

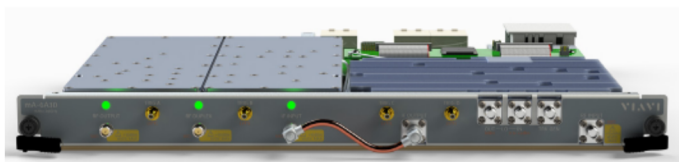
VIAVI

mA-6A30

AXIe Vector Signal Transceiver with 30 GHz Downconverter

Product Overview

The mA-6A30 is the latest in a series of AXIe modular instrumentation from VIAVI Solutions. The mA-6A30 builds upon the mA-6806, the industry's first modular AXIe solution to join the measurement capabilities of a vector signal analyzer with the arbitrary waveform playback functions of a vector signal generator, and extends the vector signal analyzer capabilities up to 30 GHz. The mA-6A30 provides the RF performance, triggering, and data transfer capabilities needed to generate, capture, and stream over 160 MHz of signal bandwidth with precision timing. Extended frequency range and pre-select filtering allows the mA-6A30 to analyze high-frequency signals, harmonics, and out-of-band spurious products. Whether you're trying to prototype your latest software defined radio waveform, validate your transceiver front-end, linearize a power amplifier, analyze radar signals, or execute production test on your wireless device, the mA-6A30 has the performance and speed to tackle your RF test and measurement problems. The fully self-contained mA-6A30 converts RF signals in the frequency range of 1 MHz to 30 GHz with internal storage for 500 MSa



Capabilities

- VSA frequency range 1 MHz – 30 GHz
- VSG frequency range 1 MHz – 6 GHz
- Maximum signal bandwidth 200 MHz
- Selectable low noise amplifier
- Output harmonic filters
- Input pre-select filtering
- 500 MSa ARB and acquisition memory
- Hardware digital downconverter
- Hardware resampling engine
- Agile list mode operation
- Hardware-based fast power and phase measurements
- I/Q streaming via PCI Express
- 30 GHz CW signal generator

Applications

- PA and FEU semiconductor test (including harmonics & out-of-band spurious)
- Radio component test
- Waveform prototyping
- IoT device development
- SIGINT / ELINT
- Wireless communications
- Aerospace and defense
- Radar

of I/Q baseband AWG and acquisition data. For real-time applications, the mA-6A30 can stream the full I/Q bandwidth over its backplane PCI Express interface. Used conjunction with the mA-3A01 AXIe solid-state storage module, the mA-6A30 provides uninterrupted recording or playback of over 2.5 hours of the full signal bandwidth. Control over Ethernet is also provided for ease of connectivity or to enable remote applications.

VSA Description

The mA-6A30 vector signal analyzer capabilities enable a wide range of applications. An onboard FPGA with powerful real-time DSP algorithms for flatness correction and image rejection provide a wide analysis bandwidth of 160 MHz. Down conversion is enabled over the frequency range of 70 MHz to 30 GHz, with direct access to the high-performance digitizer for signals below 70 MHz using the mixer-bypass capability. Selectable bandpass pre-selection filters are included for harmonic and out-of-band spurious tests. High spurious-free dynamic range and advanced correction algorithms ensure fast and accurate measurements. A selectable pre-amplifier provides outstanding sensitivity necessary for over-the-air small signal reception and recording. List mode operation allows independent sequencing of receiver hardware settings (such as LO frequency, reference level, and port) and buffer acquisition selections. The onboard FPGA also provides a configurable digital down converter that allows near instantaneous tuning and channelization within the analysis bandwidth. Flexible triggering capabilities are provided from the front panel trigger connections or through the AXIe backplane trigger bus, allowing tightly synchronized operation of data acquisition or hardware list sequencing. Sample contiguous buffer acquisitions along with streaming transfers over PCI Express enable the creation of pipelined test sequences to maximize

test execution efficiency. Used in conjunction with a mA-3A01 AXIe solid-state storage module allows uninterrupted recording of over 2.5 hours of the full analysis bandwidth.

VSG Description

The mA-6A30 pairs an on-board 500 MSa ARB capable of sequencing up to 65536 waveforms with a vector signal generator operating over a frequency range of 6 GHz. A wide dynamic range from +10 dBm to -120 dBm is available for full-scale ARB signals. Power levels below -140 dBm for sensitivity tests can be achieved using the duplex port. A harmonic filter bank provides suppression of undesired harmonic signal components across the entire operating power range. Exceptional level accuracy and repeatability provides the performance needed for demanding ATE tests. List mode functionality is available to sequence the ARB and hardware settings independently. Triggering is provided from the front panel trigger connections, the AXIe backplane trigger bus, or from ARB embedded marker signals, ensuring tight synchronization of production test events. Sample contiguous ARB sequencing allows drop-out free testing. Automatic real-time compensation for I/Q imbalance and amplitude flatness equalization is applied by the FPGA. Additionally, a programmable digital upconverter is provided for flexible ARB sample rate interpolation. The hardware resampling engine allows the mA-6A30 to playback signals with arbitrary bandwidth and sample rate and to combine multiple signals with different modulation types. Real-time generated waveforms are enabled via I/Q baseband streaming over PCI Express.

VSA Performance Specifications

| Frequency Specifications | | | |
|--|--|---|--|
| Conversion architecture Frequency <70 MHz Frequency 70 MHz to 6 GHz Frequency >6 GHz | | Direct sampling DC quadrature (zero-IF) Multi-Stage conversion | |
| Tuning Range | | 1 MHz to 30 GHz, usable to 100 kHz, mixer bypass below 70 MHz | |
| Tuning Resolution | | 0.1 Hz (with digital frequency error correction) 6 Hz (without digital frequency error correction) | |
| Accuracy, Stability, Aging | | Per chassis CLK100 | |
| Settling Time (from trigger to frequency settled within 1 ppm or 2 kHz of final frequency, whichever is greater) | | 300 us | |
| Analysis bandwidth (frequency >130 MHz) | | 160 MHz | |
| Single Sideband Phase Noise | | | |
| Center Frequency | 1 kHz Offset | 10 kHz Offset | 1 MHz Offset |
| 900 MHz | <-107 dBc / Hz <-110 dBc / Hz typical | <-115 dBc / Hz <-120 dBc / Hz typical | <-130 dBc / Hz <-133 dBc / Hz typical |
| 1900 MHz | <-101 dBc / Hz <-104 dBc / Hz typical | <-107 dBc / Hz <-112 dBc / Hz typical | <-128 dBc / Hz <131 dBc / Hz typical |
| 2900 MHz | <-99 dBc / Hz <-102 dBc / Hz typical | <-105 dBc / Hz <-108 dBc / Hz typical | <-127 dBc / Hz <-131 dBc / Hz typical |
| 5900 MHz | <-90 dBc / Hz <-94 dBc / Hz typical | <-99 dBc / Hz <-101 dBc / Hz typical | <-124 dBc / Hz <-128 dBc / Hz typical |
| 8000 MHz | <-86 dBc / Hz <-89 dBc / Hz typical | <-96 dBc / Hz <-99 dBc / Hz typical | <-117 dBc / Hz <-120 dBc / Hz typical |
| 13000 MHz | <-83 dBc / Hz <-86 dBc / Hz typical | <-93 dBc / Hz <-96 dBc / Hz typical | <-117 dBc / Hz <-120 dBc / Hz typical |
| 18000 MHz | <-81 dBc / Hz <-84 dBc / Hz typical | <-91 dBc / Hz <-94 dBc / Hz typical | <-114 dBc / Hz <-117 dBc / Hz typical |
| 26000 MHz | <-83 dBc / Hz <-86 dBc / Hz typical | <-92 dBc / Hz <-95 dBc / Hz typical | <-117 dBc / Hz <-120 dBc / Hz typical |
| 30000 MHz | <-81 dBc / Hz <-84 dBc / Hz typical | <-91 dBc / Hz <-94 dBc / Hz typical | <-113 dBc / Hz <-116 dBc / Hz typical |
| Amplitude Specifications | | | |
| Maximum Continuous Input Power | | | |
| RF Input Port Frequency setting ≤ 6 GHz Frequency setting >6 GHz | | +10 dBm, ±16 VDC +20 dBm, ±16 VDC | |
| RF Duplex Port | | +40 dBm, 0 VDC | |

| Range, Settling Time, and Repeatability | | |
|--|--|---------------------------------|
| Reference level range | Port max power to average noise level, selectable preamp | |
| Input attenuation range | | |
| Frequency setting ≤6 GHz | 30 dB | |
| Frequency setting <27 GHz | 40 dB | |
| Frequency setting ≤30 GHz | 25 dB | |
| Input attenuation resolution | 2 dB | |
| Settling Time, no change in LO, preselector, or preamp setting | <50 us within 0.1 dB | |
| Settling Time, LO Returned (from trigger to amplitude settled within 0.1 dB) | <300 μs within 0.1 dB <2 ms if crossing Mixer Bypass or 550 MHz | |
| Analysis Bandwidth Flatness | | |
| RF Input port, preselector disabled below 6 GHz, reference level >-50 dBm, exclusive of center frequency, full bandwidth | | |
| Analysis Bandwidth Flatness | | |
| 1 MHz to 28 GHz | ±1.5 dB | |
| 28 GHz to 30 GHz | ±2.0 dB | |
| CW Amplitude Accuracy | | |
| RF input port, preselector disabled, measured -1 MHz from Center Frequency, source match ≤1.22:1 | | |
| Center Frequency | Input Level ≤10 dBm to -50 dBm | Input Level ≤-50 dBm to -80 dBm |
| Mixer Bypass (<70 MHz) | ±0.70 dB typical | ±1.2 dB typical |
| 70 MHz to 550 MHz | <±0.40 dB, ±0.2 dB typical | <±0.70 dB, ±0.2 dB typical |
| 550 MHz to 1 GHz | <±0.50 dB, ±0.2 dB typical | <±0.80 dB, ±0.2 dB typical |
| 1 GHz to 3 GHz | <±0.60 dB, ±0.2 dB typical | <±0.90 dB, ±0.2 dB typical |
| 3 GHz to 6 GHz | <±0.70 dB, ±0.2 dB typical | <±1.00 dB, ±0.2 dB typical |
| RF Duplex Port, preselector disabled, measured -1 MHz from Center Frequency | | |
| Center Frequency | Input Level ≤40 dBm to -20 dBm | Input Level ≤-20 dBm to -50 dBm |
| Mixer Bypass (<70 MHz) | <±0.7 dB typical | <±0.70 dB, <±1.2 dB typical |
| 70 MHz to 550 MHz | <±0.40 dB, ±0.2 dB typical | <±0.70 dB, ±0.2 dB typical |
| 550 MHz to 1 GHz | <±0.50 dB, ±0.2 dB typical | <±0.80 dB, ±0.2 dB typical |

| | | |
|--|--------------------------------|---------------------------------|
| 1 GHz to 3 GHz | <±0.60 dB, ±0.2 dB typical | <±0.90 dB, ±0.2 dB typical |
| 3 GHz to 6 GHz | <±0.70 dB, ±0.2 dB typical | <±1.00 dB, ±0.2 dB typical |
| RF Input Port, preselector enabled, measured –1 MHz from LO Center Frequency, source match <1.22:1 | | |
| Center Frequency | Input Level ≤10 dBm to -50 dBm | Input Level ≤-50 dBm to -80 dBm |
| Mixer Bypass (<70 MHz) | ±0.70 dB typical | ±1.2 dB typical |
| 70 MHz to 550 MHz | <±0.50 dB, ±0.2 dB typical | <±0.80 dB, ±0.2 dB typical |
| 550 MHz to 1 GHz | <±0.60 dB, ±0.2 dB typical | <±0.90 dB, ±0.2 dB typical |
| 1 GHz to 3 GHz | <±0.70 dB, ±0.2 dB typical | <±1.00 dB, ±0.2 dB typical |
| 3 GHz to 6 GHz | <±0.80 dB, ±0.2 dB typical | <±1.10 dB, ±0.2 dB typical |
| 6 GHz to 12 GHz | <±1.20 dB, ±0.3 dB typical | <±1.50 dB, ±0.3 dB typical |
| 12 GHz to 18 GHz | <±1.30 dB, ±0.3 dB typical | <±1.80 dB, ±0.3 dB typical |
| 18 GHz to 24 GHz | <±1.40 dB, ±0.4 dB typical | <±1.90 dB, ±0.4 dB typical |
| 24 GHz to 30 GHz | <±1.60 dB, ±0.5 dB typical | <±2.10 dB, ±0.5 dB typical |
| RF Duplex Port, preselector enabled, measured –1 MHz from LO Center Frequency | | |
| Center Frequency | Input Level ≤40 dBm to -20 dBm | Input Level ≤-20 dBm to -50 dBm |
| Mixer Bypass (<70 MHz) | ±0.70 dB typical | ±1.2 dB typical |
| 70 MHz to 550 MHz | <±0.50 dB, ±0.2 dB typical | <±0.80 dB, ±0.2 dB typical |
| 550 MHz to 1 GHz | <±0.60 dB, ±0.2 dB typical | <±0.90 dB, ±0.2 dB typical |
| 1 GHz to 3 GHz | <±0.70 dB, ±0.2 dB typical | <±1.00 dB, ±0.2 dB typical |
| 3 GHz to 6 GHz | <0.80 dB, ±0.2 dB typical | <±1.10 dB, ±0.2 dB typical |
| Input Voltage Standing Wave Ratio RF Input Port, preselector disabled below 6 GHz, +10 dBm reference level | | |
| Center Frequency | VSWR | |
| 1 MHz to 400 MHz | <1.38:1 | |

| | | |
|---|--|----------------|
| 400 MHz to 3 GHz | <1.45:1 | |
| 3 GHz to 6 GHz | <1.62:1 | |
| 6 GHz to 20 GHz | <1.80:1 | |
| 20 GHz to 30 GHz | <2.50:1 | |
| RF Duplex Port | | |
| Center Frequency | VSWR | |
| 1 MHz to 550 MHz | <1.05:1 | |
| 550 MHz to 3 GHz | <1.20:1 | |
| 3 GHz to 6 GHz | <1.29:1 | |
| Spurious Responses | | |
| Residual DC response (at center of tuned bandwidth) | -70 dBfs | |
| IQ sideband rejection ² | <-55 dB | |
| RF image rejection ² | | |
| Normal Mode (No LNA) | | |
| Except where noted | <70 dB | |
| 15 GHz to 18 GHz | <-65 dB | |
| 28 GHz to 30 GHz | <-65 dB | |
| Maximum Sensitivity (LNA) | | |
| Except where noted | <-70 dB | |
| 28 GHz to 30 GHz | <-65 dB | |
| Input related responses | | |
| 1 MHz to 6 GHz | <-85 dBc | |
| 6 GHz to 30 GHz | <-70 dBc | |
| Non-input related residual response (excluding DC response, input terminated, 0 dB attenuation) | | |
| 1 MHz to 6.5 GHz | <-80 dBm | |
| 6.5 GHz to 10 GHz | <-90 dBm | |
| 10 GHz to 26 GHz | <-100 dBm | |
| 26 GHz to 30 GHz | <-95 dBm | |
| LO leakage at RF Input Port | <-100 dBm, preselector enabled, 0 dB attenuation | |
| 1 MHz to 6 GHz | <-110 dBm, preselector enabled, preamp enabled | |
| | <-50 dBm, preselector disabled, 0 dB attenuation | |
| | <-100 dBm, preselector disabled, preamp enabled | |
| 6 GHz to 30 GHz | <-70 dBm, 0 dB attenuation | |
| Dynamic Range | | |
| Displayed Average Noise Level | | |
| Terminated RF Input Port, preselector disabled | | |
| Center Frequency | 0 dB attenuation | Preamp enabled |
| Mixer Bypass (<70 MHz) | -143 dBm | -161 dBm |
| 70 MHz to 550 MHz | -145 dBm | -159 dBm |
| 550 MHz to 1 GHz | -144 dBm | -159 dBm |
| 1 GHz to 3 GHz | -141 dBm | -157 dBm |
| 3 GHz to 6 GHz | -130 dBm | -148 dBm |
| Terminated RF Input Port, preselector enabled, 1 Hz RBW, RMS average | | |
| Center Frequency | 0 dB attenuation | Preamp enabled |
| Mixer Bypass (<70 MHz) | -146 dBm | -161 dBm |
| 70 MHz to 550 MHz | -145 dBm | -159 dBm |

| | | |
|------------------|----------|----------|
| 550 MHz to 1 GHz | -144 dBm | -159 dBm |
| 1 GHz to 3 GHz | -142 dBm | -158 dBm |
| 3 GHz to 6 GHz | -137 dBm | -155 dBm |
| 6 GHz to 8 GHz | -148 dBm | -164 dBm |
| 8 GHz to 13 GHz | -145 dBm | -161 dBm |
| 13 GHz to 26 GHz | -142 dBm | -161 dBm |
| 26 GHz to 28 GHz | -140 dBm | -154 dBm |
| 28 GHz to 30 GHz | -134 dBm | -149 dBm |

Third-Order Intermodulation Intercept

RF Input Port, preselector disabled, two-tones, –3 MHz and –5 MHz from center frequency

| | | |
|------------------------|------------------|----------------------|
| Center Frequency | 0 dB attenuation | Preamplifier enabled |
| Mixer Bypass (<70 MHz) | +37 dBm | +11 dBm |
| 70 MHz to 550 MHz | +35 dBm | +12 dBm |
| 550 MHz to 1 GHz | +33 dBm | +12 dBm |
| 1 GHz to 3 GHz | +30 dBm | +12 dBm |
| 3 GHz to 6 GHz | +27 dBm | +11 dBm |

RF Input Port, preselector enabled, two-tones, –3 MHz and –5 MHz from center frequency

| | | |
|------------------------|------------------|----------------------|
| Center Frequency | 0 dB attenuation | Preamplifier enabled |
| Mixer Bypass (<70 MHz) | +29 dBm | +11 dBm |
| 70 MHz to 550 MHz | +29 dBm | +10 dBm |
| 550 MHz to 1 GHz | +29 dBm | +9 dBm |
| 1 GHz to 3 GHz | +28 dBm | +8 dBm |
| 3 GHz to 6 GHz | +22 dBm | +2 dBm |
| 6 GHz to 8 GHz | +12 dBm | -10 dBm |
| 8 GHz to 10 GHz | +7 dBm | -15 dBm |
| 10 GHz to 14 GHz | +10 dBm | -14 dBm |
| 14 GHz to 27.5 GHz | +11 dBm | -10 dBm |
| 27.5 GHz to 30 GHz | +15 dBm | -3 dBm |

Acquisition and Channel List Mode Specifications

Data Acquisition

| | |
|-----------------------------------|---|
| Sampling Rate | 250 MSPS (I / Q Data) |
| Resolution | 16-bit I, 16-bit Q |
| Acquisition Depth | 500 MSa (I / Q samples) |
| Selectable Sample Rate Decimation | 1 to 524288 |
| ACQ List Addresses | 65536 |
| ACQ List Parameters | Number of samples, sample rate, pre / post trigger selection, trigger holdoff, markers enabled, sample contiguous (requires common sample rate) |

Acquisition Triggering

| | |
|--------------------------|--|
| Mode | Single, continuous |
| Sources | Envelope power, periodic (timers), free-run, marker signals, front-panel triggers, backplane trigger bus |
| Pre / Post Trigger Range | -(buffer length) to 2 ³¹ -1 samples |
| Trigger Resolution | 1 sample period (4 ns) |
| Trigger Accuracy | ±8 samples |
| Trigger Holdoff | 0 to 8.59 seconds, 4 ns resolution |

| VSA RF Channel List | |
|----------------------------|--|
| Channel List Addresses | 4096 |
| Channel List Parameters | LO frequency / mixer bypass, center frequency offset, phase offset, reference level, RF attenuator, RF preamp, preselector, port |
| Mode | Manual (software), internal (sequential counter), external (arbitrary trigger encoding) |
| Sources | Periodic (timers), marker signals, ARB / ACQ completion, front-panel triggers, backplane trigger bus |

VSG Performance Specifications

Frequency Specifications

| | |
|---|---|
| Conversion architecture | DC quadrature (zero-IF) |
| Tuning Range | 1 MHz to 6 GHz, usable to 100 kHz |
| Tuning resolution | 0.1 Hz (with digital frequency error correction) 6 Hz (without digital frequency error correction) |
| Accuracy, stability, aging | Per chassis CLK100 |
| Settling Time (within 0.1 ppm of final frequency) | 300 us |

Single Sideband Phase Noise

| Center Frequency | 1 kHz offset | 10 kHz offset | 1 MHz offset |
|------------------|--|--|--|
| 900 MHz | <-107 dBc / Hz, <-110 dBc / Hz typical | <-114 dBc / Hz, <-119 dBc / Hz typical | <-129 dBc / Hz, <-133 dBc / Hz typical |
| 1900 MHz | <-101 dBc / Hz, <-104 dBc / Hz typical | <-108 dBc / Hz, <-111 dBc / Hz typical | <-128 dBc / Hz, <-130 dBc / Hz typical |
| 2900 MHz | <-98 dBc / Hz, <-102 dBc / Hz typical | <-104 dBc / Hz, <-108 dBc / Hz typical | <-126 dBc / Hz, <-130 dBc / Hz typical |
| 5900 MHz | <-90 dBc / Hz, <-94 dBc / Hz typical | <-98 dBc / Hz, <-102 dBc / Hz typical | <-123 dBc / Hz, <-127 dBc / Hz typical |

Amplitude Specifications

Output Power Range

| | |
|----------------|---------------------|
| RF output port | +13 dBm to -150 dBm |
| RF duplex port | -17 dBm to -150 dBm |

Settable Power Range

| | |
|----------------|---------------------|
| RF output port | +10 dBm to -125 dBm |
| RF duplex port | -20 dBm to -150 dBm |

Resolution, Settling Time, and Repeatability

| | |
|---------------------|----------------------|
| Settling resolution | 0.01 dB |
| Settling time | <50 μs within 0.1 dB |

| | | | | |
|--|---------------------------------|----------------------------------|-----------------------------------|---------------|
| Settling time, LO returned | | | <300 μs within 0.1 dB | |
| Level repeatability | | | 0.01 dB typical | |
| Modulation Bandwidth Flatness RF output port, output level >-50 dBm | | | | |
| Center Frequency | ±0.10 dB typical | ±0.20 dB typical | ±0.30 dB typical | -1 dB typical |
| 1 MHz to 6 GHz | ±10 MHz | ±40 MHz | ±80 MHz | ±100 MHz |
| CW Amplitude Accuracy RF output port | | | | |
| Center frequency | Output Level ≤10 dBm to -20 dBm | Output Level ≤-20 dBm to -80 dBm | Output Level ≤-80 dBm to -120 dBm | |
| 1 MHz to 400 MHz | < ±0.40 dB, ±0.25 dB typical | < ±0.60 dB, ±0.25 dB typical | < ±0.70 dB, ±0.35 dB typical | |
| 400 MHz to 1 GHz | < ±0.50 dB, ±0.25 dB typical | < ±0.70 dB, ±0.25 dB typical | < ±0.90 dB, ±0.35 dB typical | |
| 1 GHz to 3 GHz | < ±0.50 dB, ±0.25 dB typical | < ±0.70 dB, ±0.25 dB typical | < ±0.90 dB, ±0.35 dB typical | |
| 3 GHz to 6 GHz | < ±0.70 dB, ±0.25 dB typical | < ±0.70 dB, ±0.35 dB typical | < ±1.60 dB, ±0.50 dB typical | |
| RF duplex port | | | | |
| Center frequency | | Output Level ≤-30 dBm to -50 dBm | Output Level ≤-50 dBm to -120 dBm | |
| 1 MHz to 400 MHz | | < ±0.40 dB, ±0.25 dB typical | < ±0.60 dB, ±0.3 dB typical | |
| 400 MHz to 1 GHz | | < ±0.50 dB, ±0.25 dB typical | < ±0.70 dB, ±0.35 dB typical | |
| 1 GHz to 3 GHz | | < ±0.50 dB, ±0.25 dB typical | < ±0.80 dB, ±0.4 dB typical | |
| 3 GHz to 6 GHz | | < ±0.70 dB, ±0.25 dB typical | < ±1.00 dB, ±0.5 dB typical | |
| Output Voltage Standing Wave Ratio RF output port, output level ≤-20 dBm | | | | |
| Center frequency | VSWR | | | |
| 1 MHz to 400 MHz | <1.55:1 | | | |
| 400 MHz to 1 GHz | <1.40:1 | | | |
| 1 GHz to 2.7 GHz | <1.50:1 | | | |
| 2.7 GHz to 6 GHz | <1.90:1 | | | |
| RF duplex port | | | | |
| Center frequency | VSWR | | | |
| 1 MHz to 400 MHz | <1.05:1 | | | |
| 400 MHz to 3 GHz | <1.20:1 | | | |
| 3 GHz to 6 GHz | <1.29:1 | | | |

| Spurious Responses | | |
|---|--|-----------------------|
| Residual LO Response | <-65 dBm <3 GHz, <-40 dBm >3 GHz typical | |
| Residual Sideband Image | <-65 dBc typical | |
| Harmonic spurious | <-33 dBc typical | |
| Subharmonic spurious | <-45 dBc typical | |
| Nonharmonic spurious | <-65 dBc typical, output level >-10 dBm | |
| Dynamic Range | | |
| Broadband Noise Floor | | |
| RF output port, CW, measured –10 MHz from LO centery frequency | | |
| Center frequency | Output Level >-20 dBm | Output Level ≤-20 dBm |
| 1 MHz to 400 MHz | <-130 dBm typical | <-150 dBm typical |
| 400 MHz to 1 GHz | <-130 dBm typical | <-150 dBm typical |
| 1 GHz to 3 GHz | <-130 dBm typical | <-150 dBm typical |
| 3 GHz to 6 GHz | <-135 dBm typical | <-155 dBm typical |
| RF duplex port, CW, measured –10 MHz from LO center frequency | | |
| Center frequency | Output Level >-50 dBm | Output Level ≤-50 dBm |
| 1 MHz to 400 MHz | <-150 dBm typical | <-160 dBm typical |
| 400 MHz to 1 GHz | <-150 dBm typical | <-160 dBm typical |
| 1 GHz to 3 GHz | <-150 dBm typical | <-160 dBm typical |
| 3 GHz to 6 GHz | <-155 dBm typical | <-160 dBm typical |
| Third-order intermodulation distortion | | |
| RF output port, two-tones –10 dBfs, –3 MHz and –5 MHz from center frequency | | |
| Center frequency | Output level >-20 dBm | Output level ≤-20 dBm |
| 1 MHz to 400 MHz | <-70 dBc typical | <-75 dBc typical |
| 400 MHz to 1 GHz | <-60 dBc typical | <-65 dBc typical |
| 1 GHz to 3 GHz | <-60 dBc typical | <-65 dBc typical |
| 3 GHz to 6 GHz | <-60 dBc typical | <-60 dBc typical |
| ARB and Channel List Mode Specifications | | |
| ARB Data | | |
| Sampling rate | 250 MSPS (I / Q data) | |
| Resolution | 16-bit I, 16-bit Q | |
| ARB depth | 500 MSa (I / Q samples) | |
| Selectable sample rate interpolation | 1 to 524288 | |
| ARB list addresses | 65536 | |
| ARB list parameters | Number of samples, sample rate, trigger selection, trigger holdoff, markers enabled, repeat count, sample contiguous (requires common sample rate) | |
| ARB Triggering | | |
| Mode | Single, continuous | |
| Sources | Periodic (timers), free-run, marker signals, front-panel triggers, backplane trigger bus | |
| Trigger offset range | 0 to 2 ³¹ -1 samples | |
| Trigger resolution | 1 sample period (4 ns) | |
| Trigger accuracy | ±8 samples | |
| Trigger holdoff | 0 to 8.59 seconds, 4 ns resolution | |

| VSG RF Channel List | |
|-------------------------|--|
| Channel list addresses | 4096 |
| Channel list parameters | LO frequency, center frequency offset, phase offset, output level, port |
| Mode | Manual (software), internal (sequential counter), external (arbitrary trigger encoding) |
| Sources | Periodic (timers), marker signals, ARB / ACQ completion, front-panel triggers, backplane trigger bus |

CW Signal Generator Performance Specifications

| Frequency Specifications | |
|---|---|
| Conversion architecture | Analog Source - multiple synthesizer |
| Tuning Range | 1 MHz to 30 GHz, usable to 9 kHz |
| Tuning resolution | ≤1 kHz |
| Accuracy, stability, aging | Per chassis CLK100 |
| Amplitude Specifications | |
| RF output power level | 0 dBm |
| CW amplitude accuracy | <±1 dB |
| Output Voltage Standing Wave Ratio | |
| Center frequency | VSWR |
| <6 GHz | <1.50:1 |
| 6 GHz to 18 GHz | <1.90:1 |
| 18 GHz to 30 GHz | <2.50:1 |
| Spectral Purity | |
| Single sideband phase noise | -115 dBc / Hz @ 1 GHz, 10 kHz offset |
| Harmonic Spurious 2.5 GHz to 15 GHz 15 GHz to 30 GHz | <-37 dBc <-30 dBc |
| Subharmonic spurious <6 GHz 6 GHz to 15 GHz 15 GHz to 20 GHz 20 GHz to 27 GHz 27 GHz to 30 GHz | <-50 dBc <-40 dBc <-50 dBc <-30 dBc <-5 dBc |
| Nonharmonic spurious | <-40 dBc |

General Specifications

| Standard Compliance | |
|--|--|
| AXIe-1 Base Architecture Specification, Revision 3 | |
| Timing and Trigger | |
| CLK100 | as per AXIe Standard |
| Trigger Bus | as per AXIe Standard |
| SYNC | as per AXIe Standard |
| STRIG | as per AXIe Standard |
| Front Panel SMB Triggers A,B,C,D | Bi-directional triggers, +3.3 V output, -0.2 to +5 B input |

| Ethernet Base Fabric | |
|---|---|
| Link Speed | 10 / 100 / 1000 Mbps |
| VLAN Support | Yes |
| PCI Express Fabric | |
| Fabric Channels | 1 |
| Link Width | x4 |
| Link Speed | 5 Gbps |
| Configuration | Endpoint |
| Environmental and Physical Specifications | |
| Module Operating | 0° to 75° C |
| Environmental Operating | 0° to 50° C |
| Environmental Storage | -40° to 71° C |
| Humidity | 95% to 40° C (in accordance with MIL-PRF-28800F) |
| Altitude | 4600 m |
| Functional Shock | 15 g, 11 ms (in accordance with IEC-60068-2-27) |
| Random Vibration | 5 Hz - 500 Hz (in accordance with MIL-PRF-28800F) |
| Regulatory | |
| Safety compliance | IEC / EN61010-1 3 rd Edition |
| EMC compliance | IEC / EN 61326-1 EU EMC Directive 2014 / 30 / EU CSA C22.2 No. 61010-1-12 |
| Electrical | |
| Operating voltage range | 48 VDC |
| Power dissipation | <130 W |
| Mechanical | |
| Form Factor | 1 Slot AXIe |
| Dimensions | 30 mm (W) x 322.5 mm (H) x 280 mm (D) |
| Weight | 3.9 kg |

1. Technical Specifications

The technical warranted specifications listed are subject to the following conditions:

- Within 20° to 35° C environmental temperature
- After 60-minute instrument warmup period
- Within valid calibration period (1 year)
- After a full normalization
- Instrumental temperature has not deviated more than 5° C as reported from internal module temperature since last Full Normalization

Typical specifications describe additional performance information exhibited by 95% of units with 95% confidence interval, subject to the conditions above and are not guaranteed.

Nominal specifications describe supplemental information concerning useful or expected performance not covered by warranted or typical specifications.

2. IQ Sideband Image rejection refers to the image signal of the VST input (the IF signal from the 30G Downconverter). RF Image rejection refers to the image frequency of the 30G Downconverter input signal.



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