

QCL Series

Noise Comparison with a Competitor's Instrument

WHAT DO WE MEAN BY NOISE?

We use peer-reviewed and approved test methodology developed by Pacific Northwest National Labs. Most driver companies give you one noise spec: RMS. This lumps all the noise signature into one number for a given bandwidth. It does not show precisely what is happening at any specific frequency. To reduce the noise, we had to measure it as a function of frequency to identify what factors were contributing.

NOISE CURRENT DENSITY

At low frequencies, the significantly lower noise of Wavelength's QCL LAB means a stable center wavelength. The mid- and higher-frequency noise current density translates into narrower linewidth QCL. Overall, the QCL's optical signal-to-noise ratio is easily an order of magnitude better when driven by the Wavelength QCL LAB.

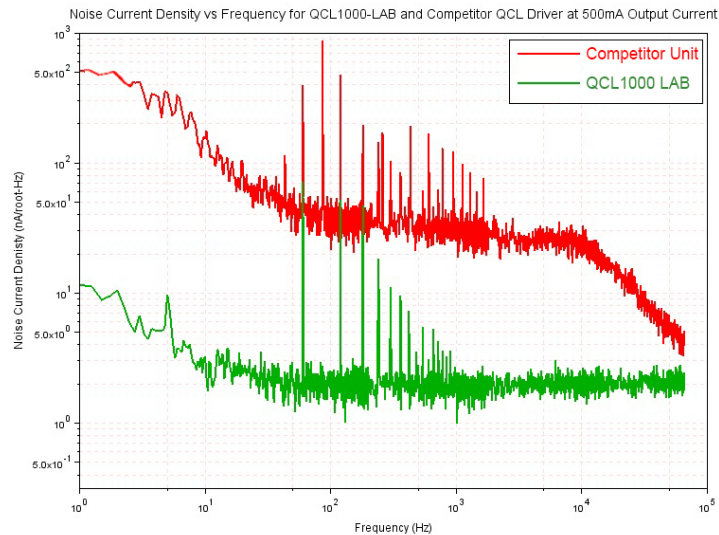


Figure 1. Wavelength's QCL1000 versus Competitor Unit at 500 mA

CUMULATIVE NOISE COMPARISON

The RMS noise integrates the current noise density. This shows the competitor's unit specification should be 50 μ A RMS noise while the Wavelength instrument beats the published 1 μ A RMS noise.

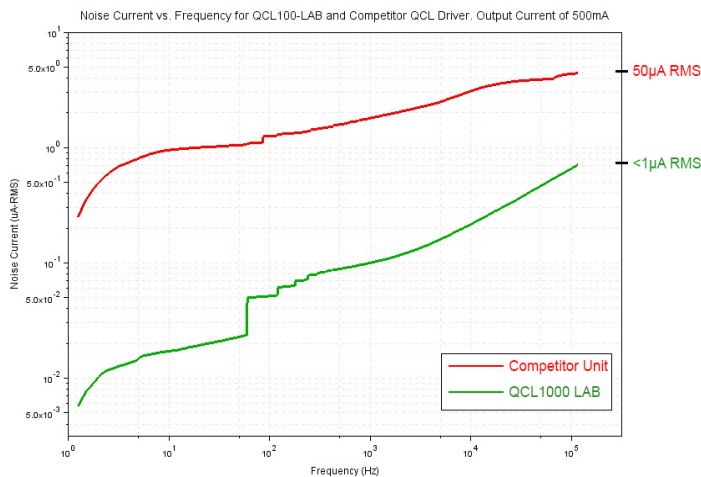


Figure 2. QCL1000 versus Competitor Unit at 500 mA

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WHAT DOES NOISE MEAN IN REAL LIFE?

With the Wavelength driver

- The linewidth of the QCL narrowed.
- The center wavelength did not vary.
- The scans became much more repeatable, indicating the signal-to-noise ratio was significantly improved.
- Sensitivity of the final sensor improved by an order of magnitude.

APPLICATIONS

Due to their unique construction, QCLs operate with high power in the near-IR through terahertz ranges. These wavelengths are particularly suited to detection of molecules significant to humans. Applications include:

- trace gas analyzers
- remote detection of explosive materials
- medical diagnosis using the breath
- non-invasive glucose testing
- emissions monitoring – marine, power generation
- pharmaceutical process quality control
- anesthesia and hospital air quality monitoring
- leak detection in industrial processes

In these critical applications the precision and stability of low noise drive electronics can make a substantial difference in detection threshold and measurement accuracy. Low noise operation opens up even more application possibilities.

DO YOU NEED LOW ELECTRONIC NOISE?

The Wavelength Electronics instrument comes in four current levels up to 2A. It can deliver up to 20V. For best noise results – pick the current level closest to your operating current. The technology has been patented by Battelle¹ and we've exclusively licensed it. We also offer the technology in an OEM version – once your proof of concept is complete.

Ask for a demo unit to try out in your system to prove what low noise can do in your application.

¹ Covered by U.S. Patents 6,696,887; 6,867,644 and 7,176,755.

Free, effective, and responsive technical support is available.

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