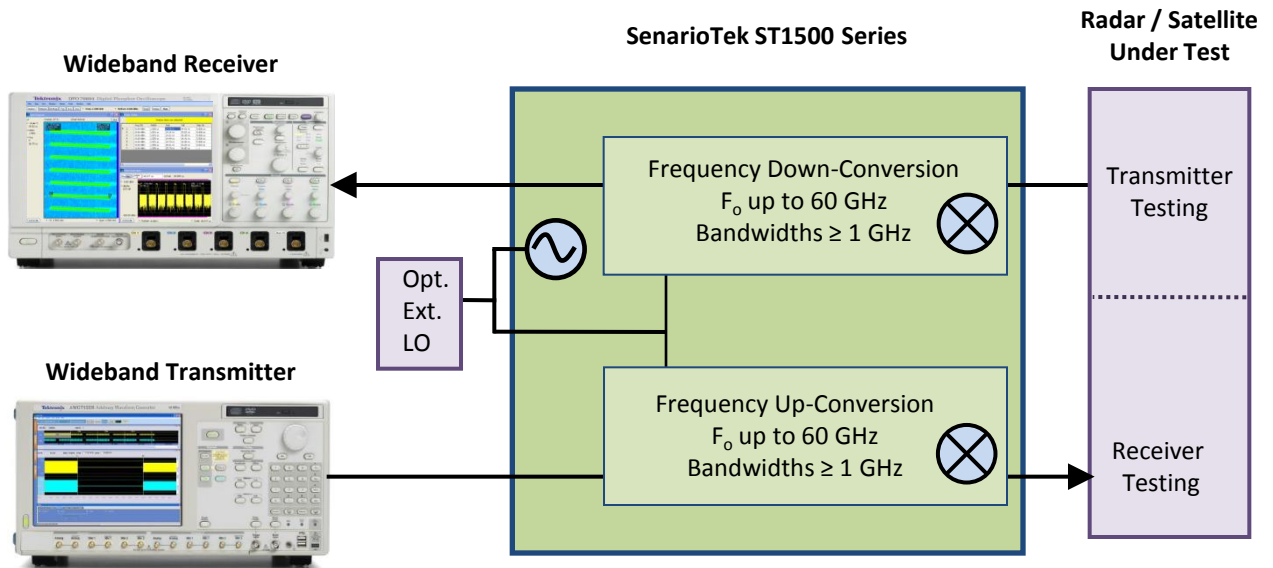


## Wideband Frequency Converters



SenarioTek offers high-performance solutions for frequency conversion, tailoring them to work with commercially available wide-bandwidth instruments. To spare you the expense of wideband, high-frequency test equipment, our solutions offer the most cost-effective way to create and measure wideband microwave signals.

### Overview

The wideband signals in radar and satellite communications systems use carrier frequencies that are beyond the direct synthesis and analysis capabilities of commercially available wideband RF instruments. To enable the testing of radar or satellite devices using baseband instruments, engineers often build their own frequency-conversion devices and signal conditioners. With the SenarioTek ST1500 Series, engineers can instead apply a calibrated and optimized solution to extend the utility of existing low-frequency wideband test instrumentation.

### SenarioTek's RF/Microwave Engineering Expertise

With extensive RF/microwave experience, the SenarioTek engineering team has designed a wide range of products and systems. Our engineers have designed electromechanical, solid-state, frequency conversion solutions covering DC to 70 GHz. We are among the best in the world at designing high-complexity custom products, including many that have strict phase- and delay-matching requirements. We have extensive expertise in high-reliability design engineering of space-related microwave systems and components.

### Key Advantages:

- Customizable solutions for signal bandwidths  $\geq 1$  GHz and for carrier frequencies up to 60 GHz
- Available in both fixed frequency conversion and variable LO
- Ideal for multi-band, multi-channel radar and satellite communication applications
- Optimized, cost-effective method to generate and analyze wideband microwave signals
- Eliminates the instabilities and frequent calibration required by common I/Q modulator techniques

### What You Need, When You Need It:

- Guaranteed on-time delivery, 16 weeks ARO typical
- One-year standard warranty (three-year optional)
- Complete documentation: electrical, mechanical, parts, test, S2P files
- Vendor qualified: Boeing, Northrop Grumman, BAE, Lockheed Martin, Harris, Raytheon
- ITAR certified, 100% designed and manufactured in the USA by US citizens
- Women Owned Small Business (WOSB)
- DOD Protégé

	ST1500 Fixed Frequency Performance Example		ST1500 Variable LO Performance Example	
	Up-Conversion	Down-Conversion	Up-Conversion	Down-Conversion
Input Frequency	2.34 ± 0.65 GHz	17.34 ± 0.65 GHz	2.0 to 8.0 GHz	17.5 to 32.0 GHz
Output Frequency	17.34 ± 0.65 GHz	2.34 ± 0.65 GHz	17.5 to 32.0 GHz	2.0 to 8.0 GHz
Bandwidth	1.3 GHz	1.3 GHz	1.0 GHz	1.0 GHz
Max Output Power	+15 dBm	+15 dBm	0 dBm	0 dBm
Noise Figure	25 dB max	35 dB max	35 dB max	35 dB max
Maximum Spurious	-55 dBc	-55 dBc	-55 dBc	-55 dBc

## Converter Design Considerations

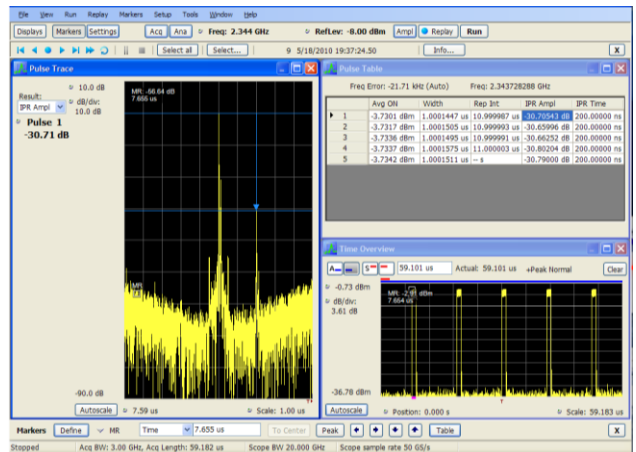
When designing a wideband frequency converter, it is often necessary to make tradeoffs across several parameters to achieve the desired balance between performance and cost. An optimized design can be achieved only when these parameters have been carefully weighed against your needs. The following list shows some of the key parameters that will be assessed by our engineers:

- Application
- Frequency Plan
- Signal Bandwidth
- Spurious Signals
- Spectral Inversion (Y/N)
- Max Power (In/Out)
- Noise Figure
- Distortion
- Phase Noise
- Budget

All these parameters interact, some very strongly. One of the most important tradeoffs is bandwidth versus spurious signal levels—and it is critical to determine the bandwidth and performance required for your application. For example, increasing the bandwidth from 1 GHz to 3 GHz will almost always affect spurious signal performance. SenarioTek engineers work directly with your engineering team to define the best solution for your application and budget.



The ST1500 Series wideband frequency converter can be designed for up, down or both up/down conversion. The ST1500-201 (shown here) is a 2.34/17.34 GHz up and down converter pair with a 1.3 GHz bandwidth.



An impulse response, or time sidelobe, of a Ku-band 1 GHz chirp signal is down converted to a frequency in the wideband receiver that improves both the spurious signal levels and Effective Number of Bits (ENOB).

Contact Us About Your Wideband Conversion Needs:

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