Data Sheet

VIAVI

mA-6A30

AXIe Vector Signal Transceiver with 30 GHz Downconverter

VIAVI Solutions

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-

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

6A30 converts RF signals in the frequency range of 1 MHz to 30 GHz with internal storage for 500 MSa 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 inerface. 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 Frequency setting <27 GHz Frequency setting ≤30 GHz	 30 dB 40 dB 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 28 GHz to 30 GHz	 ±1.5 dB ±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 15 GHz to 18 GHz 28 GHz to 30 GHz Maximum Sensitivity (LNA) Except where noted 28 GHz to 30 GHz	 <70 dB <-65 dB <-65 dB <-70 dB <-65 dB	
Input related responses 1 MHz to 6 GHz 6 GHz to 30 GHz	 <-85 dBc <-70 dBc	
Non-input related residual response (excluding DC response, input terminated, 0 dB attenuation) 1 MHz to 6.5 GHz 6.5 GHz to 10 GHz 10 GHz to 26 GHz 26 GHz to 30 GHz	 <-80 dBm <-90 dBm <-100 dBm <-95 dBm	
LO leakage at RF Input Port 1 MHz to 6 GHz 6 GHz to 30 GHz	<-100 dBm, preselector enabled, 0 dB attenuation <-110 dBm, preselector enabled, preamp enabled <-50 dBm, preselector disabled, 0 dB attenuation <-100 dBm, preselector disabled, preamp enabled <-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	Preamp 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	Preamp 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	-7 dBm
8 GHz to 10 GHz	+7 dBm	-12 dBm
10 GHz to 14 GHz	+10 dBm	-11 dBm
14 GHz to 27.5 GHz	+11 dBm	-7 dBm
27.5 GHz to 30 GHz	+15 dBm	+5 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, meaured –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 3rd 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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