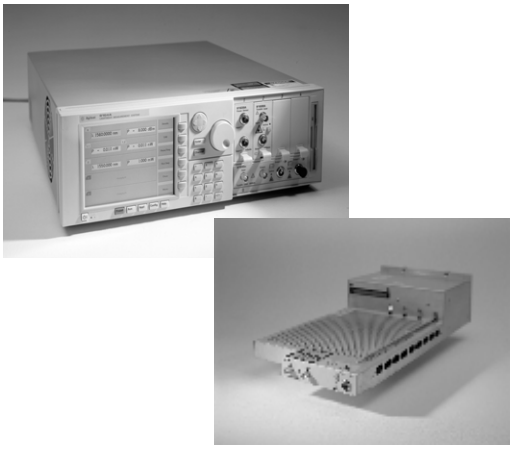
Agilent 81480/ 680/ 640B
Agilent 81672/ 482/ 682/ 642B
Tunable Laser Sources

Technical Specifications

February 2003



The Agilent 81672B, 81480B/482B, 81680B/682B, and 81640B/642B Tunable Laser Sources product family covers the complete wavelength range from 1260 nm to 1640 nm with the minimum number of lasers and no wavelength gaps. This provides customers with the maximum flexibility for test set up.

Agilent Technologies

High Power Tunable Laser Source for the 1300 nm band

The new 81672B High Power Tunable Laser Source offers a wavelength range of 1260 nm to 1375 nm and 9 dBm peak output power.
Its performance is specified for sweep speeds up to 80 nm/s. A PMF output port is standard.

The 81672B covers the wavelength range of 4-channel CWDM devices in the O-band.

A complete wavelength range of 1260 nm to 1640 nm with the minimum number of lasers

The 81672B, 81480B/482B, 81680B/682B and 81640B/642B Tunable Laser Source product family covers the complete wavelength range of 1260 nm to 1640 nm with the minimum number of lasers and no wavelength gaps. This provides customers with the maximum flexibility for test set up.

Each of the seven modules fits into the bottom slot of the Agilent 8164B Lightwave Measurement System.

Reduce the cost of optical component tests

The testing of optical filters is based on a generic principle, namely the stimulus-response test. The state-of-the art approach is a wavelength-resolved stimulus-response measurement utilizing a tunable laser source that is capable of fast and precise sweeps across the entire wavelength range, and optical power meters.

For DWDM components, high wavelength accuracy and dynamic range are critical. For CWDM components, a wide wavelength range, high power stability and tight costing are key targets. If the investment in the test solution can be shared among many different types of filters, the contribution for each individual filter is minimized. In this way, cost targets for CWDM components can be met without sacrificing accuracy.

Investing in the Agilent 81672B, 81480B/482B, 81680B/682B and 81640B/642B Tunable Laser Sources family of products can realize both the cost efficiency and performance benefits required.

It sweeps as precisely as it steps

As manufacturing yield targets become more and more stringent, it is important that all instruments deliver optimum performance under all measurement conditions. The Agilent 81672B, 81480B/482B, 81680B/682B and 81640B/642B can sweep as quickly as 80 nm/s without compromising measurement uncertainty for speed.

Unlike other concepts, which require external wavelength tracking, the Agilent High Performance Tunable Laser Sources family of products sweeps as precisely as it steps.

Low SSE output port for high dynamic range

The Agilent 81480B, 81680B and 81640B are equipped with two optical outputs. One output port delivers a signal with ultra-low source spontaneous emission (SSE). It enables accurate crosstalk measurement for DWDM system components with many channels at narrow spacing.

The second output port provides increased optical power and allows adjustment by more than 60 dB through a built-in optical attenuator.

High Power output for multi-purpose component tests

The Agilent 81672B, 81482B, 81682B and 81642B provide a high stimulus power. An optional (excepting the 81672B), built-in optical attenuator allows an output power dynamic range of more than 60 dB. Excellent wavelength precision means these are multi-purpose instruments for all kinds of component tests.

Fast 80 nm/s sweep speed

Compared to its previous model, Agilent has doubled the sweep speed to 80 nm/s, and now also specifies the performance of the 81672B, 81480B/482B, 81680B/682B and 81640B/642B under swept conditions. This minimizes test uncertainty and maximizes throughput.

Built-in wavemeter for optimum tuning precision

The Agilent 81672B, 81480B/482B, 81680B/682B and 81640B/642B include a built-in wavelength control loop that pushes today's performance limits for stand-alone instruments. They are mode-hop free tunable laser sources with continuous output power, so qualify for the test of DWDM components.

Polarization Maintaining Fiber for the test of integrated optical devices

The Agilent 81672B, 81480B/482B, 81680B/682B and 81640B/642B are ideal for characterizing integrated optical devices. Panda PMF output ports provide a well defined state of polarization to ensure constant measurement conditions for waveguide devices. A PMF cable easily connects to an external optical modulator.

81480B Tunable Laser Source, low SSE, 1400 nm

	Agilent 81480B			**2.2**
Wavelength range	1370 nm to 1495 nm			
Wavelength resolution	0.1 pm, 15 MHz at 1450 nm			
Mode-hop free tuning range[9]	full wavelength range			
Maximum tuning speed	80 nm/s (1372 nm – 1495 nm)			
	Specification under static condition	Add-on specification under dynamic condition (typ.) [11]		
		at 5 nm/s	at 40 nm/s	at 80 nm/s
Absolute wavelength accuracy [1] [2] [9]	±10 pm	±0.4 pm	±1.0 pm	±2.5 pm
Relative wavelength accuracy [1] [2] [9]	±5 pm, typ.±2 pm	±0.4 pm	±0.8 pm	±2.0 pm
Wavelength repeatability [2] [9]	±0.8 pm, typ.±0.5 pm			
		Specification under dynamic condition		
Dynamic wavelength repeatability (typ.) [2] [9] [11]		±0.3 pm	±0.4 pm	±0.7 pm
Wavelength stability (typ., 24 h at const. temp.) [2] [9]	≤ ±1 pm			
Linewidth (typ.), coherence control off Effective linewidth (typ.), coherence ctrl. on	100 kHz > 50 MHz (1430 nm – 1480 nm, at flat output power)			
	Output 1 (low SSE)	**Output 2 (high power)**		
Output power [3] (continuous power during tuning)	≥ –4.5 dBm peak (typ.) ≥ –5 dBm (1430 nm –1480 nm) ≥ –7 dBm (1420 nm –1480 nm) ≥ –13 dBm (1370 nm – 1495 nm)	≥ +5.5 dBm peak (typ.) ≥ +5 dBm (1430 nm – 1480 nm) ≥ +3 dBm (1420 nm – 1480 nm) ≥ –3 dBm (1370 nm – 1495 nm)		
Minimum output power [3]	–13 dBm	–3 dBm (–60 dBm in attenuation mode)		
Power linearity [3]	±0.1 dB (1420 nm – 1495 nm) typ. ±0.1 dB (1370 nm – 1420 nm) [9]	±0.3 dB (1420 nm – 1495 nm) typ. ±0.3 dB (1370 nm – 1420 nm) [9]		
Power stability [3] [12]	±0.01 dB, 1 hour (1420 nm – 1495 nm) typ. ±0.01 dB, 1 hour (1370 nm – 1420 nm) [9] typ. ±0.03 dB, 24 hours			
	Specification under static condition	Dynamic relative power flatness (typ.) [10] [11]		
		at 5 nm/s	at 40 nm/s	at 80 nm/s
Power flatness versus wavelength [3] Output 1(low SSE)	±0.2 dB, typ.±0.1 dB (1420 nm – 1495 nm) typ.±0.2 dB (1370 nm – 1420 nm) [9]	±10 mdB	±15 mdB	±30 mdB
Power flatness versus wavelength [3] Output 2(high power)	±0.3 dB, typ. ±0.2 dB (1420 nm – 1495 nm) typ. ±0.3 dB (1370 nm – 1420 nm) [9]	±10 mdB	±15 mdB	±30 mdB
Dynamic power reproducibility (typ.) [3] [10] [11] [12]		±5 mdB	±10 mdB	±15 mdB
Power repeatability (typ.) [3] [9] [12]	±3 mdB			
Side-mode suppression ratio (typ.) [4] [8] [9]	≥ 40 dB (1430 nm – 1480 nm)			
	Output 1 (low SSE)	Output 2 (high power)		
Signal to source spontaneous emission ratio [5] [6] [8]	≥ 63 dB/ nm (1430 nm – 1480 nm) [7] ≥ 58 dB/ nm (1420 nm – 1480 nm) [7] ≥ 53 dB/ nm (typ., 1370 nm – 1495 nm) [7] [9]	≥ 42 dB/ nm (1430 nm – 1480 nm) ≥ 40 dB/ nm (1420 nm –1480 nm) ≥ 35 dB/ nm [9] (typ., 1370 nm – 1495 nm)		
Signal to total source spontaneous emission ratio [6] [8]	≥ 60 dB (1430 nm – 1480 nm) [7] ≥ 58 dB (1420 nm – 1480 nm) [7] ≥ 53 dB (typ., 1370 nm – 1495 nm) [7] [9]	≥ 28 dB (typ., 1430 nm – 1480 nm)		
Relative intensity noise (RIN) (typ.) [8]	–145 dB/Hz (1430 nm – 1480 nm)			

[1] Valid for one month and within a ±4.4 K temperature range after automatic wavelength zeroing. Wavelength zeroing is an internal function that performs an automatic self-adjustment.

[2] At CW operation. Measured with wavelength meter based on wavelength in vacuum.

[3] Applies to the selected output.

[4] Measured by heterodyne method.

[5] Value for 1 nm resolution bandwidth.

[6] Measured with optical spectrum analyzer.

[7] Measured with fiber Bragg grating to suppress the signal.

[8] Output power as specified per wavelength range and output port.

[9] Wavelength must not be equal to any water absorption line.

[10] Valid for absolute humidity of 11.5 g/m^3
(e.g.: Equivalent to 25°C and 50% relative humidity)

[11] Conditions: Wavelength range 1430 to 1480 nm
at flat output power ≥ – 9 dBm (for Output 1)
or output power ≥ 0 dBm (for Output 2).

[12] Warm-up time 1 hour.

81680B Tunable Laser Source, low SSE, 1550 nm

	Agilent 81680B			**2.3**
Wavelength range	1460 nm to 1580 nm			
Wavelength resolution	0.1 pm, 12.5 MHz at 1550 nm			
Mode-hop free tuning range	full wavelength range			
Maximum tuning speed	80 nm/s			
	Specification under static condition	Add-on specification under dynamic condition (typ.) [10]		
		at 5 nm/s	at 40 nm/s	at 80 nm/s
Absolute wavelength accuracy [1] [2]	± 10 pm	±0.4 pm	±1.0 pm	±2.5 pm
Relative wavelength accuracy [1] [2]	±5 pm, typ.±2 pm	±0.4 pm	±0.8 pm	±2.0 pm
Wavelength repeatability [2]	±0.8 pm, typ.±0.5 pm			
		Specification under dynamic condition		
Dynamic wavelength repeatability (typ.) [2] [10]		±0.3 pm	±0.4 pm	±0.7 pm
Wavelength stability (typ., 24 h at const. temp.) [2]	≤ ±1 pm			
Linewidth (typ.), coherence control off Effective linewidth (typ.), coherence ctrl. on	100 kHz > 50 MHz (1480 nm –1580 nm, at flat output power)			
	Output 1 (low SSE)	**Output 2 (high power)**		
Output power [3] (continuous power during tuning)	≥ –4 dBm peak (typ.) ≥ –6 dBm (1520 nm – 1570 nm) ≥ –10 dBm (1480 nm – 1580 nm) ≥ –13 dBm (1460 nm – 1580 nm)	≥ +6 dBm peak (typ.) ≥ +5 dBm (1520 nm – 1570 nm) ≥ +1 dBm (1480 nm – 1580 nm) ≥ –3 dBm (1460 nm – 1580 nm)		
Minimum output power [3]	–13 dBm	–3 dBm (–60 dBm in attenuation mode)		
Power linearity [3]	±0.1 dB	±0.3 dB		
Power stability [3] [9]	±0.01 dB, 1 hour typ. ±0.03 dB, 24 hours			
	Specification under static condition	Dynamic relative power flatness (typ.) [10]		
		at 5 nm/s	at 40 nm/s	at 80 nm/s
Power flatness versus wavelength [3] Output 1(low SSE)	±0.2 dB typ. ±0.1 dB	±10 mdB	±15 mdB	±30 mdB
Power flatness versus wavelength [3] Output 2(high power)	±0.3 dB typ. ±0.15 dB	±10 mdB	±15 mdB	±30 mdB
Dynamic power reproducibility (typ.) [3] [9] [10]		±5 mdB	±10 mdB	±15 mdB
Power repeatability (typ.) [3] [9]	±3 mdB			
Side-mode suppression ratio (typ.) [4] [8]	≥ 40 dB (1480 nm – 1580 nm)			
	Output 1 (low SSE)	**Output 2 (high power)**		
Signal to source spontaneous emission ratio [5] [6] [8]	≥ 63 dB/ nm (1520 nm – 1570 nm) [7] ≥ 58 dB/ nm (typ., 1480 nm – 1580 nm) [7] ≥ 53 dB/ nm (typ., 1460 nm – 1580 nm) [7]	≥ 45 dB/ nm (1520 nm – 1570 nm) ≥ 40 dB/ nm (1480 nm –1580 nm) ≥ 35 dB/ nm (1460 nm – 1580 nm)		
Signal to total source spontaneous emission ratio [6] [8]	≥ 60 dB (1520 nm – 1570 nm) [7] ≥ 50 dB (typ., 1460 nm – 1580 nm) [7]	≥ 30 dB (typ., 1520 nm – 1570 nm)		
Relative intensity noise (RIN) (typ.) [8]	–145 dB/Hz (1480 nm – 1580 nm)			

[1] Valid for one month and within a ±4.4 K temperature range after automatic wavelength zeroing.
Wavelength zeroing is an internal function that performs an automatic self-adjustment.

[2] At CW operation. Measured with wavelength meter based on wavelength in vacuum.

[3] Applies to the selected output.

[4] Measured by heterodyne method.

[5] Value for 1 nm resolution bandwidth.

[6] Measured with optical spectrum analyzer.

[7] Measured with Fiber Bragg Grating to suppress the signal.

[8] Output power as specified per wavelength range and output port.

[9] Warm up time 1 hour.

[10] Conditions: Wavelength range 1520 to 1570 nm at flat output power ≥ –8 dBm (for Output 1) or output power ≥ 1 dBm (for Output 2).

81640B Tunable Laser Source, low SSE, 1600 nm

	Agilent 81640B			**2.3**
Wavelength range	1495 nm to 1640 nm			
Wavelength resolution	0.1 pm, 12.5 MHz at 1550 nm			
Mode-hop free tuning range	full wavelength range			
Maximum tuning speed	80 nm/s			
	Specification under static condition	Add-on specification under dynamic condition (typ.) [10]		
		at 5 nm/s	at 40 nm/s	at 80 nm/s
Absolute wavelength accuracy [1] [2]	±10 pm	±0.4 pm	±1.0 pm	±2.5 pm
Relative wavelength accuracy [1] [2]	±5 pm, typ. ±2 pm	±0.4 pm	±0.8 pm	±2.0 pm
Wavelength repeatability [2]	±0.8 pm, typ. ±0.5 pm			
		Specification under dynamic condition		
Dynamic wavelength repeatability (typ.) [2] [10]		±0.3 pm	±0.4 pm	±0.7 pm
Wavelength stability [2] (typ., 24 h at const. temp.)	≤ ±1 pm			
Linewidth (typ.), coherence control off Effective linewidth (typ.), coherence ctrl. on	100 kHz > 50 MHz (1510 nm – 1620 nm, at flat output power)			
	Output 1 (low SSE)	**Output 2 (high power)**		
Output power [3] (continuous power during tuning)	≥ –5 dBm peak (typ.) ≥ –7 dBm (1520 nm – 1610 nm) ≥ –9 dBm (1510 nm – 1620 nm) ≥ –13 dBm (1495 nm –1640 nm)	≥ +4 dBm peak (typ.) ≥ +2 dBm (1520 nm –1610 nm) ≥ 0 dBm (1510 nm – 1620 nm) ≥–5 dBm (1495 nm – 1640 nm)		
Minimum output power [3]	–13 dBm	–5 dBm (–60 dBm in attenuation mode)		
Power linearity [3]	±0.1 dB	±0.3 dB		
Power stability [3] [9]	±0.01 dB, 1 hour typ. ±0.03 dB, 24 hours			
	Specification in static mode	Dynamic relative power flatness (typ.) [10]		
		at 5 nm/s	at 40 nm/s	at 80 nm/s
Power flatness versus wavelength Output 1(low SSE) [3]	±0.2 dB typ. ±0.1 dB	±10 mdB	±15 mdB	±30 mdB
Power flatness versus wavelength Output 2(high power) [3]	±0.3 dB typ. ±0.15 dB	±10 mdB	±15 mdB	±30 mdB
Dynamic power reproducibility(typ.) [3] [9] [10]		±5 mdB	±10 mdB	±15 mdB
Power repeatability (typ.) [3] [9]	±3 mdB			
Side-mode suppression ratio (typ.) [4] [8]	≥ 40 dB (1520 nm – 1610 nm)			
	Output 1 (low SSE)	**Output 2 (high power)**		
Signal to source spontaneous emission ratio [5] [6] [8]	≥ 60 dB/nm (1520 nm –1610 nm) [7] ≥ 55 dB/nm (typ.,1510 nm – 1620 nm) [7] ≥ 50 dB/nm (typ.,1495 nm – 1640 nm) [7]	≥ 45 dB/nm (1520 nm – 1610 nm) ≥ 40 dB/nm (1510 nm –1620 nm) ≥ 35 dB/nm (1495 nm – 1640 nm)		
Signal to total source spontaneous emission ratio [6] [8]	≥ 55 dB (1520 nm – 1610 nm) [7] ≥ 45 dB (typ., 1495 nm – 1640 nm) [7]	≥ 27 dB (typ.,1520 nm – 1610 nm)		
Relative intensity noise (RIN) (typ.) [8]	–145 dB/Hz (1520 nm – 1610 nm)			

[1] Valid for one month and within a ±4.4 K temperature range after automatic wavelength zeroing. Wavelength zeroing is an internal function that performs an automatic self-adjustment.

[2] At CW operation. Measured with wavelength meter based on wavelength in vacuum.

[3] Applies to the selected output.

[4] Measured by heterodyne method.

[5] Value for 1 nm resolution bandwidth.

[6] Measured with optical spectrum analyzer.

[7] Measured with Fiber Bragg Grating to suppress the signal.

[8] Output power as specified per wavelength range and output port.

[9] Warm up time 1 hour

[10] Conditions: Any 50 nm between 1510 to 1620 nm at flat output power ≥ –9 dBm (for Output 1) or output power ≥ 0 dBm (for Output 2).

81672B High Power Tunable Laser Source, 1300nm

	Agilent 81672B			**2.2**
Wavelength range	1260 nm to 1375 nm			
Wavelength resolution	0.1 pm, 17.7 MHz at 1300 nm			
Mode-hop free tuning range[12]	full wavelength range			
Maximum tuning speed	80 nm/s			
	Specification under static condition	Add-on specification under dynamic condition (typ.)[11]		
		at 5 nm/s	at 40 nm/s	at 80 nm/s
Absolute wavelength accuracy[1][2][12]	±10 pm	±0.4 pm	±1.0 pm	±2.5 pm
Relative wavelength accuracy[1][2][12]	±5 pm, typ.±2 pm	±0.4 pm	±0.8 pm	±2.0 pm
Wavelength repeatability[2][12]	±0.8 pm, typ.±0.5 pm			
		Specification under dynamic condition		
Dynamic wavelength repeatability (typ.)[2][11]		±0.3 pm	±0.4 pm	±0.7 pm
Wavelength stability[2][12] (typ., 24 h at constant temperature)	≤ ±1 pm			
Linewidth (typ.), coherence control off Effective linewidth (typ.), coherence control on	100 kHz > 50 MHz (1270 nm – 1350 nm, at flat output power)			
Output power[12] (continuous power during tuning)	≥ +9 dBm peak (typ.) ≥ +7 dBm (1290 nm – 1370 nm) ≥ +3 dBm (1270 nm – 1375 nm) ≥ 0 dBm (1260 nm – 1375 nm)			
Minimum output power	0 dBm			
Power linearity	±0.1 dB (1260 nm – 1350 nm) typ. ±0.1dB (1350 nm –1375 nm)[12]			
Power stability[9]	±0.01 dB,1 hour (1260 nm-1350 nm) typ.±0.01 dB, 1 hour (1350 nm-1375 nm)[12] typ.±0.03 dB, 24 hours[12]			
	Specification under static condition	Dynamic relative power flatness (typ.)[10][11][12]		
		at 5 nm/s	at 40 nm/s	at 80 nm/s
Power flatness versus wavelength[12]	±0.2 dB typ. ±0.1 dB (1260 nm – 1350 nm) typ. ±0.2 dB[12] (1350 nm – 1375 nm)	±10 mdB	±15 mdB	±30 mdB
Dynamic power reproducibility(typ.)[9][10][11]		±5 mdB	±10 mdB	±15 mdB
Power repeatability (typ.)[9][12]	±3 mdB			
Side-mode suppression ratio (typ.)[4][8][12]	≥ 40 dB (1270 nm –1375 nm)			
Signal to source spontaneous emission ratio[5][6][8][12]	≥ 45 dB/ nm (1290 nm – 1370 nm) ≥ 40 dB/ nm (1270 nm – 1375 nm) ≥ 35 dB/ nm (typ.,1260 nm – 1375 nm)			
Signal to total source spontaneous emission ratio (typ.)[6][8][12]	≥ 28 dB (1290 nm – 1370 nm)			
Relative intensity noise (RIN) (typ.)[8][12]	–145 dB/Hz (1270 nm – 1375 nm)			

[1] Valid for one month and within a ±4.4 K temperature range after automatic wavelength zeroing. Wavelength zeroing is an internal function that performs an automatic self-adjustment.

[2] At CW operation. Measured with wavelength meter based on wavelength in vacuum.

[4] Measured by heterodyne method.

[5] Value for 1 nm resolution bandwidth.

[6] Measured with optical spectrum analyzer.

[8] Output power as specified per wavelength range.

[9] Warm up time 1 hour.

[10] Valid for absolute humidity of 11.5 g/m^3 (e.g.: Equivalent to 25°C and 50% relative humidity).

[11] Conditions: Wavelength range 1300 to 1350 nm at flat output power ≥ 3 dBm.

[12] Wavelength must not equal to any water absorption line.

81482B High Power Tunable Laser Source, 1400nm

	Agilent 81482B			**2.2**
Wavelength range	1370 nm to 1495 nm			
Wavelength resolution	0.1 pm, 15 MHz at 1450 nm			
Mode-hop free tuning range[9]	full wavelength range			
Maximum tuning speed	80 nm/s (1372 nm – 1495 nm)			
	Specification under static condition	Add-on specification under dynamic condition (typ.) [11]		
		at 5 nm/s	at 40 nm/s	at 80 nm/s
Absolute wavelength accuracy [1] [2] [9]	±10 pm	±0.4 pm	±1.0 pm	±2.5 pm
Relative wavelength accuracy [1] [2] [9]	±5 pm, typ.±2 pm	±0.4 pm	±0.8 pm	±2.0 pm
Wavelength repeatability [2] [9]	±0.8 pm, typ.±0.5 pm			
		Specification under dynamic condition		
Dynamic wavelength repeatability (typ.) [2] [9] [11]		±0.3 pm	±0.4 pm	±0.7 pm
Wavelength stability[2] [9] (typ., over 24 h at constant temperature)	≤ ±1 pm			
Linewidth (typ.), coherence control off Effective linewidth (typ.), coherence control on	100 kHz > 50 MHz (1430 nm – 1480 nm, at flat output power)			
Output power (continuous power during tuning) With option #003 [3]	≥ +8.5 dBm peak (typ.) ≥ +7.5 dBm (1430 nm –1480 nm) ≥ +5 dBm (1420 nm – 1480 nm) ≥ 0 dBm (1370 nm – 1495 nm) reduce by 1.5 dB			
Minimum output power With option #003 [3]	–3 dBm –4.5 dBm (–60 dBm in attenuation mode)			
Power linearity With option #003 [3]	±0.1 dB (1420 nm – 1495 nm) typ. ±0.1 dB (1370 nm –1420 nm) [9] ±0.3 dB (1420 nm – 1495 nm) typ. ±0.3 dB (1370 nm –1420 nm) [9]			
Power stability [9] [12]	±0.01 dB, 1 hour (1420 nm –1495 nm) typ.±0.01 dB, 1 hour (1370 nm –1420 nm) [9] typ.±0.03 dB, 24 hours[9]			
	Specification under static condition	Dynamic relative power flatness (typ.) [10] [11]		
		at 5 nm/s	at 40 nm/s	at 80 nm/s
Power flatness versus wavelength	±0.2 dB, typ.±0.1 dB (1420 nm –1495 nm) typ.±0.2 dB [9] (1370 nm –1420 nm)	±10 mdB	±15 mdB	±30 mdB
With option #003 [3]	±0.3 dB, typ.±0.2dB (1420 nm –1495 nm) typ.±0.3dB [9] (1370 nm –1420 nm)	±10 mdB	±15 mdB	±30 mdB
Dynamic power reproducibility(typ.) [3] [10] [11] [12]		±5 mdB	±10 mdB	±15 mdB
Power repeatability (typ.) [9] [12]	±3 mdB			
Side-mode suppression ratio (typ.) [4] [8] [9]	≥ 40 dB (1430 nm –1480 nm)			
Signal to source spontaneous emission ratio [5] [6] [8]	≥ 42 dB/ nm (1430 nm – 1480 nm) ≥ 40 dB/ nm (1420 nm – 1480 nm) ≥ 35 dB/ nm (typ.,1370 nm – 1495 nm)			
Signal to total source spontaneous emission ratio (typ.) [6] [8]	≥ 28 dB (1430 nm – 1480 nm)			
Relative intensity noise (RIN) (typ.) [8]	–145 dB/Hz (1430 nm –1480 nm)			

[1] Valid for one month and within a ±4.4 K temperature range after automatic wavelength zeroing. Wavelength zeroing is an internal function that performs an automatic self-adjustment.

[2] At CW operation. Measured with wavelength meter based on wavelength in vacuum.

[3] Option #003: Built-in optical attenuator.

[4] Measured by heterodyne method.

[5] Value for 1 nm resolution bandwidth.

[6] Measured with optical spectrum analyzer.

[8] Output power as specified per wavelength range.

[9] Wavelength must not be equal to any water absorption line.

[10] Valid for absolute humidity of 11.5 g/m^3 (e.g.: Equivalent to 25°C and 50% relative humidity)

[11] Conditions: Wavelength range 1430 to 1480 nm at flat output power ≥ 3 dBm (≥1.5 dBm[3]).

[12] Warm up time 1 hour.

81682B High Power Tunable Laser Source, 1550nm

	Agilent 81682B			**2.3**
Wavelength range	1460 nm to 1580 nm			
Wavelength resolution	0.1 pm, 12.5 MHz at 1550 nm			
Mode-hop free tuning range	full wavelength range			
Maximum tuning speed	80 nm/s			
	Specification under static condition	Add-on specification under dynamic condition (typ.) [10]		
		at 5 nm/s	at 40 nm/s	at 80 nm/s
Absolute wavelength accuracy [1] [2]	±10 pm	±0.4 pm	±1.0 pm	±2.5 pm
Relative wavelength accuracy [1] [2]	±5 pm, typ.±2 pm	±0.4 pm	±0.8 pm	±2.0 pm
Wavelength repeatability [2]	±0.8 pm, typ.±0.5 pm			
		Specification under dynamic condition		
Dynamic wavelength repeatability (typ.) [2] [10]		±0.3 pm	±0.4 pm	±0.7 pm
Wavelength stability [2] (typ., over 24 h at constant temperature)	≤ ±1 pm			
Linewidth (typ.), coherence control off Effective linewidth (typ.), coherence control on	100 kHz > 50 MHz (1480 nm – 1580 nm, at flat output power)			
Output power (continuous power during tuning) With option #003 [3]	≥ + 8 dBm peak (typ.) ≥ +6 dBm (1520 nm –1570 nm) ≥ +2 dBm (1480 nm – 1580 nm) ≥ –3 dBm (1460 nm – 1580 nm) reduce by 1.5 dB			
Minimum output power With option #003 [3]	–3 dBm –4.5 dBm (–60 dBm in attenuation mode)			
Power linearity With option #003 (typ.) [3]	±0.1 dB ±0.3 dB			
Power stability [9]	±0.01 dB, 1 hour typ. ±0.03 dB, 24 hours			
	Specification under static condition	Dynamic relative power flatness [10] (typ.)		
		at 5 nm/s	at 40 nm/s	at 80 nm/s
Power flatness versus wavelength with option #003 [3]	±0.2 dB, typ.±0.1 dB ±0.3 dB, typ.±0.2 dB	±10 mdB	±15 mdB	±30 mdB
Dynamic power reproducibility (typ.) [3] [9] [10]		±5 mdB	±10 mdB	±15 mdB
Power repeatability (typ.) [9]	±3 mdB			
Side-mode suppression ratio (typ.) [4] [8]	≥ 40 dB (1480 nm –1580 nm)			
Signal to source spontaneous emission ratio [5] [6] [8]	≥ 45 dB/ nm (1520 nm – 1570 nm) ≥ 40 dB/ nm (1480 nm – 1580 nm) ≥ 35 dB/ nm (1460 nm – 1580 nm)			
Signal to total source spontaneous emission ratio (typ.) [6] [8]	≥ 30 dB (1520 nm – 1570 nm)			
Relative intensity noise (RIN) (typ.) [8]	–145 dB/Hz (1480 nm –1580 nm)			

[1] Valid for one month and within a ±4.4 K temperature range after automatic wavelength zeroing. Wavelength zeroing is an internal function that performs an automatic self-adjustment.

[2] At CW operation. Measured with wavelength meter based on wavelength in vacuum.

[3] Option #003: Built-in optical attenuator.

[4] Measured by heterodyne method.

[5] Value for 1 nm resolution bandwidth.

[6] Measured with optical spectrum analyzer.

[8] Output power as specified per wavelength range.

[9] Warm up time 1 hour.

[10] Conditions: Wavelength range 1520 to 1570 nm at flat output power ≥ 3 dBm (≥1.5 dBm [3]).

81642B High Power Tunable Laser Source, 1600nm

	Agilent 81642B			**2.2**
Wavelength range	1495 nm to 1640 nm			
Wavelength resolution	0.1 pm, 12.5 MHz at 1550 nm			
Mode-hop free tuning range	Full wavelength range			
Maximum tuning speed	80 nm/s			
	Specification under static condition	Add-on specification under dynamic condition (typ.)[10]		
		at 5 nm/s	at 40 nm/s	at 80 nm/s
Absolute wavelength accuracy [1] [2]	±10 pm	±0.4 pm	±1.0 pm	±2.5 pm
Relative wavelength accuracy [1] [2]	±5 pm, typ.±2 pm	±0.4 pm	±0.8 pm	±2.0 pm
Wavelength repeatability [2]	±0.8 pm, typ.±0.5 pm			
		Specification under dynamic condition		
Dynamic wavelength repeatability (typ.) [2] [10]		±0.3 pm	±0.4 pm	±0.7 pm
Wavelength stability [2] (typ., 24 h at const. temp.)	≤ ±1 pm			
Linewidth (typ.), coherence control off Effective linewidth (typ.), coherence control on	100 kHz > 50 MHz (1510 nm – 1620 nm, at flat output power)			
Output power (continuous power during tuning) With option #003 [3]	≥ +8.5 dBm peak (typ.) ≥ +8 dBm (1560 nm – 1610 nm) ≥ +6 dBm (1520 nm – 1620 nm) ≥ +4.5 dBm (1510 nm – 1620 nm) ≥ 0 dBm (1495 nm – 1640 nm) reduced by 1.5dB			
Minimum output power With option #003 [3]	–3 dBm –4.5 dBm (–60 dBm in attenuation mode)			
Power linearity With option #003 [3]	±0.1 dB ±0.3 dB			
Power stability [9]	±0.01 dB, 1 hour (typ.±0.03 dB, 24 hours)			
	Specification under static condition	Dynamic relative power flatness (typ.) [10]		
		at 5 nm/s	at 40 nm/s	at 80 nm/s
Power flatness versus wavelength With option #003 [3]	±0.2 dB, typ.±0.1dB ±0.3 dB, typ.±0.2dB	±10 mdB	±15 mdB	±30 mdB
Dynamic power reproducibility(typ.) [3] [9] [10]		±5 mdB	±10 mdB	±15 mdB
Power repeatability (typ.) [9]	±3 mdB			
Side-mode suppression ratio (typ.) [4] [8]	≥ 40 dB (1520 nm – 1610 nm)			
Signal to source spontaneous emission ratio [5] [6] [8]	≥ 45 dB/nm (1520 nm –1610 nm) ≥ 40 dB/nm (1510 nm – 1620 nm) ≥ 35 dB/nm (1495 nm –1640 nm)			
Signal to total source spontaneous emission ratio (typ.) [6] [8]	≥ 27 dB (1520 nm – 1610 nm)			
Relative intensity noise (RIN) (typ.) [8]	–145 dB/Hz (1520 nm – 1610 nm)			

[1] Valid for one month and within a ±4.4 K temperature range after automatic wavelength zeroing. Wavelength zeroing is an internal function that performs an automatic self-adjustment.

[2] At CW operation. Measured with wavelength meter based on wavelength in vacuum.

[3] Option #003: Built-in optical attenuator.

[4] Measured by heterodyne method.

[5] Value for 1 nm resolution bandwidth.

[6] Measured with optical spectrum analyzer.

[8] Output power as specified per wavelength range.

[9] Warm up time 1 hour.

[10] Conditions: Any 50 nm between 1510 to 1620 nm at flat output power ≥3 dBm (≥1.5 dBm [3]).

Supplementary performance characteristics

Modulation

Internal digital modulation [1]
50% duty cycle,
200 Hz to 300 kHz.

Modulation output:
TTL reference signal.

External digital modulation [1]
> 45% duty cycle, fall time
< 300 ns, 200 Hz to 1 MHz.

Modulation input:
TTL signal.

External analog modulation
≥ ±15% modulation depth,
5 kHz to 20 MHz .

Modulation input:
5 Vp-p

External wavelength locking
> ±70 pm at 10 Hz
> ±7 pm at 100 Hz.

Modulation input:
± 5 V

Coherence control
For measurements on components with 2 m long patchcords and connectors with 14 dB return loss, the effective linewidth results in a typical power stability of
< ±0.025 dB over 1 minute by drastically reducing interference effects in the test setup.

Continuous sweep mode

Mode-hop free span

Agilent 81480B:
1430 – 1480 nm at flat output power
≥ –9 dBm (for Output 1) or
≥ 0 dBm (for Output 2)

Agilent 81680B:
1520 – 1570 nm at flat output power
≥ –8 dBm (for Output 1) or
≥1 dBm (for Output 2)

Agilent 81640B:
Any 50 nm between 1510 – 1620 nm at flat output power
≥ –9 dBm (for Output 1) or
≥ 0 dBm (for Output 2)

Agilent 81672B:
1300 – 1350 nm at flat output power
≥3 dBm

Agilent 81482B:
1430 – 1480 nm at flat output power
≥ 3 dBm or
≥ 1.5 dBm (With option #003)

Agilent 81682B:
1520 – 1570 nm at flat output power
≥ 3dBm or
≥ 1.5 dBm (With option #003)

Agilent 81642B:
Any 50 nm within 1510 – 1620 nm at flat output power ≥ 3 dBm or
≥ 1.5 dBm (With option #003)

Ambient temperature within +20 °C and +35 °C.

General

Output isolation (typ.):
50 dB.

Return loss (typ.):
60 dB (options 072);
40 dB (options 071).

Polarization maintaining fiber
(Options 071, 072)
Fiber type:
Panda.
Orientation:
TE mode in slow axis, in line with connector key.

Extinction ratio: 16 dB typ.

Recommended re-calibration period:
2 years.

Warm-up time:
< 20 min
immediate operation after boot-up.

Environmental

Storage temperature:
–40 °C to + 70 °C.

Operating temperature:
10 °C to 35 °C.

Humidity:
< 80 % R.H. at 10 °C to 35 °C.

Specifications are valid in non-condensing conditions.

[1] displayed wavelength represents average wavelength while digital modulation is active.

Ordering Information

Lightwave Measurement System:
8164B Mainframe

Tunable Laser Module:
81480B Low-SSE, 1400 nm
(1370 nm to 1495 nm)
81680B Low-SSE, 1550 n
1460 nm to 1580 nm)
81640B Low-SSE, 1600 nm
(1495 nm to 1640 nm)

81672B High Power, 1300 nm
(1260 nm to 1375 nm)
81482B High Power, 1400 nm
(1370 nm to 1495 nm)
81682B High Power, 1550 nm
(1460 nm to 1580 nm)
81642B High Power, 1600 nm
(1495 nm to 1640 nm)

Connector Option: (Must)
Tunable Laser must be ordered with one connector option.

Option 071:
PMF, straight contact output connector.

Option 072:
PMF, angled contact output connector.

Other Options:

Option 003:
built-in optical attenuator, 60 dB attenuation
(for 81482/682B and 81642B).

Connector Interface:

One Agilent 81000xI-series connector interface is required for 81672/482/682B and 81642B.

Two Agilent 81000xI-series connector interfaces are required for 81480/680B and 81640B.

Laser Safety Information

All laser sources specified by this data sheet are classified as Class 1M according to IEC 60825-1 (2001).

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

Agilent Technologies' Test and Measurement Support, Services, and Assistance

Agilent Technologies aims to maximize the value you receive, while minimizing your risk and problems. We strive to ensure that you get the test and measurement capabilities you paid for and obtain the support you need. Our extensive support resources and services can help you choose the right Agilent products for your applications and apply them successfully. Every instrument and system we sell has a global warranty. Support is available for at least five years beyond the production life of the product. Two concepts underlie Agilent's overall support policy: "Our Promise" and "Your Advantage."

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By internet, phone, or fax, get assistance with all your test & measurement needs

Online assistance:
www.agilent.com/comms/lightwave

Phone or Fax

United States:
(tel) 1 800 452 4844

Canada:
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(fax) (61 3) 9210 5947

New Zealand:
(tel) 0 800 738 378
(fax) 64 4 495 8950

Asia Pacific:
(tel) (852) 3197 7777
(fax) (852) 2506 9284

Related Agilent Literature:

Agilent 8163A Lightwave Multimeter
Agilent 8164A Lightwave Measurement System
Agilent 8166A Lightwave Multichannel System
(Technical Specifications
p/n 5988-1568EN

Agilent 8163B Lightwave Multimeter
Agilent 8164B Lightwave Measurement System
Agilent 8166B Lightwave Multichannel System
Technical Specifications
p/n 5988-3924EN

Agilent 81662A DFB Laser
Agilent 81663A DFB Laser
Agilent Fabry Perot Laser
Technical Specifications
p/n 5988-1570EN

Agilent Power Sensor Modules
Agilent Optical Heads
Agilent Return Loss Modules
Technical Specifications
p/n 5988-1569EN

Agilent 8163A Lightwave Multimeter
Agilent 8164A Lightwave Measurement System
Agilent 8166A Lightwave Multichannel System
Configuration Guide
p/n 5988-1571EN

Agilent 81689A/81689B/81649A
Compact Tunable Laser Modules
Technical Specifications
p/n 5988-3675EN

Product specifications and descriptions
in this document subject to change without notice.

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