



# 8642A Synthesized Signal Generator, 100 kHz to 1050 MHz (Discontinued – Support Information Only)

## Data Sheet

### Frequency Specifications

**Range:** 100 kHz to 1057.5 MHz

**Bands:** The full range is covered in one continuous span. However, many specifications are dependent on carrier frequency. To simplify such specifications, the carrier frequency ranges are divided into bands as shown below: Band Carrier Frequency (MHz) 9 528.750001 to 1057.5 8 264.375001 to 528.75 7 132.187501 to 264.375 6 66.093751 to 132.1875 5 33.046876 to 66.09375 4 16.523438 to 33.046875 3 8.261719 to 16.523437 2 4.130860 to 8.261718 1 0.1 to 4.130859 HET 0.1 to 132.1875

**Sweep Modes:** Start-stop, span, and phase continuous X-Axis Output: 0 to 10 Vdc,  $\pm 10\%$  Y-Axis Output: TTL positive true for display blanking during retrace

**Resolution:** 1 Hz, 0.1 Hz with special function

**Stability Standard:** Aging rate:  $\pm 2$  ppm/year Option 001:  $< 10e-9$ /day aging rate after 8 days warmup Spectral Purity Specifications

**Residual FM (in CW, AM or Angle Modulation  $< 1/3$  max dev.)** 500 MHz:  $< 1.2$  Hz (0.3 to 3 kHz BW),  $< 2$  Hz (0.05 to 15 kHz BW) 1000 MHz:  $< 2$  Hz (0.3 to 3 kHz BW),  $< 5$  Hz (0.05 to 15 kHz BW)

**SSB Phase Noise at 20 kHz Offset (CW, AM or FM/PhiM  $< 1/60$  max dev)** 125 MHz: -144 dBc/Hz 200 MHz: -141 dBc/Hz 500 MHz: -137 dBc/Hz 1000 MHz: -134 dBc/Hz

**Residual AM:**  $< 0.01\%$  AM rms, 0.3 to 3 kHz BW

**Spurious Harmonics:** -30 dBc at  $\leq +10$  dBm Subharmonics: None,  $f_c \leq 1057.5$  MHz Nonharmonics ( $> 10$  kHz offsets): -100 dBc

**Third Order Intermodulation:**  $< -50$  dBc at +10 dBm, 2 generators 25 kHz apart into a resistive combiner. Typically decreases 10 dB for every 5 dB of combined level decrease.

### Output Specifications

**Level Range:** From maximum available to -140 dBm (0.023  $\mu$ V) Maximum Level Available bands 1 thru 7: +20 dBm (2.24 V) bands 8 and HET: +18 dBm (1.78 V) band 9: +16 dBm (1.41 V)

**Resolution:** 0.01 dB

**Absolute Accuracy:**  $\pm 1$  dB, output level  $\geq -127$  dBm

**Flatness:**  $\leq \pm 0.75$  dB, +10 dBm output level

**Impedance:** 50 ohm nominal

**SWR:**  $< 1.5:1$ , level  $< 0$  dBm;  $< 2.0:1$ , level  $\geq 0$  dBm

### Reverse Power Protection: 50W, from a 50 ohm source 25 Vdc Modulation Specifications

**Amplitude Modulation** AM Depth: 0 to 99.9%, output level  $\leq +10$  dBm AM Resolution: 0.1% AM Indicator Accuracy at 1 kHz Rate and Up to 90% AM:  $\pm(3.5\%$  of setting + 1% AM),  $f_c \leq 528.75$  MHz  $\pm(5\%$  of setting + 1% AM),  $f_c > 528.75$  MHz AM Distortion at 1 kHz Rate: Depth Distortion  $f_c \leq 528.75$  MHz  $f_c > 528.75$  MHz 0 to 30% AM  $< 1\%$   $< 2\%$  30 to 70% AM  $< 2\%$   $< 4\%$  70 to 90% AM  $< 4\%$   $< 6\%$  AM 3 dB Bandwidth, Depth  $\leq 90\%$  External DC/AC Coupling: dc/20 Hz to 100 kHz,  $f_c$ : 01 to 4.13 MHz, 33.04 to 2115 MHz, HET; dc/20 Hz to 20 kHz,  $f_c$ : 4.13 to 33.04 MHz Internal: Same as external AC Incidental PhiM at 1 kHz Rate and 30% AM:  $< 0.2$  radians peak

**Frequency Modulation** Maximum FM Deviation: Carrier Maximum deviation frequency dc-decoupled ac-coupled or internal band (the smaller of) 9 1.5 MHz 1.5 MHz or  $f \bmod X 1080$  8 750 MHz 750 kHz or  $f \bmod X 540$  7 375 kHz 375 kHz or  $f \bmod X 270$  6 187 kHz 187 kHz or  $f \bmod X 135$  5 93.8 kHz 93.8 kHz or  $f \bmod X$



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67.5 4 46.9 kHz 46.9 kHz or f mod X 33.75 3 23.4 kHz 23.4 kHz or f mod X 16.88 2 11.7 kHz 11.7 kHz or f mod X 8.44 1 93.8 kHz 93.8 kHz or f mod X 67.5 HET 1.5 MHz 1.5 MHz or f mod X 1080 FM Resolution: 0.7% of setting or 0.0004% of maximum deviation, whichever is larger FM Indicator Accuracy, Rates  $\leq$  100 kHz:  $\pm$ (5% of setting + 10 Hz) FM Distortion, Rates 20 Hz to 100 kHz: 4% for max. dev., 2% for 1/2 max. dev., 0.4% for 1/15 maximum dc-coupled deviation FM 3 dB Bandwidth (dc/ac coupling): dc/20 Hz to 200 kHz (external) Incidental AM: 0.3%, 20 kHz peak dev., 1 kHz rate,  $f_c > 400$  kHz

#### **Phase Modulation**

Maximum Phase Deviation: Carrier frequency band Maximum deviation (radians) 9 100 8 50 7 25 6 12.5 5 6.25 4 3.13 3 1.56 2 0.78 1 6.25 HET 100 PhiM Accuracy:  $\pm$ (5% of setting + 0.09 radians), 1 kHz rate Phi Resolution: greater of 0.7% of setting or 0.0004% of maximum deviation PhiM Distortion:  $< 0.4\%$ , 1 kHz rate PhiM 3 dB Bandwidth: DC/20 Hz to 15 kHz

**Pulse Modulation (for output levels  $\leq$  +15 dBm)** Pulse On/Off Ratio:  $> 40$  dB;  $> 80$  dB,  $f_c > 1057.5$  MHz Rise/Fall Time:  $< 400$  ns, 10 % to 90% Maximum Repetition Frequency: 100 kHz Minimum Pulse Width: 2  $\mu$ s

**Internal Modulation Oscillator** Rates: 20 Hz to 100 kHz Frequency Resolution: 1% of setting Accuracy: 2% of setting Output Level Range: 0 to 3 V peak into 600 ohms Resolution: 4 mV Accuracy:  $\pm$ (4% + 15 mV) within 1 second Distortion:  $< 0.02\%$ , 0.02 kHz to 15.8 kHz;  $< 0.15\%$ ,  $> 15.8$  kHz Output Impedance: 600 ohms  $\pm 10\%$  Remote Programming Specifications

**Interface:** HP-IB (IEEE-488-1978)

**HP-IB Functions:** Listener, talker, and controller. SH1, AH1, T5, TE0, L3, LE0, SR1, RL1, PP1, DC1, DT1, C1, C3, C28, E2

General Specifications

**Operating Temperature Range:** 0° to 55°C

**Storage Temperature Range:** -55° to +75°C

**Leakage:** Conducted and radiated interference is within the requirements of MIL-STD-461V method RE02. Interference is also within the standards set by FTZ-1046. Also, RF leakage of  $< 0.5$   $\mu$ V is induced in a 2 turn loop 2.5 cm in diameter, held 2.5 cm away from any surface for output levels  $\leq 0$  dBm.

**Power Requirements:** 100, 120, 220, or 240 V; +5%, -10%; 48 to 440 Hz; 300 VA max **Size:** 425 mm W x 133 mm H x 617 mm D (16.75 in x 5.25 in x 24.3 in)

**Agilent System II Module Size:** 1 W x 5 1/4 H x 23 D

**Weight:** Net, 32.7 kg (71.5 lb); Shipping, 43 kg (95 lb)



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