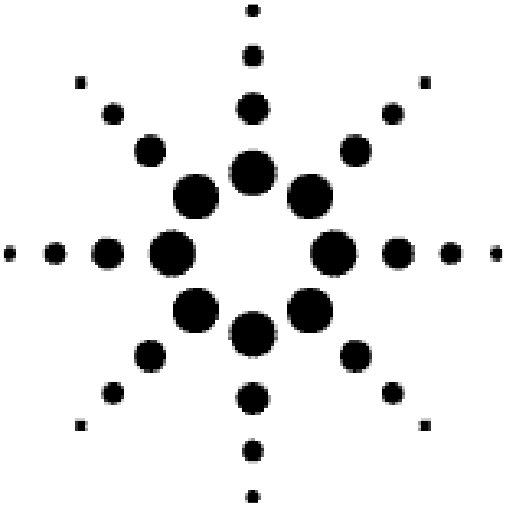

E4422A Analog RF Signal Generator, 250 kHz to 4000 MHz (Discontinued - Support Information Only)

Data Sheet

Frequency Specifications
Frequency Range Agilent ESG-4000A: 250 kHz to 4000 MHz
Resolution: 0.01 Hz
Switching Speed Modulation On: <45 ms, typical Modulation Off: <35 ms, typical
Accuracy: Same as timebase Sweep Modes
Operating modes Step: frequency & power, and arbitrary list
Dwell Time: 2 ms to 60 sec
Number of Points: 2 to 401 Internal Reference Oscillator
Stability Standard (typical) High Stability (Opt 1E5) Aging Rate <±2 ppm/yr <±0.1 ppm/yr or <± 0.0005 ppm/day after 45 days
Temperature <±1 ppm <±0.05 ppm, typical (0° to 55° C)
Line Voltage <±0.1 ppm <±0.002 ppm, typical (+5%, -10%) (+5%, -10%) ----------
Timebase Reference Output Frequency: 10 MHz Amplitude: >0.35 V_{rms} into 50 ohm load
External Reference Input Frequency: 1, 2, 5, 10 MHz ± typ. 10 ppm Option 1E5: 1 ppm, typical Amplitude: >0.15 V_{rms} Input Impedance: 50 ohm Output
Range 250 kHz to 1000 MHz: +13 to -136 dBm >1000 MHz to 3000 MHz: +10 to -136 dBm >3000 MHz to 4000 MHz: +7 to -136 dBm
Resolution 0.02 dB
Level Accuracy[1] (at 23 ±5°C) +7 to -127 dBm <-127 dBm 250 kHz to 2 GHz: ±0.5 dB ±1.5 dB
2 GHz to 4 GHz: ±0.9 dB ±2.5 dB
Attenuator Hold Level Range: >17 dB
Switching Speed: <25 ms typical With Power Search Mode: <210 ms typical
Reverse Power Protection: 250 kHz to 2000 MHz: 50 Watts >2000 MHz to 4000 MHz: 25 Watts Max DC Voltage: 50 V
SWR (typical) 250 kHz to 2000 MHz: <1.4:1 >2000 to 4000 MHz: <1.9:1
Output Impedance: 50 ohms [1]Accuracy degrades by 0.02 dB/°C over full temperature range and by 0.3 dB above +7dBm.

Frequency Bands ----------
Band Frequency Range N# 1 250 kHz to <=249.999 MHz 1 2 >249.999 to <=500 MHz 0.5 3 >500 MHz to <=1 GHz 1 4 >1 to <=2 GHz 2 5 >2 to 4 GHz 4 ----------

Spectral Purity
SSB Phase Noise (typical,at 20 kHz offset) at 500 MHz: <-120 dBc/Hz at 1000 MHz: <-116 dBc/Hz at 2000 MHz: <-110 dBc/Hz at 3000 MHz: <-104 dBc/Hz at 4000 MHz: <-104 dBc/Hz
Residual FM (CWmode, 0.3-3 kHz BW,CCITT, rms): Phase Noise Mode l: <N x 2 Hz Phase Noise Mode 2: <N x 4 Hz
Harmonics <=+4 dBm output level: <-30 dBc

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Nonharmonics (>3 kHz offset, <+7 dBm output level) 250 kHz to 1000 MHz: <-65 dBc >1000 MHz to 2000 MHz: <-59 dBc >2000 MHz: <-53 dBc
Subharmonics <=1000 MHz: None >1000 MHz: <-40 dBc

Frequency Modulation
Maximum Deviation: N x 10 MHz
Resolution: 0.1% of deviation or 1 Hz, whichever is greater
Deviation Accuracy (1 kHz rate, dev. <N x 100 kHz): <±(3.5% of FM deviation + 20 Hz)
Modulation Frequency Response(deviation = 100 kHz) ----------
Path Rates 1 dB Bandwidth 3 dB Bandwidth, typical FM1 dc/20 Hz to 100 kHz dc/5 Hz to 10 MHz
FM2 dc/20 Hz to 100 kHz dc/5 Hz to 1 MHz ----------
Distortion (1 kHz rate, THD, dev. = N x 100 kHz): <1%

Phase Modulation
Maximum Deviation: N x 90 radians
Resolution: 0.1% of set deviation
Deviation Accuracy (1 kHz rate): <±(5% of deviation + 0.01 radians)
Modulation Frequency Response ----------
PM Mode Maximum Rates (3 dB BW) Deviation PM1 PM2 Normal BW N x 90 rad dc to 100 kHz dc to 100 kHz
High BW N x 2pi rad dc to 1.5MHz (typ) dc to 1 MHz (typ) N x pi/2 rad dc to 4 MHz (typ) dc to 0.9 MHz (typ) ----------
Distortion (1 kHz rate, THD, dev <N x 90 rad): <1% Amplitude Modulation fc>500 kHz
Range (envelope peak <=max specified power): 0 to 100%
Resolution: 0.1% **Rates (3 dB Bandwidth):** dc/10 Hz to 10 kHz
Distortion(1 kHz rate, THD) 30% AM: <1.5% 90% AM: <4%
Accuracy(1 kHz rate): <±(5% of setting + 1%)

Pulse Modulation
On/Off Ratio <=3GHz: >80 dB >3 GHz: >60 dB
Rise/Fall Times: 150ns, typical
Minimum Width (typical) ALC On: 2 µs ALC Off: 0.4 µs
Pulse Repetition Frequency (typical) ALC On: 10 Hz to 250 kHz ALC Off: DC to 1.0 MHz
Level Accuracy (relative to CW): ± 0.5 dB, typical
Internal Pulse Generator (Squarewave only) Squarewave Rate: 0.1 Hz to 50 kHz Pulse Period: 16 µs to 30 seconds Width: 8 µs to 30 seconds Resolution: 4 µs Internal Modulation Source Provides FM, PM, and AM Modulation Signals and LF Out
Waveforms: sine, square, ramp, triangle, pulse, noise
Rate Range Sine: 0.1 Hz to 50 kHz Square, Ramp, Triangle: 0.1 Hz to 10 kHz
Resolution: 0.1 Hz
Frequency Accuracy: 0.005%
Swept Sine Mode(Frequency, Phase Continuous)
Operating Modes: Triggered or Continuous Sweeps
Frequency Range: 0.1 Hz to 50 kHz
Sweep Time: 1 ms to 65 seconds
Resolution: 1 ms
Dual Sinewave Mode Frequency Range: 0.1 Hz to 50 kHz
Amplitude Ratio: 0 to 100%
Amplitude Resolution: 0.1% LF Out (Internal Modulation Source)
Amplitude: 0 to 3 V_{peak} into 50 ohms
Output Impedance: <1 ohm External Modulation Inputs
Modulation Types: Ext1: FM, PM, AM, and Burst Envelope Ext2: FM, PM, AM, and Pulse
Simultaneous Modulation All modulation types may be simultaneously enabled, except: FM with PM, AM with Burst envelope. AM, FM, and PM can sum simultaneous inputs from any two sources (INT, EXT1, and EXT2.) Any given source (INT, EXT1, or EXT2) may only be routed to one activated modulation type.

Remote Programming
Interface: HP-IB (IEEE-488.2-1987) with Listen and Talk, RS-232

Control Languages: SCPI version 1992.0, also compatible with Agilent 8656B & 8657A/B/D/J mnemonics
Functions Controlled: All front panel functions except power switch and knobs
IEEE-488 Functions: SH1, AH1, T6, TE0, L4, LE0, SR1, RL1, PP0, DC1, DT0, C0, E2

General
Power Requirements: 90 to 254 V; 50,60, or 400 Hz; 200 W maximum
Operating Temperature Range: 0 to 55° C
Leakage: Conducted and radiated interference meets MIL-STD-461B RE02 Part 2 and CISPR 11
Storage Registers: Up to 100 storage registers, up to 10 sequences available
Weight: <12.7 kg (28 lb) net, <21 kg (46 lb.) shipping
Dimensions: 133 mm H x 426 mm W x 432 mm D (5.25 in H x 16.8 in W x 17 in D)

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