Summary

The SC2250 extends the useful range of traditional 6GHz RF instruments for operation at microwave frequencies up to 18GHz. It provides excellent integration capability with other modular products such as National Instrument’s Vector Signal Transceiver (VST). Selectable filtering is provided for signal conditioning applications requiring spurious and harmonic rejection.

Description

Both up and down-conversion functions are housed in a single-slot PXIe module. An independent local oscillator (LO) is available for each block. Optional LO input ports are provided to support measurements requiring extremely low phase noise performance.

The down-converter includes a bypass path to minimize cable swapping when the mixer is not required. The bypass path includes a user-selectable filter bank and low noise amplifier for signal conditioning purposes. For harmonic measurement applications, a bank of high pass filters (HPF) is available to reject the fundamental signal and provide better dynamic range. The down-converted signal is passed through 5GHz intermediate frequency (IF) filter for spurious rejection prior to output from the module.

Like its counterpart, the up-conversion path includes bypass capability and several signal conditioning options. Self-calibration of the instrument is possible using the build-in loop back signal in the up-converter.
Common Applications

- Benchtop DVT (Designer Verification Testing)
- Harmonic Performance Testing in High Volume Production Test
- RF Design and Characterization
- 802.11ax (6425 to 7125 MHz) testing on legacy 6 GHz Instruments

Typical Tx Path Performance

[Graphs and charts showing frequency responses and power responses under various conditions.]
Typical Rx Path Performance

Rx Down-Conversion Frequency Response vs Gain Block
Conditions: T=25°C, Rx_IN=8.3GHz, Rx_OUT=5.1GHz, HPF=12

Rx Down-Conversion Frequency Response vs High Pass Filter
Conditions: T=25°C, Rx_IN=8.3GHz, Rx_OUT=5.1GHz, Gain=6dB

Rx Down-Conversion High Pass Filter Bank Response
Conditions: T=25°C, GSA=6dB, Internal LO, Rx_OUT=5.1GHz

Rx Bypass Path Frequency Response vs Filter
Conditions: T=25°C, Rx_IN=7.1GHz, Rx_OUT=5.1GHz, Gain=LNA On

Rx Harmonic Performance (Instrument Generated)
Conditions: T=25°C, Rx_IN=7.1GHz, Rx_OUT=5.1GHz, Gain=LNA On
Rx (Down Conversion Path) Block Diagram

Tx (Up Conversion Path) Block Diagram
Feature Overview

Modes of Operation
To be completed

Specifications

Rx Down Conversion Path
Allows higher frequency signals to be mixed down to a lower frequency that is compatible with many spectrum and signal analyzers.

- Input Frequency: 6 – 18 GHz
- Output center frequency: 5.1 GHz
- Maximum Input Power: +20 dBm
- Maximum Harmonic Input Power: -25 dBc
- Instrument Generated Harmonic Distortion (@20dBm):
  - 2nd: -80 dBc
  - 3rd: -75dBc
- IF Filter Bandwidth: 200 or 1500 MHz
- Calibrated Amplitude Accuracy: 1 dB
- Noise Figure @6GHz:
  - 11 dB with Pre-Amplifier
  - 25 dB without Pre-Amplifier
- Noise Figure @18GHz:
  - 21 dB with Pre-Amplifier
  - 36 dB without Pre-Amplifier
- Gain (@6 GHz):
  - 5 dB with Pre-Amplifier
  - -11 dB without Pre-Amplifier
- Gain (@18 GHz):
  - 17 dB with Pre-Amplifier
  - -0 dB without Pre-Amplifier

Receive Mixer Bypass Path
Allows instrument to remain in the signal path and provides some optional signal conditioning for frequencies less than 6 GHz.

Transmit Up Conversion Path
Allows signals to be conditioned and optionally mixed up to a higher frequency.

- Input Frequency range: 400 MHz – 6 GHz
- Output Frequency range: 6 – 18 GHz
- Maximum Output Power (rms): 10 dBm max
- Fundamental Rejection: 30dB min
- Calibrated Amplitude Accuracy: 1 dB
- Gain (@6 GHz): 4 dB
- Gain (@18 GHz): -8 dB

Transmit Bypass Path
Conditions VST signals by filtering out unwanted harmonic and spurious content.

- Frequency range: 10 MHz – 6 GHz
- Insertion Loss : 10 dB max
- Rejection : 30 dB min
- Frequency range: 10 MHz – 6 GHz
- Insertion Loss : 10 dB max

Environmental/Regulatory

- FCC part 15.109, subpart B (Pending)
- FCC part 15.107, subpart B (Pending)
- RoHS Compliant
- Operating temperature: 0 to 70°C
- Storage temperature: -40 to +85°C
Optional Features

Option 21 – Extended warranty

Extends the standard software maintenance and warranty from 12 to 24 months.

Support

Technical support is available through our website, [www.signalcraft.com/support](http://www.signalcraft.com/support), or by contacting us at [support@signalcraft.com](mailto:support@signalcraft.com).

Warranty

Full one-year parts and labor when used under normal installation and operation conditions. Repair services are available for products no longer covered under warranty.

Ordering Information

Send inquiries to [info@signalcraft.com](mailto:info@signalcraft.com).