SC5511A

20 GHz Signal Source Core Module

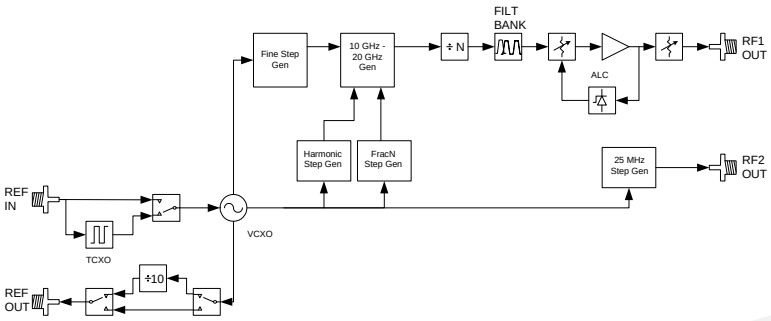
The SC5511A is a compact, high performance VCO based synthesized signal source with frequency ranging from 100 MHz to 20 GHz. Despite its small modular form factor that fits into the palm of the hand, it packs the instrument grade performance of large box instruments. Boasting low phase noise of -115 dBc/Hz @ 10kHz offset from a 10 GHz carrier, tuning the entire band at 1 Hz resolution, and having amplitude step resolution of 0.01 dB over the range of -30 dBm to 10 dBm sets the SC5511A apart from other small modular synthesizers. Furthermore, using a unique multiple phase-locked loop architecture the phase spurs are typically kept below -70 dBc across the tuning range, even at 1 Hz step resolution. Furthermore, using a high fundamental frequency VCO (20 GHz) and eliminating multipliers, sub-harmonics due to dividers are typically less than -70dBc and far put spurious signals are also kept below -70 dBc.

The SC5511A has an additional independent RF2 channel whose frequency range covers 100 MHz to 3 GHz with tuning resolution of 25 MHz. This makes the module ideal for both single-stage RF conversion systems, and dual-stage image suppression up/down converter systems. It makes a great general purpose laboratory signal source where demanding size, low phase noise, and signal purity are needed. It is also an ideal choice as an integrated clock source for fast DAC and ADC applications, especially those that require variable sampling rates.

Product Features

- Low residual phase noise better than -115 dBc/Hz at 10 kHz offset from 10 GHz carrier
- 100 MHz to 20 GHz output range
- 1 Hz tuning resolution (exact frequency)
- < -30 dBm to +10 dBm leveled output
- Spurious signals < -70 dBc typical
- Dual independent channels

Simplified Functional Diagram



Applications

- RF instrumentation
- Wireless communications
- Signal intelligence
- Data converters
- Software-defined radio

SignalCore™
PRESERVING SIGNAL INTEGRITY

Rev 1.1

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

RF1 SPECTRAL SPECIFICATIONS

RF output frequency range ..... 100 MHz to 20 GHz
Internal reference
- Stability [1] ..... ±200 ppb
- Aging ..... < 1 ppm after 1 year
- Phase locking range ..... ±5 ppm

Tuning
- Resolution ..... 1 Hz
- Speed (settled to 1 ppm) [2] ..... < 500 us

Sideband phase noise [3] (dBc/Hz)

	RF Frequency							
Offset	**1 GHz**		**5 GHz**		**10 GHz**		**20 GHz**	
	typ	*max*	typ	*max*	typ	*max*	typ	*max*
100 Hz	-80	*-74*	-66	*-60*	-60	*-54*	-54	*-48*
1 kHz	-122	*-116*	-108	*-104*	-102	*-96*	-96	*-90*
10 kHz	-134	*-128*	-121	*-115*	-115	*-110*	-110	*-105*
100 kHz	-135	*-129*	-121	*-115*	-115	*-110*	-110	*-105*
1 MHz	-135	*-129*	-121	*-115*	-115	*-110*	-110	*--105*
10 MHz	-150	*-145*	-139	*-136*	-133	*-130*	-131	*-129*
Floor	-152	*-145*	-150	*-144*	-147	*-145*	-145	*-145*

Spurious Signals
- < 10 MHz offset
  - typical ..... -65 dBc
  - max ..... -55 dBc
- > 10 MHz offset
  - typical ..... -75 dBc
  - max ..... -70 dBc

RF1 AMPLITUDE SPECIFICATIONS

Output RF range [4] ..... -30 dBm to +10 dBm
Max output ..... +15 dBm typical
Amplitude resolution ..... 0.01 dB
2nd order harmonics (0 dBm) ..... < -20 dBc
Sub-harmonics ..... < 70 dBc typical
Output level accuracy [5] ..... < ±1.0 dB typical

RF2 SPECIFICATIONS

RF range ..... 100 MHz to 3 GHz
Frequency step resolution ..... 25 MHz
Power output ..... 5 dBm typical
2nd order harmonics (0 dBm) ..... < -15 dBc
Phase Noise @ 1 GHz
- 1 kHz ..... -110 dBc/Hz
- 10 kHz ..... -118 dBc/Hz
- 100 kHz ..... -118 dBc/Hz
- 1 MHz ..... -142 dBc/Hz
- 10 MHz ..... -160 dBc/Hz

TERMINAL SPECIFICATIONS

RF output terminals
- Impedance ..... 50 Ω
- Connector type ..... SMA female
- Coupling ..... AC

Reference input terminal
- Impedance ..... 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 ..... 50 Ω
- Connector type ..... SMA female
- Coupling ..... AC
- Frequency ..... 10/100 MHz
- Amplitude ..... +3 dBm typ

PXI 10 MHz clock output terminal
- Impedance ..... 50 Ω
- Connector type ..... MCX
- Coupling ..... AC
- Frequency ..... 10 MHz

Communication interface ..... PXI Express

GENERAL SPECIFICATIONS

Power consumption ..... +12 V @ 1.6 A
..... +3.3 V @ 0.2 A
Weight ..... 1 lb
Dimensions (W x H x D, max envelope) ..... 0.8" x 5.1" x 7.2"
Warranty ..... 1 year parts and labor on defects in materials or workmanship

ORDER INFORMATION

7100044-01A ..... SC5510A, 20 GHz Signal Source PXI Express Interface

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

(1) Internal reference is a TCXO. For better accuracies and stability SignalCore recommends phase-locking to a precision external source.
(2) For step change of less than 100 MHz and only when automatic level adjustment is turned off.
(3) Specified for channel RF 1 at power levels of greater than 0 dBm.
(4) Frequencies > 17 GHz, -30 dBm to +7 dBm.
(5) Specified when amplitude control has the ALC in close loop operation. Output levels < -25 dBm, degrade to ±2.0 dB typical