

KEYSIGHT TECHNOLOGIES (AGILENT HP)

E4432B

The Keysight (Agilent) E4432B ESG-D Series RF Signal Generator is a high-performance instrument designed for a wide range of test applications requiring precision RF and digital modulation capabilities, especially in wireless communication development and manufacturing.

SPECIFICATIONS

Frequency

Minimum Frequency	250 kHz Hz
Maximum Frequency	3 GHz Hz
Frequency Resolution	0.01 Hz

Output

Maximum Output Power	+13 dBm dBm
Output Power Range	-136 dBm to +13 dBm (up to +20 dBm with option 1E5)
Phase Noise	-116 dBc/Hz at 20 kHz offset, 1 GHz carrier

Modulation

Modulation	AM, FM, Phase, Pulse, Digital I/Q (FSK, MSK, PSK, QAM)
Sweep Modes	Frequency, Power, List
Internal Baseband Generator Maximum Symbol Rate	10 Msps (Option 005 dependent)
Internal Baseband Generator Supported Digital Modulation Formats	BPSK, QPSK, OQPSK, 8PSK, 16QAM, 32QAM, 64QAM, FSK (2 to 64-level), MSK, GMSK, EDGE, W-CDMA, cdma2000, 1xEV-DO, WLAN, DVB-T (Option 005 dependent)
Internal Baseband Generator DAC Resolution (Opt 1E6)	14-bit

General

Reference Oscillator	Internal 10 MHz
Interfaces	GPIB, RS-232
Display	Color LCD

Physical

Power Supply	90 to 264 VAC, 47 to 63 Hz, 350 VA max
Dimensions (W×H×D)	426 mm × 177 mm × 518 mm (W×H×D) mm
Weight	20.4 kg kg
Acoustic Noise	< 45 dBA

Frequency Characteristics

Frequency Switching Speed	<5 ms (frequency and amplitude)
Aging Rate (Internal Timebase)	< +/- 1 ppm/year
Frequency Accuracy (Internal Timebase)	+/- (Aging Rate + Temperature Stability + Calibration Accuracy)

Output Characteristics

Output Power Resolution	0.01 dB
Output Power Accuracy	+/- 1.0 dB (at 1 GHz, 0 dBm, typical)
Output Attenuation Range	0 to 90 dB (electronic), 0 to 110 dB (mechanical)
Output Impedance	50 Ohms
VSWR	<1.5:1 (typical)
Reverse Power Protection	50 W
Output Connector Type	N-type female

Spectral Purity

SSB Phase Noise (1 GHz carrier, 100 kHz offset)	-128 dBc/Hz
SSB Phase Noise (1 GHz carrier, 1 MHz offset)	-140 dBc/Hz
Harmonics	<-30 dBc (typical)
Non-Harmonic Spurious (Offset from Carrier)	<-65 dBc (typical)
Broadband Noise	<-150 dBc/Hz (at 1 GHz, >10 MHz offset, typical)
Residual FM	1 Hz RMS (1 GHz carrier, 0.3 Hz to 3 kHz BW, typical)
Residual AM	0.03 % RMS (1 GHz carrier, 0.3 Hz to 3 kHz BW, typical)

Analog Modulation

AM Modulation Depth Range	0 to 100%
AM Modulation Frequency Range	DC to 100 kHz
AM Distortion	<1.5% (at 1 kHz, 30% AM, typical)
FM Deviation Range	Up to 10 MHz
FM Modulation Frequency Range	DC to 1 MHz
FM Distortion	<0.1% (at 1 kHz, 100 kHz deviation, typical)
PM Deviation Range	Up to 10 radians
PM Modulation Frequency Range	DC to 1 MHz
PM Distortion	<1% (at 1 kHz, 1 rad deviation, typical)
Pulse Modulation On/Off Ratio	>80 dB (typical)
Pulse Rise/Fall Time	<15 ns (typical)
Pulse Repetition Rate	1 Hz to 10 MHz
Pulse Width Range	50 ns to 40 s

Vector Modulation (Digital Modulation)

I/Q Data Input Bandwidth	20 MHz (with Option 007)
EVM	<1% (for W-CDMA, 3.84 Mcps, typical)
ACPR	<-65 dBc (for W-CDMA, 3.84 Mcps, typical)
Filter Types	Nyquist, Root Nyquist, Gaussian, Rectangular

Internal Baseband Generator

Arbitrary Waveform Generator (AWG) Sample Rate	40 MSa/s
AWG Memory Depth (Playback)	1 MSample (I), 1 MSample (Q) (4 MB total)
AWG Memory Depth (Storage)	1 MSample (I), 1 MSample (Q) (4 MB total)
Number of AWG Channels	2 (I and Q)
Waveform Creation Software Compatibility	Keysight (Agilent) N7620B Signal Studio

Sweep Capabilities

Sweep Type	Linear, Logarithmic
Sweep Time Range	10 ms to 1000 s

Inputs and Outputs

RF Output Connector	N-type female
Reference Input Frequency	10 MHz
Reference Input Level	-5 dBm to +10 dBm
Reference Output Frequency	10 MHz
Reference Output Level	>+4 dBm
External Modulation Inputs	AM, FM, PM, Pulse
I/Q Data Inputs	Yes (with Option 007)
Trigger Inputs	Yes
Trigger Outputs	Yes

General Specifications

Calibration Interval Recommended	1 year
Warm-up Time	30 minutes
Firmware Update Method	GPIO or RS-232
Remote Programming Language	SCPI

Environmental and Safety

Operating Temperature Range	0 to 55 °C
Storage Temperature Range	-40 to 70 °C
Operating Humidity Range	5% to 95% RH, non-condensing
Storage Humidity Range	5% to 95% RH, non-condensing
Operating Altitude	Up to 4,600 m
Non-operating Altitude	Up to 15,300 m
Safety Compliance	IEC/EN 61010-1, UL 61010-1, CSA C22.2 No. 61010-1
EMC Compliance	IEC/EN 61326-1

Physical Characteristics

Rack Mount Kit Availability	Yes
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Power Requirements

Input Voltage Range (AC)	90 to 264 VAC
Input Frequency Range (AC)	47 to 63 Hz
Power Consumption (Maximum)	350 VA

Ordering Information and Options

Base Model Number	E4432B
Internal Baseband Generator Option	Option 005 (Internal Dual Arbitrary Waveform Generator)
Digital Modulation Capabilities Options	Firmware Personality 100 (3GPP W-CDMA)
Timebase Stability Option	Option 1E5 (Improved Timebase Aging Rate)
External I/Q Input Option	Option 007
Included Warranty	Standard 1-year warranty

RF Output Performance

RF Output Level Flatness	±0.5 dB (250 kHz to 3 GHz, CW, typically -10 dBm)
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Reference

External Reference Input/Output Impedance	50 Ohm
External Reference Input/Output Connector Type	BNC

Interfaces

LAN Interface Standard	10BaseT Ethernet (Option 007 dependent)
GPIO Connector Type	24-pin D-sub

I/Q Baseband Output

I/Q Data Output Connectors	4 x BNC (I, -I, Q, -Q; Option 005 dependent)
I/Q Data Output Impedance	50 Ohm (Option 005 dependent)
I/Q Data Output Level	0.5 V _{pk} (into 50 Ohm, Option 005 dependent)

RF Performance

Amplitude Settling Time (< 10 dB step)	< 5 ms to within 0.05 dB
RF Leakage	< -80 dBm (1 m from case)

Connectivity & Control

GPIB Interface Standard	IEEE 488.2
LAN Interface Protocols	SCPI, VXI-11, Sockets
Front Panel USB Ports	1 x USB Type A Host
Rear Panel USB Ports	1 x USB Type A Host, 1 x USB Type B Device

Environmental

Non-Operating Vibration	Random 5-500 Hz, 0.3 Grms
Operating & Non-Operating Shock	30 G for 11 ms, half-sine pulse

TECHNOLOGY

RF Signal Generator

APPLICATIONS

Wireless Communications Development, Manufacturing Test, Troubleshooting, RF Component Testing

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