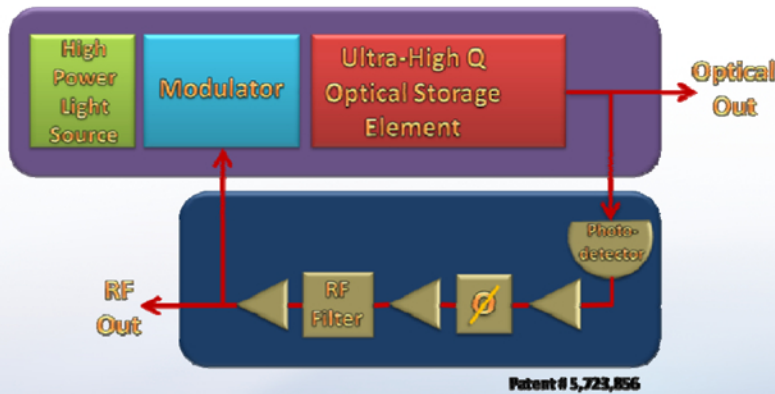




# Product Brief

## Advanced Opto-Electronic Oscillator (OEO)

### Ultra-Low Phase Noise Microwave Signal Source



Advanced OEO offers unprecedented *ultra-low close-in phase noise* for signal sources required in high-frequency, high performance applications. Available in any frequency between 8 - 12 GHz (consult factory for other frequencies). Advanced OEO offers typical phase noise performance levels of **-163 dBc/Hz at 10 KHz offset** from the carrier. Advanced OEO is offered with a variety of scalable features and options.

### Features

- Ultra-low phase noise/jitter
- Frequency scalability
- EMI tolerant
- High stability
- Electronic fine tuning
- Multiple frequency outputs option
- Phase locking option
- Optical output option
- Internal or external reference option

### Applications

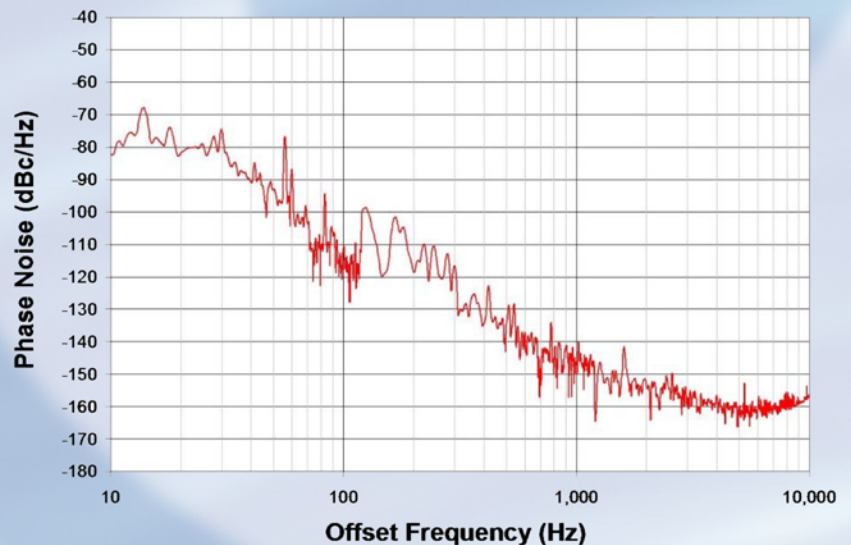
- Instrumentation
- Phase Noise Measurement
- Test Equipment
- Radar Systems
- Satellite Communications
- Imaging
- Microwave Communications

The unique design of Advanced OEO is based on the photonic generation of spectrally pure signals at RF and millimeter wave frequencies that enable OEwaves signal sources to scale to higher frequencies with little or no penalty in phase noise performance.

The revolutionary performance of Advanced OEO allows for clean and precise phase noise measurements, enhanced military radar system visibility by several fold, increased channel capacity of communications systems by an order of magnitude, and high capacity, high frequency future wireless communications systems. This level of performance will enable manufacturers to retrofit current systems as well as architect capabilities to address new markets.

### Free Running Phase Noise Plot

Advanced OEO - 10 GHz



# Product Specifications

Parameter	Advanced OEO	Notes
<b>Output Frequency</b>	8 to 12 GHz	Customer to designate frequency. Contact factory for higher frequencies and for multiple frequency outputs.
<b>RF Output Power</b>	+10 dBm (min)	
<b>Phase Noise</b>	- 75 dBc/Hz @ 10Hz Offset - 115 dBc/Hz @ 100Hz Offset - 145 dBc/Hz @ 1kHz Offset - 163 dBc/Hz @ 10kHz Offset -165 dBc/Hz @ 100kHz Offset -170 dBc/Hz > 1MHz Offset	
<b>Harmonics</b>	-40 dBc (max)	
<b>Spurious</b>	-30log (f <sub>offset</sub> ) dBc (max) -75 dBc (max)	10Hz < f <sub>offset</sub> < 1 KHz f <sub>offset</sub> > 1 KHz.
<b>Fine Tuning Range</b>	5 KHz	~ 400Hz/V; External low noise PLL may be used in conjunction.
<b>Stability</b>	10 <sup>-11</sup> @ 1 Sec.	Allan Deviation at constant ambient.
	0.005 ppm @ 1 hr.	At constant ambient.
<b>Operating Temp. Range</b>	0° - 40° C	
<b>Voltage Sources</b>	+9 Vdc +15Vdc 120Vac	120Vac required to power the laser driver.
<b>Package Size</b>	19" Rack-Mount	Length and height may vary depending on custom and optional features.
<b>Output Connectors</b>	RFout: SMA (F)	Customer may specify connector type.
<b>Options</b>		
<b>Optical Output - Power</b>	0 dBm	FC/APC connector.
<b>PLL - Variable Loop Bandwidth</b>	10 – 200 Hz	Phase locked operation with an external reference (not supplied) may degrade phase noise performance within the set loop bandwidth.
<b>Internal or External Reference</b>	10MHz or 100 MHz	Ref frequency requires being integer divisible by the oscillator output frequency.

**For other inquiries:**

Phone\_ (626) 351-4200  
 Email\_ sales@oewaves.com  
 Web\_ www.oewaves.com  
 Address\_ 465 N. Halstead Street, Suite 140  
 Pasadena, California 91107

**NOTE:**

These specifications are subject to change without notice due to OEwaves ongoing development cycle. Unless otherwise noted, all specifications in this document are to be treated as "typical"; actual performance may vary contingent on operating environment.

This product line is covered by one or more of the following U.S. patents: 5,723,856; 5,777,778; 5,204,640. Other patents pending.

