



DG900 시리즈 임의 파형/함수 발생기

- 독창적 SiFi II (신호 충실도 II) 기술 : 임의 파형을 포인트별 파형 발생, 왜곡 없는 신호 복구, 정확하고 가변 가능한 샘플링 속도, 모든 출력 파형 (사인파, 펄스파 포함)에 200 ps의 낮은 지터
- 임의 파형에 대한 각 채널당 16 Mpts 메모리
- 기본 두 채널이 동일한 성능 및 각각의 같은 독립적인 신호원
- 높은 주파수 안정도 : ± 1 ppm, 낮은 위상 잡음 : -105 dBc/Hz
- 고조파 발생기 내장 (최대 8차 고조파)
- 7 디지트, 240 MHz 대역의 주파수 측정 기능 내장
- 임의 파형 최대 160여개 파형 내장
(엔지니어링 응용, 의용 전자, 차량 전자, 연산 공정, 기타 다양한 분야의 공통 신호 포함)
- 최대 샘플링율 250 MSa/s, 수직 분해능 16 bits
- 임의 파형 시퀀스 편집 기능 및 PC 소프트웨어를 통하여 임의 파형 발생 가능
- 다양한 아날로그와 디지털 변조 기능 : AM, FM, PM, ASK, PSK, PWM
- 표준 파형은 기본 파형에 결합된 특정 파형을 출력할 수 있는 기능 제공
- 표준 채널 트래킹 기능이 활성화 시 양쪽 채널 모든 파라미터는 사용자 구성에 따라서 업데이트
- USB Host&Device 표준 지원 및 USB to GPIB 기능 지원
- 4.3인치 컬러 터치 화면
- RS232C, PRBS, 듀얼톤 출력 지원

▶ 특징

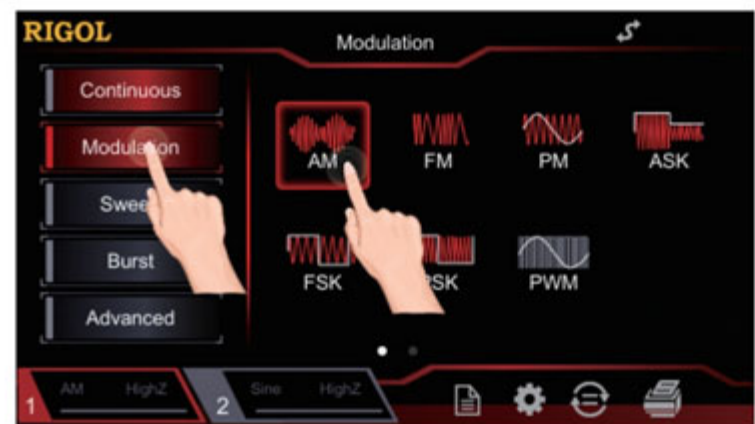
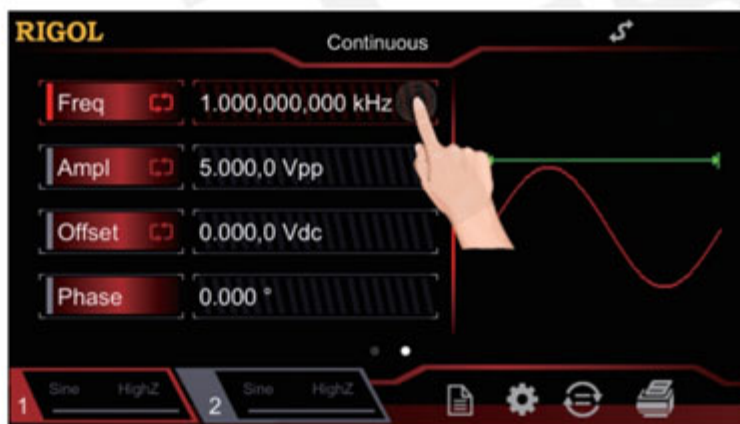
독창적 SiFi II 기술

임의 파형을 신호 왜곡 없이 포인트별 발생 가능합니다. 이전의 SiFi 에 비하여 다양한 필터가 추가 되었으며 엣지 시간에 대한 다이내믹한 조정 기능을 추가하였습니다.



터치가 가능한 UI 디자인

탭과 드래그 동작 제스처를 지원하는 새로운 UI 작업 환경을 제공합니다. 키보드를 사용하여 파라미터 설정을 완료할 수 있습니다.

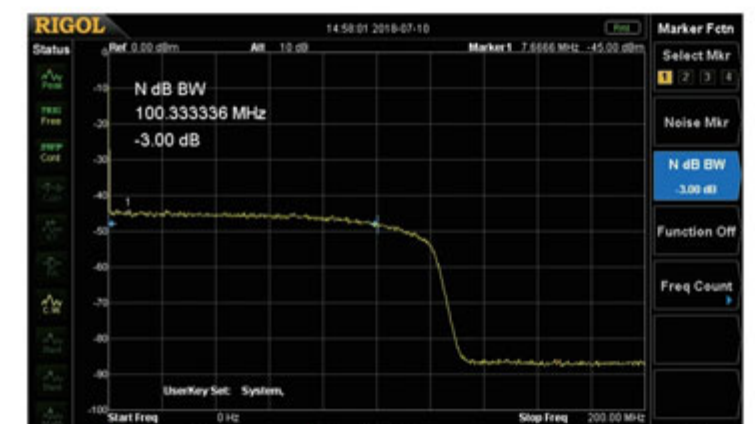


고급 기능 출력

PRBS와 RS232C 패턴 출력과 장비 내(로컬) 시퀀스 편집 가능합니다.



100MHz 대역의 화이트 가우시안 잡음



팬 없이 자연 열 소실(냉각) 0dB 동작 잡음

새로운 열 분산 구조 설계는 복잡한 환경에서 기기의 동작이 안정적으로 이루어지도록 엄격한 열 시뮬레이션 시험을 거쳤습니다.



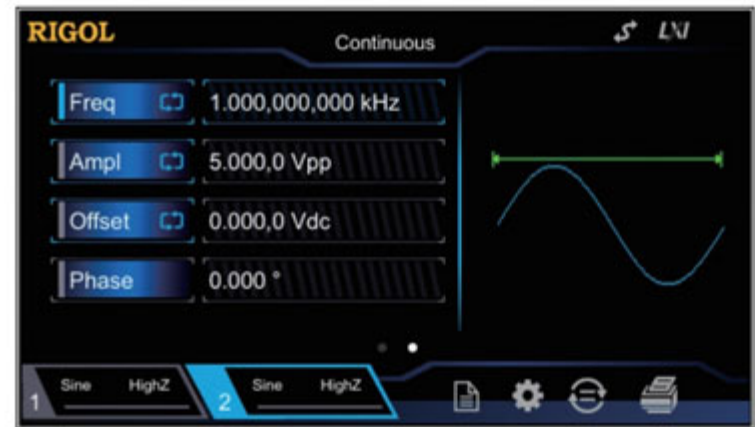
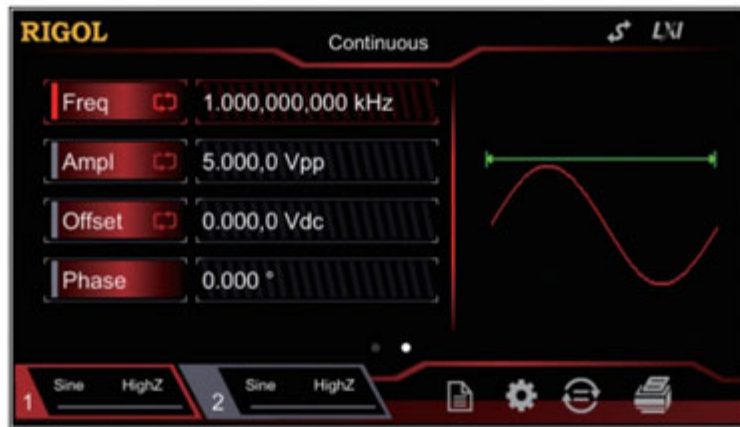
DG900 시리즈 임의 파형/함수 발생기



크기 : W×H×D = 237.4 mm × 97 mm × 268 mm, 장비 무게 : 약 1.75 kg

▶ 기능 인터페이스

같은 성능을 가진 듀얼 채널



SiFi II 독창적인 SiFi II 기술의 임의 파형 기능



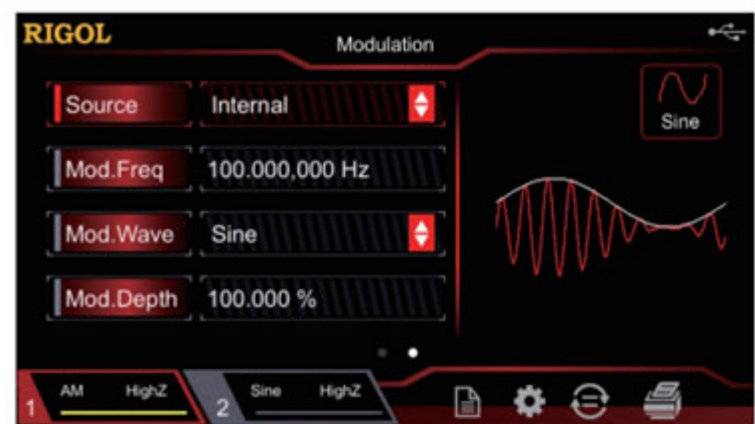
160여개의 내장된 파형



버스트(Burst) 기능



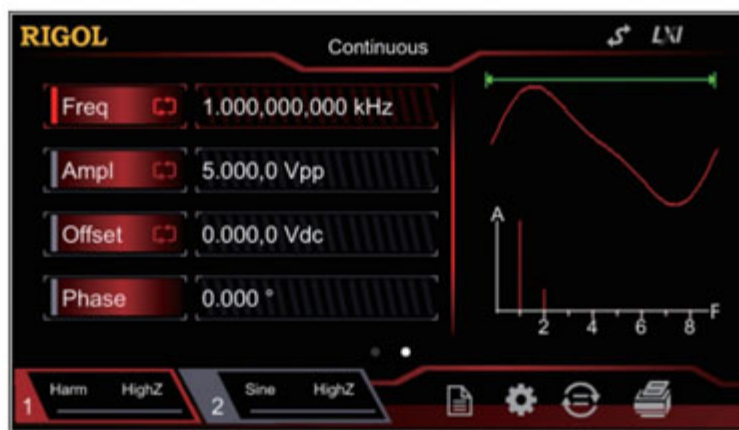
다양한 아날로그와 디지털 변조 기능



스weep(Sweep) 기능



기본 고조파 발생 기능



듀얼톤 기능



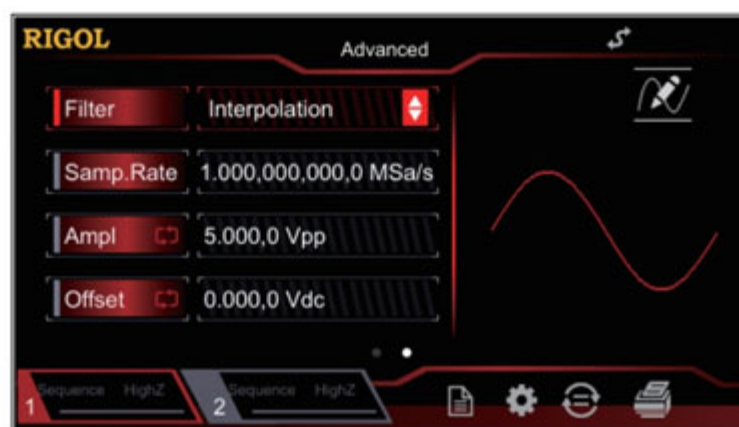
PRBS 기능



RS232 기능



시퀀스 기능



파형 결합 기능



기본 7 digit, 240 MHz 대역의 주파수 측정기



채널과 시스템 설정



파일 관리 기능



▶ 사양

- 별도 명시되지 않는 한, 모든 사양은 다음의 두 조건이 충족시 보증됩니다.
- 함수 발생기가 교정 주기 내에 있을 것.
 - 지정된 동작 온도(23°C±5°C)에서 30분 이상 지속적으로 작동되어야 함.
- 일반(Typical)이라고 표시된 것 제외하고 모든 사양이 보장됩니다.

DG900 series specifications

Model	DG952	DG972	DG992
Channel	2	2	2
Max. Frequency	50 MHz	70 MHz	100 MHz
Sample Rate	250 MSa/s		

Waveform	
Basic Waveforms	Sine, Square, Ramp, Pulse, Noise, DC, Dual-tone
Advanced Waveforms	PRBS, RS232, Sequence
Built-in Arbitrary Waveforms	160 types of waveforms, including Sinc, Exponential Rise, Exponential Fall, ECG, Gauss, HaverSine, Lorentz, etc.

Frequency Characteristics			
Sine	1 µHz to 50 MHz	1 µHz to 70 MHz	1 µHz to 100 MHz
Square	1 µHz to 15 MHz	1 µHz to 20 MHz	1 µHz to 25 MHz
Ramp	1 µHz to 1.5 MHz	1 µHz to 1.5 MHz	1 µHz to 2 MHz
Pulse	1 µHz to 15 MHz	1 µHz to 20 MHz	1 µHz to 25 MHz
Harmonic	1 µHz to 20 MHz	1 µHz to 20 MHz	1 µHz to 25 MHz
PRBS	2 kbps to 40 Mbps	2 kbps to 50 Mbps	2 kbps to 60 Mbps
Dual-tone	1 µHz to 20 MHz	1 µHz to 20 MHz	1 µHz to 20 MHz
RS232	baud rate range: 9600, 14400, 19200, 38400, 57600, 115200, 128000, 230400		
Sequence	2 k to 60 MSa/s		
Noise (-3 dB)	100 MHz bandwidth		
Arbitrary Waveform	1 µHz to 15 MHz	1 µHz to 20 MHz	1 µHz to 20 MHz
Resolution	1 µHz		
Accuracy	±(1 ppm of the setting value + 10 pHz), 18 °C to 28 °C		

Sine Wave Spectrum Purity	
Harmonic Distortion	Typical ^[1] DC to 10 MHz (included): <-55 dBc 10 MHz to 20 MHz (included): <-50 dBc 20 MHz to 40 MHz (included): <-40 dBc >40 MHz: <-35 dBc
Total Harmonic Distortion ^[1]	<0.075% (10 Hz to 20 kHz)
Spurious (non-harmonic)	Typical ^[1] ≤10 MHz: <-60 dBc >10 MHz: <-60dBc + 6dB/octave
Phase Noise	Typical (0 dBm, 10 kHz offset) 10 MHz: <-105 dBc/Hz

Signal Characteristics	
Square	
Rise/Fall Time	Typical (1 Vpp, 1 kHz) ≤9 ns
Overshoot	Typical (100 kHz, 1 Vpp) ≤5%
Duty	0.01% to 99.99% (limited by the current frequency setting)
Non-symmetry	1% of the period + 4 ns
Jitter (rms)	Typical (1 Vpp) ≤5 MHz: 2 ppm of the period + 200 ps >5 MHz: 200 ps
Ramp	
Linearity	≤1% of peak output (typical, 1 kHz, 1 VPP, 100% symmetry)

Symmetry	0% to 100%
Pulse	
Pulse	16 ns to 1000 ks (limited by the current frequency setting)
Duty	0.001% to 99.999% (limited by the current frequency setting)
Rising/Falling Edge	≥8ns (limited by the current frequency setting and pulse width setting)
Overshoot	Typical (1 Vpp, 1 kHz) ≤5%
Jitter (rms)	Typical (1 Vpp) ≤5 MHz: 2 ppm of the period + 200 ps >5 MHz: 200 ps
Arbitrary Waveform Sequence	
Waveform Length	16 Mpts
Vertical Resolution	16 bits
Sample Rate	Interpolation filter: 10 Sa/s to 60 MSa/s Step filter: 2k Sa/s to 50 MSa/s Smooth filter: 2k Sa/s to 50 MSa/s
Min Rise/Fall Time	Interpolation filter: ≥8 ns Step filter: 3.0/sample rate Smooth filter: 1.0/sample rate
Jitter (rms)	Typical (1 Vpp) Interpolation filter: 200 ps Step filter: <5 ps Smooth filter: <5 ps
Overshoot	Typical (1 Vpp) ≤5%
Harmonic Output	
Harmonic Order	≤8
Harmonic Type	Even Harmonic, Odd Harmonic, Order Harmonic, User
Harmonic Amplitude	The amplitude of each order of the harmonic can be set.
Harmonic Phase	The phase of each order of harmonic can be set.

Output Characteristics

Amplitude (into 50 Ω)	
Range	≤10 MHz: 1.0 mVpp to 10 Vpp ≤30 MHz: 1.0 mVpp to 5.0 Vpp ≤60 MHz: 1.0 mVpp to 2.5 Vpp >60 MHz: 1.0 mVpp to 1 Vpp
Accuracy	Typical (1 kHz sine, 0 V offset, >10 mVpp, auto) ±(1% of the setting value) ± 5 mV
Flatness	Typical (Sine, 1 Vpp) ≤5 MHz: ±0.1 dB ≤15 MHz: ±0.2 dB ≤25 MHz: ±0.3 dB ≤40MHz: ±0.5 dB >40 MHz: ±1 dB
Unit	Vpp, Vrms, dBm
Resolution	0.1 mVpp or 4 digits
Offset (into 50 Ω)	
Range(Peak ac+dc)	±5 Vpk ac+dc
Accuracy	±(1% of the setting value + 5 mV + 1% of the amplitude)
Waveform Output	
Output Impedance	50 Ω (typical)
Protection	Short-circuit protection, automatically disable the waveform output when overload occurs

Modulation Characteristics

Modulation Type	AM, FM, PM, ASK, FSK, PSK, PWM
AM	
Carrier Waveform	Sine, Square, Ramp, Arb
Source	Internal/External
Modulating Waveform	Sine, Square, Ramp, Noise, Arb
Modulation Depth	0% to 120%
Modulation Frequency	2 MHz to 1 MHz

FM			
Carrier Waveform	Sine, Square, Ramp, Arb		
Source	Internal/External		
Modulating Waveform	Sine, Square, Ramp, Noise, Arb		
Modulation Frequency	2 mHz to 1 MHz		
PM			
Carrier Waveform	Sine, Square, Ramp, Arb		
Source	Internal/External		
Modulating Waveform	Sine, Square, Ramp, Noise, Arb		
Phase Deviation	0° to 360°		
Modulation Frequency	2 mHz to 1 MHz		
ASK			
Carrier Waveform	Sine, Square, Ramp, Arb		
Source	Internal/External		
Modulating Waveform	Square with 50% duty cycle		
Key Frequency	2 mHz to 1 MHz		
FSK			
Carrier Waveform	Sine, Square, Ramp, Arb		
Source	Internal/External		
Modulating Waveform	Square with 50% duty cycle		
Key Frequency	2 mHz to 1 MHz		
PSK			
Carrier Waveform	Sine, Square, Ramp, Arb		
Source	Internal/External		
Modulating Waveform	Square with 50% duty cycle		
Key Frequency	2 mHz to 1 MHz		
PWM			
Carrier Waveform	Pulse		
Source	Internal/External		
Modulating Waveform	Sine, Square, Ramp, Noise, Arb		
Width Deviation	0% to 100% of the pulse width		
Modulation Frequency	2 mHz to 1 MHz		
External Modulation Input			
Input Range	AM, PM, FM: 75 mVRMS to ±5 (Vac+dc) ASK, PSK, FSK: standard 5 V TTL		
Input Bandwidth	50 kHz		
Input Impedance	10 kΩ		

Burst Characteristics			
Carrier Waveform	Sine, Square, Ramp, Pulse, Noise, Arb, PRBS, RS232, Sequence (except DC, dual-tone, and Harmonic)		
Carrier Frequency	2 mHz to 10 MH	2 mHz to 20 MHz	2 mHz to 30 MHz
Burst Count	1 to 1,000,000 or Infinite		
Internal Period	1 μs to 500 s		
Gated Source	External Trigger		
Source	Internal, External, Manual		
Trigger Delay	0 ns to 100 s		

Sweep Characteristics			
Carrier Waveform	Sine, Square, Ramp, Arb		
Type	Linear, Log, and Step		
Orientation	Up/Down		
Start/Stop Frequency	Same as the upper/lower limit of the corresponding carrier frequency		
Sweep Time	1 ms to 500 s		
Hold/Return Time	0 ms to 500 s		
Source	Internal, External, Manual		
Marker	Falling edge of the sync signal (programmable)		

Frequency Counter	
Measurement Function	Frequency, Period, Positive/Negative Pulse Width, Duty Cycle

Frequency Resolution	7 digits/s (Gate Time = 1 s)		
Frequency Range	1 μ Hz to 240 MHz		
Period Measurement	Measurement Range	4 ns to 1,000 ks	
Voltage Range and Sensitivity (non-modulating signal)			
DC Coupling	DC Offset Range	± 1.5 Vdc	
	1 μ Hz to 100 MHz	50 mVRMS to ± 2.5 (Vac+dc)	
	100 MHz to 240 MHz	100 mVRMS to ± 2.5 (Vac+dc)	
AC Coupling	1 μ Hz to 100 MHz	50 mVRMS to ± 2.5 Vpp	
	100 MHz to 240 MHz	100 mVRMS to ± 2.5 Vpp	
Pulse Width and Duty Cycle Measurement			
Frequency and Amplitude Ranges	1 μ Hz to 25 MHz	50 mVRMS to ± 2.5 (Vac+dc)	DC Coupling
Pulse Width	Min. Pulse Width	≥ 20 ns	
	Pulse Width Resolution	5 ns	
Duty	Measurement Range (display)	0% to 100%	
Input Characteristics			
Input Signal Range	Breakdown Voltage	± 7 (Vac+dc)	Input Impedance = 1 M Ω
Input Adjustment	Coupling Mode	AC	DC
	High Frequency Rejection	On: Input Bandwidth = 150 kHz; Off: Input Bandwidth = 240 MHz	
Input Trigger	Trigger Level Range	-2.5 V to +2.5 V	
	Trigger Sensitivity Range	High, Low	
GateTime	1 ms	1.048 ms	
	10 ms	8.389 ms	
	100 ms	134.218 ms	
	1 s	1.074 s	
	10 s	8.590 s	
	>10 s	>8.590 s	
Trigger Characteristics			
Trig Input			
Level	TTL-compatible		
Slope	Rising or falling (selectable)		
Pulse Width	>100 ns		
Latency	Sweep: <100 ns (typical) Burst: <350 ns (typical)		
Trigger Output			
Level	TTL-compatible		
Pulse Width	>60 ns (typical)		
Max. Frequency	1 MHz		
Two-channel Characteristics - Phase Offset			
Range	0° to 360°		
Waveform Phase Resolution	0.03°		
Reference Clock			
External Reference Input			
Lock Range	10 MHz \pm 50 Hz		
Level	250 mVpp to 5 Vpp		
Lock Time	<2 s		
Input Impedance(Typical)	1 k Ω , AC coupling		
Internal Reference Output			
Frequency	10 MHz \pm 50 Hz		
Level	3.3 Vpp		
Output Impedance(Typical)	50 Ω , AC coupling		
Synchronous Output			
Level	TTL-compatible		

Impedance	50 Ω , nominal value	
Overvoltage Protection		
<p>Occurred when: The instrument amplitude setting is greater than 3.2 Vpp or the output AC+DC is greater than $1.6V_{DC}$ and the input voltage is greater than $\pm 12 \times (1 \pm 5\%)V$ (<10 kHz). Disruptive discharge voltage: $\pm 5(V_{AC} + DC)$. The instrument amplitude setting is smaller than or equal to 3.2 Vpp or the output AC+DC is smaller than $1.6V_{DC}$ and the input voltage is greater than $\pm 2.6 \times (1 \pm 5\%)V$ (<10 kHz). Disruptive discharge voltage: $\pm 18(V_{AC} + DC)$.</p>		
Overcurrent Protection		
Occurred when: the current is greater than ± 240 mA.		
Programming Time		
Configuration Changes	USB	
Function Change	10 ms	
Amplitude Change	5 ms	
Frequency Change	5 ms	
General Specifications		
Power Supply		
Power Voltage	100 V to 127 V (45 Hz to 440 Hz) 100 V to 240 V (45 Hz to 65Hz)	
Power Consumption	Lower than 30 W	
Display		
Type	4.3-inch TFT LCD touch screen	
Resolution	480 horizontal \times RGB \times 272 vertical resolution	
Color	16 M	
Environment		
Temperature Range	Operating: 0 $^{\circ}$ C to 45 $^{\circ}$ C Non-operating: -40 $^{\circ}$ C to 60 $^{\circ}$ C	
Cooling Method	Fan cooled	
Humidity Range	Below 30 $^{\circ}$ C: $\leq 95\%$ RH 30 $^{\circ}$ C to 40 $^{\circ}$ C: $\leq 75\%$ RH 40 $^{\circ}$ C to 50 $^{\circ}$ C: $\leq 45\%$ RH	
Altitude	Operating: below 3,000 meters Non-operating: below 15,000 meters	
Mechanical Characteristics		
Dimensions (W \times H \times D)	238 mm \times 97 mm \times 266.6 mm	
Weight	Package excluded: 1.75 kg Package included: 2.85 kg	
Interface	USB Host, USB Device, and USB-GPIB	
IP Protection	IP2X	
Calibration Interval	1 year (recommended)	
Certification Information		
EMC	Compliant with EN61326-1:2006	
	IEC 61000-3-2:2000	± 4.0 kV (Contact Discharge) ± 4.0 kV (Air Discharge)
	IEC 61000-4-3:2002	3 V/m (80 MHz to 1 GHz); 3 V/m (1.4 GHz to 2 GHz); 1 V/m (2.0 GHz to 2.7 GHz)
	IEC 61000-4-4:2004	1kV power line
	IEC 61000-4-5:2001	0.5 kV (phase-to-neutral voltage); 0.5 kV (phase-to-earth voltage); 1 kV (neutral-to-earth voltage)
	IEC 61000-4-6:2003	3 V, 0.15 MHz to 80 MHz
	IEC 61000-4-11:2004	Voltage dip: 0% UT during half cycle 0% UT during 1 cycle 70% UT during 25 cycles Short interruption: 0% UT during 1 cycle
Electrical Safety	complies with USA: UL 61010-1:2012, Canada: CAN/CSA-C22.2 No. 61010-1-2012 EN 61010-1:2010,	

Note[1]: 0 dBm output, DC offset 0, impedance 50 Ω .

▶ Options and Accessories

	Description	Order No
Model	DG952 (50MHz, Dual-channel)	DG952
	DG972 (70MHz, Dual-channel)	DG972
	DG992 (100MHz, Dual-channel)	DG992
Standard Accessories	1 Power Cord conforming to the standard of the destination country	-
	1 USB Cable	CB-USBA-USBB-FF-150
	1 BNC Cable	CB-BNC-BNC-MM-100
	1 Quick Guide	-
	1 Product Warranty Card	-
Optional Accessories	40 dB Attenuator	RA5040K
	USB-GPIB Interface Converter	USB-GPIB-L

