

# Agilent 81662A DFB Laser Agilent 81663A DFB Laser Agilent Fabry-Perot Laser Technical Specifications February 2002



The Agilent 81662A low power and 81663A high power DFB Laser Source Modules are best suited for optical amplifier test and DWDM system test applications.

The Agilent Fabry-Perot Laser Sources are available as single or dual wavelength sources, are insensitive to back reflections and are stabilized for short and long term applications.

The DFB and FP Laser Source Modules are part of the flexible Agilent Lightwave Solution Platform and have a future proof design which allows for easy firmware upgrades.



**Agilent Technologies**

## Fabry-Perot source module specifications (Standard modules, 0dBm)

Specifications apply to the end of a 2m long fiber cable (as specified under fiber type) with Diamond<sup>®</sup> HMS-10/Agilent connectors attached. All specifications are valid for an attenuation setting of 0.0 dB. All modules require straight output connectors.

|   | Agilent<br>81650A  | Agilent<br>81651A | Agilent<br>81652A     | Agilent<br>81654A      |
|---|--|-------------------|-----------------------|------------------------|
| Type  | Fabry-Perot Laser  |                   |                       |                        |
| Center wavelength <sup>[1]</sup>                                | 1310 nm<br>±15 nm  | 1550 nm<br>±15 nm | 1550/1625nm<br>±15 nm | 1310/1550nm<br>± 15 nm |
| Fiber type  | single-mode 9/125µm  |                   |                       |                        |
| Spectral bandwidth (rms) <sup>[1] [2]</sup>                     | < 3.5 nm   | < 4.5 nm          | < 4.5/5.5 nm          | < 3.5nm/ 4.5nm         |
| Output power <sup>[3]</sup>                                     | >0 dBm (1mW)   |                   |                       |                        |
| CW power stability <sup>[4] [5]</sup><br>- short term (15 min.) | < ± 0.005 dB<br>typ. < ±0.003 dB with coherence control active |                   |                       |                        |
| - long term (24 h)<br>- to back reflection (RL ≥ 14dB)          | typ. ± 0.03 dB<br>typ ± 0.003 dB                               |                   |                       |                        |
| Dimensions (H x W x D)  | 75 mm x 32 mm x 335 mm (2.8" x 1.3" x 13.2")                   |                   |                       |                        |
| Weight  | 0.5 kg   |                   |                       |                        |
| Recalibration period  | 2 years  |                   |                       |                        |
| Operating temperature   | 0°C to 45°C  |                   |                       |                        |
| Humidity  | Noncondensing  |                   |                       |                        |
| Warm-up time  | 60 minutes <sup>[4]</sup>                                      |                   |                       |                        |

<sup>[1]</sup> Center wavelength is shown on display

<sup>[2]</sup> rms: root mean square

<sup>[3]</sup> Class 1 according to IEC 60825-1 (1998)

Class I according to FDA 21 CFR 1040.10 (1995)

<sup>[4]</sup> Warm-up time 20 min, if previously stored at the same temperature.

<sup>[5]</sup> Controlled environment ( $\Delta T = \pm 1$  °C)

### Supplementary performance characteristics:

#### Internal digital modulation mode:

270 Hz, 330 Hz, 1 kHz, 2 kHz, and free selection 200 Hz to 10 kHz.

All output signals are pulse shaped, duty cycle 50%.

Internal coherence control for linewidth broadening.

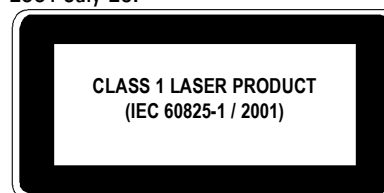
#### Output attenuation:

The output power of all source modules can be attenuated from 0 dB to 6 dB in steps of 0.1 dB.

### Laser Safety Information

The laser sources listed above are classified as Class 1 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.



## Fabry-Perot source module specifications (High power modules, 13dBm)

Specifications apply to the end of a 2m long fiber cable (as specified under fiber type) with Diamond<sup>®</sup> HMS-10/Agilent connectors attached. All specifications are valid for an attenuation setting of 0.0 dB. All modules require straight output connectors.

|   | Agilent 81655A   | Agilent 81656A  | Agilent 81657A       |
|---|--|-----------------|----------------------|
| Type  | Fabry-Perot Laser  |                 |                      |
| Center wavelength <sup>[1]</sup>  | 1310 nm ± 15 nm  | 1550 nm ± 15 nm | 1310/1550 nm ± 15 nm |
| Fiber type  | Standard single-mode 9 / 125 μm  |                 |                      |
| Spectral bandwidth (rms) <sup>[1] [2]</sup>   | < 5.5 nm   | < 7.5 nm        | < 5.5 nm/7.5 nm      |
| Output power (Class 3B) <sup>[3]</sup>  | >+ 13 dBm (20 mW)  |                 |                      |
| CW power stability <sup>[4] [5]</sup><br>- short term (15 min.)<br><br>- long term (24 h)<br>- to back reflection (RL ≥ 14dB) | < ± 0.005 dB<br>typ < ± 0.003 dB with coherence control active<br>typ. ± 0.03 dB<br>typ ± 0.003 dB |                 |                      |
| Dimensions (H x W x D)  | 75 mm H x 32 mm W x 335 mm (2.8" x 1.3" x 13.2")   |                 |                      |
| Weight  | 0.5 kg   |                 |                      |
| Recalibration period  | 2 years  |                 |                      |
| Operating temperature   | 0°C to 45 °C   |                 |                      |
| Humidity  | Noncondensing  |                 |                      |
| Warm-up time  | 60 min <sup>[4]</sup>  |                 |                      |

<sup>[1]</sup> Central wavelength is shown on display

<sup>[2]</sup> rms: root mean square

<sup>[3]</sup> Class 3A according to IEC 60825-1 (1998).  
Class IIIb according FDA 21 CFR 1040.10 (1995).

<sup>[4]</sup> Warm-up time 20 min, if previously stored at the same temperature.

<sup>[5]</sup> Controlled environment (ΔT = ± 1 °C).

### Supplementary performance characteristics:

#### Internal digital modulation mode:

270 Hz, 330 Hz, 1 kHz, 2 kHz, and free selection

200 Hz to 10 kHz.

All output signals are pulse shaped, duty cycle 50 %.

Internal coherence control for linewidth broadening

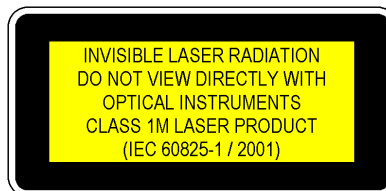
#### Output attenuation:

The output power of all source modules can be attenuated from 0dB to 6dB in steps of 0.1 dB.

### Laser Safety Information

All laser sources listed above 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.



## DFB source module specifications

Specifications apply to maximum power setting.

|   | <b>Agilent 81662A</b><br>For Peak Wavelengths see options   | <b>Agilent 81663A</b><br>For Peak Wavelengths see options  |
|---|---|--|
| Type  | CW DFB Laser with built-in isolator   | CW DFB Laser with built-in isolator  |
| Wavelength <sup>[1],[2]</sup> <ul style="list-style-type: none"> <li>• Tuning Range</li> <li>• Display Resolution</li> <li>• Repeatability <sup>[5]</sup></li> <li>• Stability (15min.) <sup>[4],[5]</sup></li> <li>• Stability (24h) <sup>[4],[5]</sup></li> </ul> | ITU Grid (100 GHz)<br>typ. > ±500 pm<br>10 pm<br>±3 pm (typ. ±1 pm)<br>±3 pm (typ. ±1 pm)<br>typ. ±5 pm | ITU Grid (100 GHz)<br>typ. > ±850 pm <sup>[8]</sup><br>10 pm<br>±5 pm (typ. ±2 pm)<br>±5 pm (typ. ±2 pm)<br>typ. ±5 pm |
| Fiber type  | Panda PMF 9 / 125 μm  | Panda PMF 9 / 125 μm   |
| Output Connector <sup>[7]</sup>   | Compatible to angled contact APC, ASC, DIN47256/4108  | Compatible to angled contact APC, ASC, DIN47256/4108   |
| Power <ul style="list-style-type: none"> <li>• Max. Output <sup>[3],[6]</sup></li> <li>• CW Stability (15min) <sup>[5]</sup></li> <li>• CW Stability (24 h) <sup>[4],[5]</sup></li> </ul>   | typ. > +10 dBm (10 mW)<br>typ. ±0.005 dB<br>typ. ±0.03 dB   | typ. > +13 dBm (20 mW)<br>typ. ±0.003 dB<br>typ. ±0.01 dB  |
| Side Mode Suppression Ratio (SMSR) <sup>[6]</sup>   | typ. 45 dB  | typ. 50 dB   |
| Polarization Extinction Ratio (PER)   | typ. > 20 dB  | typ. > 20 dB   |
| Dimensions (H x W x D)  | 75 mm H x 32 mm W x 335 mm D (2.8" x 1.3" x 13.2")  | 75 mm H x 32 mm W x 335 mm D (2.8" x 1.3" x 13.2")   |
| Weight  | 0.5kg   | 0.5kg  |
| Recalibration Period  | 1 year  | 1 year   |
| Operating Temperature   | 15°C to 35 °C   | 15°C to 35 °C  |
| Warm-up time <sup>[4]</sup>   | 60 min  | 60 min   |

<sup>[1]</sup> ITU-grid wavelength is shown on display as default.

<sup>[2]</sup> Via GPIB tuning resolution < 10 pm.

<sup>[3]</sup> Class 3A according to IEC 60825-1 (1998) and Class IIIb according FDA CFR 21 (1995).

<sup>[4]</sup> If previously stored at the same temperature 20 min.

<sup>[5]</sup> Controlled environment  $\Delta T = \pm 1$  °C.

<sup>[6]</sup> At maximum power setting and default wavelength at the end of a 2 m SM patchcord.

<sup>[7]</sup> Connector interface not included.

<sup>[8]</sup> Valid for serial numbers starting with prefix DE417 and above.

| 81662A/<br>81663A<br>option | ITU<br>Frequency<br>[THz] | Center<br>Wavelength<br>[nm] | 81662A/<br>81663A<br>option | ITU<br>Frequency<br>[THz] | Center<br>Wavelength<br>[nm] | 81662A/<br>81663A<br>option | ITU<br>Frequency<br>[THz] | Center<br>Wavelength<br>[nm] |
|-----------------------------|---------------------------|------------------------------|-----------------------------|---------------------------|------------------------------|-----------------------------|---------------------------|------------------------------|
| 309                         | 196,00                    | 1.529,55                     | 375                         | 192,70                    | 1.555,75                     | 441                         | 189,40                    | 1,582.85                     |
| 311                         | 195,90                    | 1.530,33                     | 377                         | 192,60                    | 1.556,55                     | 443                         | 189,30                    | 1,583.69                     |
| 313                         | 195,80                    | 1.531,12                     | 379                         | 192,50                    | 1.557,36                     | 445                         | 189,20                    | 1,584.53                     |
| 315                         | 195,70                    | 1.531,90                     | 381                         | 192,40                    | 1.558,17                     | 447                         | 189,10                    | 1,585.36                     |
| 317                         | 195,60                    | 1.532,68                     | 383                         | 192,30                    | 1.558,98                     | 449                         | 189,00                    | 1,586.20                     |
| 319                         | 195,50                    | 1.533,47                     | 385                         | 192,20                    | 1.559,79                     | 451                         | 188,90                    | 1,587.04                     |
| 321                         | 195,40                    | 1.534,25                     | 387                         | 192,10                    | 1.560,61                     | 453                         | 188,80                    | 1,587.88                     |
| 323                         | 195,30                    | 1.535,04                     | 389                         | 192,00                    | 1.561,42                     | 455                         | 188,70                    | 1,588.73                     |
| 325                         | 195,20                    | 1.535,82                     | 391                         | 191,90                    | 1.562,23                     | 457                         | 188,60                    | 1,589.57                     |
| 327                         | 195,10                    | 1.536,61                     | 393                         | 191,80                    | 1.563,05                     | 459                         | 188,50                    | 1,590.41                     |
| 329                         | 195,00                    | 1.537,40                     | 395                         | 191,70                    | 1.563,86                     | 461                         | 188,40                    | 1,591.26                     |
| 331                         | 194,90                    | 1.538,19                     | 397                         | 191,60                    | 1.564,68                     | 463                         | 188,30                    | 1,592.10                     |
| 333                         | 194,80                    | 1.538,98                     | 399                         | 191,50                    | 1.565,50                     | 465                         | 188,20                    | 1,592.95                     |
| 335                         | 194,70                    | 1.539,77                     | 401                         | 191,40                    | 1.566,31                     | 467                         | 188,10                    | 1,593.79                     |
| 337                         | 194,60                    | 1.540,56                     | 403                         | 191,30                    | 1.567,13                     | 469                         | 188,00                    | 1,594.64                     |
| 339                         | 194,50                    | 1.541,35                     | 405                         | 191,20                    | 1.567,95                     | 471                         | 187,90                    | 1,595.49                     |
| 341                         | 194,40                    | 1.542,14                     | 407                         | 191,10                    | 1.568,77                     | 473                         | 187,80                    | 1,596.34                     |
| 343                         | 194,30                    | 1.542,94                     | 409                         | 191,00                    | 1.569,59                     | 475                         | 187,70                    | 1,597.19                     |
| 345                         | 194,20                    | 1.543,73                     | 411                         | 190,90                    | 1.570,42                     | 477                         | 187,60                    | 1,598.04                     |
| 347                         | 194,10                    | 1.544,53                     | 413                         | 190,80                    | 1.571,24                     | 479                         | 187,50                    | 1,598.89                     |
| 349                         | 194,00                    | 1.545,32                     | 415                         | 190,70                    | 1.572,06                     | 481                         | 187,40                    | 1,599.75                     |
| 351                         | 193,90                    | 1.546,12                     | 417                         | 190,60                    | 1.572,89                     | 483                         | 187,30                    | 1,600.60                     |
| 353                         | 193,80                    | 1.546,92                     | 419                         | 190,50                    | 1.573,71                     | 485                         | 187,20                    | 1,601.46                     |
| 355                         | 193,70                    | 1.547,72                     | 421                         | 190,40                    | 1.574,54                     | 487                         | 187,10                    | 1,602.31                     |
| 357                         | 193,60                    | 1.548,51                     | 423                         | 190,30                    | 1.575,37                     | 489                         | 187,00                    | 1,603.17                     |
| 359                         | 193,50                    | 1.549,32                     | 425                         | 190,20                    | 1.576,20                     | 491                         | 186,90                    | 1,604.03                     |
| 361                         | 193,40                    | 1.550,12                     | 427                         | 190,10                    | 1.577,03                     | 493                         | 186,80                    | 1,604.88                     |
| 363                         | 193,30                    | 1.550,92                     | 429                         | 190,00                    | 1.577,86                     | 495                         | 186,70                    | 1,605.74                     |
| 365                         | 193,20                    | 1.551,72                     | 431                         | 189,90                    | 1.578,69                     | 497                         | 186,60                    | 1,606.60                     |
| 367                         | 193,10                    | 1.552,52                     | 433                         | 189,80                    | 1.579,52                     | 499                         | 186,50                    | 1,607.47                     |
| 369                         | 193,00                    | 1.553,33                     | 435                         | 189,70                    | 1.580,35                     | 501                         | 186,40                    | 1,608.33                     |
| 371                         | 192,90                    | 1.554,13                     | 437                         | 189,60                    | 1.581,18                     | 503                         | 186,30                    | 1,609.19                     |
| 373                         | 192,80                    | 1.554,94                     | 439                         | 189,50                    | 1.582,02                     | 505                         | 186,20                    | 1,610.06                     |

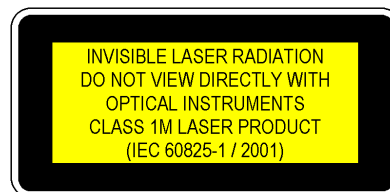
#### Supplementary Performance Characteristics:

- Internal digital modulation mode:  
Free selection 200 Hz to 100 kHz.
- All output signals are pulse shaped, duty cycle 50%.
- Internal coherence control for linewidth broadening.
- ON-switching with fast output power stabilization < 20 s.
- Output power "attenuation" at default wavelength 6 dB in steps of 0.1 dB.
- Tuning speed over full range 30 s.
- Polarization maintaining fiber orientation:  
TE mode in slow axis, in line with connector key.

#### Laser Safety Information

The 81662A and 81663A DFB Laser Sources listed above 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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#### Related Agilent Literature

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

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