

KEYSIGHT TECHNOLOGIES (AGILENT HP)

N5181A-503

The Keysight (formerly Agilent) N5181A-503 is a member of the MXG Series of RF analog signal generators, specifically configured with Option 503 to provide high-performance signal generation from 250 kHz to 3 GHz. Known for its fast switching speed, excellent reliability, and compact size, this generator is designed for testing analog receivers and components in cellular, wireless, and aerospace/defense applications. It serves as an ideal choice for local oscillator (LO) substitution, clock generation, and interference testing.

SPECIFICATIONS

Frequency

Minimum Frequency	100 kHz Hz
Maximum Frequency	3 GHz Hz
Frequency Resolution	0.01 Hz
Phase Offset Tuning	Adjustable in nominal 0.1° increments
Internal Reference Frequency Aging Rate	±1 ppm/year (standard TCXO), ±0.1 ppm/year or ±0.0005 ppm/day after 30 days (Option 1ER OCXO)
Internal Reference Temperature Stability	±1 ppm (0 to 55 °C, standard TCXO), ±0.02 ppm (0 to 55 °C, Option 1ER OCXO)
External Reference Input Frequency	10 MHz (typical)

Output

Maximum Output Power	+10 dBm dBm
Output Power Range	-110 to +13 dBm (settable -127 to +19 dBm)

Modulation

Modulation	AM, FM, Phase Modulation (ΦM), Pulse Modulation (Option UNW)
Sweep Modes	List, Step (frequency and amplitude)
LF Generator Frequency Resolution	0.1 Hz
LF Generator Output Amplitude Range	0 to 5 Vp-p into 50 ohms
LF Generator Output Impedance	50 ohms (nominal)
Pulse Period Range (Option UNW)	70 ns to 42 s
Pulse Width Range (Option UNW)	20 ns to 42 s
Pulse Resolution (Option UNW)	10 ns (nominal)

General

Reference Oscillator	TCXO (standard) or OCXO (Option 1ER)
Interfaces	LAN (100Base-T), USB 2.0, GPIB, LXI Class C
Display	Monochrome LCD
Calibration Cycle	3 years
Save/Recall Registers	100 registers, arranged in 10 register groups

Physical

Power Supply	100 to 120 VAC (50/60/400 Hz), 220 to 240 VAC (50/60 Hz)
Dimensions (W×H×D)	426 mm x 88 mm x 489 mm mm
Weight	12.5 kg kg

Amplitude

Minimum Output Power	-110 dBm (standard), -127 dBm (with Option 1EQ)
Amplitude Resolution	0.01 dB
Amplitude Switching Speed (SCPI mode)	≤ 5 ms (standard), ≤ 1.15 ms (with Option UNZ)
Maximum Reverse Power Protection	50 W (average), 250 kHz to 3 GHz
Output Impedance	50 Ω (nominal)
Output SWR	< 1.4 (typical, 250 kHz to 3 GHz)

Spectral Purity

Harmonics	< -30 dBc (at carrier frequencies < 3 GHz, output power ≤ +4 dBm)
Non-Harmonics Spurious	< -62 dBc (at carrier frequencies < 3 GHz, > 10 kHz offset)
Sub-harmonics	None (for carrier frequencies ≤ 3.2 GHz)
Broadband Noise Floor	< -140 dBc/Hz (typical at > 15 MHz offset)
Residual FM	< 1 Hz rms (50 Hz to 15 kHz bandwidth, typical at 1 GHz)

Analog Modulation

Frequency Modulation Maximum Deviation	Up to 20 MHz
Frequency Modulation Rate	DC to 7 MHz
Frequency Modulation Distortion	< 1% (1 kHz rate, 100 kHz deviation)
Amplitude Modulation Depth	0 to 100%
Amplitude Modulation Rate	DC to 50 kHz
Amplitude Modulation Distortion	< 1.5% (1 kHz rate, 30% AM depth)
External Modulation Input Sensitivity	1 V _{peak} for indicated deviation or depth into 50 Ω

Pulse Modulation

Pulse Modulation On/Off Ratio	> 80 dB (typical)
Pulse Rise/Fall Time	< 10 ns (typical)
Minimum Pulse Width	20 ns (typical)
Pulse Repetition Frequency	0.1 Hz to 10 MHz
Pulse Delay Range	20 ns to 42 s

Sweep and Modulation Modes

Dwell Time Range	100 μ s to 100 s
Number of Points	2 to 65535 (Step sweep), 1 to 3201 (List sweep)
Internal Modulation Source Waveforms	Sine, Square, Triangle, Ramp, Noise
Internal Modulation Source Frequency Range	0.1 Hz to 100 kHz

Connectivity and Interfaces

RF Output Connector Type	Type-N female, 50 Ω
External Reference Input Connector	BNC female, rear panel
Reference Output Connector	BNC female, rear panel
External Trigger Input Connector	BNC female, rear panel
Sweep Trigger Output Connector	BNC female, rear panel
GPIB Interface	IEEE-488
LAN Interface	100Base-T (RJ-45)
USB 2.0 Interface	USB Type-A (host), USB Type-B (device)

Software and Control

SCPI Command Compatibility	SCPI 1997.0
Emulation Modes	ESG, PSG, 8648 signal generators
IVI-COM / IVI-C Drivers	Supported
LabVIEW Drivers	Supported
Web User Interface	LXI Web Interface

Power and Environmental

Power Consumption	250 W max
Operating Temperature Range	0 to 55 $^{\circ}$ C
Storage Temperature Range	-40 to 70 $^{\circ}$ C
Operating Humidity Range	95% RH at 40 $^{\circ}$ C (non-condensing)
Acoustic Noise Emissions	40 dBA typical
Safety and EMC Compliance	IEC/EN 61326-1, CSA, UL, CE

Physical Characteristics

Rack Unit Height	2U
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Hardware Options and Accessories

Frequency Range Options	Option 501 (1 GHz), Option 503 (3 GHz), Option 506 (6 GHz)
High Output Power Option	Option 1EA
Pulse Modulation Option	Option UNW
Rack Mount Kit Configurations	Option 1CP

Environmental

Operating Altitude	Up to 4,600 m (15,000 ft)
Storage Altitude	Up to 15,240 m (50,000 ft)
Vibration Resistance	MIL-PRF-28800F Class 3 compliant
Shock Resistance	MIL-PRF-28800F Class 3 compliant (30 g half-sine)

Power

AC Input Voltage	100 to 120 VAC (50/60/400 Hz) / 220 to 240 VAC (50/60 Hz)
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Inputs & Outputs

Auxiliary I/O Connector	37-pin D-sub (rear panel)
USB Ports	2x USB 2.0 Type-A (1 front, 1 rear), 1x USB 2.0 Type-B (rear)

Frequency Reference

External Reference Input Level	-3.5 to +20 dBm (nominal)
Internal Reference Output Frequency	10 MHz
Reference Output Level	$\geq +4$ dBm (into 50 Ω , nominal)
External Reference Input Impedance	50 Ω (nominal)
External Reference Input Frequency Range (Option 1ER)	1 to 50 MHz (in 1 MHz steps)

RF Output

Maximum Reverse DC Voltage	50 VDC
Attenuator Type	Electronic

Power & Environmental

AC Input Frequency	45 to 440 Hz (at 100/120 VAC) / 45 to 66 Hz (at 220/240 VAC)
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TECHNOLOGY

RF Analog Signal Generation

APPLICATIONS

LO and clock substitution, interference generation, analog component test

Generated by SpecAtlasHub (specatlashub.com). Specifications are compiled from available sources and are subject to change — verify critical values against the manufacturer before purchase.