Economy Single-Channel Arbitrary Waveform Generator Technical Specifications

All these specifications apply to the Waveform Generator unless otherwise explanation. To reach these specifications, the instrument must have been operating continuously for more than 30 minutes within the specified operating temperature.

All the specifications are guaranteed unless those marked with “typical”.

Waveforms	
Standard Waveforms	Sine, Square, Ramp, Pulse, Noise
Arbitrary Waveforms	Exponential rise, Exponential fall, Sin(x)/x, Staircase, etc. 45 built-in waveforms, User-Definable Waveform

Frequency Characteristic **Max sampling rate 125 MSa/s; Frequency resolution is 1 μHz**		
Sine	AG051(F)	1 μHz—5 MHz
	AG1011(F)	1 μHz—10 MHz
Square	1 μHz—5 MHz	
Ramp	1 μHz—1MHz	
Pulse	1 μHz—5 MHz	
White Noise	5 MHz bandwidth (-3 dB) (typical)	
Arbitrary	1 μHz—5 MHz	

Amplitude Characteristic		
Output Amplitude	High Z	1 mVPP - 25 VPP
	50 Ω	1 mVPP – 12.5 VPP
Amplitude Resolution	0.1 mVpp or 4 digits	
Amplitude Accuracy	±(1% of setting + 1 mVpp) （Typical value 1kHz Sine, 0V offset）	
DC Offset Range (AC+DC)	±6.25 V (50 Ω) ±12.5 V (High Z)	
DC Offset Resolution	1 mV or 4 digits	
DC Offset Accuracy	±(1 % of |setting| + 1 mV + amplitude Vpp *0.5%)	
Output Impedance	50 Ω (typical)	

Waveform Characteristic	
Sine	
Flatness (when the Amplitude is 1.0 V_{p-p} (+4 dBm), relative to 1 kHz)	1 μHz to 5 MHz：0.2 dB
Harmonic Distortion (when the Amplitude is 1.0 V_{p-p})	<-40 dBc
Total Harmonic Distortion (when the Amplitude is 1 V_{p-p})	10 Hz to 20 kHz： <0.2 %
Phase Noise	-110 dBc/Hz at 1 MHz frequency, 10 kHz offset, 1 V_{p-p}, typical

Residue Clock Noise	-57 dBm (typical)
Square	
Rise/Fall Time	<25 ns (10% - 90%) (typical, 1 kHz, 1 V_{p-p})
Jitter (rms)	< 1 ns
Non-symmetry (below 50% Duty Cycle)	1% of period+ 5 ns
Overshoot	< 5%
Duty Cycle	50% fixed
Ramp	
Linearity	< 0.1% of peak output (typical, 1 kHz, 1 V_{p-p}, Symmetry 50%)
Symmetry	0% to 100%
Pulse	
Pulse Width	100 ns to 1000 ks
Accuracy	10 ns
Rising/Falling Edge Time	< 25 ns
Overshoot	< 5%
Jitter	< 1 ns
Arbitrary	
Waveform Length	2 – 8k points
Sample Rate	125 MSa/s
Amplitude Accuracy	14 bits
Minimum Rise/Fall Time	35 ns (typical)
Jitter (RMS)	6 ns + 30 ppm

Modulated Waveform (Only for the model with "F")	
AM	
Carrier Waveforms	Sine
Source	Internal/ External
Internal Modulating Waveforms	Sine, Square, Ramp, White Noise, Arbitrary
Internal AM Frequency	2 mHz - 20 kHz
Depth	0.0% - 100.0%
FM	
Carrier Waveforms	Sine
Source	Internal/ External
Internal Modulating Waveforms	Sine, Square, Ramp, White Noise, Arbitrary
Internal Modulating Frequency	2 mHz - 20 kHz
Frequency Deviation	2 mHz - 1 kHz
PM	
Carrier Waveforms	Sine
Source	Internal/ External
Internal Modulating Waveforms	Sine, Square, Ramp, White Noise, Arbitrary
Internal PM Frequency	2 mHz - 20 kHz
Phase Deviation	0° - 180°

FSK	
Carrier Waveforms	Sine
Source	Internal/ External
Internal Modulating Waveforms	50% duty cycle square
FSK Rate	2 mHz - 100 kHz
Sweep	
Type	Linear, Logarithmic
Carrier Waveforms	Sine, Square, Ramp
Direction	Up / Down
Sweep Time	1 ms to 500 s ± 0.1%
Source	Source, External or Manual
Burst	
Waveforms	Sine, Square, Ramp, Pulse, Arbitrary
Types	Count (1 to 50,000 periods), infinite, gated
Start Phase	-360° - +360°
Internal Period	(10 ms - 500 s) ± 1%
Gated Source	External Trigger
Trigger Sources	Source, External or Manual

Counter Specification (Only for the model with "F")		
Function	Frequency, period, positive Pulse width, Duty cycle	
Frequency Range	Single channel: 100 mHz - 200 MHz	
Frequency Resolution	6 digits	
Voltage Range and Sensitivity (non-modulation signal)		
DC coupled	DC offset range	±1.5 VDC
	100 mHz - 100 MHz	250 mV_{p-p} - 5 V_{p-p} (AC+DC)
	100 MHz - 200 MHz	450 mV_{p-p} - 3 V_{p-p} (AC+DC)
AC coupled	1 Hz - 100 MHz	250 mV_{p-p} - 5 V_{p-p}
	100 MHz - 200 MHz	450 mV_{p-p} - 4 V_{p-p}
Pulse width and Duty cycle Measure	1 Hz - 10 MHz (100 m V_{p-p} - 10 V_{p-p})	
Input adjust	Input impedance	1 MΩ
	Coupling mode	AC, DC
	High frequency restrain	High frequency noise restrain (HFR) On or Off
	sensitivity	Low, Middle, High
Trigger level range	±2 V	

Input/Output		
Front Panel		
Output terminal	Output main signal	
Sync terminal	Output sync TTL signal	
	Rise time	< 50 ns

Rear Panel		
Interfaces	USB (type B) connector	
External Modulation Input (Only for the model with "F")		
Input Frequency Range	DC-20 kHz	
Input Voltage Range	± 1 Vpk	
Input Impedance	10 kΩ (typical)	
External Trigger Input (Only for the model with "F")		
Level	TTL-compatible	
Slope	Rising or falling (selectable)	
Pulse Width	>100 ns	
External Reference Clock Input		
Impedance	1 kΩ, AC coupled	
Requested Input voltage swing	100 mV_{p-p} to 5 V_{p-p}	
Locking range	10 MHz ± 35 kHz	
Counter Input (Only for the model with "F", share the same port as External Reference Clock Input)		
DC coupled	DC offset range	±1.5 VDC
	100 mHz - 100 MHz	250 mV_{p-p} - 5 V_{p-p}
	100 MHz - 200 MHz	450 mV_{p-p} - 3 V_{p-p}
AC coupled	1 Hz - 100 MHz	250 mV_{p-p} - 5 V_{p-p}
	100 MHz - 200 MHz	450 mV_{p-p} - 4 V_{p-p}

Power Amplifier Specification (Optional)	
Input Impedance	50 kΩ
Output Impedance	< 2 Ω
Gain	X 10
Max Input Voltage	2.2 V_{p-p}
Max Output Power	10 W
Max Output Voltage	22 V_{p-p}
Full Power Bandwidth	DC - 100 kHz
Slew Rate	10 V/us
Overshoot	< 7%

Adjustment interval：

The recommended calibration interval is one year.