

KEYSIGHT TECHNOLOGIES (AGILENT HP)

8656B

The Keysight (Agilent HP) 8656B is a programmable synthesized signal generator operating in the 100 kHz to 990 MHz frequency range. Highly regarded for its reliability, performance, and cost-effectiveness, it provides precise output control with ± 1 dB level accuracy and 0.1 dB resolution from +13 to -127 dBm. It features versatile AM/FM modulation capabilities (both internal and external) and a rapid frequency switching speed of under 35 ms, making it a staple instrument for RF design, manufacturing, and service environments.

SPECIFICATIONS

Frequency

Minimum Frequency	100 kHz Hz
Maximum Frequency	990 MHz Hz
Frequency Resolution	10 Hz
Phase Adjustment Resolution	1°

Output

Maximum Output Power	+13 dBm dBm
Output Power Range	+13 to -127 dBm
Phase Noise	< -114 dBc/Hz at 20 kHz offset, 500 MHz carrier

Modulation

Modulation	AM, FM
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General

Reference Oscillator	10 MHz (standard or Option 001 High Stability)
Interfaces	GPB (IEEE-488)

Frequency Specifications

Frequency Range	100 kHz to 990 MHz
Frequency Switching Speed	< 35 ms (to within 100 Hz of final frequency)
Reference Oscillator Frequency	10 MHz
Reference Oscillator Aging Rate (Standard)	< $\pm 2 \times 10^{-6}$ per year
Reference Oscillator Aging Rate (Option 001)	< 5×10^{-10} per day (after 10 days warm-up)
Reference Oscillator Temp Stability (Option 001)	< $\pm 7 \times 10^{-9}$ (0 to 55 °C)
External Reference Input Requirements	10 MHz, level > 0.15 Vrms into 50 ohms
Reference Output Level	10 MHz, level > 0.5 Vrms into 50 ohms

Amplitude (Output Power) Specifications

Amplitude Range	+13 to -127 dBm
Amplitude Resolution	0.1 dB
Output Impedance	50 ohms nominal
Reverse Power Protection Limit	50 W RF, 25 V DC (from 50 ohm source)

Spectral Purity

Non-Harmonic Spurious (offsets > 50 kHz)	< -60 dBc
SSB Phase Noise at 20 kHz Offset (500 MHz carrier)	< -114 dBc/Hz
RF Leakage	< 1 μ V induced in a 2-turn, 2.5 cm loop, 2.5 cm from surface

Amplitude Modulation (AM)

AM Depth Range	0 to 99% (for output levels $\leq$ +7 dBm)
External AM Input Sensitivity	1 V _{peak} for indicated depth
External AM Input Impedance	600 ohms nominal

Frequency Modulation (FM)

FM Deviation Range	0 to 99 kHz
FM Resolution	100 Hz (deviations < 10 kHz); 1 kHz (deviations $\geq$ 10 kHz)
FM Accuracy	$\pm$ (5% of setting + 10 Hz) (at 400 Hz and 1 kHz rates)
FM Rate/Bandwidth (AC)	20 Hz to 100 kHz (3 dB bandwidth)
FM Rate/Bandwidth (DC)	DC to 100 kHz (3 dB bandwidth)
External FM Input Sensitivity	1 V _{peak} for indicated deviation
External FM Input Impedance	600 ohms nominal

Internal Modulation Source

Internal Modulation Frequencies	400 Hz and 1000 Hz
Internal Modulation Frequency Accuracy	$\pm$ 3%

Rear and Front Panel Connectors

RF Output Connector	Type-N female (front panel; rear panel with Option 002)
External AM Input Connector	BNC female (front panel)
External FM Input Connector	BNC female (front panel)
External Reference Input Connector	BNC female (rear panel)
Reference Output Connector	BNC female (rear panel)
GPIO Interface	24-pin IEEE-488 (rear panel)

General and Environmental Specifications

Operating Temperature Range	0 to 55 °C
Storage Temperature Range	-55 to +75 °C
Power Supply Voltage	100 / 120 / 220 / 240 V AC (+5%, -10%)
Power Supply Frequency	48 to 440 Hz
Power Consumption	< 125 VA
Dimensions (W x H x D)	425 mm × 133 mm × 520 mm

Ordering Options and Accessories

Option 001	High-Stability Oven Reference Timebase
Option 002	Rear-panel RF Output and Modulation Inputs
Option 907	Front Handle Kit
Option 908	Rack Flange Kit
Option 909	Rack Flange and Front Handle Kit

Protection

Maximum DC Reverse Voltage	50 V dc
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TECHNOLOGY

Synthesized RF Signal Generation

APPLICATIONS

RF transmitter and receiver testing, general laboratory use, automated test systems

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