

KEYSIGHT TECHNOLOGIES (AGILENT HP)

E4424B

The Keysight Agilent E4424B is a high-spectral-purity analog RF signal generator in the ESG-AP series, operating over a frequency range of 250 kHz to 2 GHz. Designed for demanding receiver, component, and local oscillator tests, the E4424B offers outstanding phase-noise performance, comprehensive analog modulation (AM, FM, phase, and pulse), and high level accuracy.

SPECIFICATIONS

Frequency

Minimum Frequency	250 kHz Hz
Maximum Frequency	2 GHz Hz
Frequency Resolution	0.01 Hz
Phase Offset Tuning	Adjustable in nominal 0.1° increments

Output

Maximum Output Power	+13 dBm dBm
Output Power Range	-136 dBm to +13 dBm (250 kHz to 1 GHz), -136 to +10 dBm (1 to 2 GHz)
Phase Noise	<-134 dBc/Hz (at 20 kHz offset, 1 GHz carrier)

Modulation

Modulation	AM, FM, Phase Modulation, Pulse Modulation
Sweep Modes	Step sweep (frequency, power, list)
Internal Modulation Source Waveforms	Sine, triangle, square, ramp, noise, dual-sine
Internal Modulation Source Frequency Range (Sine)	0.1 Hz - 50 kHz
Internal Modulation Source Frequency Range (Square/Triangle/Ramp)	0.1 Hz - 10 kHz
Internal Modulation Source Frequency Resolution	0.1 Hz
FM Input Impedance	50 Ω nominal
AM Input Impedance	50 Ω nominal

General

Reference Oscillator	High stability ovenized reference (Option 1D5 standard on AP series)
Interfaces	GPIO, RS-232
Display	LCD monochrome with backlight
Save/Recall Registers	100 registers (10 registers in 10 groups)
Programming Languages	SCPI, Agilent 8648A/B/C/D, Agilent 8656B, Agilent 8657A/B compatibility
Operating Humidity	0% to 95% relative humidity (non-condensing)

Physical

Power Supply	90 to 254 VAC, 50 to 60 Hz, or 400 Hz
Dimensions (W×H×D)	133 mm H x 426 mm W x 432 mm D mm
Weight	13.5 kg kg

Frequency Specifications

Internal Reference Aging Rate	$< 1.5 \times 10^{-8}$ / month
Internal Reference Temperature Stability	$< \pm 1 \times 10^{-8}$ (0 to 55 °C)
External Reference Input Frequency	1, 2, 5, 10 MHz (± 10 ppm)

Amplitude Specifications

Maximum Leveled Output Power (≤ 1 GHz)	+13 dBm
Maximum Leveled Output Power (> 1 GHz to 2 GHz)	+10 dBm
Minimum Leveled Output Power	-136 dBm
Amplitude Resolution	0.02 dB
Amplitude Accuracy	± 0.5 dB (at levels > -127 dBm)
Output Voltage SWR	$< 1.4:1$ (typically $< 1.3:1$)
RF Output Impedance	50 Ω

Spectral Purity

Harmonics	< -30 dBc (at carrier levels $\leq +4$ dBm)
Non-Harmonics (Spurious, ≤ 2 GHz)	< -74 dBc

Analog Modulation

Frequency Modulation (FM) Maximum Deviation	4 MHz
Frequency Modulation (FM) Rate Range (DC)	DC to 100 kHz
Phase Modulation (PM) Maximum Deviation (Normal Bandwidth)	40 rad
Phase Modulation (PM) Rate Range (Normal Bandwidth)	DC to 100 kHz
Amplitude Modulation (AM) Depth Range	0 to 100%
Amplitude Modulation (AM) Rate Range (DC)	DC to 10 kHz
Pulse Modulation On/Off Ratio	> 80 dB
Pulse Modulation Rise/Fall Time	< 150 ns

Sweep and Operating Modes

Dwell Time Range	2 ms to 60 s
Number of Sweep Points	2 to 401

System Connectivity and Interfaces

RF Output Connector Type	Type-N female
GPIO Interface	IEEE-488.2
RS-232 Interface	Yes
External Reference Input Connector	BNC female
Reference Output Connector	BNC female

Physical and Environmental Specifications

Operating Temperature Range	0 to 55 °C
Storage Temperature Range	-40 to 71 °C
Rack Unit (RU) Height	3U

Power Requirements

Power Consumption	< 200 W
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Sweep

Sweep Spacing	Linear, Logarithmic
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RF Output

Reverse Power Protection (Max Power)	50 W (up to 2 GHz)
Reverse Power Protection (Max DC Voltage)	50 VDC

Environmental

Maximum Operating Altitude	4,600 m (15,000 ft)
Maximum Storage Altitude	15,000 m (50,000 ft)

Phase Noise

SSB Phase Noise at 1 GHz (100 Hz offset)	<-80 dBc/Hz (typically <-89 dBc/Hz)
SSB Phase Noise at 1 GHz (1 kHz offset)	<-105 dBc/Hz (typically <-115 dBc/Hz)
SSB Phase Noise at 1 GHz (10 kHz offset)	<-130 dBc/Hz (typically <-134 dBc/Hz)
SSB Phase Noise at 1 GHz (20 kHz offset)	<-134 dBc/Hz (typically <-138 dBc/Hz)
SSB Phase Noise at 1 GHz (100 kHz offset)	<-135 dBc/Hz (typically <-139 dBc/Hz)
SSB Phase Noise at 1 GHz (1 MHz offset)	<-135 dBc/Hz (typically <-140 dBc/Hz)

Performance

Frequency Switching Speed	< 65 ms (typically < 40 ms)
Amplitude Switching Speed	< 40 ms typical
Spectral Purity Residual FM	< 1 Hz rms (50 Hz to 15 kHz bandwidth at 1 GHz carrier)

Frequency Modulation (FM)

FM Distortion	< 1% at 1 kHz rate and N x 100 kHz deviation (typically < 0.5%)
FM 3 dB Bandwidth (DC-coupled)	DC to 100 kHz
FM 3 dB Bandwidth (AC-coupled)	20 Hz to 100 kHz

Amplitude Modulation (AM)

AM Depth Resolution	0.1%
AM Distortion	< 1.5% at 1 kHz rate and 30% depth (typically < 1.0%)
AM 3 dB Bandwidth (AC-coupled)	10 Hz to 10 kHz

Phase Modulation (PM)

PM 3 dB Bandwidth (Normal Bandwidth)	DC to 100 kHz
PM 3 dB Bandwidth (High Bandwidth)	DC to 10 MHz (typical)

Pulse Modulation

Pulse Modulation Repetition Frequency	DC to 10 MHz
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Internal Modulation Source

LF Output Voltage Range	0 to 3 Vp-p into 50 ohms
LF Output Impedance	50 ohms

TECHNOLOGY

Analog RF Signal Generation

APPLICATIONS

Receiver testing, component characterization, and local oscillator substitution

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