

Agilent 81682A, Agilent 81642A
and Agilent 81689A

	Agilent 81682A	Agilent 81642A	Agilent 81689A
Wavelength range	1460 nm to 1580 nm	1510 nm to 1640 nm	1525 nm to 1575 nm
Wavelength resolution	0.1 pm, 12.5 MHz at 1550 nm	0.1 pm, 12.5 MHz at 1550 nm	0.01 nm, 1.25 GHz at 1550 nm
Mode hop-free tuning range	1460 nm to 1580 nm	full wavelength range	
Absolute wavelength accuracy	± 0.01 nm ^{1,2}	± 0.015 nm ^{1,2}	± 0.3 nm, typ. ²
Relative wavelength accuracy	± 5 pm, typ. ± 2 pm ^{1,2}	± 7 pm, typ. ± 3 pm ^{1,2}	± 0.3 nm ²
Wavelength repeatability	± 1 pm, typ. ± 0.5 pm ²	± 1 pm, typ. ± 0.5 pm ²	± 0.05 nm ²
Wavelength stability (typ. over 24 hours at constant temperature)	$< \pm 1$ pm ²	$< \pm 1$ pm ²	$< \pm 0.02$ nm ²
Tuning speed	400 ms/600 ms/2.8 s (typ. for a 1/10/100 nm step)	400 ms/600 ms/2.8 s (typ. for a 1/10/100 nm step)	< 10 sec/ 50 nm (typ.)
Linewidth (typ.)	100 kHz, coherence control off	100 kHz, coherence control off	20 MHz ³
Effective Linewidth (typ.), coherence control on	> 50 MHz (1480 - 1580 nm, at maximum flat output power)	> 50 MHz (1520 - 1620 nm, at maximum flat output power)	--
Output power (continuous power during tuning)	≥ 8 dBm peak typ. ≥ 6 dBm (1520 - 1570 nm) ≥ 2 dBm (1480 - 1580 nm) ≥ -3 dBm (1460-1580 nm)	≥ 7 dBm peak typ. ≥ 6 dBm (1560 - 1610 nm) ≥ 4 dBm (1530 - 1610 nm) ≥ 2 dBm (1520 - 1620 nm) ≥ -3 dBm (1510-1640 nm)	≥ 6 dBm (1525 - 1575 nm)
/with option #003	reduce by 1.5 dB ⁴	reduce by 1.5 dB ⁴	--
Minimum output power	-3 dBm	-3 dBm	-3 dBm
/with option #003	-4.5 dBm (-60 dBm in attenuation mode) ⁴	-4.5 dBm (-60 dBm in attenuation mode) ⁴	
Power stability	± 0.01 dB, 1 hour ¹⁰ typ. ± 0.03 dB, 24 hours ¹⁰	± 0.01 dB, 1 hour ¹⁰ typ. ± 0.03 dB, 24 hours ¹⁰	± 0.03 dB, 1 hour ⁹ ± 0.06 dB, 24 hours ⁹
Power repeatability (typ.)	± 0.01 dB	± 0.01 dB	± 0.02 dB ⁹
Power linearity (typ.)	+0.1 dB	± 0.3 dB	± 0.1 dB
/with option #003	± 0.2 dB ⁴	± 0.3 dB ⁴	
Power flatness versus wavelength	± 0.2 dB, typ. ± 0.1 dB	± 0.3 dB, typ. ± 0.15 dB	± 0.3 dB
/with option #003	± 0.3 dB, typ. ± 0.2 dB ⁴	± 0.3 dB ⁴	

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Side-mode Suppression ratio (typ.)	≥ 40 dBc (1480 - 1580 nm) ^{5,8}	≥ 40 dBc (1530 - 1610 nm) ^{5,8}	> 40 dBc (1525 - 1575 nm at 0 dBm) ⁵
Signal-to-Source Spontaneous Emission Ratio	≥ 45 dB/nm (1520 - 1570 nm) ^{6,8} ≥ 40 dB/nm (1480 - 1580 nm) ^{6,8} ≥ 35 dB/nm (1460 - 1580 nm) ^{6,8}	≥ 45 dB/nm (1530 - 1610 nm) ^{6,8} ≥ 40 dB/nm (1520 - 1620 nm) ^{6,8} ≥ 35 dB/nm (1510 - 1640 nm) ^{6,8}	≥ 39 dB/nm (1525 - 1575 nm at 6 dBm) ⁶
Signal-to-Total-Source Spontaneous Emission Ratio	≥ 30 dB (1520 - 1570 nm) ^{7,8}	≥ 27 dB (1530 - 1610 nm) ^{7,8}	--
Relative Intensity noise (RIN, typ.)	-145 dB/Hz (1460 - 1580 nm) ⁸	-145 dB/Hz (1530 - 1610 nm) ⁸	< -140 dB/Hz (100 MHz - 2.5 GHz)
Dimensions	--	--	75 mm H, 32 mm W, 335 mm D (2.8" × 1.3" × 13.2")
Weight	--	--	1 kg

1. Valid for one month and within a ±5 K temperature range after automatic wavelength zeroing.
2. At CW operation. Measured with wavelength meter based on wavelength in vacuum.
3. Measured by heterodyning method with 20 ms sweep time, 50 MHz span, 1 MHz resolution.
4. Option #003: built-in optical attenuator.
5. Measured by heterodyning method.
6. Measured with optical spectrum analyzer at 1 nm resolution bandwidth.
7. Measured with optical spectrum analyzer.
8. Output power as specified per wavelength range.
9. 500 ms after changing power.
10. Warm up time: 1 hour

Supplementary Performance Characteristics

Operating Modes

Internal Digital Modulation ¹

50% duty cycle, 200 Hz to 300 kHz. Modulation output: TTL reference signal.

¹ Agilent 81480A, Agilent 81680A/40A/82/42A: displayed wavelength represents average wavelength while digital modulation is active.

External Digital Modulation ¹

> 45% duty cycle, fall time < 300 ns, 200 Hz to 1 MHz. Modulation input: TTL signal.

External Analog Modulation ¹

≤ 15% modulation depth, 5 kHz to 20 MHz.
Modulation input: 5 V_{p-p}.

External Wavelength Locking (Agilent 81480A, Agilent 81680A/40A/82A/42A)

> ±70 pm at 10 Hz
> ±7 pm at 100 Hz
Modulation input: ±5 V

Coherence Control (Agilent 81480A, Agilent 81680A/40A/82A/42A)

For measurements on components with 2-meter 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 (Agilent 81680A/40A/82A/42A)

Tuning velocity adjustable to: 40 nm/s, 5 nm/s, 0.5 nm/s.

Mode-hop free span:

- *Agilent 81480A:*
1420 - 1470 nm at flat output power ≥ 0 dBm
- *Agilent 81680A/82A:*
1520 - 1570 nm at flat output power ≥ 3 dBm
- *Agilent 81640A:*
Any 50 nm within 1520 - 1620 nm at flat output power ≥ 0 dBm
- *Agilent 81642A:*
Any 50 nm within 1520 - 1620 nm at flat output power ≥ 2 dBm

Ambient temperature within $+20^{\circ}\text{C}$ and $+30^{\circ}\text{C}$.

Stepped Mode (Agilent 81680A/40A/82A/42A)

Full instrument performance (Agilent 81680A/40A/82A/42A).

Please note that the laser is turned off for 3 μs after each wavelength tuning in the range 1620-1640nm (Agilent 81640A only).

General

Output Isolation (typ.):

50 dB (for Agilent 81689A: 38 dB)

Return loss (typ.):

60 dB (options 022, 072);
40 dB (options 021, 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 IIIb according to FDA 21 CFR 1040.10,
Class 3A according to IEC 825 - 1; 1993.

Recalibration Period:

2 years.

Warm-up Time:

< 20 min (< 40 min for Agilent 81689A), immediate operation after boot-up.

Environmental**Storage Temperature:**

-40°C to +70°C.

Operating Temperature:

+10°C to +35°C (+15°C to +35°C for Agilent 81689A).

Humidity:

< 80% R. H. at +10°C to +35°C (+15°C to +35°C for Agilent 81689A).
Specifications are valid in non-condensing conditions.