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## Test & Measurement

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**CMA4000 Specifications**

|                                |                                                                                                                                                                                       |                                        |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| Display                        | VGA LCD Display (8.4" color or 8.2" monochrome)                                                                                                                                       |                                        |
| Mass Storage                   | Up to 125 traces internal storage. Over 65,000 traces with optional hard drive.<br>Up to 180 traces for a standard 3.5 inch, 1.44 MB floppy disk.<br>Floppy disk drive comes standard |                                        |
| Stored Data Points             | up to 16,000                                                                                                                                                                          |                                        |
| Group Refractive Index Setting | 1.400000 - 1.699999                                                                                                                                                                   |                                        |
| Loss Modes                     | ORL, 2-point, 2-point LSA, dB/KM, dB/KM LSA, splice, reflectance                                                                                                                      |                                        |
| Trace Compare Modes            | Overlay, Delta Trace Compare, Align                                                                                                                                                   |                                        |
| Data Acquisition               | Real Time, Fast Scan, Medium Scan, Slow Scan, Timed Average (user selectable)                                                                                                         |                                        |
| Information Output             | Trace display, FAS event table, integrated trace display with event information window, header page, measurement parameters, ASCII report                                             |                                        |
| Analysis                       | High speed integrated fiber analysis                                                                                                                                                  |                                        |
| Vertical Scale Settings        | 0.125/0.25/0.5/1/2/4/8 dB (module dependent)                                                                                                                                          |                                        |
| Horizontal Scale Settings      | 0.001 km/div. to 0.448 km/div @ 2 km; 0.001 km/div. to 57.304 km/div. @ 256 km (IOR = 1.5)                                                                                            |                                        |
| I/O Ports                      | Standard: Integral alpha-numeric keyboard, (2) RS-232 Serial, (1) Parallel, VGA, Mouse, External Keyboard Port                                                                        |                                        |
| Language Capability            | English standard (others per request and may require hard drive option)                                                                                                               |                                        |
| Physical Dimensions & Weight   | 9.5" H x 13.5" W x 3.75" D (24.1 x 34.3 x 9.5 cm) / 11.0 lbs. (4.9 kg)<br>Includes mainframe, battery and one module                                                                  |                                        |
| Power                          |                                                                                                                                                                                       |                                        |
| Power Supply                   | Autoswitching 92-132 VAC, 47-63 Hz [weight 1.7 lbs. (.77 kg)]<br>184-264 VAC, 47-63 Hz                                                                                                |                                        |
| Battery                        | Sealed Lead Acid Battery Pack [weight 1.4 lbs (0.63 kg)]                                                                                                                              |                                        |
| Battery Life                   | up to 9 hours maximum per battery,<br>depending on operating mode                                                                                                                     |                                        |
| Recharge Time                  | 1.5 - 2 hours                                                                                                                                                                         |                                        |
| Environmental                  |                                                                                                                                                                                       |                                        |
| Operation:                     |                                                                                                                                                                                       |                                        |
| Temperature                    | AC Power<br>0°C to 45°C (32°F to 122°F)                                                                                                                                               | Battery<br>0°C to 40°C (32°F to 104°F) |
| Humidity                       | 95% RH max., non-condensing                                                                                                                                                           | 95% RH max., non-condensing            |
| Maximum Altitude               | 50,000 feet                                                                                                                                                                           | 50,000 feet                            |
| Storage:                       |                                                                                                                                                                                       |                                        |
| Temperature                    | -25°C to 60°C (-13°F to 140°F)                                                                                                                                                        |                                        |
| Humidity                       | 95% RH max., non-condensing                                                                                                                                                           |                                        |
| Maximum Altitude               | 50,000 feet                                                                                                                                                                           |                                        |

**Optical Module Specifications [All measurements made using FC/SPC connectors at 25°C (77°F)]**

| <b>Models</b>                                | <b>4415</b>                                                               | <b>4414</b>                  | <b>4413</b>                  |
|----------------------------------------------|---------------------------------------------------------------------------|------------------------------|------------------------------|
| Center Wavelength                            | 1310 nm ± 20 nm<br>1550 nm ± 30 nm                                        | 1550 nm ± 30 nm              | 1310 nm ± 20 nm              |
| Fiber Type                                   | Singlemode 9/125μ                                                         | Singlemode 9/125μ            | Singlemode 9/125μ            |
| Spectral Width (RMS)                         | 1310 nm: £ 10 nm<br>1550 nm: £ 10 nm                                      | 1550 nm: £ 10 nm             | 1310 nm: £ 10 nm             |
| Dynamic Range <sup>1</sup><br>(SNR = 1)      | 1310 nm: 30 dB<br>1550 nm: 28 dB                                          | 1550 nm: 28 dB               | 1310 nm: 30 dB               |
| Initial Reflective Deadzone <sup>2</sup>     | 1310 nm: 3 meters (typical)<br>1550 nm: 3 meters (typical)                | 1550 nm: 3 meters (typical)  | 1310 nm: 3 meters (typical)  |
| Initial Non-Reflective Deadzone <sup>2</sup> | 1310 nm: 10 meters (typical)<br>1550 nm: 12 meters (typical)              | 1550 nm: 12 meters (typical) | 1310 nm: 10 meters (typical) |
| Pulsewidth                                   | 10 ns to 10μs                                                             |                              |                              |
| Distance Resolution                          | 0.0001 km; 0.1 meters; 0.001 kft, 1 ft, 0.0001 mi                         |                              |                              |
| Distance Sampling                            | 0.25, 0.5, 1, 2, 4, 8, 16 meters (range dependent)                        |                              |                              |
| Distance Accuracy                            | 0.0025% of distance measurement ± distance resolution ± index uncertainty |                              |                              |
| Distance Range Setting                       | 2/4/8/16/32/64/128/256 km                                                 |                              |                              |
| Loss Resolution                              | 0.001 dB                                                                  |                              |                              |
| Laser Safety                                 | Meets CDRH Class 1 Requirements (Eye Safe) 21 CFR                         |                              |                              |

| <b>Models</b>                                | <b>4425</b>                                                               | <b>4424</b>                  | <b>4423</b>                  |
|----------------------------------------------|---------------------------------------------------------------------------|------------------------------|------------------------------|
| Center Wavelength                            | 1310 nm ± 20 nm<br>1550 nm ± 20 nm                                        | 1550 nm ± 20 nm              | 1310 nm ± 20 nm              |
| Fiber Type                                   | Singlemode 9/125μ                                                         | Singlemode 9/125μ            | Singlemode 9/125μ            |
| Spectral Width (RMS)                         | 1310 nm: £ 10 nm<br>1550 nm: £ 10 nm                                      | 1550 nm: £ 10 nm             | 1310 nm: £ 10 nm             |
| Dynamic Range <sup>1</sup><br>(SNR = 1)      | 1310 nm: 36 dB<br>1550 nm: 34 dB                                          | 1550 nm: 34 dB               | 1310 nm: 36 dB               |
| Initial Reflective Deadzone <sup>2</sup>     | 1310 nm: 3 meters (typical)<br>1550 nm: 3 meters (typical)                | 1550 nm: 3 meters (typical)  | 1310 nm: 3 meters (typical)  |
| Initial Non-Reflective Deadzone <sup>2</sup> | 1310 nm: 10 meters (typical)<br>1550 nm: 12 meters (typical)              | 1550 nm: 12 meters (typical) | 1310 nm: 10 meters (typical) |
| Pulsewidth                                   | 10 ns to 10μs                                                             |                              |                              |
| Distance Resolution                          | 0.0001 km; 0.1 meters; 0.001 kft, 1 ft, 0.0001 mi                         |                              |                              |
| Distance Sampling                            | 0.25, 0.5, 1, 2, 4, 8, 16 meters (range dependent)                        |                              |                              |
| Distance Accuracy                            | 0.0025% of distance measurement ± distance resolution ± index uncertainty |                              |                              |
| Distance Range Setting                       | 2/4/8/16/32/64/128/256 km                                                 |                              |                              |
| Loss Resolution                              | 0.001 dB                                                                  |                              |                              |
| Laser Safety                                 | Meets CDRH Class 1 Requirements (Eye Safe) 21 CFR                         |                              |                              |

| <b>Models</b>                                | <b>4438</b>                                                               | <b>4436</b>                                                    | <b>4534</b>                   |
|----------------------------------------------|---------------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------|
| Center Wavelength                            | 1550 nm ± 20 nm                                                           | 1310 nm ± 20 nm<br>1550 nm ± 20 nm                             | 1550 nm ± 20 nm               |
| Fiber Type                                   | Singlemode                                                                | Singlemode 9/125μ                                              | Singlemode 9/125μ             |
| Spectral Width (RMS)                         | £15 nm                                                                    | 1310 nm: £ 10 nm<br>1550 nm: £ 10 nm                           | 1550 nm: £ 10 nm              |
| Dynamic Range <sup>1</sup><br>(SNR = 1)      | 46.0 dB                                                                   | 1310 nm: 40 dB<br>1550 nm: 40 dB                               | 1550 nm: 40 dB                |
| Initial Reflective Deadzone <sup>2</sup>     | 3 meters                                                                  | 1310 nm: 3.5 meters (typical)<br>1550 nm: 3.5 meters (typical) | 1550 nm: 3.5 meters (typical) |
| Initial Non-Reflective Deadzone <sup>2</sup> | 5 meters                                                                  | 1310 nm: 6 meters (typical)<br>1550 nm: 6 meters (typical)     | 1550 nm: 6 meters (typical)   |
| Pulsewidth                                   |                                                                           | 10 ns to 20μs (wavelength dependent)                           |                               |
| Distance Resolution                          | 0.0001 km; 0.1 meters; 0.001 kft, 1 ft, 0.001 mi                          |                                                                |                               |
| Distance Sampling                            | 0.25, 0.5, 1, 2, 4, 8, 16 meters (range dependent)                        |                                                                |                               |
| Distance Accuracy                            | 0.0025% of distance measurement ± distance resolution ± index uncertainty |                                                                |                               |
| Distance Range Setting                       | 2/4/8/16/32/64/128/256 km                                                 |                                                                |                               |
| Loss Resolution                              | 0.001 dB                                                                  |                                                                |                               |
| Laser Safety                                 | Meets CDRH Class 1 Requirements (Eye Safe) 21 CFR                         |                                                                |                               |

**Notes:**

1. Subtract approximately 2 dB of range to 98% peak noise. Bellcore TR-TSY-000196 Issue 2
2. Using Bellcore TR-TSY-000196 Issue 2. Deadzones measured on -45 dB reflections.

| <b>Models</b>                                | <b>4442</b>                                                               | <b>4441</b>                 | <b>4440</b>                  |
|----------------------------------------------|---------------------------------------------------------------------------|-----------------------------|------------------------------|
| Center Wavelength                            | 850 nm ± 20 nm<br>1300 nm ± 20 nm                                         | 1300 nm ± 20 nm             | 850 nm ± 20 nm               |
| Fiber Type                                   | Multimode                                                                 | Multimode                   | Multimode                    |
| Spectral Width (RMS)                         | 850 nm: £ 10 nm<br>1300 nm: £ 10 nm                                       | 1300 nm: £ 10 nm            | 850 nm: £ 10 nm              |
| Dynamic Range <sup>1</sup><br>(SNR = 1)      | 850 nm: 23 dB<br>1300 nm: 26 dB                                           | 1300 nm: 26 dB              | 850 nm: 23 dB                |
| Initial Reflective Deadzone <sup>2</sup>     | 850 nm: 3.5 meters (typical)<br>1300 nm: 3 meters (typical)               | 1300 nm: 3 meters (typical) | 850 nm: 3.5 meters (typical) |
| Initial Non-Reflective Deadzone <sup>2</sup> | 850 nm: 6.5 meters (typical)<br>1300 nm: 7 meters (typical)               | 1300 nm: 7 meters (typical) | 850 nm: 6.5 meters (typical) |
| Pulsewidth                                   | 4 ns to 1µs (wavelength dependent)                                        |                             |                              |
| Distance Resolution                          | 0.0001 km; 0.1 meters; 0.001 kft, 1 ft, 0.0001 mi                         |                             |                              |
| Distance Sampling                            | 0.25, 0.5, 1, 2, 4, 8 meters (range dependent)                            |                             |                              |
| Distance Accuracy                            | 0.0025% of distance measurement ± distance resolution ± index uncertainty |                             |                              |
| Distance Range Setting                       | 2/4/8/16/32/64 km                                                         |                             |                              |
| Loss Resolution                              | 0.001 dB                                                                  |                             |                              |
| Laser Safety                                 | Meets CDRH Class 1 Requirements (Eye Safe) 21 CFR                         |                             |                              |

| <b>Models</b>                                | <b>4456</b>                                                                                                                 | <b>4457</b>                                                                                                                 |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| Center Wavelength                            | 850 nm ± 20 nm<br>1300 nm ± 20 nm<br>1310 nm ± 20 nm<br>1550 nm ± 20 nm                                                     | 850 nm ± 20 nm<br>1300 nm ± 20 nm<br>1310 nm ± 20 nm<br>1550 nm ± 30 nm                                                     |
| Fiber Type                                   | Multimode and Singlemode                                                                                                    | Multimode and Singlemode                                                                                                    |
| Spectral Width (RMS)                         | 850 nm: £ 10 nm<br>1300 nm: £ 10 nm<br>1310 nm: £ 10 nm<br>1550 nm: £ 10 nm                                                 | 850 nm: £ 10 nm<br>1300 nm: £ 10 nm<br>1310 nm: £ 10 nm<br>1550 nm: £ 10 nm                                                 |
| Dynamic Range <sup>1</sup><br>(SNR = 1)      | 850 nm: 23 dB<br>1300 nm: 26 dB<br>1310 nm: 21.5 dB<br>1550 nm: 21 dB                                                       | 850 nm: 21 dB<br>1300 nm: 24 dB<br>1310 nm: 32 dB<br>1550 nm: 30 dB                                                         |
| Initial Reflective Deadzone <sup>2</sup>     | 850 nm: 3.5 meters (typical)<br>1300 nm: 2.5 meters (typical)<br>1310 nm: 3 meters (typical)<br>1550 nm: 3 meters (typical) | 850 nm: 3.5 meters (typical)<br>1300 nm: 2.5 meters (typical)<br>1310 nm: 3 meters (typical)<br>1550 nm: 3 meters (typical) |
| Initial Non-Reflective Deadzone <sup>2</sup> | 850 nm: 6.5 meters (typical)<br>1300 nm: 7 meters (typical)<br>1310 nm: 10 meters (typical)<br>1550 nm: 12 meters (typical) | 850 nm: 6.5 meters (typical)<br>1300 nm: 7 meters (typical)<br>1310 nm: 15 meters (typical)<br>1550 nm: 20 meters (typical) |
| Pulsewidth                                   | 4 ns to 10 µs (wavelength dependent)                                                                                        |                                                                                                                             |
| Distance Resolution                          | 0.0001 km; 0.1 meters; 0.001 kft, 1 ft, 0.0001 mi                                                                           |                                                                                                                             |
| Distance Sampling                            | 0.25, 0.5, 1, 2, 4, 8, 16 meters (range dependent)                                                                          |                                                                                                                             |
| Distance Accuracy                            | 0.0025% of distance measurement ± distance resolution ± index uncertainty                                                   |                                                                                                                             |
| Distance Range Setting                       | 2/4/8/16/32/64/128/256 km (wavelength dependent)                                                                            |                                                                                                                             |
| Loss Resolution                              | 0.001 dB                                                                                                                    |                                                                                                                             |
| Laser Safety                                 | Meets CDRH Class 1 Requirements (Eye Safe) 21 CFR                                                                           |                                                                                                                             |

**Notes:**

1. Subtract approximately 2 dB of range to 98% peak noise. Bellcore TR-TSY-000196 Issue 2
2. Using Bellcore TR-TSY-000196 Issue 2. Deadzones measured on -45 dB reflections.

| <b>Models</b>                                | <b>4461</b>                                                                  | <b>4462</b>                                                                  |
|----------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| Center Wavelength                            | 1240 nm ± 6 nm                                                               | 1240 nm ± 6 nm<br>1310 nm ± 20 nm                                            |
| Fiber Type                                   | Singlemode                                                                   | Singlemode                                                                   |
| Spectral Width (RMS)                         | 1240 nm: £ 15 nm                                                             | 1240 nm: £ 15 nm<br>1310 nm: £ 15 nm                                         |
| Dynamic Range <sup>1</sup><br>(SNR = 1)      | 1240 nm: 36 dB                                                               | 1240 nm: 34 dB<br>1310 nm: 34 dB                                             |
| Initial Reflective Deadzone <sup>2</sup>     | 1240 nm: 3 meters (typical)                                                  | 1240 nm: 3 meters (typical)<br>1310 nm: 3 meters (typical)                   |
| Initial Non-Reflective Deadzone <sup>2</sup> | 1240 nm: 10 meters (typical)                                                 | 1240 nm: 10 meters (typical)<br>1310 nm: 10 meters (typical)                 |
| Pulsewidth                                   |                                                                              |                                                                              |
| Distance Resolution                          | 0.0001 km; 0.1 meters; 0.001 kft, 1 ft, 0.0001 mi                            | 0.0001 km; 0.1 meters; 0.001 kft, 1 ft, 0.0001 mi                            |
| Distance Sampling                            | 0.25, 0.5, 1, 2, 4, 8, 16 meters (range dependent)                           | 0.25, 0.5, 1, 2, 4, 8, 16 meters (range dependent)                           |
| Distance Accuracy                            | 0.0025% of distance measurement ± distance<br>resolution ± index uncertainty | 0.0025% of distance measurement ± distance<br>resolution ± index uncertainty |
| Distance Range Setting                       | 2/4/8/16/32/64/128/256 km                                                    | 2/4/8/16/32/64/128/256 km                                                    |
| Loss Resolution                              | 0.001 dB                                                                     | 0.001 dB                                                                     |
| Laser Safety                                 | Meets CDRH Class 1 Requirements (Eye Safe) 21 CFR                            | Meets CDRH Class 1 Requirements (Eye Safe) 21 CFR                            |

| <b>Models</b>                                | <b>4463</b>                                                                  | <b>4464</b>                                                                  |
|----------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| Center Wavelength                            | 1240 nm ± 6 nm<br>1550 nm ± 20 nm                                            | 1240 nm ± 6 nm<br>1625 nm ± 10 nm                                            |
| Fiber Type                                   | Singlemode                                                                   | Singlemode                                                                   |
| Spectral Width (RMS)                         | 1240 nm: £ 15 nm<br>1550 nm: £ 15 nm                                         | 1240 nm: £ 15 nm<br>1625 nm: £ 15 nm                                         |
| Dynamic Range <sup>1</sup><br>(SNR = 1)      | 1240 nm: 36 dB<br>1550 nm: 34 dB                                             | 1240 nm: 36 dB<br>1625 nm: 36 dB                                             |
| Initial Reflective Deadzone <sup>2</sup>     | 1240 nm: 3 meters (typical)<br>1550 nm: 3 meters (typical)                   | 1240 nm: 3 meters (typical)<br>1625 nm: 3.5 meters (typical)                 |
| Initial Non-Reflective Deadzone <sup>2</sup> | 1240 nm: 10 meters (typical)<br>1550 nm: 12 meters (typical)                 | 1240 nm: 10 meters (typical)<br>1625 nm: 15 meters (typical)                 |
| Pulsewidth                                   |                                                                              |                                                                              |
| Distance Resolution                          | 0.0001 km; 0.1 meters; 0.001 kft, 1 ft, 0.0001 mi                            | 0.0001 km; 0.1 meters; 0.001 kft, 1 ft, 0.0001 mi                            |
| Distance Sampling                            | 0.25, 0.5, 1, 2, 4, 8, 16 meters (range dependent)                           | 0.25, 0.5, 1, 2, 4, 8, 16 meters (range dependent)                           |
| Distance Accuracy                            | 0.0025% of distance measurement ± distance<br>resolution ± index uncertainty | 0.0025% of distance measurement ± distance<br>resolution ± index uncertainty |
| Distance Range Setting                       | 2/4/8/16/32/64/128/256 km                                                    | 2/4/8/16/32/64/128/256 km                                                    |
| Loss Resolution                              | 0.001 dB                                                                     | 0.001 dB                                                                     |
| Laser Safety                                 | Meets CDRH Class 1 Requirements (Eye Safe) 21 CFR                            | Meets CDRH Class 1 Requirements (Eye Safe) 21 CFR                            |

| <b>Models</b>                                | <b>4471</b>                                                                  | <b>4472</b>                                                                  |
|----------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| Center Wavelength                            | 1625 nm ± 10 nm                                                              | 1310 nm ± 20 nm<br>1625 nm ± 10 nm                                           |
| Fiber Type                                   | Singlemode                                                                   | Singlemode                                                                   |
| Spectral Width (RMS)                         | 1625 nm: £ 10 nm                                                             | 1310 nm: £ 10 nm<br>1625 nm: £ 10 nm                                         |
| Dynamic Range <sup>1</sup><br>(SNR = 1)      | 1625 nm: 36 dB                                                               | 1310 nm: 36 dB<br>1625 nm: 36 dB                                             |
| Initial Reflective Deadzone <sup>2</sup>     | 1625 nm: 4 meters (typical)                                                  | 1310 nm: 3 meters (typical)<br>1625 nm: 4 meters (typical)                   |
| Initial Non-Reflective Deadzone <sup>2</sup> | 1625 nm: 12 meters (typical)                                                 | 1310 nm: 10 meters (typical)<br>1625 nm: 12 meters (typical)                 |
| Pulsewidth                                   |                                                                              |                                                                              |
| Distance Resolution                          | 0.0001 km; 0.1 meters; 0.001 kft, 1 ft, 0.0001 mi                            | 0.0001 km; 0.1 meters; 0.001 kft, 1 ft, 0.0001 mi                            |
| Distance Sampling                            | 0.25, 0.5, 1, 2, 4, 8, 16 meters (range dependent)                           | 0.25, 0.5, 1, 2, 4, 8, 16 meters (range dependent)                           |
| Distance Accuracy                            | 0.0025% of distance measurement ± distance<br>resolution ± index uncertainty | 0.0025% of distance measurement ± distance<br>resolution ± index uncertainty |
| Distance Range Setting                       | 2/4/8/16/32/64/128/256 km                                                    | 2/4/8/16/32/64/128/256 km                                                    |
| Loss Resolution                              | 0.001 dB                                                                     | 0.001 dB                                                                     |
| Laser Safety                                 | Meets CDRH Class 1 Requirements (Eye Safe) 21 CFR                            | Meets CDRH Class 1 Requirements (Eye Safe) 21 CFR                            |

| <b>Models</b>                                | <b>4473</b>                                                                       |
|----------------------------------------------|-----------------------------------------------------------------------------------|
| Center Wavelength                            | 1550 nm $\pm$ 20 nm<br>1625 nm $\pm$ 10 nm                                        |
| Fiber Type                                   | Singlemode                                                                        |
| Spectral Width (RMS)                         | 1550 nm: $\pm$ 10 nm<br>1625 nm: $\pm$ 10 nm                                      |
| Dynamic Range <sup>1</sup><br>(SNR = 1)      | 1550 nm: 34 dB<br>1625 nm: 36 dB                                                  |
| Initial Reflective Deadzone <sup>2</sup>     | 1550 nm: 4 meters (typical)<br>1625 nm: 4 meters (typical)                        |
| Initial Non-Reflective Deadzone <sup>2</sup> | 1550 nm: 12 meters (typical)<br>1625 nm: 12 meters (typical)                      |
| Pulsewidth                                   |                                                                                   |
| Distance Resolution                          | 0.0001 km; 0.1 meters; 0.001 kft, 1 ft, 0.0001 mi                                 |
| Distance Sampling                            | 0.25, 0.5, 1, 2, 4, 8, 16 meters (range dependent)                                |
| Distance Accuracy                            | 0.0025% of distance measurement $\pm$ distance resolution $\pm$ index uncertainty |
| Distance Range Setting                       | 2/4/8/16/32/64/128/256 km                                                         |
| Loss Resolution                              | 0.001 dB                                                                          |
| Laser Safety                                 | Meets CDRH Class 1 Requirements (Eye Safe) 21 CFR                                 |

Notes:

1. Subtract approximately 2 dB of range to 98% peak noise. Bellcore TR-TSY-000196 Issue 2
2. Using Bellcore TR-TSY-000196 Issue 2. Deadzones measured on -45 dB reflections.

## Multi-Test Functions

### Dual Source (441X and 442X optics only; factory installed)

|                    |                                                             |
|--------------------|-------------------------------------------------------------|
| Wavelength         | 1310/1550 $\pm$ 20 nm (except 4457 module 1550 $\pm$ 30 nm) |
| Output             | -10 dBm (typical)                                           |
| Transmission Mode  | CW, 1 KHz and 2 KHz                                         |
| Output Fiber       | 9/125 $\mu$ m SM fiber                                      |
| Optical Connector  | Same as OTDR                                                |
| Modes of Operation | CW, 1 KHz and 2 KHz                                         |
| Stability          | $\pm$ 0.2 dB (8 hours)                                      |
| Spectral Width     | Same as OTDR                                                |
| Safety             | Same as OTDR                                                |

### Optical Meter (factory installed)

|                        |                                                                                                                            |
|------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Detector Type          | 2 mm Ge PIN photodiode                                                                                                     |
| Wavelength             | 800 - 1800 nm                                                                                                              |
| Range                  | +10 to -55 dBm or +20 to -45 dBm with AM460 filter                                                                         |
| Calibrated Wavelengths | 3 total: 850, 1310, 1550                                                                                                   |
| Universal Connector    | Yes (use AM-430-xx adapter caps)                                                                                           |
| Resolution             | 0.01 dB, dBm, 0.01% Watts                                                                                                  |
| Store Reference Mode   | Yes                                                                                                                        |
| Accuracy <sup>1</sup>  | $\pm$ 4% ( $\pm$ 0.18 dB) @ +5 dBm to -50 dBm<br>$\pm$ 8% ( $\pm$ 0.36 dB) @ +10 dBm to +5 dBm and<br>@ -50 dBm to -55 dBm |
| Linearity              | $\pm$ 0.04 dB, +5 dBm to -50 dBm                                                                                           |

### Visual Fault Locator (field installed)

|                   |                                               |
|-------------------|-----------------------------------------------|
| Wavelength        | 635 $\pm$ 10 nm                               |
| Output            | 0 dBm                                         |
| Transmission Mode | CW or 2 Hz                                    |
| Output Fiber      | 9/125 $\mu$ m, SM fiber                       |
| Optical Connector | FC, SC, ST - fixed connector                  |
| Safety            | IEC 825 Class 2, FDA (21 CFR 1040.10 class 2) |

Note:

1. Specification applies to +10 dBm meter not to +20 dBm meter.

**CMA4000 Optional Accessories (must be added as separate line item):**

|          |                                  |          |                                      |
|----------|----------------------------------|----------|--------------------------------------|
| TD-400   | Hard transit case                | TD-459US | US style keyboard                    |
| TD-410   | Deluxe soft case                 | TD-459GE | German CE style keyboard             |
| TD-415   | Soft carry bag                   | TD-459FR | French CE style keyboard             |
| TD-405   | Printer w/cable                  | TD-459SP | Spanish CE style keyboard            |
| TD-309   | Printer paper (5 rolls/pack)     | TD-459IT | Italian CE style keyboard            |
| TD-409   | Case of paper (5 packs/case)     | TD-30163 | Additional User's Manual             |
| TD-453   | 12 v lead acid battery           | TD-30162 | Additional Training Manual           |
| TD-29621 | 12 v DC power adapter            | TD-30711 | Parallel cable - DB25M to DB25M      |
| TD-30710 | Serial cable DB9F to DB9F (null) | TD-30712 | Serial cable DB9F to DB9M (straight) |

**CMA4000 Mainframe:**

**Control Unit:** P/N TD-14XXX PC-based modular platform

**Standard Accessories:**

- 8-inch VGA LCD display
- Multi-tasking operating system
- User's & Training Manuals
- 1 VGA port
- Internal memory (up to 140 traces)
- 1 carry strap
- AC adapter/charger
- AC line cord (choose style - see below)
- 2 serial ports
- 1 parallel port
- 1 mouse port
- 1 PS/2 keyboard port
- 12 v rechargeable battery (qty 2)
- Floppy drive
- Built-in keyboard

**AC Power Cord Options:**

|          |                    |          |                       |
|----------|--------------------|----------|-----------------------|
| TD-11685 | US power cord      | TD-30362 | Australian power cord |
| TD-30358 | Euro power cord    | TD-30359 | UK power cord         |
| TD-30361 | Italian power cord | TD-30360 | Swiss power cord      |

**OTDR/Source Connector Adapter:**

Adapters for PC and Ultra Polish:

|           |           |           |                     |
|-----------|-----------|-----------|---------------------|
| UC-130-10 | Biconic   | UC-130-35 | SMA 905/906         |
| UC-130-15 | DIN 47256 | UC-130-40 | Diamond HP HMS-10   |
| UC-130-20 | D4        | UC-130-45 | Diamond HP HMS-0    |
| UC-130-25 | FC        | UC-130-50 | Diamond HP-HMS-10/A |
| UC-130-30 | ST        | UC-130-55 | SC                  |

Adapters for Angle Polish:

|            |                |           |                |
|------------|----------------|-----------|----------------|
| UC-130-60  | FC NTT         | UC-130-70 | DIN/HRL-10     |
| UC-130-60A | FC Seiko Giken | UC-130-75 | ST             |
| UC-130-65  | SC             | UC-130-80 | Diamond E-2000 |

Meter Connector Adapter (select one when ordering power meter):

|           |               |            |         |
|-----------|---------------|------------|---------|
| AM-430-10 | Biconic       | AM-430-50  | ST      |
| AM-430-15 | D4            | AM-430-75  | VFO/PFO |
| AM-430-20 | SMA 906       | AM-430-85  | DIN     |
| AM-430-25 | Diamond GFS-3 | AM-430-90  | SC      |
| AM-430-45 | FC            | AM-430-100 | FDDI    |

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*Total care for networks*

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