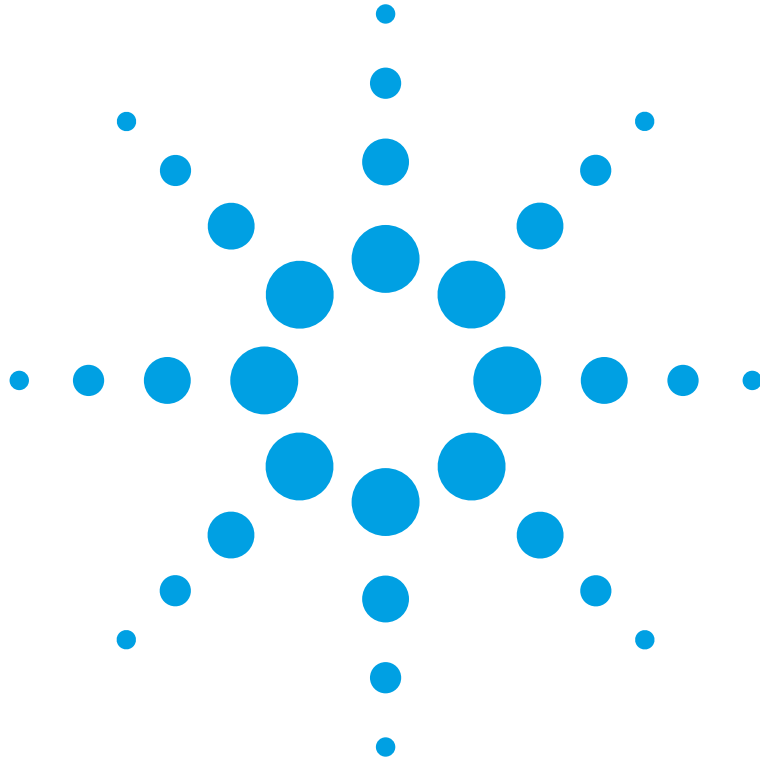


Agilent 81950A
Compact Tunable Laser Source module
Getting Started Guide



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In This Guide...

Chapter 1, "Getting Started"

This chapter contains an introductory description of the modules and aims to make the modules familiar to you.



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1

Getting Started

This chapter provides a general description of Agilent 81950A Compact TLS module.

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Safety Considerations

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. Agilent Technologies Inc. assumes no liability for the customer's failure to comply with these requirements.

Before operation, review the instrument and manual, including the red safety page, for safety markings and instructions. You must follow these to ensure safe operation and to maintain the instrument in safe condition.

WARNING

The **WARNING** sign denotes a hazard. It calls attention to a procedure, practice or the like, which, if not correctly performed or adhered to, could result in injury or loss of life. Do not proceed beyond a **WARNING** sign until the indicated conditions are fully understood and met.

Safety Symbols

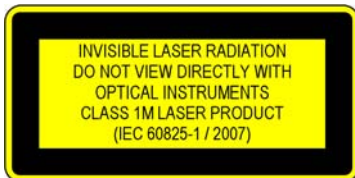
The apparatus will be marked with this symbol when it is necessary for the user to refer to the instruction manual in order to protect the apparatus against damage.



Hazardous laser radiation.



Invisible laser radiation.



Initial Inspection

Inspect the shipping container for damage. If there is damage to the container or cushioning, keep them until you have checked the contents of the shipment for completeness and verified the instrument both mechanically and electrically.

The Performance Tests give procedures for checking the operation of the instrument. If the contents are incomplete, mechanical damage or defect is apparent, or if an instrument does not pass the operator's checks, notify the nearest Agilent Technologies Sales/Service Office.

WARNING

To avoid hazardous electrical shock, do not perform electrical tests when there are signs of shipping damage to any portion of the outer enclosure (covers, panels, etc.).

WARNING

You *MUST* return instruments with malfunctioning laser modules to an Agilent Technologies Sales/Service Center for repair and calibration.

Line Power Requirements

The Agilent 81950A Compact Tunable Laser Source modules operate when installed in Agilent 8163A/B Lightwave Multimeters, Agilent 8164A/B Lightwave Measurement Systems, and Agilent 8166A/B Lightwave Multichannel Systems.

Operating Environment

The safety information in your mainframe's User's Guide summarizes the operating ranges for the Agilent 81950A Compact Tunable Laser Source modules. In order for these modules to meet specifications, the operating environment must be within the limits specified for your mainframe.

Input/Output Signals

CAUTION

There is one BNC input connector on the front panel of an Agilent 81950A Compact Tunable Laser Source module.

To prevent the BNC interface from damage, do not exceed the voltage limit of $\pm 5V$ when applying external voltage.

Storage and Shipment

An Agilent 81950A Compact Tunable Laser Source module can be stored or shipped at temperatures between -40°C and $+70^{\circ}\text{C}$.

Protect the module from temperature extremes that may cause condensation within it.

Initial Safety Information for Tunable Laser Modules

The laser sources specified by this user guide are classified according to IEC 60825-1 (2007) Laser Notice No. 50 dated 2007-June-24.

The laser sources comply with 21 CFR 1040.10 except for deviations pursuant to Laser Notice No. 50 dated 2001-July-26:

	Agilent 81950A Option 210	Agilent 81950A Option 201
<i>Laser Type</i>	ECL-Laser InGaAsP	ECL-Laser InGaAsP
<i>Wavelength range</i>	1527nm-1566nm	1570nm-1609nm
<i>Max. CW output power*</i>	50 mW	50 mW
<i>Beam waist diameter</i>	9 μ m	9 μ m
<i>Numerical aperture</i>	0.1	0.1
<i>Laser Class according to IEC 60825-1 (2007)- Intl.</i>	1M	1M
<i>Max. permissible CW output power**</i>	163 mW	163 mW
<p>* <i>Max. CW output power</i> is defined as the highest possible optical power that the laser source can produce at its output connector.</p> <p>** <i>Max. permissible CW output power</i> is the highest optical power that is permitted within the appropriate laser class.</p>		

Laser Safety Labels

Laser class 1M label

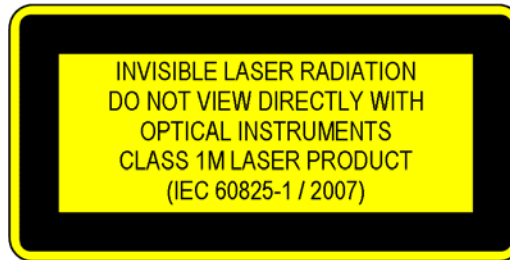


Figure 1 Class 1M Safety Label - 81950A

A sheet of laser safety labels is included with the laser module as required. In order to meet the requirements of IEC 60825-1 we recommend that you stick the laser safety labels, in your language, onto a suitable location on the outside of the instrument where they are clearly visible to anyone using the instrument.

WARNING

Please pay attention to the following laser safety warning:

Under no circumstances look into the end of an optical cable attached to the optical output when the device is operational. The laser radiation can seriously damage your eyesight.

Do not enable the laser when there is no fiber attached to the optical output connector.

The laser is enabled by pressing the 'active' button close to the optical output connector on the front panel of the module. The laser is on when the green LED on the front panel of the instrument is lit.

The use of optical instruments with this product will increase eye hazard.

The laser module has a built-in safety circuitry which will disable the optical output in the case of a fault condition

Refer servicing only to qualified and authorized personnel.

Introduction

What is a Tunable Laser Source?

A Tunable Laser Source (TLS) is a laser source for which the wavelength can be varied through a specified range. The Agilent Technologies range of TLS modules also allow you to set the output power, and to choose between continuous wave or modulated power.

The Agilent Technologies range of compact TLS modules are flexible stimulus modules suitable for applications such as the testing of optical amplifiers, DWDM components, and complete DWDM systems.

Installation

The Agilent 81950A Compact TLS module is a front-loadable module.

For a description of how to install your module, refer to “How to Fit and Remove Modules” in the Installation and Maintenance chapter of your mainframe’s User’s Guide.

Front Panels

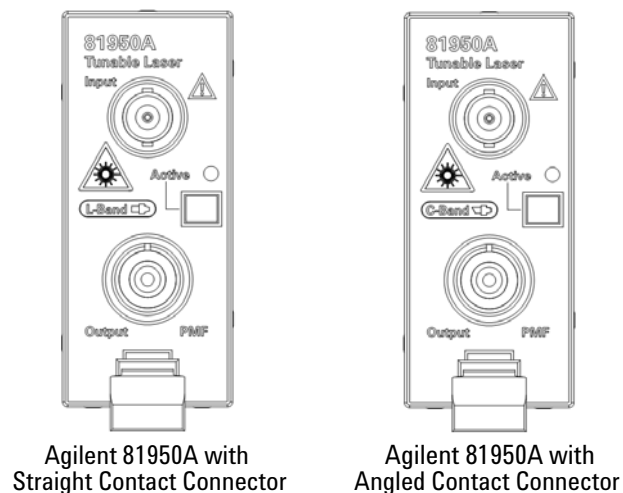


Figure 2 Agilent 81950A Compact Tunable Laser Module

Front Panel Controls and Indicators

Switch the laser source on or off using the switch on its front panel, using the *[State]* parameter in the instrument's Graphical User Interface, or remotely using SCPI commands. When the Active LED is lit the source is emitting radiation. When the Active LED is not lit the source is not emitting radiation.

Typical Use Models

The Agilent 81950A Compact TLS module provides high output power up to +15.5 dBm.

This module covers a total wavelength range of 40 nm, either:

- In the C-band
with the 81950A Option 210, or
- In the L-band
with the 81950A Option 201.

Their compact single-slot format makes them a flexible and cost-effective stimulus for single channel and multichannel DWDM applications

Device Characterization at high power levels

The high optical output power of the Agilent 81950A Compact TLS module improves the testing of all types of optical amplifiers and other active components as well as broadband passive optical components. It helps overcome losses in test setups or in the device under test itself. Thus, engineers can test optical amplifiers such as EDFAs, Raman amplifiers, SOAs and EDWAs to their limits. This tunable laser provides the high power levels required to help speed the development of innovative devices by enabling the test and measurement of nonlinear effects.

Low linewidth source for complex modulation formats

The low linewidth of the Agilent 81950A Compact TLS module makes this module an ideal light source for transmission systems with (D)QPSK and higher order modulation formats and as local oscillator for coherent receivers. The fine tuning capability allows to precisely set the intermediate frequency in the coherent receiver.

SBS suppression feature enables high launch power

The SBS Suppression feature avoids the reflection of light induced by Stimulated Brillouin Scattering (SBS). It enables the launch of the high optical output power into long fibers without intensity modulation to avoid impairment in time-domain measurements.

Specifications:

For further details on specifications, refer to the *User Guide*.

Optical Output

Polarization Maintaining Fiber

A Polarization maintaining fiber (PMF) output is standard for Agilent 81950A Compact TLS modules.

PMF is aligned to maintain the state of polarization. A well defined state of polarization helps ensure constant measurement conditions.

The fiber is of Panda type, with TE mode in the slow axis in line with the connector key.

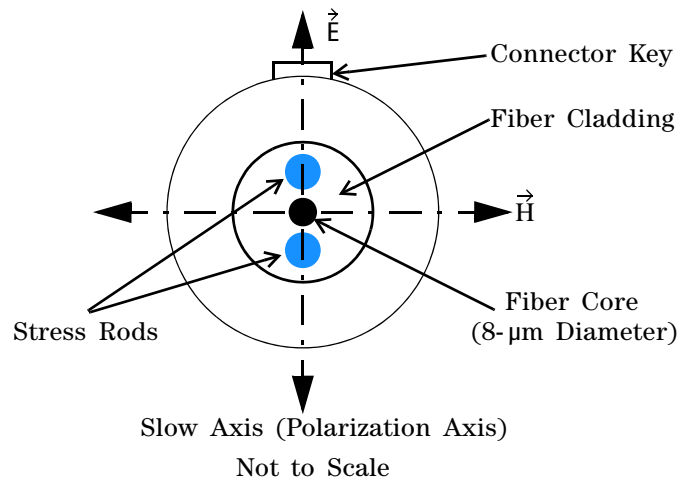


Figure 3 PMF Output Connector

For further details on connector interfaces and accessories, refer to the *User Guide*.

Angled and Straight Contact Connectors

Angled contact connectors are available as an option for Agilent 81950A Compact TLS modules.

Angled contact connectors help you to control return loss, since reflected light tends to reflect into the cladding, reducing the amount of light that reflects back to the source.

CAUTION

If the contact connector on your instrument is angled, you can only use cables with angled connectors with the instrument



Figure 4 Angled and Straight Contact Connector Symbols

Figure 4 shows the symbols that tell you whether the contact connector of your Tunable Laser module is angled or straight. The angled contact connector symbol is colored green.

You should connect straight contact fiber end connectors with neutral sleeves to straight contact connectors and connect angled contact fiber end connectors with green sleeves to angled contact connectors.

NOTE

Angled non-contact fiber end connectors with orange sleeves cannot be directly connected to the instrument.

For further details on connector interfaces and accessories, refer to the *User Guide*.

Signal Input and Output

CAUTION

There is one BNC input connector on the front panel of an Agilent 81950A Compact Tunable Laser Source module.

To prevent the BNC interface from damage, do not exceed the voltage limit of $\pm 5V$ when applying external voltage.

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