PG Series

PGA SERIES
PRODUCT MANUAL

HANDHELD VECTOR SIGNAL GENERATOR

PGA-60
9 kHz - 6 GHz

V1.3
08/10/2026

HAROGIC

PGA Series Overview.

BENCHMARK HANDHELD VECTOR SIGNAL GENERATOR

The PGA series delivers top-tier RF performance, including wide output power range, low harmonics, low phase noise, and excellent spur suppression. It features a high-performance 16-bit DAC for high-quality baseband signal output, built-in high-speed memory supporting up to 100 MHz playback and 50 MHz real-time IQ streaming, and an FPGA-based high-factor interpolator for fine sample rate adjustment. While delivering outstanding RF performance, the instrument also provides exceptional flexibility for system deployment and engineering applications.

EASE OF OPERATION

The PGA series features a 10.1-inch multi-touch display and an intuitive interface. Weighing only 1.4 kg, it is ideal for both laboratory and field applications.

STANDARD COMPREHENSIVE SIGNAL OUTPUT FUNCTIONS

The PGA series comes standard with a wide range of essential test signal generation functions, including single tone, multi-tone, frequency sweep, power sweep, digital ramp sweep, pulse modulation, and Gaussian white noise. Additionally, the series supports analog modulation schemes such as AM, FM, and PM, alongside robust IQ playback and real-time streaming capabilities.

Key Features

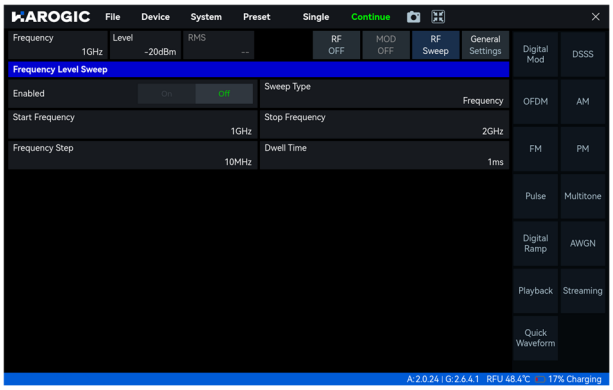
- Frequency: 9 kHz to 6 GHz
- Modulation Bandwidth: 100 MHz playback, 50 MHz real-time
- Memory depth: 128 MB (32 M samples)
- 1 GHz phase noise: -124 dBc/Hz@10 kHz
- Maximum output power: 7 dBm to 14 dBm, 25 dBm (opt.10)
- Minimum output power: ≤ -100 dBm across full frequency range
- Harmonics: ≤ -50 dBc (0 dBm output, typical)
- 16-bit DAC for high-quality baseband waveform
- FPGA-based high-performance interpolator
- Fine sampling rate adjustment supported
- Fine reference frequency adjustment supported
- Built-in GNSS for timing, positioning, and frequency calibration
- Supports remote control
- Battery life: 2.5 hours; supports power-bank operation
- Portable design: 1.4 kg with a 10.1-inch multi-touch display

PGA Series Interface Description

SGStudio Software Overview*

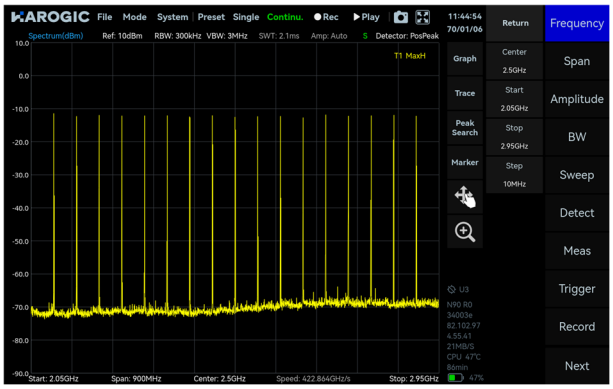
Clear and User-Friendly Interface

SGStudio features a user-friendly interface designed for ease operation. The GUI is logically organized into five key functional areas: the Menu bar, RF parameter settings, mode selection, mode parameter settings, and status information.



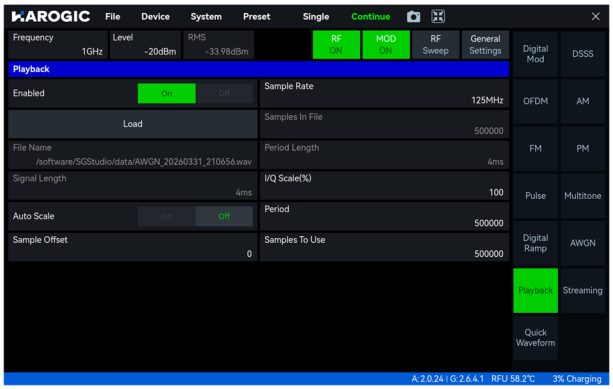
RF Frequency and Power Sweep Control

SGStudio provides comprehensive RF control, supporting single tone, frequency sweep, and power sweep modes. It simplifies complex characterization tasks, enabling users to perform automated frequency response and compression point testing directly through the GUI-eliminating the need for custom programming.



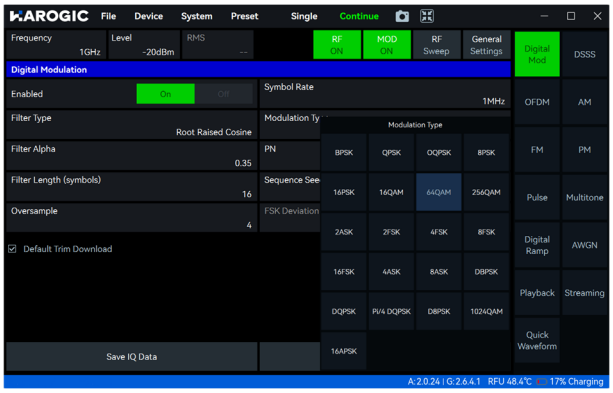
IQ Streaming and Playback

SGStudio supports continuous real-time waveform streaming from the host for playback, as well as waveform buffering in the device's internal memory for subsequent playback. Buffered playback supports wider signal bandwidth and requires no host intervention during playback, thereby fully freeing host processing resources. In buffered playback mode, the maximum waveform length is limited by the capacity of the device's internal memory.



Digital Modulation Signal Output

Engineered for versatility, the PGA series supports an extensive library of modulation schemes, ranging from fundamental ASK, FSK, and PSK to high-order 1024QAM. The architecture is specifically optimized for modern wireless standards, with support for DSSS and OFDM to facilitate advanced signal generation for both field testing and R&D verification.



Basic AM/FM/PM Signal Output

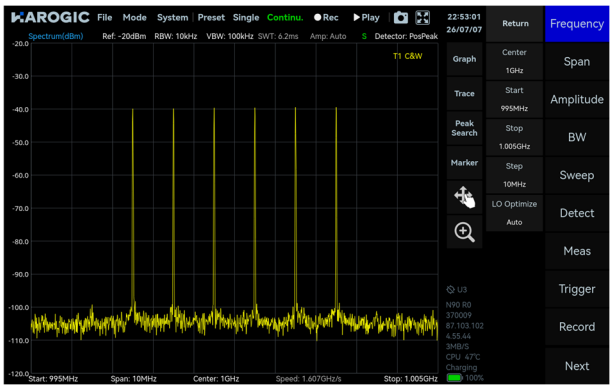
Supports analog modulation formats, including AM, FM, and PM. Each of the three modulation types supports a variety of modulation signal formats, with configurable parameters including modulation rate, modulation index, frequency deviation, phase deviation, and initial phase, accommodating routine analog modulation signal generation and RF testing requirements.

Basic Pulse Signal Output

Supports basic pulse signal output with configurable pulse repetition period, duty cycle, and pulse width.

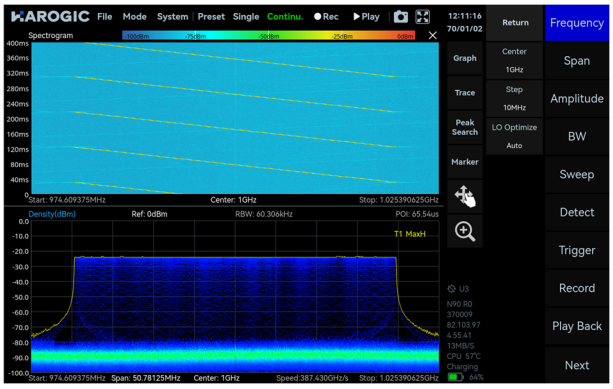
Multitone Signal Output

The PGA series supports the generation of multi-tone RF signals composed of multiple discrete tones. Users can configure the number of tones, tone spacing, and phase mode. In-band notches can also be configured relative to the RF center frequency, making this function suitable for dynamic range, intermodulation distortion, and frequency-response flatness testing.



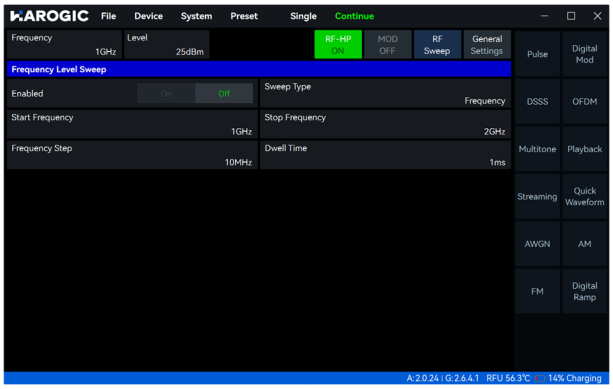
Digital Ramp Sweep

Supports linear digital ramp frequency sweeps with configurable sweep span, sweep time, and sweep period. This function is suitable for radar signal simulation, wideband excitation, and frequency-response testing.



Medium Power Output (opt.10)

The PGA series offers an optional medium-power RF output port, delivering up to 25 dBm of output power over the 10 MHz to 6 GHz frequency range. This option is ideal for applications requiring higher excitation levels, such as device testing and system integration.



*Some spectrum and waveform illustrations are shown using measurement screens from spectrum analyzer software.

Specifications*

FREQUENCY

Frequency range	9 kHz to 6 GHz	
Frequency resolution	Output frequency < 500 MHz	1 Hz
	500 MHz ≤ Output frequency ≤ 6 GHz	0.1 Hz
LO switching time	≤ 100 us pre-programmed; ≤ 50 ms software controlled	
Reference clock	Internal or external, manual correction or GNSS calibration is available	
Frequency accuracy	≤ 0.25 ppm, supports GNSS correction	
Aging and temperature stability	≤ 1 ppm/year, ≤ 0.25 ppm	
Built-in GNSS 1PPS accuracy	≤ 100 ns	

SPECTRUM PURITY

SSB phase noise (dBc/Hz)

Carrier frequency	1 GHz	3 GHz	6 GHz
1 kHz	-115	-105	-98
10 kHz	-124	-114	-108
100 kHz	-125	-116	-110
1 MHz	-138	-128	-122

Harmonics CW, 0 dBm	100 MHz	≤-45 dBc
	1 GHz	≤-50 dBc
	3 GHz	≤-60 dBc
	6 GHz	≤-75 dBc
Non-harmonic spurious	9 kHz - 500 MHz	Worst-case spurious ≤-50 dBc
	500 MHz - 6 GHz	1 MHz step size, 20 MHz observation bandwidth Spurious level ≤ -80 dBc at approximately 98% of frequency points, worst-case spurious ≤-55 dBc
EVM (Typical)	1 GHz	≤0.3% 1 MSPS QAM 16, Alpha = 0.35 ≤0.5% 10 MSPS QAM 64, Alpha = 0.35
	6 GHz	≤0.5% 1 MSPS QAM 16, Alpha = 0.35 ≤1.0% 10 MSPS QAM 64, Alpha = 0.35

AMPLITUDE

	9 kHz	100 MHz	1 GHz	3 GHz	6 GHz
Max. output power (dBm)	≥ 0	≥ 7	≥ 14	≥ 14	≥ 7
Min. output power (dBm)	≤ -100	≤ -100	≤ -100	≤ -100	≤ -100
Power accuracy (Guaranteed/Typical)	Output power ≥ -45 dBm			± 1.2 dB / 0.7 dB	
	Output power: -80 dBm to -45 dBm			± 1.5 dB / 1.2 dB	
	Output power: -100 dBm to -80 dBm			± 2.0 dB / 1.8 dB	
Power setting step size	0.1 dB				

SIGNAL PROCESSING

Standard function	Single tone, multitone, frequency sweep, power sweep AM, FM, PM, pulse modulation, digital ramp sweep Gaussian white noise, IQ playback, real-time IQ streaming
Modulation bandwidth	100 MHz RAM playback, 50 MHz continuous streaming
Built-in memory depth	128 MB (32 M samples)
IQ sampling rate	195.3125 kHz to 125 MHz, step size ≤10 Hz
Basic modulation signal generation	APSK: 16APSK ASK: 2ASK, 4ASK, 8ASK FSK: 2FSK, 4FSK, 8FSK, 16FSK QAM: 16QAM, 64QAM, 256QAM, 1024QAM PSK: BPSK, QPSK, 8PSK, 16PSK, DBPSK, DQPSK, D8PSK, Pi/4 DQPSK

GENERAL

Input and output	
Power	USB PD (65 W), supports power bank operation
RF output	N (F), output impedance 50 Ω
USB port	USB3.0 Type-C * 1, USB2.0 Type-C * 1, USB2.0 Type-A * 1
Ethernet port	RJ45, 1000 Mbps, supports LAN remote control
Video and audio interface	Micro HDMI * 1 (supports extended display), 3.5 mm headphone port * 1
External reference clock input	MMCX (F), 10 MHz, amplitude ≥1.5 Vpp, impedance 200 Ω
Reference clock output	MMCX (F), 100 MHz, 3.3V CMOS, programmable On/Off
External trigger input	MMCX (F), 3.3V CMOS, high impedance
Trigger output	MMCX (F), 3.3 V CMOS
GNSS antenna input	MMCX (F)
Display	IPS LCD 1280 × 800, 10.1-inch multi-touch screen

RAM / EMMC storage	4 GB/32 GB	
Compute module	Raspberry Pi Compute Module 5	
Processor	Broadcom BCM2712, Quad-core 64-bit Arm Cortex-A76, 2.4 GHz	
Power consumption	35 W (typ.)	
Battery life	2.5 hours (typ.)	
Size (D × W × H)	260 × 185 × 46 mm	
Weight	1.4 kg	
Built-in GNSS 1PPS accuracy	±100 ns, the built-in GNSS requires an external antenna	
Operating temperature (ambient)	0 to 50 °C	
Storage temperature (ambient)	-20 to 70 °C	
Operating relative humidity	Ambient Temp.: 0 to 40 °C	5 to 75%
	Ambient Temp.: > 40 °C	5 to 45%
Packaging accessories	Main unit * 1, power adapter * 1, power cable * 1	

Medium Power Output (opt.10)		
Frequency range	10 MHz to 6 GHz	
Maximum output power	≥ 25 dBm (typ.)	
Minimum output power	≤ -80 dBm (typ.)	
Power accuracy (Guaranteed / Typical)	Output power: ≥-20 dBm	±1.2 dB / 0.7 dB
	Output power: -60 dBm to -20 dBm	±1.5 dB / 0.7 dB
	Output power: -80 dBm to -60 dBm	±2.5 dB / 1.2 dB
Harmonics (CW, 0 dBm)	100 MHz	≤-55 dBc
	1 GHz	≤-50 dBc
	3 GHz	≤-42 dBc
	6 GHz	≤-46 dBc

*Specifications apply under the following conditions:

(1) 10 min warm-up after power-on

(2) Ambient temperature: 25 °C (instrument temperature: 50 °C)

(3) With adequate cooling ensuring both ambient and core temperatures remain within the rated range

OPTIONS

Code		
10	Medium power output	built-in hardware
80	4-year warranty	service
81	5-year warranty	service

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