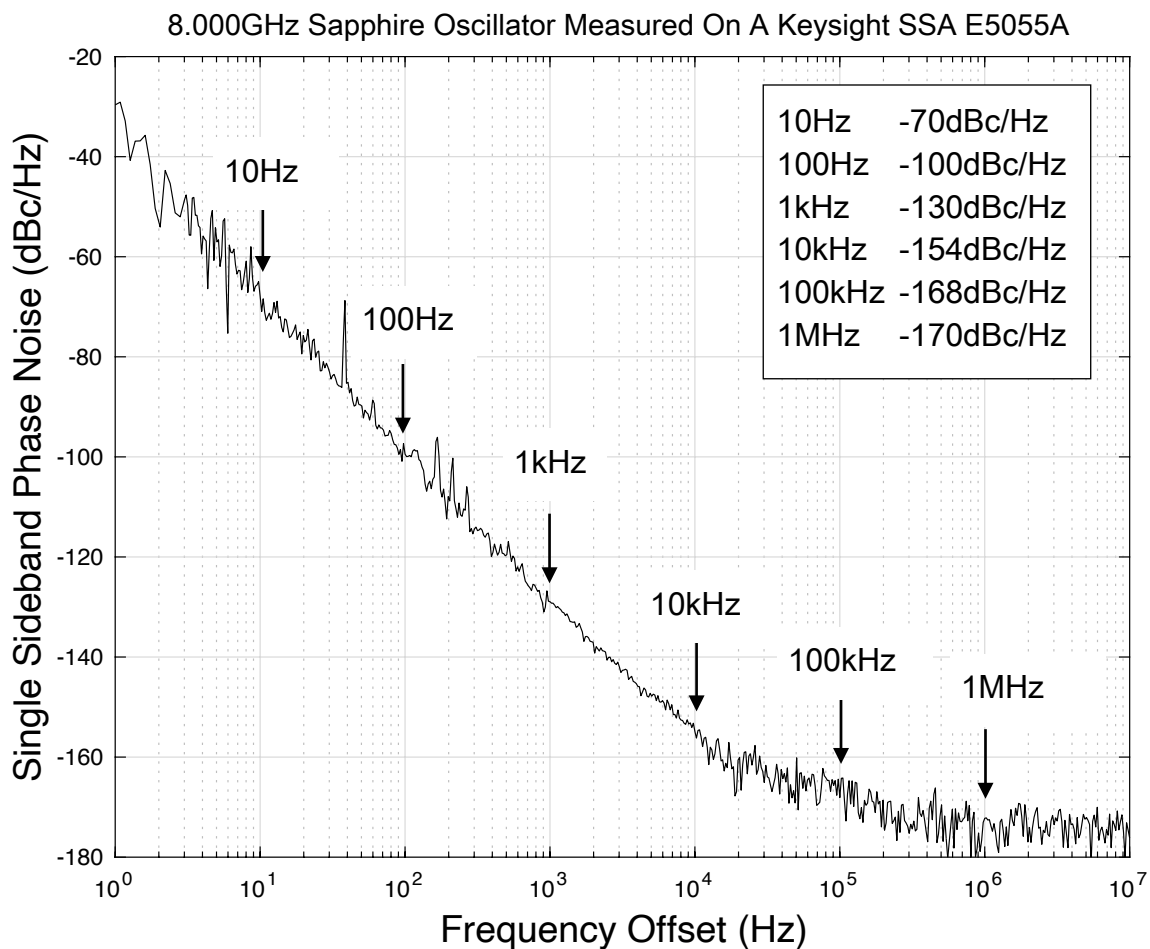
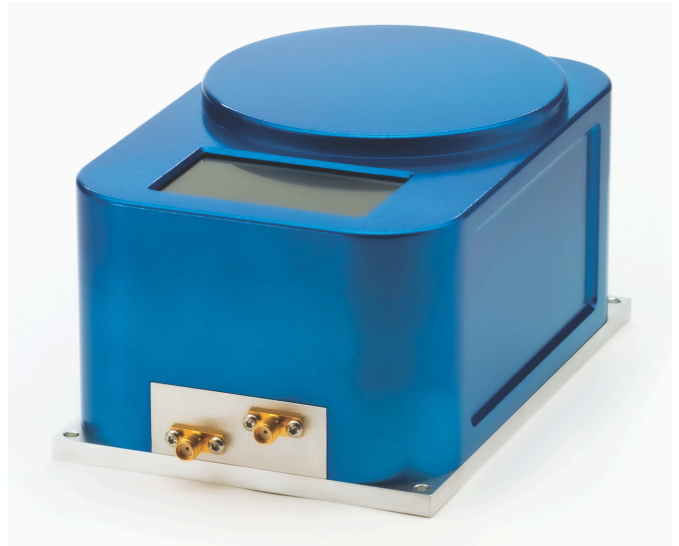


- State of the art, ultra low phase noise 'whispering-gallery' mode oscillators.
- Fundamental operation at 8.0, 10.0, 10.24GHz.
- Integrated phase locking to an external 10MHz reference with lock-detect.
- Phase noise improvement of 20-40dB compared to the best multiplied quartz and SAW oscillators.
- Graphic status display.



## Specifications

Frequency	8.00, 10.00, 10.24 GHz (std) Inquire about additional frequencies.
Accuracy	$\pm 1$ ppm (free running), $\pm 0.1$ ppm (typical) after warmup. Accuracy matches reference when phase locked to an external reference.
Output Power SMA-50 $\Omega$	12dBm $\pm 2$ dBm - 8GHz 10dBm $\pm 2$ dBm - 10GHz, 10.24GHz
Phase Noise (typical) @ 8.000GHz	-70dBc/Hz @10Hz -100dBc/Hz @100Hz -130dBc/Hz @1kHz -154dBc/Hz @10kHz -170dBc/Hz @100kHz -175dBc/Hz @1MHz
Reference Input	10MHz 0dBm to +15dBm 50 $\Omega$ input, SMA Connector
Operating Temp	0C to +40C (case temp)
Warm Up	10 min - 8GHz 5 min - 10GHz, 10.24GHz
DC Power	+12V DC, (DC-feed) or Molex 10pin ~36W warmup (3Amps) ~5-10W nominal (0.5-0.9Amps),
Dimensions	158mm (L) x 108mm (W) x 84mm (H) @ 8GHz
Weight	1.2kg - 8GHz 1.0kg - 10GHz, 10.24GHz

## Overview

---

Sapphire loaded cavity oscillators (SLCO) were first developed in the late 1990's. Most applications to date have been laboratory designs at cryogenic temperatures where Q-factor and stability are optimized for frequency transfer standards. Saetta Labs has developed a thermally stabilized sapphire cavity oscillator for use at room temperatures (0C to 40C). This unique design prioritizes unparalleled low phase noise, unit to unit repeatability, reliability and ease of integration. The housing is an integrated thermal management system.

Sapphire is the lowest loss dielectric available. The 'whispering-gallery' mode bounds the microwave resonance to within the dielectric only, removing the Q-factor limitations of a traditional air or dielectrically loaded metal cavity.

The SLCO operates at a fundamental microwave X-band frequency. It is not multiplied from a lower frequency. The ultra-high Q factors of the whispering-gallery mode enable performance with unparalleled low phase noise and stability. Our SLCO simply outperforms any other oscillator technology when phase noise is the critical specification.

## Operational Modes

---

The two modes of operation, auto-detected include:

*Free-running* The oscillator is stabilized to within 1ppm of the internal 10MHz.

*Phase locked* When a 10MHz external reference is applied with the correct power and frequency, the oscillator will stabilize then lock to the external reference automatically.

## Warm Up

---

Warm up time is approximately 5 minutes for the 10.00 and 10.24GHz oscillators and 10 minutes for the 8GHz version. This is dependent on housing temperature and mounting configuration.

## Connector IO

---

Production units have DC feeds for +12V and Lock Detect and a solderable ground post.

First Beta Production units have the following 10pin Molex:

Pin	Signal	Description
1-4	N.C.	N.C. - do not connect
5	LD	Logic Level lock detect, 0 = unlocked, 1 = locked. 3.3V logic
6,8,10	GND	Ground, connected to internal and chassis ground.
7,9	+12V	3.5A Max

## Display

---

A 400x240 graphic display shows the oscillator status including frequency tracking, mode of operation and lock status.

## Calibration

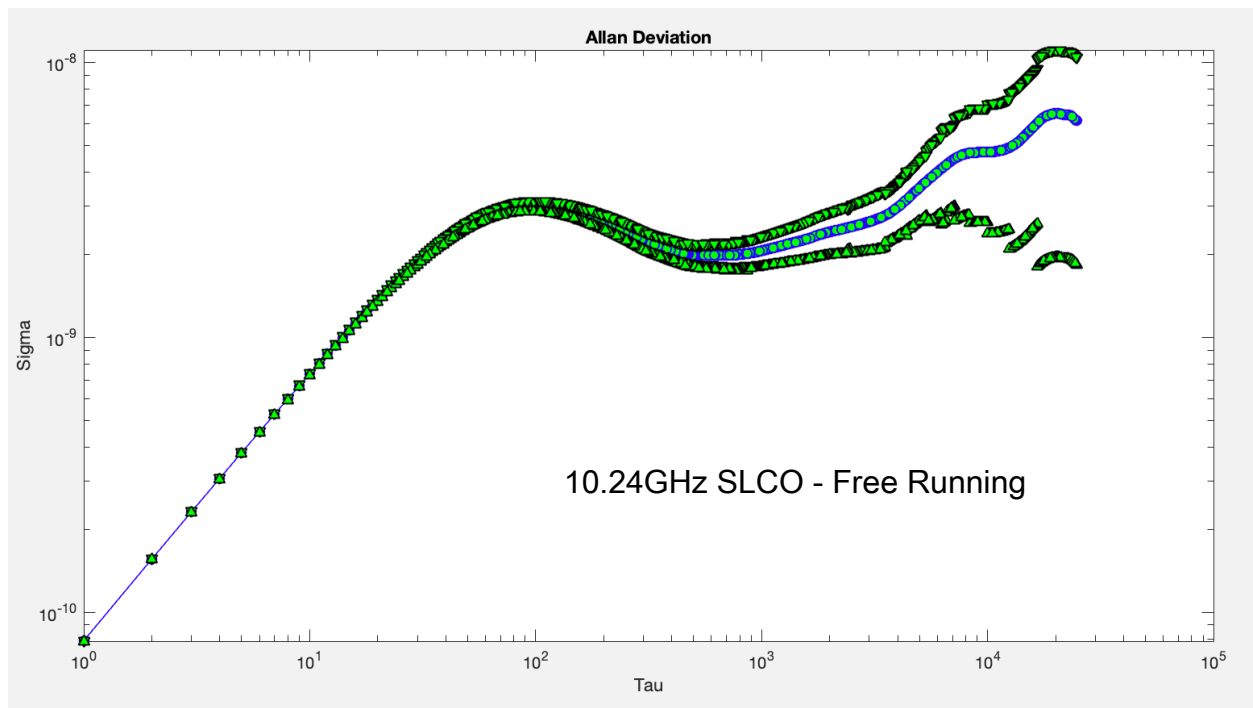
---

The SLCO-8.000 requires no specific annual calibration. The calibration process is a 'performance check' only, no adjustment is required. The internal 10MHz is automatically 'calibrated' to the external reference when connected. The unit dynamically tracks the reference when phase locked to an external 10MHz. The dynamic nature of the self monitoring means there is no inherent aging in the oscillator, it is always self stabilizing.

## Stability - free running

---

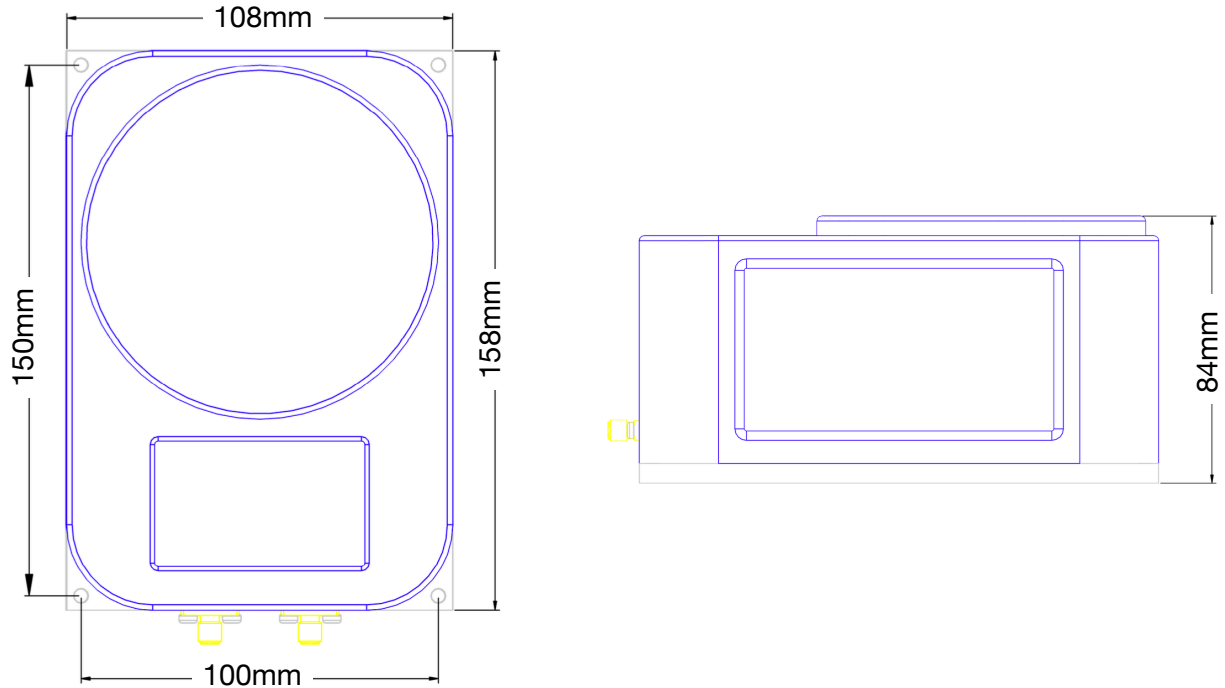
The long term stability is maintained (typical - free running) at less than 100ppb.



10.24GHz sapphire oscillator measured on a Keysight E53230A Frequency Counter.

## External Dimensions

---



All units in mm.

Mounting holes are M4, 6.25mm depth.

Oscillator should be thermally mounted for heat dissipation.

## Warranty

---

Saetta Labs warranties all Sapphirе Loaded Cavity Oscillators for 3 years from manufacturing defects.