

10 GHz Signal Source Core Module

The SC5503B is a 50 MHz to 10 GHz synthesized signal source. Designed as an instrument grade RF/microwave CW source, and to meet demanding low phase noise applications, the SC5503B employs a multiple phase-locked loop architecture as well as a YIG oscillator as the heart of its synthesizer. It also has an automatic leveling control (ALC) circuit to ensure precise amplitude control over frequency and temperature.

The SC5503B tunes at 1 Hz steps over the entire frequency range with tuning speeds less than 1 ms for small frequency jumps. Typical amplitude range control is between -60 dBm and +10 dBm. Phase spurs are typically less than -70 dBc and other non-harmonic spurs are less than -70 dBc. This excellent spurious free dynamic range is achieved by well isolated internal circuitry. Isolation is achieved by robust mechanical design and close attention to circuit layout detail.

Frequency accuracy is provided by an onboard 10 MHz temperature compensated crystal oscillator (TCXO) which can be phase locked to an external reference source if required, and it is recommended to do so in applications that may require a more stable and accurate base reference.

The SC5503B can be used as a standalone CW signal source, or as a LO source for frequency conversion systems such as the SignalCore IQ modulators and demodulators. It is designed to meet the requirements of many modern applications such as wireless device testing, software-defined radio research, point-to-point radio, multichannel coherent systems, and other academic and military programs.



Product Features

- Low residual phase noise better than -121 dBc/Hz at 10 kHz offset, -150 dBc/Hz at 1 MHz offset, measured on 1 GHz carrier
- 1 Hz tuning resolution (exact frequency)
- -60 dBm to +10 dBm output range
- Output spurious signals < -75 dBc typical
- 2nd order harmonics < -20 dBc

TECHNICAL SPECIFICATIONS (AT 25°C AMBIENT, SINE WAVEFORM)

SPECTRAL SPECIFICATIONS

RF output frequency range 50 MHz to 10 GHz

Internal reference

 Stability ¹ ±2.5 ppm

 Aging < 1 ppm after 1 year

 Phase locking range ±5 ppm

Tuning

 Resolution 1 Hz

 Speed (settled to .1 ppm) ² < 2 ms

Sideband phase noise ³ (typical, dBc/Hz)

Offset	RF Frequency			
	100	1 GHz	5 GHz	8 GHz
100 Hz	-120	-100	-87	-82
1 kHz	-132	-112	-99	-95
10 kHz	-138	-121	-107	-104
100	-145	-131	-118	-114
1 MHz	-153	-150	-142	-140
10 MHz	-153	-153	-158	-155

Sideband phase spurious signals ⁴

< 100 kHz -70 dBc typical

> 100 kHz -75 dBc typical

AMPLITUDE SPECIFICATIONS

Output RF range ⁵ - 60 dBm to +10 dBm

Max output +17 dBm

Amplitude resolution 0.5 dB

2nd order harmonics (0 dBm tone) < -20 dBc

Sub-harmonics < -70 dBc

Output level accuracy

 > -40 dBm to +10 dBm < ±0.75 dB

 < -40 dBm < ±1.00 dB

Spurious signals -75 dBc

TERMINAL SPECIFICATIONS

RF output terminal

 Impedance 50 Ω

 Connector type SMA female

 Coupling AC

Reference input terminal

 Impedance (single ended) 50 Ω

 Connector type SMA female

 Coupling AC

 Frequency 10 MHz

 Amplitude range -5 dBm to +10 dBm

 Lock range ±5 ppm

Reference output terminal

 Impedance (single ended) 50 Ω

 Connector type SMA female

 Coupling AC

 Frequency ⁶ 10 / 100 MHz

 Amplitude +3 dBm

Communication interface USB / RS-232 / SPI

Power consumption 34 W typical

Weight 2.6 lbs (1.2 kg)

Dimensions (W x H x D, max envelope) 3.7" x 1.4" x 6.1"
(94 mm x 36 mm x 155 mm)

Warranty 3 years parts and labor on defects in materials or workmanship

ORDER INFORMATION

7100027-01 .. SC5503B, 50 MHz to 10 GHz Signal Source
Core Module – USB and SPI
Interfaces

7100027-02 .. SC5503B, 50 MHz to 10 GHz Signal Source
Core Module – USB and RS-232 Interfaces

Specifications are subject to change without notice. For the most recent product specifications, please visit www.signalcore.com.

(1) Stability of the internal 10 MHz reference source

(2) Tuning step less than 50 MHz

(3) Measured sideband noise include both AM and PM noise

(4) These are phase modulated spurs measured out to 1 MHz offset from the carrier

(5) >9 GHz output power is +7 dB

(6) Reference clock frequency is user selectable between 10 MHz and 100 MHz