

# OPTICAL DEVICE MEASUREMENT & ANALYSIS SYSTEM

MANUFACTURER NAME HERE

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## **I. GENERAL SPECIFICATIONS**

### **A. System Configuration**

- Control PC & SW
  - PC : Windows 7 x86, 4GB RAM, 23" LCD Monitor
  - SW : GUI, Motion Control, Camera Control, Automatic Align & Measurement
- Optical Device Measurement System
  - DUT/FAB Mount Jig Part
  - Mechanical Alignment Part
  - Optical Measurement Part
- Data Server
  - Linux x64, 4GB RAM, 23" LCD Monitor
  - DBMS Service
  - Web Service
  - WDM Analysis Service

### **B. Available DUTs (Measurement & Analysis)**

- O-Band 4 channel CWDM MUX & DeMUX chip
- O-Band 4 channel DWDM chip
- O/E-Band 8 channel CWDM MUX & DeMUX chip (optional)
- O/E/C/L-Band 4/16/40 channel DWDM chip (optional)

### **C. Output Data & File Format**

- Discrete spectra of transmittance of all DUT channels
- Horizontal tab (ASCII code 0x09) separated text file format

### **D. WDM Analysis Service Outputs**

- Peak Insertion Loss, Peak Wavelength
  - Maximum transmitted point of each channel
- Bandwidth Min/Max Insertion Loss
  - Min/max transmitted point in the pass bandwidth of each channel

- Crosstalk (Adjacent/Total/Non-Adjacent)
  - Ratio of maximum transmitted power of other channel wavelength to the peak power of measured channel
- Center Wavelength
  - Central wavelength of the channel calculated with 3dB pass band
- Pass Band (1dB, 3dB)
  - Wavelength range at which the transmittance is larger than 1dB or 3dB

## II. MOUNTING JIGS

### A. DUT Mounting Scheme

- absorption force by air pressure and screw lock

### B. Mountable DUT Length

- Air Lock Mount : Min 50mm, Max 150mm length
- Screw Lock Mount : Max 30mm width

### C. Mountable FAB Width

- Min 1mm, Max 15mm

### D. FAB Section Angle

- 0°, -8°, +8° from optic axis

## III. MECHANICAL ALIGNMENT PART

### A. Motion Control Configurations

- Motion Controller : PCI board in the control PC
- Number of Controllable Axis : 16
- Align Stages & Axes
  - Left Stage : 6 axes (X, Y, Z,  $\theta_x$ ,  $\theta_y$ ,  $\theta_z$ )
  - Right Stage : 6 axes (X, Y, Z,  $\theta_x$ ,  $\theta_y$ ,  $\theta_z$ )

- Center Stage : 1 axes
- Camera Stage : 1 axes

**B. Stage Properties**

Axis	Stroke	Mechanical Resolution	Min. Controllable Distance
X	20 mm	1.0 $\mu\text{m}$	0.05 $\mu\text{m}$
Y	20 mm	1.0 $\mu\text{m}$	0.05 $\mu\text{m}$
Z	70 mm	1.0 $\mu\text{m}$	0.05 $\mu\text{m}$
$\theta_x$	16 °	0.003°	0.00015°
$\theta_y$	70 °	0.0032°	0.00016°
$\theta_z$	70 °	0.0032°	0.00016°

\*Left and right stages are all the same as each corresponding axis

**C. Z-Axis Approach Sensor**

- Contact Detection Sensor

**D. Vision Cameras**

- Top View and Side View (orthogonal to optic axis)

### III. OPTICAL MEASUREMENT PART

#### A. Laser Source

Laser Source Type	Continuous Sweep Tunable Laser Source (TLS)
Wavelength Sweep Range	1240nm – 1380nm
Wavelength Resolution	0.1pm at 1310nm
Wavelength Stability	$\pm 2.5\text{pm}^{1)}$
Absolute Wavelength Accuracy	$\pm 10\text{pm}^{2)3)}$
Wavelength Repeatability	$\pm 1.5\text{pm}^{2)}$
Maximum Sweep Speed	200nm/s
Minimum Sweep Step	0.001nm
Maximum Output Power	+13dBm
Signal To Source Spontaneous Emissions Ratio	70dB/nm <sup>4)</sup>
Operating Temperature	+10°C to +35°C
Operating Humidity	< 80% R.H.
Line Power	AC 100–240V $\pm 10\%$ , 50-60Hz, 280VA max
Trigger Bandwidth	100kHz
GPIO Interface Performance	300kB/s <sup>5)</sup>
GPIO Interface Function Code	SH1, AH1, T6, L4, SR0, RL1, PP0, DC1, DT0, CO. SCPI standard <sup>6)</sup>

1) 24 hours at constant temperature  $\pm 1\text{K}$

2) Continuous sweep mode, both direction

3) Full wavelength range for sweep speed < 50nm/s

4) At maximum output power, between 1320nm and 1350nm

5) Burst data rate during read of 12001 points

6) all modes and parameters accessible via GPIO interface

**B. Optical Powermeters**

Sensor Element	InGaAs Photodiode
Wavelength Range	1250nm – 1650nm
Power Range	-80dBm – +10dBm
Maximum Safe Power	+16dBm
Averaging Time	1 $\mu$ s – 10s
Applicable Fiber Type	Standard SM/MM $\leq 62.5\mu$ m, NA $\leq 0.24$
Data Logging Capability	2 buffers/port, 1M samples/buffer
Dynamic Range At Logging Mode	> 63dB <sup>1)</sup>
Frequency Response (3dB Cutoff Frequency)	250kHz <sup>2)</sup>
Total Uncertainty	$\pm 2.5\%$ <sup>3)</sup>
Polarization Dependent Responsivity	< $\pm 0.01$ dB (1250nm to 1580nm) <sup>4)</sup>
Noise Peak-To-Peak	< 7pW <sup>5)</sup>
Noise 2 $\sigma$	< 0.8nW <sup>6)</sup>
Port Separation	> 85dB <sup>7)</sup> (CW)
Return Loss	> 57dB (1280nm to 1580nm)
Line Power	AC 100–240V $\pm 10\%$ , 50/60Hz, 60VA max
Operating Temperature	+5°C to +40°C
Operating Humidity	15% to 95% R.H. (non-condensing)
Warm-up Time	20 minutes
Recommended Recalibration Period	24months

1) 0dBm PM Range, 1ms averaging time, ambient temperature 23 $\pm$ 5°C, temperature constant within  $\pm 1$ K after zeroing

2) 1 $\mu$ s averaging time, -10dBm to +10dBm range

3) Operating conditions

- Single mode fiber, within one year of calibration
- Spectral FWHM of laser source < 10nm
- Wavelength setting corresponds to laser source wavelength  $\pm 0.4$ nm

4) Ambient temperature 23 $\pm$ 5°C, SMF straight connector

5) 1s of averaging time, 300s observation time, ambient temperature 23 $\pm$ 5°C

- 6) 100k samples, 0dBm range, 1ms averaging time
- 7) One neighbor port with 0dBm, excluding noise and offset drift

**C. Optical Polarization Controller (Optional)**

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