VIAVI Solutions

Data Sheet

VIAVI
VST

6 GHz RF Vector Signal Transceiver (VST)

The Vector Signal Transceiver (VST) is an essential building block in RF communications test solutions supplied by VIAVI Solutions.

Overview

Comprised of a vector signal generator and vector signal analyzer the vector signal transceiver combines multiple instruments into a single PXI Express module with the performance, flexibility and speed at low cost, and small form factor required of a manufacturing test system.

Software Analysis/Generation (optional)

The VST is a software-designed instrument with software analysis and generation packages for the latest cellular, connectivity and IoT standards.

Expanded Bandwidth (option 02)

The VST module provides an industry leading 200 MHz of RF bandwidth leveraging the speed and flexibility of the user programmable FPGA. The added bandwidth enables the user to test the latest options added to the leading wireless and cellular standards including 802.11ac 160 MHz and LTE-A carrier aggregation while also leveraging the latest performance enhancing processing techniques such as digital pre-distortion.

Baseband I/Q Interface (option 03)

The VST can be configured with high-performance, differential or single-ended baseband I/Q interface with 16-bit data sampled at 120 MS/s, for a total of 80 MHz of complex equalized I/Q bandwidth. This baseband I/Q interface allows the VST to address many additional applications, such as testing both the up-converted RF and downconverted baseband signals of a device with a single instrument.

Benefits

- Vector signal analyzer and generator in a single 3U x 3 slot wide PXIe module
- 65 MHz to 6 GHz frequency range
- 80 MHz or 200 MHz instantaneous bandwidth
- Optional baseband I/Q inputs and outputs
- Optional communications standards analysis software and waveform generation tools

Software Analysis/Generation (optional)

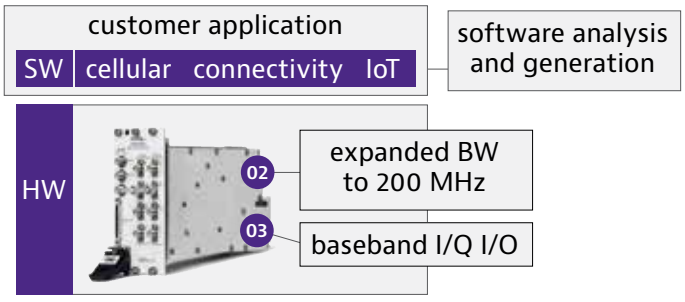
The VST is a software-designed instrument with software analysis and generation packages for the latest cellular, connectivity and IoT standards.

Expanded Bandwidth (option 02)

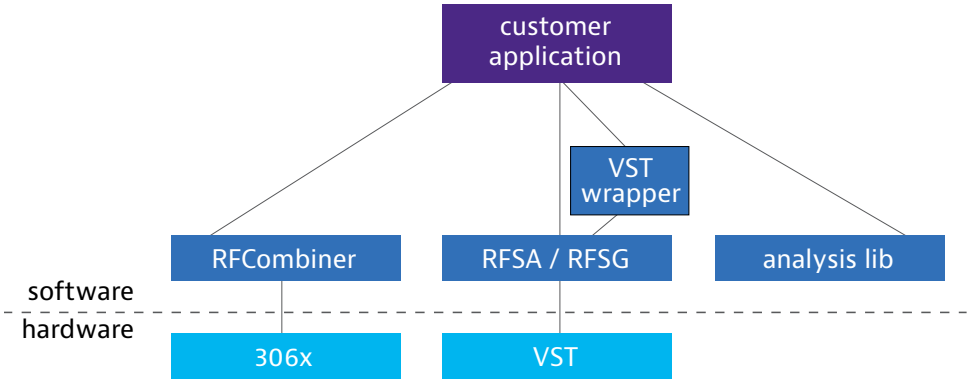
The VST module provides an industry leading 200 MHz of RF bandwidth leveraging the speed and flexibility of the user programmable FPGA. The added bandwidth enables the user to test the latest options added to the leading wireless and cellular standards including 802.11ac 160 MHz and LTE-A carrier aggregation while also leveraging the latest performance enhancing processing techniques such as digital pre-distortion.

Baseband I/Q Interface (option 03)

The VST can be configured with high-performance, differential or single-ended baseband I/Q interface with 16-bit data sampled at 120 MS/s, for a total of 80 MHz of complex equalized I/Q bandwidth. This baseband I/Q interface allows the VST to address many additional applications, such as testing both the up-converted RF and downconverted baseband signals of a device with a single instrument.



VIAVI Solutions use the VST integrated with other modular instruments and software to produce custom solutions for manufacturing test.



Specification Highlights			
Parameter	***Unit***	***VSA***	***VSG***
Frequency range	MHz	65 to 6000	65 to 6000
Bandwidth	MHz	80 or 200 (optional)	80 or 200 (optional)
Phase Noise (1 GHz)	dBc/Hz @20 kHz	-112	-112
Level Accuracy	dB	±0.35 to 0.55	±0.35 to 0.55
Level Range	dBm	+30 to -161 dBm/Hz	+10 to -168 dBm/Hz
Tuning Time	µs	380	380
Level Settling Time	µs	-	125

The VST features a zero-IF receiver enabling higher bandwidth, lower cost, less power consumption, and a smaller footprint when compared to heterodyne receivers. Other advantages include simpler designs with single LOs, and high selectivity, which allows separation of adjacent channels whose signals overlap.

The VST offers industry-leading performance and measurement speed. Using IEEE 802.11ac as an example, the VST achieves an error vector magnitude (EVM) measurement floor of better than -45 dB (0.5 %) at 5.8 GHz for an 80 MHz MCS9 signal.

Software Analysis and Generation (optional)

Options for various radio communications standards are supported, ideal for measuring transmitters, receivers and RF component performance in accordance with methods defined in 3GPP / 3GPP2 and ETSI standards.

Waveform generation is supported using IQCreator™. IQCreator supports all cellular and wireless connectivity standards and can be downloaded from the VIAVI website. A runtime license is all that is required to load and play IQCreator waveforms using the VST.

Communication Standards

- LTE uplink and downlink
- UMTS uplink and downlink
- TD-SCDMA
- c2K/EV-DO reverse link
- GSM/EDGE
- WLAN 802.11a,b,g,n,p,ac
- Bluetooth BR/EDR/LE
- WiMAX OFDMA
- DECT
- Zigbee®
- Z-Wave®[1]
- APCO-25[1]
- TETRA[1]
- VDL[1]

Cellular Measurements

GSM / EDGE Tx & Rx Measurements Per 3GPP TS51-101-1 section 13

- Frequency error and modulation accuracy
- Transmit output power and burst timing
- Spectrum due to Modulation & Switching transients
- Receiver sensitivity, BER/BLER

WCDMA Uplink Tx & Rx Measurements Per 3GPP TS34.121-1 V8.10.0 (2010-03)

- 5.2 Maximum Output Power
- 5.3 Frequency Error
- 5.8 Occupied Bandwidth (OBW)
- 5.9 Spectral Emission Mask (SEM)
- 5.10 Adjacent Channel Leakage Ratio (ACLR)
- 5.13 Modulation Accuracy, EVM, phase discontinuity, PCDE
- 6.2 Reference sensitivity, test loop mode 1&2 3 GPP TS34.109 V7.3.0

WCDMA Downlink Tx & Rx Measurements Per 3GPP TS25.141 release 10 section 6[2] & 7[3]

- 6.2.1 Base Station Power
- 6.2.2 P-CPICH Power
- 6.3 Frequency Error
- 6.5.1 Occupied Bandwidth (OBW)
- 6.5.2.1 Spectral Emission Mask (SEM)
- 6.5.2.2 Adjacent Channel leakage Ratio (ACLR)
- 6.7.1 Error Vector Magnitude (EVM)
- 6.7.2 Peak Code Domain Error (PCDE)
- 6.7.4 RCDE
- 7.2 Reference Sensitivity

cdma2k / EV-DO Reverse link Tx Measurements (RC1-RC4) per 3GPP2 C.S0033-B rev1 and C.S0024-B rev 0, A & B

- Channel Power, Total Power
- Adjacent Channel Power Ratio (ACPR)

- Spectral Emission Mask (SEM)
- Modulation accuracy (Rho) per 3GPP2 C.S0011-A or 3GPP2 C.S0033-A
- Frequency Error
- Phase Error
- Carrier Leak
- Code Domain Power (RC3/4, EV-DO)

TD-SCDMA Tx Measurements Per 3GPP TS34.12

- Total Average Power, mid-amble power, data power
- Tx on/off mask
- Occupied band width (OBW_
- Spectral Emission Mask (SEM)
- Adjacent Channel Leakage Ratio (ACLR)
- Modulation Accuracy
- Timing Error
- PCDE

LTE FDD Uplink Tx & Rx Measurements Per 3GPP 36.521-1 V9.6.0 (2011-09)

- 6.2 Transmit Power
- 6.3 Output Power Dynamics
- 6.5 Transmit Signal Quality
- 6.6 Output RF spectral emissions
- 7.3 Reference Sensitivity level

LTE TDD Uplink Tx & Rx Measurements Per 3GPP 36.521-1 V9.6.0 (2011-09)

- 6.2 Transmit Power
- 6.3 Output Power Dynamics
- 6.5 Transmit Signal Quality
- 6.6 Output RF spectral emissions
- 7.3 Reference Sensitivity level

LTE Downlink TDD & FDD Tx & Rx Measurements Per 3GPP TS136.141 release 10 section 6 & 7

- 6.2 Base Station Output Power
- 6.5.1 Frequency Error
- 6.5.2 Error Vector Magnitude (EVM)
- 6.6.1 Occupied Bandwidth (OBW)
- 6.6.2 Adjacent Channel Leakage Power (ACLP)
- 6.6.3 Operating band unwanted emissions
- 7.2 Reference Sensitivity

Connectivity Measurements

WLAN Tx & Rx Measurements Per IEEE 802.11 (2012) for a,b,g,n,p IEEE 802,11 (D4.0) for ,ac[6]

- Power
- Frequency and Clock/Chip rate
- Modulation Accuracy
- Spectral Mask and Flatness
- Receiver Sensitivity (Option 500 required)

Bluetooth Tx & Rx Measurements Per version 2.1+EDR, LE 4.0

- Output Power TRM/CA/01/C
- Power Density TRM/CA/02/C
- Tx Output Spectrum 20dB BW TRM/CA/05/C
- Tx Output Spectrum Adjacent Channel TRM/CA/06/C
- Modulation Characteristics TRM/CA/07/C
- Initial Carrier Frequency Tolerance TRM/CA/08/C
- Carrier Frequency Drift TRM/CA/09/C
- BR Reference Sensitivity RCV/CA/01/C, RCV/CA/02/C
- EDR Relative Tx power TRM/CA/10/C
- EDR Carrier Frequency Stability and Mod Accuracy TRM/CA/11/C
- EDR Differential Phase Encoding TRM/CA/12/C
- EDR In-band Spurious Emissions TRM/CA/13/C
- EDR Reference Sensitivity RCV/CA/07/C
- Output Power at NOC TRM-LE/CA/01/C
- In band emissions at NOC TRM-LE/CA/03/C
- Modulation Characteristics TRM-LE/CA/05/C
- Carrier Frequency Offset and Drift at NOC TRM-LE/CA/06/C
- LE Receiver Sensitivity (single ended) RCV-LE/CA/01C, RCV-LE/CA/02/C

DECT Tx Measurements Per EN176-1

- 7.4 Accuracy and stability of RF carriers RFP
- 7.5 Accuracy and stability of RF carriers PP
- 8.3 Packet timing jitter
- 8.4 Reference timing accuracy (RFP)
- 8.5 Packet transmission accuracy (PP)
- 9.1.3 Normal Transmit Power (NTP)
- 11.4–7 RF Carrier Modulation Part 1 to 4

Generic Signal Analysis

Bit/Symbol demodulation power and mod analysis for:

- BPSK, DBPSK, /2 DBPSK, QPSK, OQPSK, DQPSK, /4 DQPSK, 8-PSK, D8PSK, /8 D8PSK, 8-PSK EDGE
- FM/FM stereo demodulation power and mod analysis
- SNR, SINAD, THD, THD+N
- Spectrum Analysis
- OBW, ACLR, SEM

Example use cases:

Support for ITU-T G.9959 Z-Wave® 7.1.2.2 Symbol Clock Error

- 7.1.2.5.1 Transmit Frequency Error
- 7.1.2.5.2 Transmit Power Adjustments
- Frequency Deviations
- Power Spectral Density

Support for IEEE 802.15.4 ZigBee® 10.3.2 Transmit Power Spectral Density (PSD) Mask

- 10.3.3 Symbol Rate
- 10.3.8 Error Vector Magnitude
- 10.3.9 Transmit Centre Frequency Tolerance
- 10.3.10 Transmit Power

Ordering Information	
Order as	
VST	Vector Signal Transceiver
Options[8]	
01	80 MHz bandwidth
02	160 MHz bandwidth
03	80 MHz bandwidth + baseband I&Q inputs / outputs
100	GSM/EDGE analysis / generation
101	UMTS-Uplink analysis / generation
102	cdma2k®/Ev-Do analysis
103	WLAN a/b/g/n/p analysis
104	WiMAX OFDMA analysis
105	DECT analysis
106	Bluetooth® BR/EDR/LE analysis / generation
107	LTE-FDD uplink analysis / generation
108	LTE-TDD uplink analysis / generation
109	TD-SCDMA uplink analysis
110	UMTS downlink analysis / generation
111	Generic PSK, FSK, QAM, FM analysis
113	WLAN ac analysis[9]
115	BRCM MC10/11 1024QAM analysis[10]
117	LTE FDD & TDD Downlink analysis / generation
500	IQCreator Runtime license
Test Sequencing Options	
203	WLAN Test Sequencer[12]
210	UMTS Downlink Test Sequencer[13]
217	LTE Downlink Test Sequencer[14]
Accessories	
43139/973	Multiway Synch Cable Assembly[15]

1 Available as pre-sets in the Generic Analysis Library for FM, FSK, PSK, QAM 2 UMTS bands 1-14

3 UMTS bands 1-14

8 Select from options 01, 02, 03

9 Requires options 02 and 103

10 Requires option 113

12 Requires option 103

13 Requires option 110

14 Requires option 117

15 For use with option 217 for multi-up device Rx testing

VIAVI Solutions

To reach the VIAVI office nearest you, visit viavisolutions.com/contact

vst-ds-wir-nse-ae
30187347 900 1118