Agilent 81480/ 680/ 640B
Agilent 81672/ 482/ 682/ 642B
Tunable Laser Sources
Technical Specifications
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The 81672B, 81480B/482B, 81680B/682B, 81640B/642B Tunable Laser Sources offer the minimum number of lasers for the maximum flexibility to reduce the test cost, and have specifications at the fast tuning speed which gives the minimum uncertainty at the highest throughput.

Agilent Technologies

Minimum number of lasers for the maximum flexibility to reduce the test cost

The Agilent 81672B, 81480B/482B, 81680B/682B and 81640B/642B modules offer the complete wavelength range from 1260 nm to 1640 nm with the minimum numbers of lasers without any wavelength gap, so that customers can get the maximum flexibility in their test set up.

Optimum performance under the fast swept conditions to ensure the minimum uncertainty at the highest throughput

As manufacturing yield becomes more and more stringent, it is important that all instruments have the optimum performance under all measurement conditions. To ensure maximum instrument performance even under the fastest swept conditions, the Agilent 81672B, 81480B/482B, 81680B/682B and 81640B/642B modules are specified over the full range of tuning speed. Thus leading to the minimum test uncertainty at the highest throughput.

Built-in wavemeter for the optimum tuning precision

The Agilent 81672B, 81480B/482B, 81680B/682B and 81640B/642B modules with their built-in wavelength control loop push today's performance limits. As they are all mode-hop free tunable with continuous output power, they qualify for the test of the most critical DWDM components. All seven modules fit into the bottom slot of the 8164B mainframe.

Test of optical amplifiers and passive components

The 81672B, 81482B, 81682B and 81642B modules provide the high stimulus power needed to test today's optical amplifiers. An optional (except 81672B), built-in optical attenuator allows an output power dynamic range of more than 60 dB. Its excellent wavelength precision makes it a multi-purpose instrument for all kinds of component test.

Polarization Maintaining Fiber for the test of integrated optical devices

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

Low spontaneous emission for maximum measurement range

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

To characterize steep notch filters such as Fiber Bragg Gratings, only a power meter module is required.

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

Compact module for multi-channel test

A variable amount of the compact, yet fully remote controlled Agilent 81689A Tunable Laser modules, in combination with the 81482B, 682B and 81642B high power modules, is the ideal solution to characterize optical amplifiers for use in DWDM applications. Furthermore the 81689A allows a realistic multi-channel test bed for DWDM transmission systems to be set up.

The 8164B, 81672B, 81480B/ 482B, 81680B/ 682B, 81640B/ 642B and 81689A are produced to ISO 9001 international quality system standard as part of Agilent's commitment to continually increasing customer satisfaction through improved quality control.

Specifications describe the instrument's warranted performance. They are verified at the end of a 2 m long patchcord and are valid after warm-up and for the stated output power and wavelength ranges.

Each specification is assured by thoroughly analyzing all measurement uncertainties. Supplementary performance characteristics describe the instrument's non-warranted typical performance.

Every instrument is delivered with a commercial certificate of calibration and a detailed test report.

For further details on specifications, see the Definition of Terms in Appendix C of the Tunable Laser User's Guide.

81480B Tunable Laser Source, low SSE, 1400 nm

	Agilent 81480B			
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 [11] [2] (typ.)		
		@5 nm/s	@40 nm/s	@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 (typ.)		
Dynamic wavelength repeatability [2][9] [11]		±0.4 pm	±0.5 pm	±0.8 pm
Wavelength stability [2] [9] (typ., 24 h at const. temp.)	≤ ±1 pm			
Linewidth (typ.), coherence control off Effective linewidth (typ.), coherence ctrl. on	100 kHz > 50 MHz (1430 nm – 1480 nm), at maximum 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 (1420nm-1495nm) typ. ±0.1dB (1370nm-1420nm) [9]	±0.3 dB (1420nm-1495nm) typ. ±0.3 dB (1370nm-1420nm) [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 [10] [11] (typ.)		
		@5 nm/s	@40 nm/s	@80 nm/s
Power flatness versus wavelength Output 1 (low SSE) [3]	±0.2 dB, typ. ±0.1 dB (1420-1495nm) typ. ±0.2 dB [9] (1370nm-1420nm)	±5 mdB	±15 mdB	±30 mdB
Power flatness versus wavelength Output 2 (high power) [3]	±0.3 dB, typ. ±0.2 dB (1420-1495nm) typ. ±0.2 dB [9] (1370nm-1420nm)	±5 mdB	±15 mdB	±30 mdB
Dynamic power reproducibility [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 - 1480 nm)			
	Output 1 (low SSE)	Output 2 (high power)		
Signal to source spontaneous emission ratio [5] [6] [8]	≥ 63 dB/nm [7] (1430 – 1480 nm) ≥ 61 dB/nm [7] (1420 – 1480 nm) ≥ 55 dB/nm [7] [9] (typ., 1370 – 1495 nm)	≥ 42 dB/ nm (1430 – 1480 nm) ≥ 40 dB/ nm (1420 – 1480 nm) ≥ 35 dB/ nm [9] (1370 – 1495 nm)		
Signal to total Source spontaneous emission ratio [6] [8]	≥ 60 dB [7] (1430 – 1480 nm) ≥ 58 dB [7] (1420 – 1480 nm) ≥ 53 dB [7] [9] (typ., 1370 – 1495 nm)	≥ 28 dB (typ., 1430 - 1480 nm)		
Relative intensity noise (RIN, typ.) [8]	-145 dB/Hz (1430 - 1480 nm)			

[1] Valid for one month and within a ±4.4 K temperature range after automatic wavelength zeroing.

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

[3] Applies to the selected output.

[4] Measured by heterodyning 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			
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	Add-on specification under dynamic condition[10] (typ.)		
	static condition	@5 nm/s	@40 nm/s	@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 (typ.)		
Dynamic wavelength repeatability[2] [10]		±0.4 pm	±0.5 pm	±0.8 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 –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 –1570 nm) ≥ –10 dBm (1480 –1580 nm) ≥ –13 dBm (1460 – 1580 nm)	≥ +6 dBm peak typ. ≥ +5 dBm (1520 – 1570 nm) ≥ +1 dBm (1480 – 1580 nm) ≥ –3 dBm (1460 –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	Dynamic relative power flatness[10] (typ.)		
	static condition	@5 nm/s	@40 nm/s	@80 nm/s
Power flatness versus wavelength [3] Output 1(low SSE)	±0.2 dB typ. ±0.1 dB	±5 mdB	±15 mdB	±30 mdB
Power flatness versus wavelength [3] Output 2(high power)	±0.3 dB typ. ±0.15 dB	±5 mdB	±15 mdB	±30 mdB
Dynamic power reproducibility [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 – 1580 nm)			
	Output 1 (low SSE)	Output 2 (high power)		
Signal to source spontaneous emission ratio [5] [6] [8]	≥ 63 dB/ nm [7] (1520 – 1570 nm) ≥ 58 dB/ nm [7] (typ., 1480– 1580 nm) ≥ 53 dB/ nm [7] (typ., 1460 – 1580 nm)	≥ 45 dB/ nm (1520 – 1570 nm) ≥ 40 dB/ nm (1480 –1580 nm) ≥ 35 dB/ nm (1460 – 1580 nm)		
Signal to total source spontaneous emission ratio [6] [8]	≥ 60 dB (1520 – 1570 nm) [7] ≥ 50 dB (typ., 1460 – 1580 nm) [7]	≥ 30 dB (typ., 1520 – 1570 nm)		
Relative intensity noise (RIN, typ.) [8]	–145 dB/Hz (1480 – 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 heterodyning 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 ≥ -6 dBm (for Output 1) or
output power ≥ 1 dBm (for Output 2).

81640B Tunable Laser Source, low SSE, 1600 nm

	Agilent 81640B			
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[10] (typ.)		
		@5 nm/s	@40 nm/s	@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 (typ.)		
Dynamic wavelength repeatability[2] [10]		±0.4 pm	±0.5 pm	±0.8 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 –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 – 1610 nm) ≥ –9 dBm (1510 – 1620 nm) ≥ –13 dBm (1495 –1640 nm)	≥ +4 dBm peak typ. ≥ +2 dBm (1520 –1610 nm) ≥ 0 dBm (1510 – 1620 nm) ≥ –5 dBm (1495 – 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 under static condition	Dynamic relative power flatness[10] (typ.)		
		@5 nm/s	@40 nm/s	@80 nm/s
Power flatness versus wavelength Output 1(low SSE) [3]	±0.2 dB typ. ±0.1 dB	±5 mdB	±15 mdB	±30 mdB
Power flatness versus wavelength Output 2(high power) [3]	±0.3 dB typ. ±0.15 dB	±5 mdB	±15 mdB	±30 mdB
Dynamic power reproducibility [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 – 1610 nm)			
	Output 1 (low SSE)	**Output 2 (high power)**		
Signal to source spontaneous emission ratio [5] [6] [8]	≥ 60 dB/nm (1520 –1610 nm) [7] ≥ 55 dB/nm (typ., 1510 – 1620 nm) [7] ≥ 50 dB/nm (typ., 1495– 1640 nm) [7]	≥ 45 dB/nm (1520 – 1610 nm) ≥ 40 dB/nm (typ.,1510–1620 nm) ≥ 35 dB/nm (typ.,1495– 1640 nm)		
Signal to total source spontaneous emission ratio [6] [8]	≥ 55 dB (1520 – 1610 nm) [7] ≥ 45 dB (typ., 1495 – 1640 nm) [7]	≥ 27 dB (typ., 1520 – 1610 nm)		
Relative intensity noise (RIN, typ.) [8]	–145 dB/Hz (1520 – 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 heterodyning 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			
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[11] (typ.)		
		@5 nm/s	@40 nm/s	@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 (typ.)		
Dynamic wavelength repeatability[2] [11] [12]		±0.4 pm	±0.5 pm	±0.8 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 – 1375 nm, at flat output power)			
Output power (continuous power during tuning)	≥ +9 dBm peak typ. ≥ +7 dBm (1290 nm–1370 nm) ≥ +3 dBm (1270 nm– 1375 nm) ≥ –3 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[10] [11] (typ.)		
		@5 nm/s	@40 nm/s	@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)	±5 mdB	±15 mdB	±30 mdB
Dynamic power reproducibility [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 –1375 nm)			
Signal to source spontaneous emission ratio [5][6] [8]	≥ 45 dB/ nm (1290 – 1370 nm) ≥ 40 dB/ nm (1270 – 1375 nm) ≥ 35 dB/ nm (typ.1260 – 1375 nm) [12]			
Signal to total source spontaneous emission ratio (typ.) [6] [8]	≥ 28 dB (1290 – 1370 nm)			
Relative intensity noise (RIN, typ.) [8]	–145 dB/Hz (1270 –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 heterodyning 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			
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[11] (typ.)		
		@5 nm/s	@40 nm/s	@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 (typ.)		
Dynamic wavelength repeatability[2] [9] [11]		±0.4 pm	±0.5 pm	±0.8 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) for #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 #003	±0.1 dB (1420 nm – 1495 nm) typ. ±0.1 dB (1370 nm –1420 nm) [9] ±0.3 dB (1420 nm – 1495 nm) [11] 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[10] [11] (typ.)		
		@5 nm/s	@40 nm/s	@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)	±5 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)	±5 mdB	±15 mdB	±30 mdB
Dynamic power reproducibility [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 –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 – 1480 nm)			
Relative intensity noise (RIN, typ.) [8]	–145 dB/Hz (1430 –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 heterodyning method.

[5] Measured with optical spectrum analyzer at 1 nm resolution bandwidth.

[6] Measured with optical spectrum analyzer.

[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 > =3 dBm.

[12] Warm up time 1 hour.

81682B High Power Tunable Laser Source, 1550nm

	Agilent 81682B			
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[10] (typ.)		
		@5 nm/s	@40 nm/s	@80 nm/s
Absolute wavelength accuracy [1] [2]	±0.01 nm	±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 (typ.)		
Dynamic wavelength repeatability[2] [10]		±0.4 pm	±0.5 pm	±0.8 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 – 1580 nm, at flat output power)			
Output power (continuous power during tuning) for #003 [3]	≥ + 8 dBm peak typ. ≥ +6 dBm (1520 –1570 nm) ≥ +2 dBm (1480 – 1580 nm) ≥–3 dBm (1460 – 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 #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.)		
		@5 nm/s	@40 nm/s	@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	±5 mdB	±15 mdB	±30 mdB
Dynamic power reproducibility [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 –1580 nm)			
Signal to source spontaneous emission ratio [5] [6] [8]	≥ 45 dB/ nm (1520 – 1570 nm) ≥ 40 dB/ nm (1480 – 1580 nm) ≥ 35 dB/ nm (1460 – 1580 nm)			
Signal to total source spontaneous emission ratio (typ.) [6] [8]	≥ 30 dB (1520 – 1570 nm)			
Relative intensity noise (RIN, typ.) [8]	–145 dB/Hz (1480 –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 heterodyning 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 ≥3dBm.

81642B High Power Tunable Laser Source, 1600nm

	Agilent 81642B			
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[10] (typ.)		
		@5 nm/s	@40 nm/s	@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 (typ.)		
Dynamic wavelength repeatability[2] [10]		±0.4 pm	±0.5 pm	±0.8 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 (1510-1620 nm, at flat output power)			
Output power (continuous power during tuning) for #003 [3]	≥ +8.5 dBm peak typ. ≥ +8 dBm (1560 -1610 nm) ≥ +6 dBm (1520 -1620 nm) ≥ +4.5 dBm (1510 -1620 nm) ≥ 0 dBm (1495 -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[10] (typ.)		
		@5 nm/s	@40 nm/s	@80 nm/s
Power flatness versus wavelength With option #003[3]	±0.2 dB, typ. ±0.1dB ±0.3 dB, typ. ±0.2dB	±5 mdB	±15 mdB	±30 mdB
Dynamic power reproducibility[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 – 1610 nm)			
Signal to source spontaneous emission ratio [5] [6] [8]	≥45 dB/nm (1520 –1610 nm) ≥40 dB/nm (1510 – 1620 nm) ≥35 dB/nm (1495 –1640 nm)			
Signal to total source spontaneous emission ratio (typ.) [6] [8]	≥ 27 dB (typ.,1520 – 1610 nm)			
Relative intensity noise (RIN, typ.) [8]	-145 dB/Hz (1520 – 1610 nm)			

[1] Valid for one month and within a ±4.4 K temperature range after automatic wavelength zeroing.
[2] At CW operation. Measured with wavelength meter based on wavelength in vacuum.
[3] Option#003: built-in optical attenuator.
[4] Measured by heterodyning 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 1510 to 1620 nm at flat output power ≥3 dBm.

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 ≥-6 dBm (for Output 1) or ≥3 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
Agilent 81682B:
1520-1570 nm at flat output power ≥ 3dBm
Agilent 81642B:
Any 50 nm within 1510-1620 nm at flat output power ≥3 dBm

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.

Laser class:
Class 1M according to IEC 60825-1(2001), comply with 21 CFR 1040.10 except for deviations pursuant to Laser Notice No. 50, dated 2001-July-26

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 to 1495 nm)
81680B Low-SSE, 1550 nm (1460 to 1580 nm)
81640B Low-SSE, 1600 nm (1495 to 1640 nm)

81672B High Power, 1300 nm (1260 to 1375 nm)
81482B High Power, 1400 nm (1370 to 1495 nm)
81682B High Power, 1550 nm (1460 to 1580 nm)
81642B High Power, 1600 nm (1495 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 81482B, 682B and 642B).

Option 1CM: rack mount kit without front handles for the 8164B mainframe.

Option 1CN: front handles for the 8164B mainframe.

Agilent 81645A Filler Module:
The 81645A filler module is required to operate the 8164B mainframe if it is used without an 81672B/48xB/68xB/64xB tunable laser module.

Connector Interface:

One Agilent 81000xI-series connector interface is required for 81672B, 482B, 682B, 642B.

Two Agilent 81000xI-series connector interfaces are required for 81480B, 81680B, 81640B.

Laser Safety Information

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

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Related Agilent Literature:

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

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

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

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