

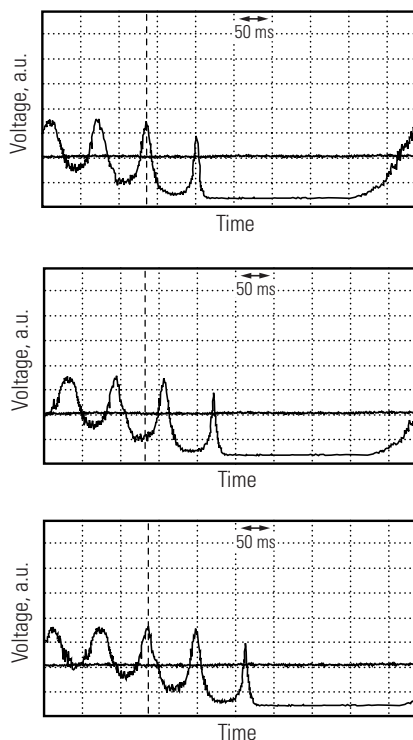
# Swept Wavelength Testing: Measuring Fiber-Bragg-Grating Temperature Drift

For applications requiring fast wavelength measurements and high resolution, the Vidia-Swept™ tunable laser from New Focus provides superior resolution, accuracy and speed over traditional test methods.

For one proposed telecom network application, the wavelength drift of a fiber-Bragg grating (FBG) must be less than 100 pm over the temperature range from 0° to 60° Celsius. In the past, tunable lasers could provide the resolution needed, but the traditional “step & measure” technique was much too slow to monitor the drift in real time. Optical Spectrum Analyzers (OSAs) can provide the speed necessary for these measurements, but can’t meet the resolution requirements. The New Focus Vidia-Swept combines the speed of an OSA with the resolution of a laser.

In the example at right, the Model 6428 Vidia-Swept laser was used to monitor temperature drift in a fiber-Bragg grating from 0° to 60° Celsius. The programmable trigger output from the laser was set near the center wavelength of the fiber-Bragg grating. The trigger’s jitter was observed to be less than 5 pm when referenced against an acetylene-cell absorption line, which provides an absolute wavelength reference known to <1 pm. The grating’s temperature was then adjusted to test the thermal compensation of the component.

The trigger output of the laser combined with the wavelength sweep repeatability and linearity enabled us to observe wavelength movement of the grating with extremely high resolution.



*This data series was taken with a Model 6428 Vidia-Swept tunable laser, and illustrates the 60-pm response shift of a fiber-Bragg grating over 57.6° to 0° C. The scan speed is 1 nm/sec and the trigger setting is 1563.40 nm.*

A total drift of 60 pm was seen over the 0° to 60° C temperature range. Similar measurements can be made to set the wavelengths of a Mux or Demux component in real-time manufacturing environments (see Application Note #8).

As this example illustrates, the Vidia-Swept tunable laser provides the speed of an OSA and the resolution of a laser for high-resolution telecom-test applications.

