Agilent 81600B
Tunable Laser Source Family

Technical Specifications

August 2004

New model:
1260 – 1375 nm,
low SSE output!

The Agilent 81600B Tunable Laser Source Family offers the full wavelength range from 1260 nm to 1640 nm with the minimum number of lasers and no wavelength gaps. This provides test instrumentation with maximum flexibility.
Investing in the Agilent 81600B Tunable Laser Source Family can realize the cost efficiency and performance required to test components for coarse and dense wavelength division multiplexing (CWDM, DWDM) and passive optical networks (PON).

Agilent Technologies

Agilent 81600B Tunable Laser Source Family

The Agilent 81600B Tunable Laser Source Family consists of seven modules that fit into the bottom slot of the Agilent 8164B Lightwave Solution Mainframe.

The 81600B option 200 All-band Tunable Laser Source is the flagship model, featuring the widest tuning range of 200 nm with a single laser and a 70 dB/nm signal-to-source spontaneous emission ratio (signal-to-SSE ratio). The excellent low-SSE performance typically allows cross-talk measurements of better than 70 dB for an 8 channel CWDM multiplexer.

The 81600B option 160, 150, 140 and the new 81600B option 130 Tunable Laser Sources offer other wavelength ranges and are equipped with two optical outputs, like the option 200. By selecting the port, high power or low-SSE can be obtained.

The 81600B option 142 and 132 Tunable Laser Sources have a single high power output port.

Full wavelength range from 1260 nm to 1640 nm with the minimum number of lasers

The Agilent 81600B Tunable Laser Source Family offers the full wavelength range from 1260 nm to 1640 nm with the minimum number of lasers and no wavelength gaps. This provides test instrumentation with the maximum flexibility.

New O-band model available

The new 81600B option 130 Tunable Laser Source covers the wavelength range from 1260 nm to1375 nm, providing high power and low SSE outputs.

Realize the cost efficiency and performance benefits in WDM 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 and PON components, a wide wavelength range, dynamic range and tight costing are key targets. If the investment in the test solution can be shared among many different type of filters, the contribution to each individual filter is minimized. In this way, cost targets for CWDM and PON components can be met without sacrificing accuracy.

Investing in the Agilent 81600B Tunable Laser Source Family can realize both the cost efficiency and performance benefits required.

Specified performance in the continuous sweep mode

As manufacturing yield expectations becomes more and more stringent, it is important that all instruments deliver optimum performance under all measurement conditions.

The Agilent 81600B Tunable Laser Source Family can sweep as fast as 80 nm/s with specified accuracy during the sweep.

Low SSE output port for high dynamic range

The low-SSE output port of the dual-output models delivers a signal with ultra-low source spontaneous emission. It enables accurate cross-talk measurement of DWDM, CWDM and PON wavelength filtering components by producing light only at the desired wavelength.

The second output port provides high optical power, adjustable over a power range of more than 60 dB via a built-in optical attenuator.

High Power output for multi-purpose component tests

The Agilent 81600B options 142 and 132 provide one output port with high stimulus power for applications where the SSE level is not critical.

The 81600B option 142 can also be equipped with a built-in optical attenuator, so providing an adjustable power range of 60 dB.

Built-in wavelength meter for optimum tuning precision

The Agilent 81600B Tunable Laser Source Family includes a built-in real time wavelength meter which realizes an absolute wavelength accuracy of ±10 pm (typ. ±3.6 pm) as a stand-alone instrument.

Polarization Maintaining Fiber for the test of integrated optical devices

The 81600B Tunable Laser Source Family is ideal for characterizing integrated optical devices. Its 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.

81600B opt. 200 All-Band Tunable Laser Source, 1440 nm – 1640 nm, low SSE

	Agilent 81600B opt. 200 2.3			
Wavelength range	1440 nm to 1640 nm			
Wavelength resolution	0.1 pm, 12.5 MHz at 1550 nm			
Mode-hop free tunability	full wavelength range			
Maximum sweep speed	80 nm/s			
	Stepped mode	Continuous sweep mode (typ.)		
		at 5 nm/s	at 40 nm/s	at 80 nm/s
Absolute wavelength accuracy [1]	±10 pm, typ. ± 3.6 pm	±4.0 pm	±4.6 pm	±6.1 pm
Relative wavelength accuracy [1]	±5 pm, typ. ±2 pm	±2.4 pm	±2.8 pm	±4.0 pm
Wavelength repeatability	±0.8 pm, typ. ±0.5 pm	±0.3 pm	±0.4 pm	±0.7 pm
Wavelength stability [4] (typ.)	≤ ±1 pm, 24 hours			
Linewidth (typ.), coherence control off Effective linewidth (typ.), coherence ctrl. on	100 kHz > 50 MHz (1475 nm – 1625 nm, at max. constant output power)			
	Output 1 (low SSE)	**Output 2 (high power)**		
Maximum output power (continuous power during sweep)	≥ +3 dBm peak (typ.) ≥ +2 dBm (1520 nm – 1610 nm) ≥ –2 dBm (1475 nm – 1625 nm) ≥ –7 dBm (1440 nm –1640 nm)	≥ +9 dBm peak (typ.) ≥ +8 dBm (1520 nm –1610 nm) ≥ +4 dBm (1475 nm – 1625 nm) ≥ –1 dBm (1440 nm – 1640 nm)		
Attenuation		max. 60 dB		
Power repeatability (typ.)	±0.003 dB			
Power stability [4]	±0.01 dB, 1 hour typ. ±0.03 dB, 24 hours			
Power linearity	±0.1 dB	±0.1 dB (±0.3 dB in attenuation mode)		
Power flatness versus wavelength	±0.25 dB [3], typ. ±0.1 dB	±0.3 dB [3], typ. ±0.15 dB		
		Continuous sweep mode		
		at 5 nm/s	at 40 nm/s	at 80 nm/s
Dynamic power reproducibility (typ.)		±0.005 dB	±0.01 dB	±0.015 dB
Dynamic relative power flatness (typ.)		±0.01 dB	±0.02 dB	±0.04 dB
Side-mode suppression ratio (typ.)	≥ 60 dB (1520 nm – 1610 nm)			
	Output 1 (low SSE)	**Output 2 (high power)**		
Signal to source spontaneous emission ratio [2]	≥ 70 dB/nm (1520 nm –1610 nm) ≥ 80 dB/0.1 nm (typ., 1520 nm – 1610 nm) ≥ 66 dB/nm (typ., 1475 nm – 1625 nm) ≥ 60 dB/nm (typ., 1440 nm – 1640 nm)	≥ 48 dB/nm (1520 nm – 1610 nm) ≥ 58 dB/0.1 nm (typ., 1520 nm – 1610 nm) ≥ 43 dB/nm (1475 nm – 1625 nm) ≥ 37 dB/nm (1440 nm – 1640 nm)		
Signal to total source spontaneous emission ratio [2]	≥ 65 dB (1520 nm – 1610 nm) ≥ 57 dB (typ., 1440 nm – 1640 nm)	≥ 30 dB (typ., 1520 nm – 1610 nm)		
Relative intensity noise (RIN) (0.1 – 6 GHz) (typ.) [2]	–145 dB/Hz (1520 nm – 1610 nm)			

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

[2] At maximum output power as specified per wavelength range.

[3] Wavelength range 1440 nm – 1630 nm.

[4] At constant temperature ±1 K

81600B opt. 160 Tunable Laser Source, 1495 nm – 1640 nm, low SSE

	Agilent 81600B opt. 160 2.3			
Wavelength range	1495 nm to 1640 nm			
Wavelength resolution	0.1 pm, 12.5 MHz at 1550 nm			
Mode-hop free tunability	full wavelength range			
Maximum sweep speed	80 nm/s			
	Stepped mode	Continuous sweep mode (typ.)		
		at 5 nm/s	at 40 nm/s	at 80 nm/s
Absolute wavelength accuracy [1]	±10 pm, typ. ±3.6 pm	±4.0 pm	±4.6 pm	±6.1 pm
Relative wavelength accuracy [1]	±5 pm, typ. ±2 pm	±2.4 pm	±2.8 pm	±4.0 pm
Wavelength repeatability	±0.8 pm, typ. ±0.5 pm	±0.3 pm	±0.4 pm	±0.7 pm
Wavelength stability [3] (typ.)	≤ ±1 pm, 24 hours			
Linewidth (typ.), coherence control off Effective linewidth (typ.), coherence ctrl. on	100 kHz > 50 MHz (1510 nm – 1620 nm, at max. constant output power)			
	Output 1 (low SSE)	**Output 2 (high power)**		
Maximum output power (continuous power during sweep)	≥ –2 dBm peak (typ.) ≥ –4 dBm (1520 nm – 1610 nm) ≥ –6 dBm (1510 nm – 1620 nm) ≥ –7 dBm (1495 nm –1640 nm)	≥ +7 dBm peak (typ.) ≥ +5 dBm (1520 nm –1610 nm) ≥ +3 dBm (1510 nm – 1620 nm) ≥ –1 dBm (1495 nm – 1640 nm)		
Attenuation		max. 60 dB		
Power repeatability (typ.)	±0.003 dB			
Power stability [3]	±0.01 dB, 1 hour typ. ±0.03 dB, 24 hours			
Power linearity	±0.1 dB	±0.1 dB (±0.3 dB in attenuation mode)		
Power flatness versus wavelength	±0.25 dB, typ. ±0.1 dB (1495nm – 1630nm)	±0.3 dB, typ. ±0.15 dB		
		Continuous sweep mode		
		at 5 nm/s	at 40 nm/s	at 80 nm/s
Dynamic power reproducibility (typ.)		±0.005 dB	±0.01 dB	±0.015 dB
Dynamic relative power flatness (typ.)		±0.01 dB	±0.02 dB	±0.04 dB
Side-mode suppression ratio (typ.) [2]	≥ 40 dB (1520 nm – 1610 nm)			
	Output 1 (low SSE)	**Output 2 (high power)**		
Signal to source spontaneous emission ratio [2]	≥ 64 dB/nm (1520 nm –1610 nm) ≥ 74 dB/0.1 nm (typ., 1520 nm – 1610 nm) ≥ 62 dB/nm (typ., 1510 nm – 1620 nm) ≥ 59 dB/nm (typ., 1495 nm – 1640 nm)	≥ 45 dB/nm (1520 nm – 1610 nm) ≥ 55 dB/0.1 nm (typ., 1520 nm – 1610 nm) ≥ 42 dB/nm (1510 nm – 1620 nm) ≥ 37 dB/nm (1495 nm – 1640 nm)		
Signal to total source spontaneous emission ratio [2]	≥ 59 dB (1520 nm – 1610 nm) ≥ 56 dB (typ., 1495 nm – 1640 nm)	≥ 27 dB (typ., 1520 nm – 1610 nm)		
Relative intensity noise (RIN) (0.1 – 6 GHz) (typ.) [2]	–145 dB/Hz (1520 nm – 1610 nm)			

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

[2] At maximum output power as specified per wavelength range.

[3] At constant temperature ±1 K

81600B opt. 150 Tunable Laser Source, 1450 nm – 1590 nm, low SSE

	Agilent 81600B opt. 150 2.3			
Wavelength range	1450 nm to 1590 nm			
Wavelength resolution	0.1 pm, 12.5 MHz at 1550 nm			
Mode-hop free tunability	full wavelength range			
Maximum sweep speed	80 nm/s			
	Stepped mode	Continuous sweep mode (typ.)		
		at 5 nm/s	at 40 nm/s	at 80 nm/s
Absolute wavelength accuracy [1]	±10 pm, typ. ±3.6 pm	±4.0 pm	±4.6 pm	±6.1 pm
Relative wavelength accuracy [1]	±5 pm, typ. ±2 pm	±2.4 pm	±2.8 pm	±4.0 pm
Wavelength repeatability	±0.8 pm, typ. ±0.5 pm	±0.3 pm	±0.4 pm	±0.7 pm
Wavelength stability [3] (typ.)	≤ ±1 pm, 24 hours			
Linewidth (typ.), coherence control off Effective linewidth (typ.), coherence ctrl. on	100 kHz > 50 MHz (1480 nm – 1580 nm, at max. constant output power)			
	Output 1 (low SSE)	**Output 2 (high power)**		
Maximum output power (continuous power during sweep)	≥ –1 dBm peak (typ.) ≥ –3 dBm (1520 nm – 1570 nm) ≥ –6 dBm (1480 nm – 1580 nm) ≥ –7 dBm (1450 nm –1590 nm)	≥ +7 dBm peak (typ.) ≥ +5 dBm (1520 nm – 1570 nm) ≥ +4 dBm (1480 nm – 1580 nm) ≥ –1 dBm (1450 nm – 1590 nm)		
Attenuation		max 60 dB		
Power repeatability (typ.)	±0.003 dB			
Power stability [3]	±0.01 dB, 1 hour typ. ±0.03 dB, 24 hours			
Power linearity	±0.1 dB	±0.1 dB (±0.3 dB in attenuation mode)		
Power flatness versus wavelength	±0.2 dB, typ. ±0.1 dB	±0.3 dB, typ. ±0.15 dB		
		Continuous sweep mode		
		at 5 nm/s	at 40 nm/s	at 80 nm/s
Dynamic power reproducibility (typ.)		±0.005 dB	±0.01 dB	±0.015 dB
Dynamic relative power flatness (typ.)		±0.01 dB	±0.02 dB	±0.04 dB
Side-mode suppression ratio (typ.) [2]	≥ 40 dB (1480 nm – 1580 nm)			
	Output 1 (low SSE)	**Output 2 (high power)**		
Signal to source spontaneous emission ratio [2]	≥ 65 dB/nm (1520 nm –1570 nm) ≥ 75 dB/0.1 nm (typ., 1520 nm – 1570 nm) ≥ 61 dB/nm (typ., 1480 nm – 1580 nm) ≥ 59 dB/nm (typ., 1450 nm – 1590 nm)	≥ 45 dB/nm (1520 nm – 1570 nm) ≥ 55 dB/0.1 nm (typ., 1520 nm – 1570 nm) ≥ 42 dB/nm (1480 nm – 1580 nm) ≥ 37 dB/nm (1450 nm – 1590 nm)		
Signal to total source spontaneous emission ratio [2]	≥ 60 dB (1520 nm – 1570 nm) ≥ 50 dB (typ., 1450 nm – 1590 nm)	≥ 30 dB (typ., 1520 nm – 1570 nm)		
Relative intensity noise (RIN) (0.1 – 6 GHz) (typ.) [2]	–145 dB/Hz (1480 nm – 1580 nm)			

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

[2] At maximum output power as specified per wavelength range.

[3] At constant temperature ±1 K

81600B opt. 140 Tunable Laser Source, 1370 nm – 1495 nm, low SSE

	Agilent 81600B opt. 140 2.4			
Wavelength range	1370 nm to 1495 nm			
Wavelength resolution	0.1 pm, 15 MHz at 1450 nm			
Mode-hop free tunability	full wavelength range			
Maximum sweep speed	80 nm/s (1372 nm – 1495 nm)			
	Stepped mode	Continuous sweep mode (typ.)		
		at 5 nm/s	at 40 nm/s	at 80 nm/s
Absolute wavelength accuracy [1]	±10 pm, typ. ±3.6 pm	±4.0 pm	±4.6 pm	±6.1 pm
Relative wavelength accuracy [1]	±5 pm, typ. ±2 pm	±2.4 pm	±2.8 pm	±4.0 pm
Wavelength repeatability	±0.8 pm, typ. ±0.5 pm	±0.3 pm	±0.4 pm	±0.7 pm
Wavelength stability [4] (typ.)	≤ ±1 pm, 24 hours			
Linewidth (typ.), coherence control off Effective linewidth (typ.), coherence ctrl. on	100 kHz > 50 MHz (1430 nm – 1480 nm, at max. constant output power)			
	Output 1 (low SSE)	**Output 2 (high power)**		
Maximum output power (continuous power during sweep)	≥ –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)		
Attenuation		max 60 dB		
Power repeatability (typ.)	±0.003 dB			
Power stability [4]	±0.01 dB, 1 hour (1420 nm – 1495 nm) typ. ±0.01 dB, 1 hour (1370 nm – 1420 nm) typ. ±0.03 dB, 24 hours			
Power linearity	±0.1 dB (1420 nm – 1495nm) typ. ±0.1 dB (1370 nm – 1420 nm)	±0.3 dB (1420 nm – 1495 nm) typ. ±0.3 dB (1370 nm – 1420 nm)		
Power flatness versus wavelength	±0.2 dB, typ. ±0.1 dB (1420 nm – 1495 nm) typ. ±0.2 dB (1370 nm – 1420 nm)	±0.3 dB, typ. ±0.2 dB (1420 nm – 1495 nm) typ. ±0.3 dB (1370 nm – 1420 nm)		
		Continuous sweep mode [3]		
		at 5 nm/s	at 40 nm/s	at 80 nm/s
Dynamic power reproducibility (typ.)		±0.005 dB	±0.01 dB	±0.015 dB
Dynamic relative power flatness (typ.)		±0.01 dB	±0.015 dB	±0.03 dB
Side-mode suppression ratio (typ.) [2]	≥ 40 dB (1430 nm – 1480 nm)			
	Output 1 (low SSE)	**Output 2 (high power)**		
Signal to source spontaneous emission ratio [2]	≥ 63 dB/nm (1430 nm –1480 nm) ≥ 73 dB/0.1 nm (typ., 1430 nm – 1480 nm) ≥ 61 dB/nm (1420 nm – 1480 nm) ≥ 55 dB/nm (typ., 1370 nm – 1495 nm)	≥ 42 dB/nm (1430 nm – 1480 nm) ≥ 52 dB/0.1 nm (typ., 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 [2]	≥ 60 dB (1430 nm – 1480 nm) ≥ 58 dB (1420 nm – 1480 nm) ≥ 53 dB (typ., 1370 nm – 1495 nm)	≥ 28 dB (typ., 1430 nm – 1480 nm)		
Relative intensity noise (RIN) (0.1 – 6 GHz) (typ.) [2]	–145 dB/Hz (1430 nm – 1480 nm)			

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

[2] At maximum output power as specified per wavelength range.

[3] Valid for absolute humidity of 11.5 g/m^3 (For example, equivalent to 50% relative humidity at 25°C).

[4] At constant temperature ±1 K

81600B opt. 130 Tunable Laser Source, 1260 nm – 1375 nm, low SSE

	Agilent 81600B opt. 130 1.0			
Wavelength range	1260 nm to 1375 nm			
Wavelength resolution	0.1 pm, 17.7 MHz at 1300 nm			
Mode-hop free tunability	full wavelength range			
Maximum sweep speed	80 nm/s			
	Stepped mode	Continuous sweep mode (typ.)		
		at 5 nm/s	at 40 nm/s	at 80 nm/s
Absolute wavelength accuracy [1]	±10 pm, typ. ±3.6 pm	±4.0 pm	±4.6 pm	±6.1 pm
Relative wavelength accuracy [1]	±5 pm, typ. ±2 pm	±2.4 pm	±2.8 pm	±4.0 pm
Wavelength repeatability	±0.8 pm, typ. ±0.5 pm	±0.3 pm	±0.4 pm	±0.7 pm
Wavelength stability [4] (typ.)	≤ ±1 pm, 24 hours			
Linewidth (typ.), coherence control off Effective linewidth (typ.), coherence ctrl. on	100 kHz > 50 MHz (1270 nm – 1350 nm, at max. constant output power)			
	Output 1 (low SSE)	**Output 2 (high power)**		
Maximum output power (continuous power during sweep)	≥ –4 dBm peak (typ.) ≥ –6 dBm (1290 nm – 1370 nm) ≥ –9 dBm (1270 nm – 1375 nm) ≥ –13 dBm (1260 nm – 1375 nm)	≥ +5 dBm peak (typ.) ≥ +4 dBm (1290 nm – 1370 nm) ≥ +1 dBm (1270 nm – 1375 nm) ≥ –3 dBm (1260 nm – 1375 nm)		
Attenuation		max 60 dB		
Power repeatability (typ.)	±0.003 dB			
Power stability [4]	±0.01 dB, 1 hour (1260 nm – 1350 nm) typ. ±0.01 dB, 1 hour (1350 nm – 1375 nm) typ. ±0.03 dB, 24 hours			
Power linearity	±0.1 dB (1260 nm – 1350 nm) typ. ±0.1 dB (1350 nm – 1375 nm)	±0.3 dB (1260 nm – 1350 nm) typ. ±0.3 dB (1350 nm – 1375 nm)		
Power flatness versus wavelength	±0.2 dB, typ. ±0.1 dB (1260 nm – 1350 nm) typ. ±0.2 dB (1350 nm – 1375 nm)	±0.3 dB, typ. ±0.15 dB (1260 nm – 1350 nm) typ. ±0.3 dB (1350 nm – 1375 nm)		
		Continuous sweep mode [3]		
		at 5 nm/s	at 40 nm/s	at 80 nm/s
Dynamic power reproducibility (typ.)		±0.005 dB	±0.01 dB	±0.015 dB
Dynamic relative power flatness (typ.)		±0.01 dB	±0.02 dB	±0.04 dB
Side-mode suppression ratio (typ.) [2]	≥ 40 dB (1290 nm – 1370 nm)			
	Output 1 (low SSE)	**Output 2 (high power)**		
Signal to source spontaneous emission ratio (typ.) [2]	≥ 63 dB/nm (1290 nm –1370 nm) ≥ 61 dB/nm (1270 nm – 1375 nm) ≥ 55 dB/nm (1260 nm – 1375 nm)	≥ 42 dB/nm (1290 nm – 1370 nm) ≥ 40 dB/nm (1270 nm – 1375 nm) ≥ 35 dB/nm (1260 nm – 1375 nm)		
Signal to total source spontaneous emission ratio (typ.) [2]	≥ 58 dB (1290 nm – 1370 nm) ≥ 56 dB (1270 nm – 1375 nm) ≥ 51 dB (1260 nm – 1375 nm)	≥ 26 dB (1290 nm – 1370 nm)		
Relative intensity noise (RIN) (0.1 – 6 GHz) (typ.) [2]	–140 dB/Hz (1270 nm – 1375 nm)			

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

[2] At maximum output power as specified per wavelength range.

[3] Valid for absolute humidity of 11.5 g/m^3 (For example, equivalent to 50% relative humidity at 25°C).

[4] At constant temperature ±1 K

81600B opt. 142 Tunable Laser Source, 1370 nm – 1495 nm, high power

	Agilent 81600B opt. 142 2.4			
Wavelength range	1370 nm to 1495 nm			
Wavelength resolution	0.1 pm, 15 MHz at 1450 nm			
Mode-hop free tunability	full wavelength range			
Maximum sweep speed	80 nm/s (1372 nm – 1495 nm)			
	Stepped mode	Continuous sweep mode (typ.)		
		at 5 nm/s	at 40 nm/s	at 80 nm/s
Absolute wavelength accuracy [1]	±10 pm, typ. ±3.6 pm	±4.0pm	±4.6 pm	±6.1 pm
Relative wavelength accuracy [1]	±5 pm, typ. ±2 pm	±2.4 pm	±2.8 pm	±4.0 pm
Wavelength repeatability	±0.8 pm, typ. ±0.5 pm	±0.3 pm	±0.4 pm	±0.7 pm
Wavelength stability [4] (typ.)	≤ ±1 pm, 24 hours			
Linewidth (typ.), coherence control off Effective linewidth (typ.), coherence ctrl. on	100 kHz > 50 MHz (1430 nm – 1480 nm, at max. constant output power)			
Maximum output power (continuous power during sweep) With option 003	≥ +8.5 dBm peak (typ.) ≥ +7.5 dBm (1430 nm – 1480 nm) ≥ +5 dBm (1420 nm – 1480 nm) ≥ 0 dBm (1370 nm –1495 nm) Reduced by 1.5 dB.			
Power repeatability (typ.)	±0.003 dB			
Power stability [4]	±0.01 dB, 1 hour (1420 nm – 1495 nm) typ. ±0.01 dB, 1 hour (1370 nm – 1420 nm) typ. ±0.03 dB, 24 hours			
Power linearity With option 003	±0.1 dB (1420 nm – 1495 nm) typ. ±0.1 dB (1370 nm – 1420 nm) Add ±0.2 dB			
Power flatness versus wavelength With option 003	±0.2 dB, typ. ±0.1 dB (1420 nm – 1495 nm) typ. ±0.2 dB (1370 nm – 1420 nm) Add ±0.1 dB			
		Continuous sweep mode [3]		
		at 5 nm/s	at 40 nm/s	at 80 nm/s
Dynamic power reproducibility (typ.)		±0.005 dB	±0.01 dB	±0.015 dB
Dynamic relative power flatness (typ.)		±0.01 dB	±0.015 dB	±0.03 dB
Side-mode suppression ratio (typ.) [2]	≥ 40 dB (1430 nm – 1480 nm)			
Signal to source spontaneous emission ratio [2]	≥ 42 dB/nm (1430 nm –1480 nm) ≥ 52 dB/0.1 nm (typ., 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.)[2]	≥ 28 dB (1430 nm – 1480 nm)			
Relative intensity noise (RIN) (0.1 – 6 GHz) (typ.) [2]	–145 dB/Hz (1430 nm – 1480 nm)			

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

[2] At maximum output power as specified per wavelength range.

[3] Valid for absolute humidity of 11.5 g/m^3 (For example, equivalent to 50% relative humidity at 25°C).

[4] At constant temperature ±1 K

81600B opt. 132 Tunable Laser Source, 1260 nm – 1375 nm, high power

	Agilent 81600B opt. 132 2.4			
Wavelength range	1260 nm to 1375 nm			
Wavelength resolution	0.1 pm, 17.7 MHz at 1300 nm			
Mode-hop free tunability	full wavelength range			
Maximum sweep speed	80 nm/s			
	Stepped mode	Continuous sweep mode (typ.)		
		at 5 nm/s	at 40 nm/s	at 80 nm/s
Absolute wavelength accuracy [1]	±10 pm, typ. ±3.6 pm	±4.0 pm	±4.6 pm	±6.1 pm
Relative wavelength accuracy [1]	±5 pm, typ. ±2 pm	±2.4 pm	±2.8 pm	±4.0 pm
Wavelength repeatability	±0.8 pm, typ. ±0.5 pm	±0.3 pm	±0.4 pm	±0.7 pm
Wavelength stability [2] (typ.)	≤ ±1 pm, 24 hours			
Linewidth (typ.), coherence control off Effective linewidth (typ.), coherence ctrl. on	100 kHz > 50 MHz (1270 nm – 1350 nm, at max. constant output power)			
Maximum output power (continuous power during sweep)	≥ +9 dBm peak (typ.) ≥ +7 dBm (1290 nm – 1370 nm) ≥ +3 dBm (1270 nm – 1375 nm) ≥ 0 dBm (1260 nm –1375 nm)			
Power repeatability (typ.)	±0.003 dB			
Power stability [4]	±0.01 dB, 1 hour (1260 nm – 1350 nm) typ. ±0.01 dB, 1 hour (1350 nm – 1375 nm) typ. ±0.03 dB, 24 hours			
Power linearity	±0.1 dB (1260 nm – 1350 nm) typ. ±0.1 dB (1350 nm – 1375 nm)			
Power flatness versus wavelength	±0.2 dB, typ. ±0.1 dB (1260 nm – 1350 nm) typ. ±0.2 dB (1350 nm – 1375 nm)			
		Continuous sweep mode [3]		
		at 5 nm/s	at 40 nm/s	at 80 nm/s
Dynamic power reproducibility (typ.)		±0.005 dB	±0.01 dB	±0.015 dB
Dynamic relative power flatness (typ.)		±0.01 dB	±0.015 dB	±0.03 dB
Side-mode suppression ratio (typ.) [2]	≥ 40 dB (1270 nm – 1375 nm)			
Signal to source spontaneous emission ratio [2]	≥ 45 dB/nm (1290 nm –1370 nm) ≥ 55 dB/0.1 nm (typ., 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.) [2]	≥ 28 dB (1290 nm – 1370 nm)			
Relative intensity noise (RIN) (0.1 – 6 GHz) (typ.) [2]	–145 dB/Hz (1270 nm – 1375 nm)			

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

[2] At maximum output power as specified per wavelength range.

[3] Valid for absolute humidity of 11.5 g/m^3 (For example, equivalent to 50% relative humidity at 25°C).

[4] At constant temperature ±1 K

Conditions

Storage temperature:
–40°C to +70°C

Operating temperature:
+10°C to +35°C

Humidity:
< 80 % R.H. at +10°C to +35°C non-condensing.

Specifications apply for wavelengths not equal to any water absorption line.

Warm-up time:
1 h
immediate operation after boot up

Output power:
Specifications are valid at the following output power levels:

81600B option 200/160 and 150:
≥ –7 dBm (for Output 1)
≥ –1 dBm (for Output 2, –60 dB in attenuation mode).

81600B option 140:
≥ –13 dBm (for Output 1)
≥ –3 dBm (for Output 2, –60 dB in attenuation mode).

81600B option 130:
≥ –13 dBm (for Output 1)
≥ –3 dBm (for Output 2, –60 dB in attenuation mode).

81600B option 142:
≥ –3 dBm
≥ –4.5 dBm (with option 003: –60 dB in attenuation mode).

81600B option 132:
≥ 0 dBm

Continuous sweep mode:
Specifications are valid for mode-hop free sweeping.

Maximum 50 nm at constant output power levels as follows:

81600B option 200:
1475 nm – 1620 nm
≥ –2 dBm (for Output 1)
≥ +4 dBm (for Output 2).

81600B option 160:
1510 nm – 1620 nm
≥ –6 dBm (for Output 1)
≥ +3 dBm (for Output 2).

81600B option 150:
1520 nm – 1570 nm
≥ –6 dBm (for Output 1)
≥ +3 dBm (for Output 2).

81600B option 140:
1430 nm – 1480 nm
≥ –9 dBm (for Output 1)
≥ 0 dBm (for Output 2).

81600B option 130:
1300 nm – 1350 nm
≥ –9 dBm (for Output 1)
≥ +1 dBm (for Output 2).

81600B option 142:
1430 nm – 1480 nm
≥ –3 dBm
≥ +1.5 dBm (with Option 003).

81600B option 132:
1300 nm – 1350 nm
≥ +3 dBm

Operating temperature within +20°C and +35°C

Supplementary performance characteristics

Internal digital modulation
50% duty cycle, 200 Hz to 300 kHz. Displayed wavelength represents average wavelength.

Modulation output:
TTL reference signal.

External digital modulation
> 45% duty cycle, delay time < 300 ns, 200 Hz to 1 MHz. Displayed wavelength represents average wavelength.

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.

General

Output isolation (typ.):
50 dB.

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

Polarization maintaining fiber
(Option 071, 072)

Fiber type:
Panda.

Orientation:
TE mode in slow axis, in line with connector key.

Polarization Extinction ratio:
16 dB typ.
14 dB typ. (Option 200)

Recommended re-calibration period:
2 years.

Ordering Information

Lightwave Solution Mainframe:
8164B

Tunable Laser Module:
81600B

One of the following is required:

Option 200 All-band Tunable Laser Source
1440 nm to 1640 nm, low SSE

Option 160 Tunable Laser Source
1495 nm to 1640 nm, low SSE

Option 150 Tunable Laser Source
1450 nm to 1590 nm, low SSE

Option 140 Tunable Laser Source
1370 nm to 1495 nm, low SSE

Option 130 Tunable Laser Source
1260 nm to 1375 nm, low SSE

Option 142 Tunable Laser Source
1370 nm to 1495 nm, high power

Option 132 Tunable Laser Source
1260 nm to 1375 nm, high power

Connector Option:

One of the following is required:

Option 071: PMF, straight contact output connector.

Option 072: PMF, angled contact output connector.

Other Option:

Option 003: Built-in optical attenuator,
60 dB attenuation
(for Option 142).

Connector Interface:
One Agilent 81000xI-series connector interface is required for Options 142 and 132.

Two Agilent 81000xI-series connector interfaces are required for Options 200, 160, 150, 140, and 130.

TLS Upgrade option:

Upgrade an Agilent tunable laser source to the latest 81600B Family product.
Choose one option from #UG1 to #UG4 with the 81600B:

<table>
<tr><th></th><th>81600B #200</th><th>81600B #160</th><th>81600B #150</th><th>81600B #140</th><th>81600B #142</th><th>81600B #130</th><th>81600B #132</th></tr>
<tr><td>81640A/B</td><td rowspan="6">#UG1</td><td colspan="3" rowspan="3">#UG3</td><td></td><td colspan="2" rowspan="4">#UG2</td></tr>
<tr><td>81680A/B</td><td></td></tr>
<tr><td>81480A/B</td><td></td></tr>
<tr><td>81642A/B</td><td colspan="3" rowspan="3">#UG4</td><td rowspan="3">#UG3</td></tr>
<tr><td>81682A/B</td><td colspan="2" rowspan="2"></td></tr>
<tr><td>81482B</td></tr>
</table>

For details, please contact your local Agilent sales representative.

Custom-made TLS:

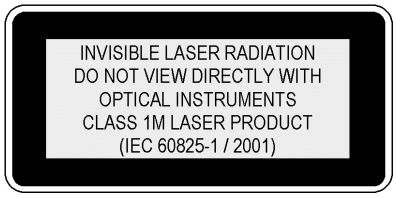
A 1650 nm Tunable Laser Source is available on request.

Please contact your local Agilent Sales Office.

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.



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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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Our Promise means your Agilent test and measurement equipment will meet its advertised performance and functionality. When you are choosing new equipment, we will help you with product information, including realistic performance specifications and practical recommendations from experienced test engineers. When you use Agilent equipment, we can verify that it works properly, help with product operation, and provide basic measurement assistance for the use of specified capabilities, at no extra cost upon request. Many self-help tools are available.

Your Advantage

Your Advantage means that Agilent offers a wide range of additional expert test and measurement services, which you can purchase according to your unique technical and business needs. Solve problems efficiently and gain a competitive edge by contracting with us for calibration, extra-cost upgrades, out-of-warranty repairs, and on-site education and training, as well as design, system integration, project management, and other professional engineering services. Experienced Agilent engineers and technicians worldwide can help you maximize your productivity, optimize the return on investment of your Agilent instruments and systems, and obtain dependable measurement accuracy for the life of those products.

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

Online assistance:

www.agilent.com/comms/lightwave

For related literature, please visit:

www.agilent.com/comms/tls

Phone or Fax

United States:

(tel) 1 800 452 4844

Canada:

(tel) 1 877 894 4414
(fax) (905) 282-4120

Europe:

(tel) (31 20) 547 2323
(fax) (31 20) 547 2390

Japan:

(tel) (81) 426 56 7832
(fax) (81) 426 56 7840

Latin America:

(tel) (305) 269 7500
(fax) (305) 269 7599

Australia:

(tel) 1 800 629 485
(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

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