

# 8782B Vector Signal Generator, 1 MHz to 250 MHz

## Data Sheet

### Product Specifications

Frequency Specifications

**Ranges:** 1 MHz to 250 MHz 1 MHz to 350 MHz (typical)

**Resolution:** 1 Hz

**Accuracy and Stability:** Same as reference oscillator

**Frequency Switching Time:** < 170 ms (typical)

**Internal Reference Oscillator** Aging Rate: Less than  $1.5 \times 10^{-9}$  per day after 10 day warm-up for internal reference.

(Typically less than  $1.5 \times 10^{-9}$  per day after 24 hour warm-up in normal operating environment)

Temperature Effects:

Typically less than  $1 \times 10^{-7}/^{\circ}\text{C}$  Line Voltage Effects: Typically less than  $1 \times 10^{-8}/^{\circ}\text{C}$  RF Output Level Specifications

**Level Range:** +7 to -100 dBm +10 dBm typical

**Accuracy:**  $\pm 1.5$  dB for level  $\geq 30$  dBm  $\pm 2.0$  dB for level  $< -30$  dBm  $\geq -80$  dBm  $\pm 2.4$  dB for level  $< 80$  dBm

**Flatness:**  $< \pm 1$  dB

**Resolution:** 0.1 dB

**Residual Output with RF Switched Off:** More than 60 dB below the selected level (for level  $> -40$  dBm).

**Output SWR:**  $< 1.3:1$  (typical)

**Output Impedance:** 50 ohms nominal Spectral Purity

**Residual SSB Phase Noise in a 1 Hz BW:** Offset from At 140 MHz 1 MHz to 250 MHz (dBc) Carrier Carrier (dBc)

(typical) 1 kHz -115 -125 10 MHz -125 -130 Residual FM  $< 4$  Hz RMS for 300 Hz to 3 kHz bandwidth

**Spurious Signals:** Harmonics  $< -30$  dBc, Non-harmonically related to spurious signals at output level  $> -40$  dBm:  $< -55$

dBc for spurious frequencies from 1 MHz to 2 GHz Modulation Specifications

**Digital Modulation** Burst and scalar modulations are available with all digital modulations. Modulation

Types: BPSK,

QPSK, 8PSK, 16QAM, 64QAM, 256AM, 9PRS, 25PRS, 49PRS, 81PRS State dc Accuracy:  $\pm 1\%$  of full scale I/Q

value at 70 MHz carrier (Typically  $\pm 2\%$  of full scale I and Q values following calibration at  $25^{\circ}\text{C}$  and  $< 5^{\circ}\text{C}$  temp

change) Data and Clock Inputs Clock Modes: Single, separate I and Q, asynchronous Parallel Data Rates: 0 to 100 MHz

clocked 0 to 50 MHz asynchronous Serial Data Rates: 0 to 200 MHz clock and data lines with drive signal rise time  $<$

$1.0 \mu\text{s}$  Data Set Up and Hold Time: Minimum 2.5 ns (typical) Threshold ECL Termination: -1.3V (typical) TTL or

Grounded Termination: Adjustable -2.5V to +2.5V (typical) Input Impedance: 50 ohms, nominal Spectrum Filters:

Internal baseband spectrum-limiting filters with a nominal bandwidth of 74 MHz limit aliasing. User-supplied baseband

filters may be connected at the rear panel connectors and switched by front panel control into the baseband signal path

in place of the internal filters. External filters must have 50 ohm nominal impedance and a maximum passband loss of 3

dB for proper operation. The Agilent 8782B calibration will properly calibrate for external filter loss provided the

external filter passband extends to dc and the maximum passband loss is 3 dB. For ac coupled filters, a loss factor

between 0 and 3 dB may be entered manually. PRBS Internal 2e23-1 Pseudo Random Binary Sequence Generator

Internal Clock Rates: 1.125, 2.5, 5 and 10 MHz External Clock Rates: Up to 100 MHz Up to 200 MHz (typical) Digital

Modulation Impairments I/Q Ratio: From +40 dB to -10 dB (typical) Quadrature Adjustment: 80° to 100° ±0.2°

accuracy Carrier Leakage: < -10 dB carrier leakage angle ±360° (typical) Phase Rotation (relative to coherent carrier): ±30° (typical)

**Pulse (Burst) Modulation** Burst Rates: 0 to 50 MHz Burst Data Input Thresholds ECL Termination: -1.3V (typical)

TTL or Ground Termination: Adjustable from -2.5V to +2.5V (typical) Burst dc On/Off Ratio: 50 dB at 70 MHz

carrier. (Typically 40 dB following calibration at 25°C and < 5°C temp change from 1 to 250 MHz> Burst Rise/Fall

Time: < 2.2 ns (typical)

**AM/Scalar Modulation** Scalar dc Accuracy (at 70 MHz carrier): < 1% of full scale input for 0-10 dB of attenuation.

Typically 1.5% of full scale input for 0-10 dB of attenuation following calibration at 25°C and < 5°C temperature drift

< 2% for 10 dB to 20 dB of attenuation Typically < 2% at all carrier frequencies Sensitivity: 0 to +1V for 0 to full scale

output power Frequency Response: dc to 50 kHz at 70 MHz carrier frequency Scalar Residual: < 1% of full scale I/Q at

70 MHz carrier

**Vector Modulation (using analog I and Q inputs)** Frequency Response: dc to 50 MHz (1 dB) at 140 MHz carrier

frequency dc to 100 MHz (1 dB) (typical) Vector dc Accuracy: at 140 MHz: 1.5% of full scale vector inputs (Typically

2% following calibration at 25°C and < 5°C temperature drift) Vector dc Residual: at 140 MHz: 1% of full scale vector

inputs (Typically 1.3% following calibration at 25°C and < 5°C temperature change) Sensitivity: ±0.5V into 50 ohms

with 50 ohm source impedance for ±100% of full scale magnitude Input Impedance: 50 ohm nominal

SWR: < 1.5:1, dc

to 50 MHz Vector Modulation Impairments Quadrature Adjustment: 80° to 100° ±0.2° accuracy Coherent Carrier

Output Specifications The coherent carrier provides a reference signal for demodulating the Agilent 8782B output. It is

an unmodulated and unleveled version of the front panel RF output.

**Frequency Range:** 1 MHz to 250 MHz

**Output Level:** +10 dBm from 1 MHz to 150 MHz (typical) +8.5 dBm > 150 MHz (typical)

**Output Impedance:** 50 ohms nominal

**Harmonics:** < -35 dBc (typical) Option 001 1 GHz LO Output Specifications

**Frequency:** 1 GHz

**Accuracy and Stability:** Same as reference oscillator

**Output Level:** 10 dBm (typical)

**Non-Harmonically Related Spurious:** < 60 dBc for spurious frequencies less than 2 GHz

General Specifications

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

**Power:** 100, 120, 220 or 240 Vac 48 to 66 Hz 100 or 120 Vac 360 to 440 Hz 500 VA max. 360 VA typical

**EMI:** Conducted and radiated interference is within the requirements of CE03, CS01, CS02, CS06, RE02, RS01 and

RS03 of MIL-STD-461B. It is also within the requirements of VDE 0871/1978, Level B and CISPR Publication 11

(1975). Furnished with each Agilent 8782B: power cord, operating manual.

**Dimensions** Weight: Net, 27.0 kg (60.0 lb) Size: 177 mm H x 426 mm W x 617 mm D (7.0 in x 16.8 in x 24.4 in)