform player, Vector Signal Player (VSP), and the RF analysis feature set Signal View Toolkit (VST) for live monitoring / capture and SVT File for providing post-capture analysis. VSS is capable of creating a single waveform or reproducing entire spectral environments, with its capacity to combine multi-carrier / multi-standard waveforms.

The Signal WorkShop feature set includes:

- Unified, comprehensive focus on observing, analyzing, documenting, and even recreating electromagnetic environments
- Live monitoring and post-capture signal display, analysis and processing
- Interactive spectrum / spectrogram / time plots
- Results strip charting and data logging
- Modulation domain analysis function for basic modulation classification (AM, FM, CW, pulse, other)
- Precision GPS latitude, longitude, time stamp
- Bandwidth resampling engine and time-trim tools to assist in capture file-size management
- AM / FM / PM analysis
- ASK / FSK / PSK / QAM analysis
- ASK Burst / FSK Burst / PSK Burst analysis
- Pulse analysis
- Signal notepad for recording plots and data
- Channel Power and Adjacent Channel Power Ratio (ACPR) analysis functions
- Spectrum Allocation Table
- Environmental Signal Parameterization identifies and measures parameters for signals in the environment
- Remote API control

Vector Signal Simulator (VSS)

The VSS signal generation software can create communication and / or pulsed waveforms and even entire broadband environments, including mixed signals, realistic impairments, and additive recorded signals. An intuitive graphical interface creates signals in single and multi-carrier formats with full control of RF parameters and embedded data. VSS computes the RF spectrum and Complementary Cumulative Distribution Function (CCDF), which are plotted to provide a means to visually validate created signals and are stored along with primary file data. Signal files are created and stored as Signal WorkShop files, consisting of paired .txt (header) and .dat (binary data) files.



Analog Test Features:

VSS provides a wide variety of data generation functions including analog FM / PM / AM (including SSB and Suppressed Carrier) generation, additive white Gaussian noise (AWGN), Noise Power Ratio (NPR), cellular emulation for CDMA2000, WCDMA, GSM, IS136, IS95, complex digital modulation creation for PSK, FSK, QAM, tone combs, pulse generation, and more. Moreover, files can be imported as I/Q or Real. Impairments and signal modifications can be applied to existing waveforms, including user-defined filtering, phase, and potentially hopping. Moreover, whole signal environments can be built using Signal WorkShop's built-in resampling engine, which allows not only multi-carrier aggregation but also facilitates multi-standard signal aggregation.

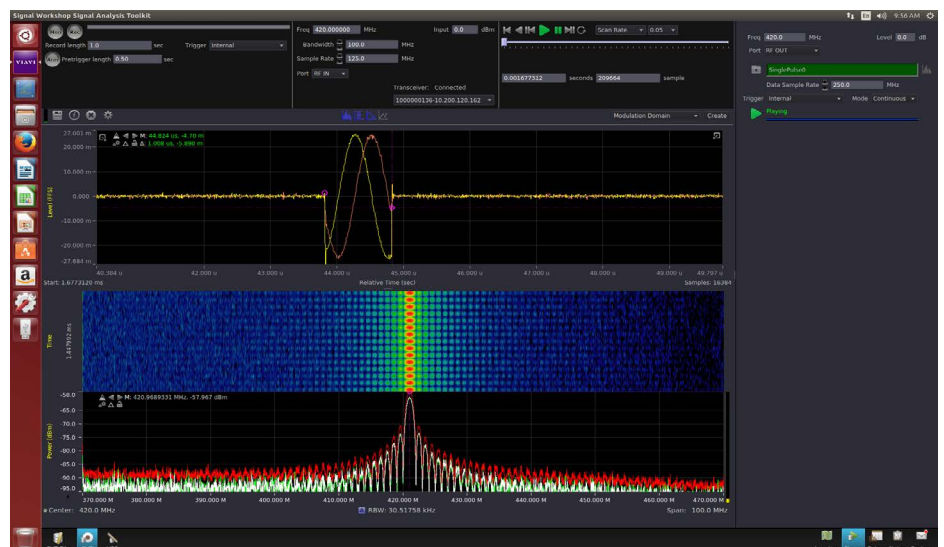
Vector Signal Player (VSP)

VSP provides the hardware interface for waveform playback. While waveforms may be created or captured at a certain frequency, VSP provides the added flexibility of playing signals back at any RF frequency within the hardware's range at playback time and at any sampling rate, by way of its powerful resampling engine. VSP also provides level control.

Signal View Toolkit (SVT)

SVT controls the RF hardware for live RF captures, whereas, SVT File provides post-capture analysis of captured / saved files. Both have the same analysis features; however, the SVT functions on a shared-resource basis in monitor mode (alternating between capture and analysis). The signal analysis features are discussed below under SVT File.

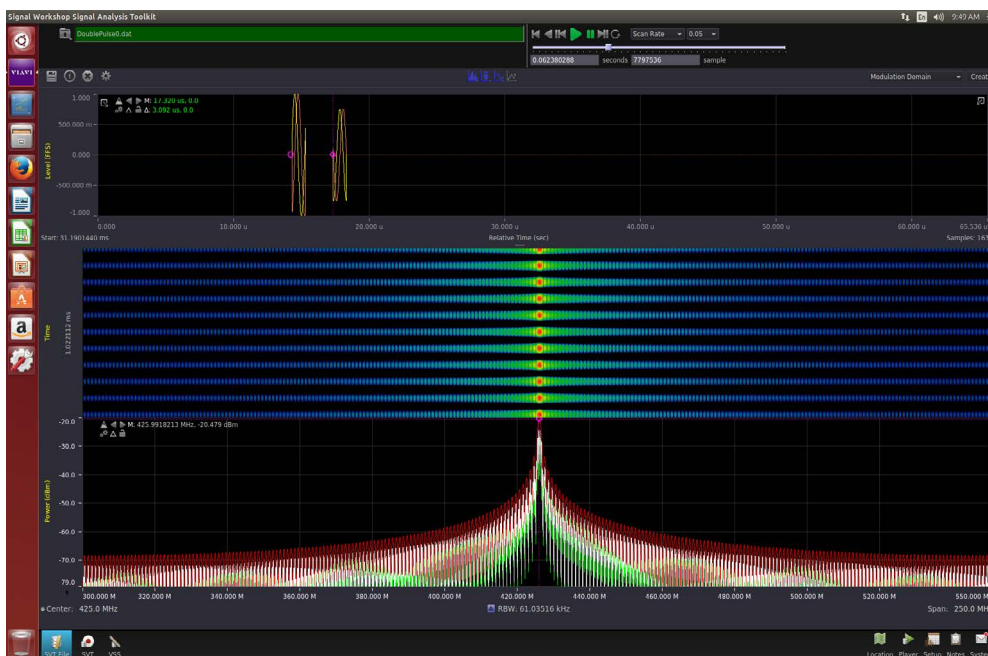
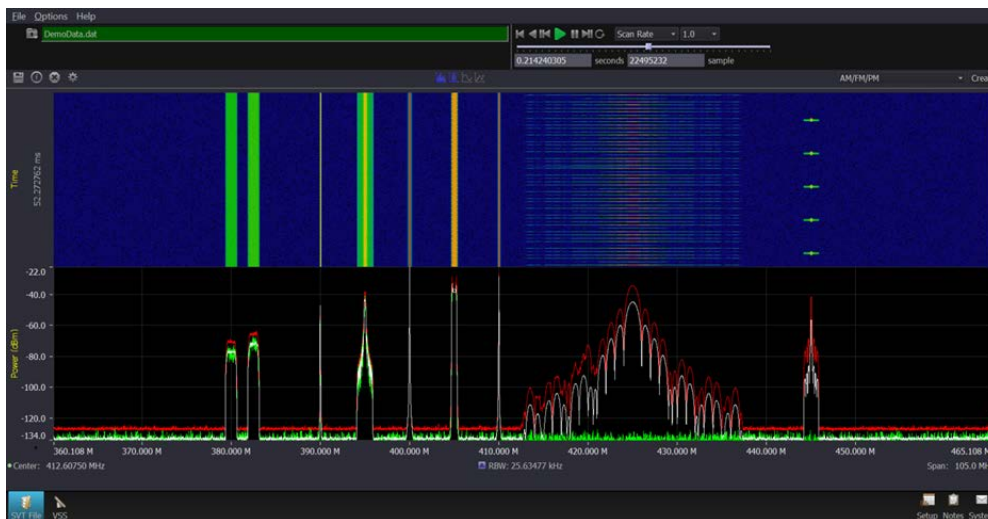
One key concern when capturing waveforms that are potentially massive in size, is the ability to trim captured waveforms before saving to optimize file size. SVT conveniently provides the ability to trim time by picking start and stop times (specified in time or samples), as well as a resampling engine that allows the user to specify custom bandwidths. These features will aid the professional in cataloguing his work and managing file capture sizes.



Signal View Toolkit (SVT) File

Spectrum / Spectrogram / Time Plot

This provides the primary top-level interactive display set in SVT / SVT File by which to visualize the spectrum, spectrogram (waterfall), and time domain plots. These windows provide a multi-dimensional tool for initially viewing data to begin the process of narrowing collected information to find and classify valuable signals of interest.



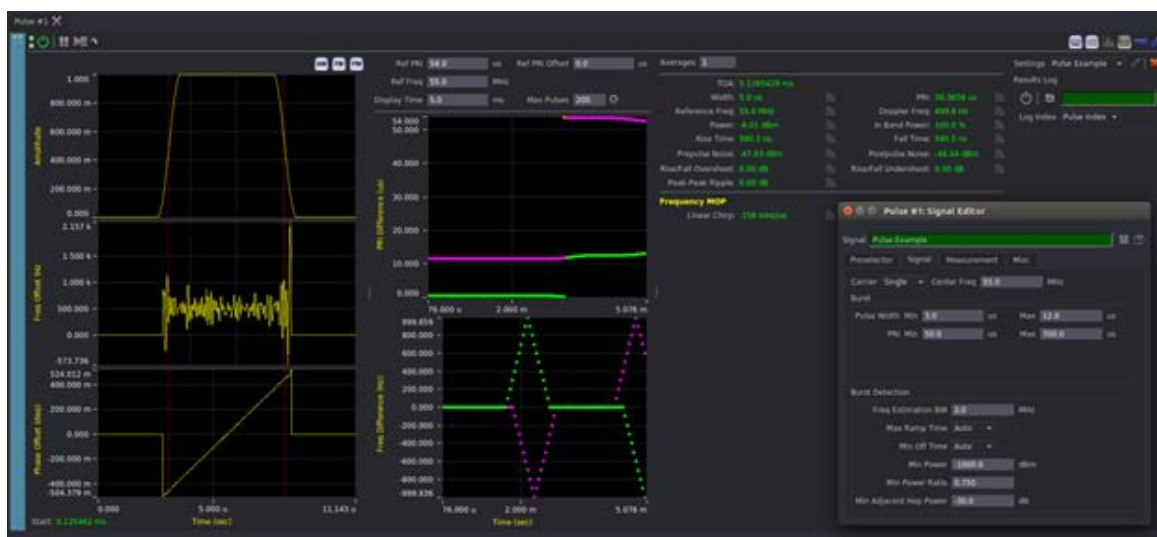
Modulation Domain

Modulation Domain is one of the most useful post-analysis functions in SVT / SVT File, highly recommended as a place to start the drill-down process of signal classification for most applications. It assists in estimating the basic modulation type by plotting and coherently measuring AM, FM, and PM demodulated parametrics, which can be tuned to specific frequencies and bandwidths within the capture spectrum, using its selectable and configurable presselector (which is commonly found in most of the demodulation analysis tools).



Pulse Analysis

The Pulse Analysis function is used in pulse applications such as commercial, automotive, and military radar, as well as avionics applications such as DME. It measures and plots pulse parameters, including carrier frequency, power, pulse width, PRI, and modulation characteristics (chirp, Barker, etc), rise and fall times, Doppler, TOA, time rate of change over in PRI time, frequency rate of change over time, and more.



Strip Chart

As various analysis functions calculate numeric values (carrier frequency, power, etc.), any numeric values from the analysis functions can be selected and sent to the strip chart to display these values over time, as well as logging selected values to a .CSV file, if desired.

Signal Notepad

Any spectrum trace can be stored and viewed with the signal notepad. This allows different traces to be overlaid for easy comparison. The traces can be stored to disk in ASCII format.

Applications

Radio Design Development

- Synthesizer settling – verify spectral frequency deviation, setting, and recovery damping characteristics.
- Turn on/Turn off, attack/decay characteristics – check rise time/fall time, as well as spectral occupancy.
- Provide system stimulus and response analysis for RF systems, whether under design, development, or test.

Spectrum Management

- Extensive documentation aids facilitate documentation of all observations.
- Electromagnetic Environment (EME) characterization.
- Identify all signals in an environment and compare to what should be there.
- Analyze and locate interferers for interference mitigation.
- Record, analyze, and report on test events.
- GEO stamp – highly precise time and location identification.
- EME Characterization – Identify signals in the environment, signal analysis, interference detection and mitigation, as well as band usage statistics.
- Surveillance – SIGINT, Satellite Test Range Support.

Surveillance

- Identify and analyze signals in complex signal environments.

Radar/EW/ECM Test

- Verification testing – Signal analysis, stimulus/response testing, radar and target simulation, ECM/ECCM testing

Test Range Support

- Test Support – Range set up characterization, record and analyze test events, CIED / EW, EME characterization, EME generation, transmitter and receiver tests, validation and verification tests.
- Determine EME prior to testing/presence of unwanted signal activity for mitigation.

Military Radio/Communications Test

- Test Applications – Radio signal characterization, spec verification, interoperability testing, golden radio simulation.
- Provide EME and stimulus then observe response.

Ordering Information

Versions and Options

Domestic Configurations

Note: Description fields are VSG/VSA, Channels, Storage, Signal Workshop

Order Number	Description
142297	Ranger, 6GHz/6GHz, Single, 9.6TB, Com
142518	Ranger, 6GHz/6GHz, Single, 9.6TB, DOD
142530	Ranger, 6GHz/6GHz, Single, 12.8TB, Com
142631	Ranger, 6GHz/6GHz, Single, 12.8TB, DOD
142627	Ranger, 6GHz/6GHz, Dual, 9.6TB, Com
142629	Ranger, 6GHz/6GHz, Dual, 9.6TB, DOD
142548	Ranger, 6GHz/6GHz, Dual, 12.8TB, Com
142633	Ranger, 6GHz/6GHz, Dual, 12.8TB, DOD
142383	Ranger, 6GHz/30GHz, Single, 9.6TB, Com
142634	Ranger, 6GHz/30GHz, Single, 9.6TB, DOD
142638	Ranger, 6GHz/30GHz, Single, 12.8TB, Com
142640	Ranger, 6GHz/30GHz, Single, 12.8TB, DOD
142635	Ranger, 6GHz/30GHz, Dual, 9.6TB, Com
142637	Ranger, 6GHz/30GHz, Dual, 9.6TB, DOD
142641	Ranger, 6GHz/30GHz, Dual, 12.8TB, Com
142643	Ranger, 6GHz/30GHz, Dual, 12.8TB, DOD

Export Configurations

Note: Description fields are VSG/VSA, Channels, Storage, Signal Workshop

141879	Ranger, 6GHz/6GHz, Single, 9.6TB, Int
142630	Ranger, 6GHz/6GHz, Single, 12.8TB, Int
142628	Ranger, 6GHz/6GHz, Dual, 9.6TB, Int
142632	Ranger, 6GHz/6GHz, Dual, 12.8TB, Int
142653	Ranger, 6GHz/30GHz, Single, 9.6TB, Int
142639	Ranger, 6GHz/30GHz, Single, 12.8TB, Int
142636	Ranger, 6GHz/30GHz, Dual, 9.6TB, Int
142642	Ranger, 6GHz/30GHz, Dual, 12.8TB, Int

Accessories

141825	Case, Transit, AXle Chassis, 5-Slot
139745	Kit, Rack Mount, AXle Chassis, 5-Slot
142501	Monitor, 27", 2560x1440, Multi-Stream
140905	mA-3A01, AXle, 3 x 3.2TB Mass Storage
142529	mA-3A01, AXle, 4 x 3.2TB Mass Storage



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