

# Tunable Laser Source

TLS-APBX / TLS-APX Model



# External cavity Littman/Metcalf Tunable Laser Source

Benchtop version: TLS-APBX

OEM version: TLS-APX

## Features

- Mode-hop-free continuous sweeping
- High output power: up to + 16 dBm
- Narrow linewidth: < 500 KHz
- High SMSR: > 45 dB
- Wavelength accuracy: +/- 10 pm
- Fine tuning piezo control
- Wavelength etalon option

## Applications

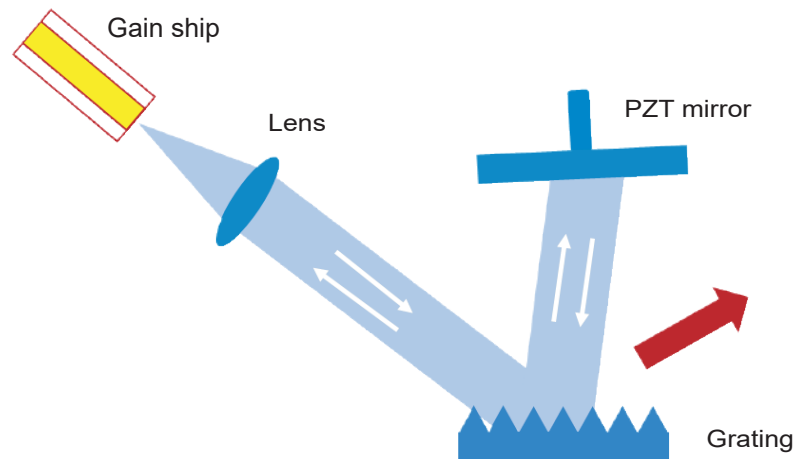
- Optical measurement systems
- Coherent optical communication
- Optical component characterization
- Precision spectroscopy
- Atomic and molecular physics

## Product description:

APEX Technologies TLS model is a high performance external cavity Littman/ Metcalf tunable laser source combining wide tuning range, high output power and high signal-to-noise ratio. Our laser covers the wavelength range between 700 and 1630 nm using several TLS models with high scan speed mode-hop-free continuous sweeping and a wavelength span ranging from 30 to 110 nm depending on the wavelength range.

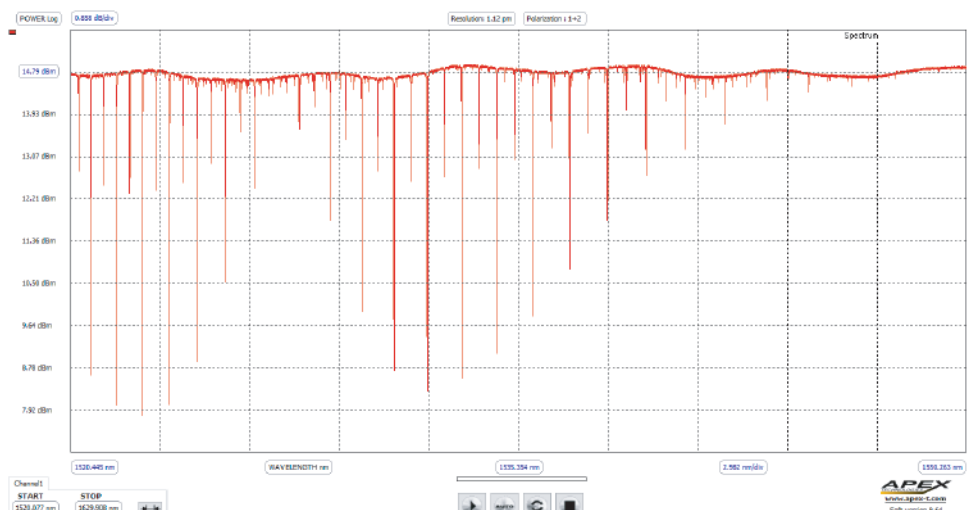
## Physical principle:

Our external cavity design consists of a gain ship, a grating used as dispersion element and a piezoelectric mirror used for mode selection. The external cavity mode and the grating selected mode are synchronized by controlling the rotation of the pivot point that changes the length of the cavity and the incidence angle on the grating that changes the wavelength selectivity of the grating. This technique provide a wide tuning range mode-hop-free sweeping with a narrow linewidth and high output power.



## High wavelength characteristics

Our TLS model reach an excellent wavelength accuracy by using two internal wavelength calibrator. One part of the output power is connected to a wavelength etalon in which we have an interferometer system that allows a high relative frequency calibration. We reach also a high absolute wavelength accuracy of +/- 10 pm by using the absorption spectrum of a gas cell. For example, the below graph represents the absorption spectrum of an acetylene gaz used as a reference for the C+L band.



## APEX Technologies TLS features

APEX Technologies TLS operates with an adjustable sweep speed from 5 to 100 nm/s. This laser includes a piezoelectric input control that allows to modulate the laser frequency with a scan range of 3 GHz and a modulation frequency of up to 10 kHz. We also offer the possibility to modulate the laser current.

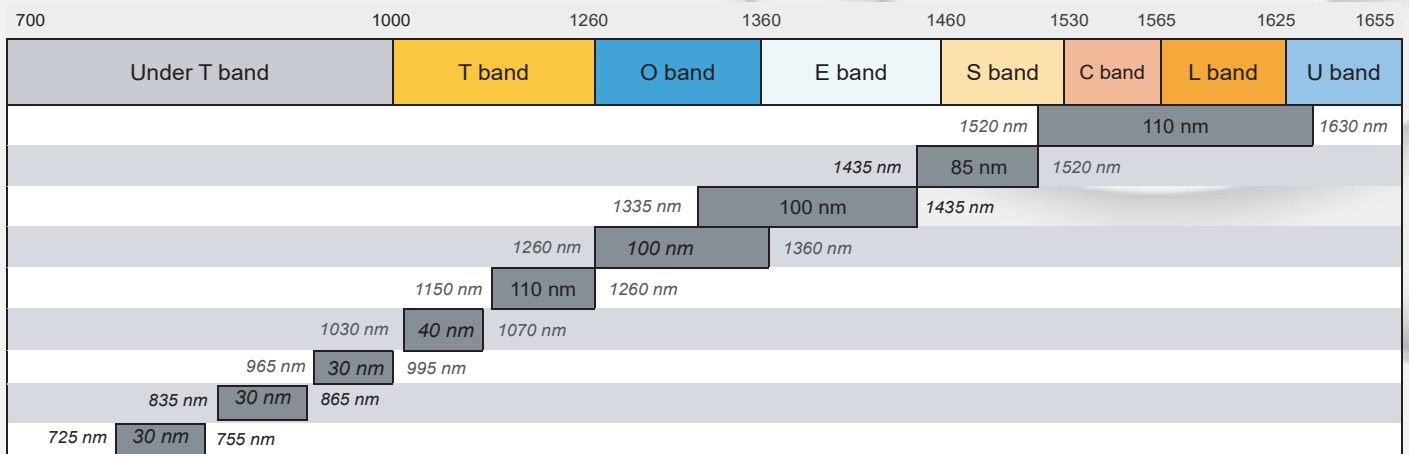
### Common Specifications

|  |                               |
|--|-------------------------------|
| Wavelength setting resolution                      | 3 pm                          |
| Wavelength stability                               | ≤± 10 pm                      |
| Absolute Wavelength accuracy @ 25°C (+/- 1) *      | +/- 10 pm (typical)           |
| Wavelength repeatability*                          | +/- 10 pm (typical)           |
| Power flatness (Step mode)                         | 0.05 dB                       |
| Power flatness (Sweep mode)                        | 2 dB                          |
| Sweep speed  | Adjustable from 5 to 100 nm/s |
| Fine tuning scan range (input piezo control)       | ≥3 GHz                        |
| Power stability @24h                               | +/- 0.2 dB                    |
| Power repeatability (Step mode)                    | +/- 0.05 dB                   |
| Dynamic power repeatability (Sweep mode @ 10 nm/s) | +/- 0.01 dBm                  |
| Dynamic power repeatability (Sweep mode@ 100 nm/s) | +/- 0.06 dBm                  |
| RIN  | -158 dB/Hz                    |
| Lorentzian linewidth (Fundamental)                 | 55 kHz                        |
| Linewidth (Integration over 1s)                    | 280 kHz                       |
| SMSR   | ≥45 dB/0.1 nm                 |
| Signal to total source spontaneous emission ratio  | ≥50 dB (typical)              |

\*Maximum absolute wavelength accuracy +/- 15 pm

### APEX Technologies TLS models

APEX Technologies offers TLS models that cover the wavelength range between 725 to 1655 nm in a benchtop or OEM versions. The benchtop version allows to integrate 1, 2 or 4 TLS models in a single box. The output power depends on the TLS model and can go up to 16 dBm. Higher output power can be provided under request.

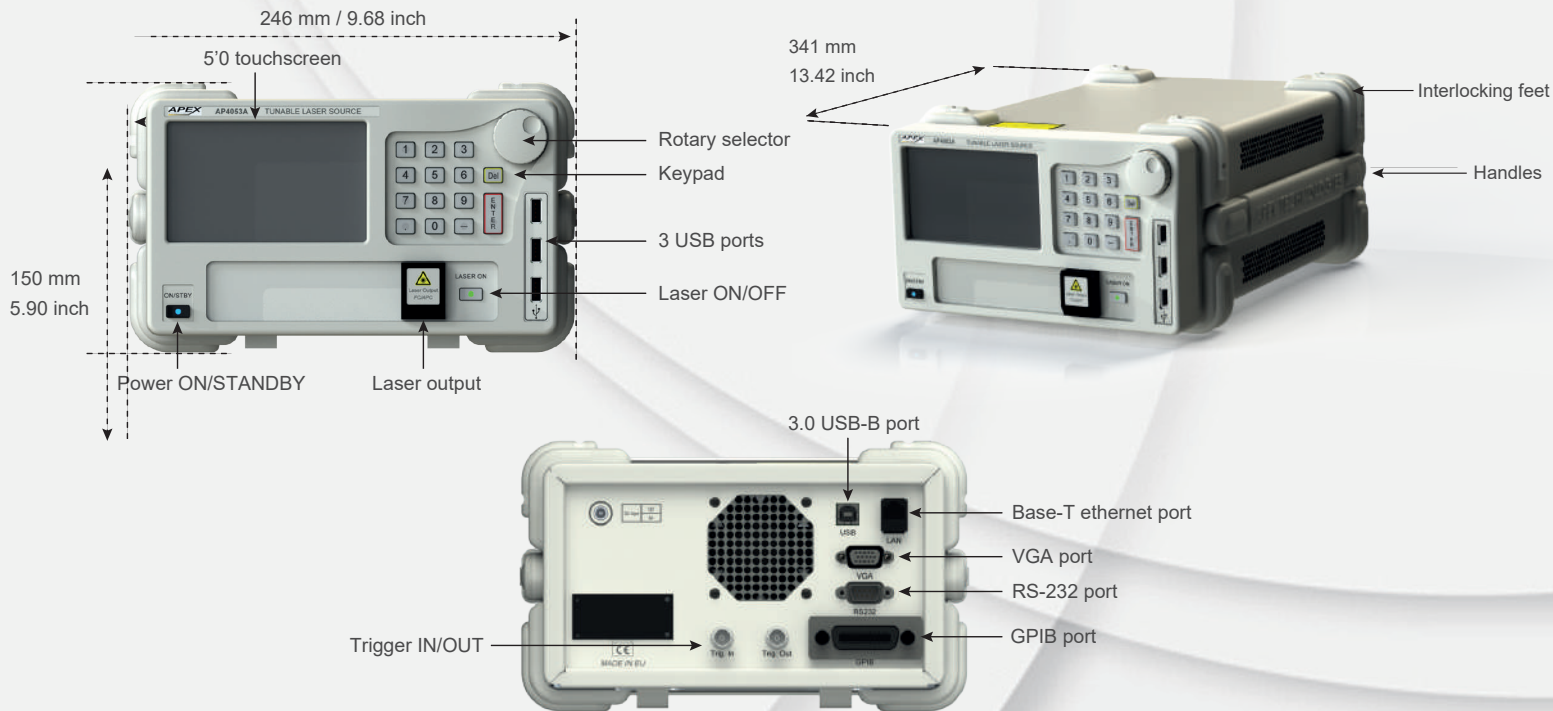


| TLS-APBX/TLS-APX model | Wavelength range (nm) | Peak Output Power** (dBm) | Full span output power (dBm) |
|------------------------|-----------------------|---------------------------|------------------------------|
| TLS-APB-1/TLS-AP-1     | 725-755               | 10                        | 6                            |
| TLS-APB-2/TLS-AP-2     | 835-865               | 10                        | 6                            |
| TLS-APB-3/TLS-AP-3     | 965-995               | 10                        | 6                            |
| TLS-APB-4/TLS-AP-4     | 1030-1070             | 13                        | 9                            |
| TLS-APB-5/TLS-AP-5     | 1150-1250             | 10                        | 6                            |
| TLS-APB-6/TLS-AP-6     | 1260-1360             | 15                        | 12                           |
| TLS-APB-7/TLS-AP-7     | 1335-1435             | 13                        | 9                            |
| TLS-APB-8/TLS-AP-8     | 1435-1520             | 10                        | 6                            |
| TLS-APB-9/TLS-AP-9     | 1525-1607             | 12                        | 10                           |
| TLS-APB-10/TLS-AP-10   | 1520-1630             | 12                        | 10                           |

\*\*Typical value - more under request

## Stand-alone Tunable Laser Source Benchtop

APEX Technologies TLS operates with an adjustable sweep speed from 5 to 100 nm/s. This laser includes a piezoelectric input control that allows to modulate the laser frequency with a scan range of 3 GHz and a modulation frequency of up to 10 kHz. We also offer the possibility to modulate the laser current.



### Specifications:

|                          | Stand-alone benchtop optical instruments  |
|--------------------------|---|
| Connector type           | FC/APC (other connectors on demand)   |
| USB-A connectors         | 3 USB-A 2.0 ports (enables keyboard, mouse and USB stick)   |
| USB remote control       | Yes, Via USB-B 3.0 port   |
| Ethernet                 | Yes   |
| GPIB                     | Yes   |
| RS-232                   | Yes   |
| Internal memory          | 64 Gbit   |
| File format              | txt, bmp and setup file formats   |
| Display                  | 5.0' touchscreen pad and VGA port   |
| Dimensions               | W x H x D: 246 x 150 x 341 mm / 9.68 x 5.90 x 13.42 inch  |
| Weight                   | Average: 4.5 kg / 9.92 lb   |
| Environmental conditions | Operating temperature: +5 to +35°C<br>Storage temperature: -10 to +50°C<br>Humidity: 20 to 80% RH (no condensation) |
| Power requirement        | Furnished AC Adaptor with 12V/5A DC output, power 60W   |

# APEX

TECHNOLOGIES

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