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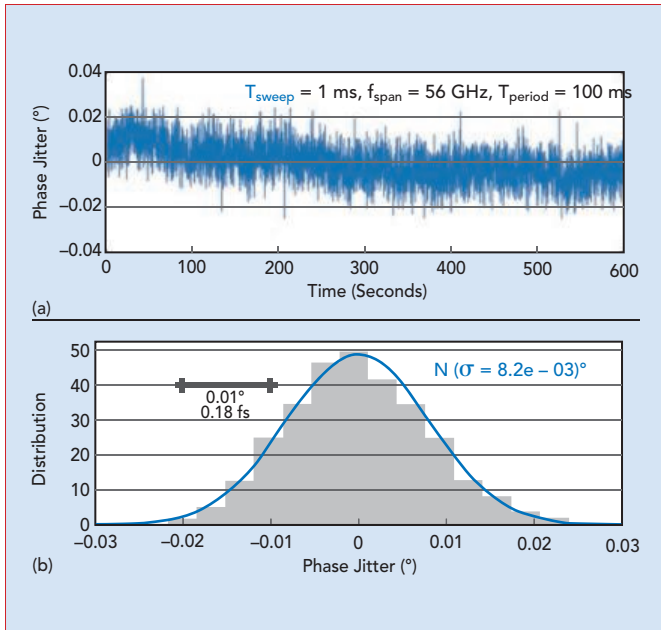
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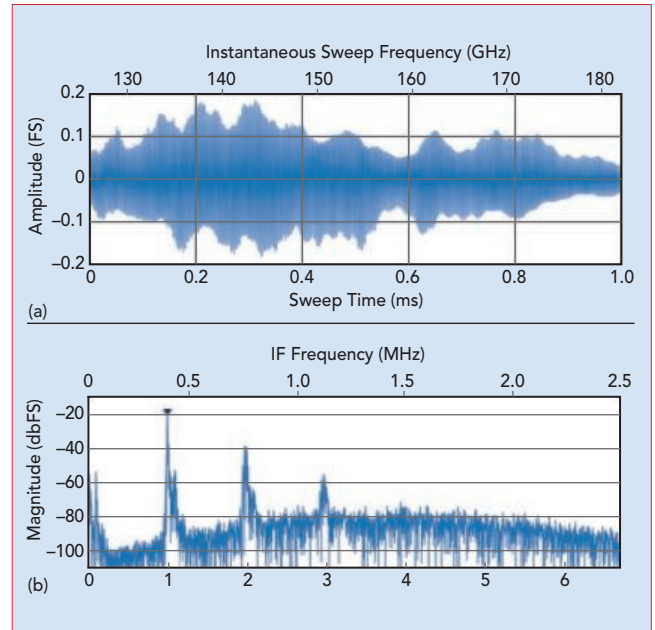
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▲ Fig. 4 Measured jitter over 10 minutes (a) and associated histogram (b) with a waveguide short connected to the sensor.



▲ Fig. 5 Measured IF of a 1 m distant target showing the sensor's bandwidth and 80 dB dynamic range

embedded ortho-mode transducer for dual-polarization receive or, alternatively, a single center transceiver and two additional receive channels for angle estimation applications. A functional block diagram of the sensor in a single Tx/Rx configuration is shown in **Figure 3**.

The sensor's clock network achieves exceptional frequency stability for very low jitter measurements (see **Figure 4**) and fast FMCW operation, sweeping the

56 GHz bandwidth in 1 ms. It uses a stable ± 100 ppb long-term stability frequency reference and can be locked to Sync-E frequency sources (e.g., global navigation satellite clock sources) for calibration. The sensors include a versatile external trigger with a programmable trigger subsystem, designed to meet the needs of complex applications. The 56 GHz spectral modulation bandwidth makes it possible to measure the transmission and reflection or

absorption behavior of a significantly larger portion of the spectrum compared to currently available industrial radar sensors (see **Figure 5**).

2 π -LABS provides an API in Python, which provides access to all the important radar parameters via an SCPI command set, the same protocol used by many VNAs. The documentation includes example scripts for the most common tasks, which are expanding from a growing community of users.



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