WDM Laser Source

IQ-2400

- C- and L- band use
- +13 dBm output power
- ±0.01 nm uncertainty
- Outstanding wavelength stability
- Ideal for EDFA testing

Fiber-optic T&M, monitoring, manufacturing and assembly solutions

EXFO

High-Accuracy WDM Laser Source

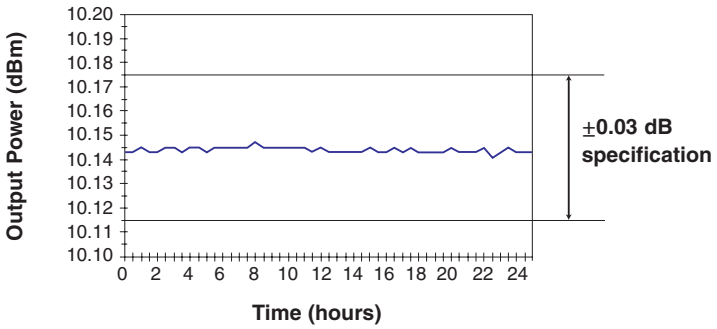
The IQ-2400 WDM Laser Source offers high accuracy and stability for testing the power and spectral sensitivity of active components, passive components and WDM building blocks.

Unequaled long-term wavelength stability

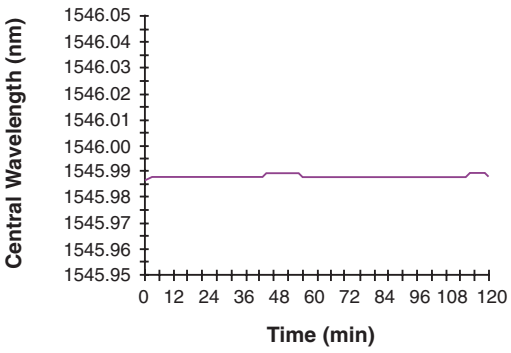
The IQ-2400 emulates ITU-T channels in dense WDM applications such as multiwavelength network simulation, simultaneous multiple inputs for EDFA characterization and insertion loss measurement of DWDM passive components. This source is ideal for the production environment offering unmatched, long-term wavelength stability. The ±0.01 nm absolute accuracy enables the IQ-2400 WDM Laser Source to replace a wavelength measurement instrument when testing components or systems. The IQ-2400 features wavelength-tuning capabilities around each of the ITU-T grid wavelengths, dithering up to 300 kHz with a triangular or square waveform, and an output power reaching 13 dBm with a 10 dB attenuation range. DFB laser diode manufacturers have the option of providing their own DFBs.

Multifunctional flexibility to match your needs

The IQ-2400 WDM Laser Source can operate in four different modes: Normal, High-Wavelength Stability, Dithering, and On/Off. Normal mode provides access to total wavelength and power tuning ranges, maintaining full control of the output power (automatic power control). From a set point in wavelength and power levels, High-Wavelength Stability mode provides finer wavelength and power tuning resolutions through laser temperature steps of 0.01°C and laser current steps of 0.01 mA. This mode operates the laser at a constant current (automatic current control). Since the central wavelength may drift slightly (due to aging) in Normal mode, High-Wavelength Stability mode allows for continuous access to long-term, high-accuracy wavelength set points. The last two modes, On/Off and Dithering, provide modulation capabilities from 10 Hz to 300 kHz. On/Off mode ensures maximum optical extinction when activated, while Dithering mode adds a small waveform (triangular or square) to the CW signal, thus reducing the signal coherence length. In On/Off mode, several sources can be synchronized from an external TTL signal generator or from any module's synchronization output. Therefore, each source can operate at a different frequency and amplitude or precisely in phase.



The source's excellent power stability output is ideal for long-term monitoring



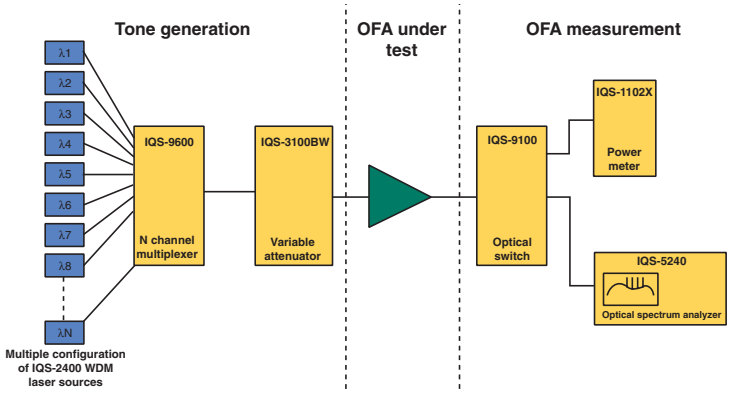
The temperature stabilization circuit ensures low central wavelength drift

Precise calibration for outstanding performance

The power and wavelength of each DFB laser is accurately calibrated to ensure the best possible performance and confidence in your test results. The IQ-2400's calibration setup, using its NIST-traceable wavelength meter and four-channel power meter, allows fully referenced and automated calibration of the DFB's internal temperature and laser current. A precise central wavelength at any power level can be obtained. The ±0.01 nm absolute accuracy is one of the highest levels of accuracy available today for a laser source instrument.

Versatile and reliable EDFA and WDM testing

Combine more than one modular IQ-2400 WDM Laser Source with IQ-3100BW Variable Attenuator, IQ-1102X Power Meter and IQ-5240 Optical Spectrum Analyzer in an IQ-200 Optical Test System. This setup enables precise, stable tones at every attenuation step throughout the complete WDM spectrum. Automatic tone balancing avoids the time-consuming and tedious manual adjustments that were once necessary to obtain a uniform input comb.



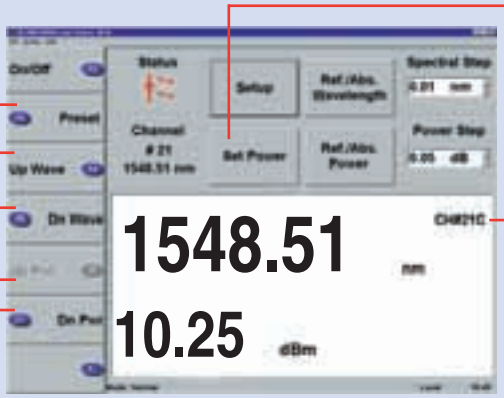
Typical setup for an IQ-based optical fiber amplifier test system using the IQ-2400 WDM Laser Source.

Main screen: IQ-2400 software application

Quick access to pre-selected set points

A ±0.5 nm tuning range for complete optical loss/gain characterization around each ITU-T grid wavelength

A 10 dB output power attenuation range



Output power correction

Indicator: user-defined set point for power and wavelength

IQ-2402 Specifications

Model		P4
Wavelength band (nm)		1308 ±5
Wavelength tuning range (nm)		±0.5 (typical)
Wavelength tuning resolution[2] (nm)		0.01
Wavelength uncertainty[3,4] (nm)		±0.01
Wavelength stability[4,5] (nm)		±0.002
Output power[6] (dBm)		10
Output power attenuation range (dB)		>6
Sidemode suppression[7] (dB)		30 (40 typical)
Output power uncertainty[3] (dB)		±0.3
Power stability[3,4] (dB)	15 min	±0.005 (Δ= 0.01)
	8 h	±0.03 (Δ= 0.06)
Modulation frequency (internal or external sync.) (kHz)		0.010 to 300
Dithered modulation amplitude range[8] (mA)		1 to 5
Dithered modulation electrical waveform		Square/triangular

IQ-2403 Specifications

Model		P4/P5	P6/P7
Wavelength band		C-band	C-band
		1528 nm to1565 nm	1528 nm to 1565 nm
Wavelength tuning range[1] (nm)		±1	±1
Wavelength tuning resolution[2] (nm)		0.01	0.01
Wavelength uncertainty[3,4] (nm)		±0.01	±0.02
Wavelength stability[4,5] (nm)		±0.002	±0.002
Output power[6] (dBm)		10	13
Output power attenuation range (dB)		10	10
Sidemode suppression[7] (dB)		30 (40 typical)	30 (40 typical)
Output power uncertainty[3] (dB)		±0.3	±0.3
Power stability[3,4] (dB)	15 min	±0.005 (Δ= 0.01)	±0.005 (Δ= 0.01)
	8 h	±0.03 (Δ= 0.06)	±0.03 (Δ= 0.06)
Modulation frequency (internal or external sync.) (kHz)		0.010 to 300	0.010 to 300
Dithered modulation amplitude range[8] (mA)		1 to 5	1 to 5
Dithered modulation electrical waveform		Square/triangular	Square/triangular

IQ-2404 Specifications

Model		P4/P5	P6/P7
Wavelength band		L-band	L-band
		1566 nm to 1606 nm	1566 nm to 1606 nm
Wavelength tuning range[1] (nm)		±1	±1
Wavelength tuning resolution[2] (nm)		0.01	0.01
Wavelength uncertainty[3,4] (nm)		±0.01	±0.02
Wavelength stability[4,5] (nm)		±0.002	±0.002
Output power[6] (dBm)		10	13
Output power attenuation range (dB)		10	10
Sidemode suppression[7] (dB)		30 (40 typical)	30 (40 typical)
Output power uncertainty[3] (dB)		±0.3	±0.3
Power stability[3,4] (dB)	15 min	±0.005 (Δ= 0.01)	±0.005 (Δ= 0.01)
	8 h	±0.03 (Δ= 0.06)	±0.03 (Δ= 0.06)
Modulation frequency (internal or external sync.) (kHz)		0.010 to 300	0.010 to 300
Dithered modulation amplitude range[8] (mA)		1 to 5	1 to 5
Dithered modulation electrical waveform		Square/triangular	Square/triangular

NOTES

1. Guaranteed if the ambient temperature stays between 15 °C to 30 °C.
2. In high-wavelength stability mode, better resolution is possible, but on a limited range.
3. Specified at 23 °C ± 1 °C with 50 % relative humidity.
4. After a 1-hour warmup period.
5. For 8 hours at 23 °C ± 1 °C with 50 % relative humidity.
6. Output power is specified at connector output.
7. Guaranteed at maximum power level.
8. Dithered modulation is only available internally at a typical duty cycle of 50% duty cycle.

General Specifications

Size (H X W X D)	12.25 cm X 3.8 cm X 26.5 cm	4.8 in X 1.5 in X 10.4 in
Weight	0.580 kg	1.25 lb
Temperature		
Operating	10 °C to 40 °C	50 °F to 104 °F
Storage	-40 °C to 70 °C	-40 °F to 158 °F
Relative humidity	0 to 95 % non condensing	

Remote Control

With IQ-203: GPIB (IEEE-488.1, IEEE-488.2) and RS-232.

With IQ-206: Control using external PC and expansion card.

Instruments Drivers

LabVIEW® drivers, OCX controls and ActiveX.

Standard Accessories

Instruction manual, test report and Certificate of Compliance.

Ordering Information

IQ-24XXBLD-XX-XX-XX

Wavelength band

02 1308 nm
03 1528-1565 nm C-band
04 1566-1606 nm L-band

Specified wavelength (nm)

96 1528.77	29 1554.94	62 1582.02
97 1529.55	30 1555.75	63 1582.85
98 1530.33	31 1556.55	64 1583.69
99 1531.12	32 1557.36	65 1584.53
00 1531.90	33 1558.17	66 1585.36
01 1532.68	34 1558.98	67 1586.20
02 1533.47	35 1559.79	68 1587.04
03 1534.25	36 1560.61	69 1587.88
04 1535.04	37 1561.42	70 1588.73
05 1535.82	38 1562.23	71 1589.57
06 1536.61	39 1563.05	72 1590.41
07 1537.40	40 1563.86	73 1591.26
08 1538.19	41 1564.68	74 1592.10
09 1538.98	42 1565.50	75 1592.95
10 1539.77	43 1566.31	76 1593.79
11 1540.56	44 1567.13	77 1594.64
12 1541.35	45 1567.95	78 1595.49
13 1542.14	46 1568.77	79 1596.34
14 1542.94	47 1569.59	80 1597.19
15 1543.73	48 1570.43	81 1598.04
16 1544.53	49 1571.24	82 1598.89
17 1545.32	50 1572.06	83 1599.75
18 1546.12	51 1572.89	84 1600.60
19 1546.92	52 1573.71	85 1601.46
20 1547.72	53 1574.54	86 1602.31
21 1548.51	54 1575.37	87 1603.17
22 1549.32	55 1576.20	88 1604.03
23 1550.12	56 1577.03	89 1604.89
24 1550.92	57 1577.86	90 1605.74
25 1551.72	58 1578.69	CU 1308
26 1552.52	59 1579.52	
27 1553.33	60 1580.35	
28 1554.13	61 1581.18	

Also available for the IQS-200 Optical Test System

Connector code

96 = E-2000/APC[1]
EA = APC Universal Interface
The fixed base-plate (EA) must be ordered with a removable universal connector adapter EUI-XX. Please specify one EUI from the following list:
EUI-89 = FC
EUI-91 = SC
EUI-95 = E-2000

Options code

P3 = user-provided DFB(s) (Call factory)
P4 = +10 dBm
P5 = +10 dBm with PMF output
P6 = +13 dBm
P7 = +13 dBm with PMF output

Safety

Class 1M
21 CFR 1040.10 and 1040.11
IEC 60825-1:1993+A1:1997+A2:2001

Note

1. For purchases in the US, this connector with an integrated shutter is mandatory for modules P4, P5, P6 and P7.

CORPORATE HEADQUARTERS	400 Godin Avenue	Vanier (Quebec) G1M 2K2 CANADA	Tel.: 1 418 683-0211 . Fax: 1 418 683-2170
EXFO AMERICA	4275 Kellway Circle, Suite 122	Addison TX 75001 USA	Tel.: 1 800 663-3936 . Fax: 1 972 836-0164
EXFO EUROPE	Le Dynasteur, 10/12 rue Andras Beck	92366 Meudon la Forêt Cedex FRANCE	Tel.: +33.1.40.83.85.85 . Fax: +33.1.40.83.04.42
EXFO ASIA-PACIFIC	151 Chin Swee Road, #03-29 Manhattan House	SINGAPORE 169876	Tel.: +65 6333 8241 . Fax: +65 6333 8242
EXFO CHINA	Beijing New Century Hotel Office Tower, Room 1754-1755 No. 6 Southern Capital Gym Road	Beijing 100044 P. R. China	Tel.: +86 (10) 6849 2738 · Fax: +86 (10) 6849 2662
TOLL-FREE (USA and Canada)	Tel.: 1 800 663-3936	www.exfo.com • info@exfo.com	

SPIQ2400.3AN

Printed in Canada 04/03