

KEYSIGHT TECHNOLOGIES (AGILENT HP)

E4434B

The Keysight (formerly Agilent HP) E4434B is a 1 GHz digital RF signal generator belonging to the ESG-DP Series. It offers excellent spectral purity, versatile analog modulation, and advanced digital modulation capabilities, making it ideal for general-purpose R&D, high-volume manufacturing, and troubleshooting applications.

SPECIFICATIONS

General

Interfaces	GPIO, RS-232
Display	Monochrome LCD with backlighting
EMC Compliance	Meets EN 55011 Class A and CISPR 11 Class A
Recommended Calibration Cycle	24 months

Physical

Power Supply	90 to 254 VAC, 50 to 60 Hz (and 400 Hz at 120 V), < 200 W
Operating Temperature	0 to 55 °C °C
Dimensions (W×H×D)	426 mm × 133 mm × 432 mm mm
Weight	< 13.5 kg (30 lb) kg

Frequency Specifications

Frequency Range	250 kHz to 1 GHz
Frequency Resolution	0.01 Hz
Phase Offset Adjustability	Adjustable in nominal 0.1° increments
Frequency Switching Speed	< 45 ms (typical)
Standard Reference Aging Rate	< ±1.5 ppm/year

Amplitude and Level Control

Output Level Range	-136 to +13 dBm
Amplitude Resolution	0.02 dB
Absolute Level Accuracy	±0.5 dB (at levels > -127 dBm, 250 kHz to 1 GHz)
Output Impedance	50 ohms
Maximum Reverse Power Protection	50 W (from a 50 ohm source)
Maximum DC Voltage Input	50 VDC

Spectral Purity

Harmonics	<-30 dBc (at output levels <= +4 dBm)
Non-Harmonic Spurious	<-80 dBc (at < 1 GHz)
SSB Phase Noise (1 GHz carrier, 20 kHz offset)	<-134 dBc/Hz (typical <-138 dBc/Hz)
Non-harmonic Spurious (<1 GHz carrier, >10 kHz offset)	<-80 dBc (typical <-90 dBc)
Residual FM (CW mode, 300 Hz - 3 kHz BW, RMS)	< 1 Hz (typical < 0.5 Hz)

Analog Modulation

Analog Modulation Types	AM, FM, Phase Modulation (Φ M), Pulse Modulation
AM Depth Range	0 to 100%
AM Resolution	0.1%
AM Rate (3 dB Bandwidth)	10 Hz to 10 kHz (AC coupled) / DC to 10 kHz (DC coupled)
FM Resolution	0.1% of deviation or 1 Hz (whichever is greater)

Digital Modulation

External I/Q Modulation Bandwidth (1 dB)	DC to 40 MHz (typical)
External I/Q Modulation Bandwidth (3 dB)	DC to 80 MHz (typical)
I/Q Quadrature Error	< $\pm 1^\circ$ (typical < $\pm 0.5^\circ$)
I/Q Gain Imbalance	< ± 0.15 dB (typical < ± 0.1 dB)
I/Q Carrier Leakage	<-35 dBc (typical <-45 dBc)

Arbitrary Waveform Generator

I/Q Waveform Playback Memory	1 Msample (4 MB)
I/Q Waveform Storage Memory	1 Msample (4 MB)
I/Q Resolution	14-bit
Arbitrary Waveform Sample Rate	40 MHz

Sweep and List Modes

Sweep Types	Step sweep (frequency and power), List sweep (frequency and power)
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Inputs and Outputs

RF Output Connector Type	Type-N female
External Reference Input Frequency	1, 2, 5, 10 MHz (± 10 ppm)
Internal Reference Output Frequency	10 MHz

Physical Characteristics

Rack Unit Height	3U
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Frequency

Standard Oven Reference Temperature Stability	< ±2 × 10 ⁻⁸ (0 to 55 °C)
Standard Oven Reference Aging Rate	< 1 × 10 ⁻⁹ /day, < 1 × 10 ⁻⁷ /year

Modulation

Pulse Modulation Rise/Fall Time	150 ns (typical)
Pulse Modulation On/Off Ratio	> 80 dB
Phase Modulation Maximum Deviation	N × 90 rad (normal bandwidth), N × 9 rad (high bandwidth)
Internal Modulation Source Waveforms	Sine, square, triangle, ramp, noise, dual-sine, swept-sine
Internal Modulation Source Frequency Range (Sine)	0.1 Hz to 50 kHz
Internal Modulation Source Resolution	0.1 Hz

Environmental

Storage Temperature Range	-40 to +71 °C
Operating Altitude	Up to 4,600 m (15,000 ft)
Operating Humidity Range	0% to 95% relative humidity, non-condensing
Vibration and Shock Compliance	Meets MIL-T-28800D Type III, Class 3, Style E

Sweep

Sweep Dwell Time Range	2 ms to 104 s
Step Sweep Points Range	2 to 401
List Sweep Points Range	2 to 10000

Phase Noise

SSB Phase Noise (500 MHz carrier, 20 kHz offset)	<-140 dBc/Hz
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TECHNOLOGY

Analog & Digital RF Synthesis

APPLICATIONS

RF Receiver Testing, Digital Modulation Emulation, General Purpose R&D & Manufacturing

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