Optical Device Measurement & Analysis System

Manufacturer Name Here

www.your-company-domain.com

Document version	**0.5 (draft)**
Last modified date	**2018-08-25**

Revision History

v0.5 (2018-08-25)

- Mounting Jigs - Mountable DUT Dimensions - Air Lock Mount :
  - added width 50 -150mm
- Mounting Jigs - Mountable DUT Dimensions - Air Lock Mount :
  - added min width 60
- Mounting Jigs - Mountable DUT Dimensions - Screw Lock Mount :
  - added min width 5
  - added length 6-150mm
- Mechanical Alignment Part - Stage Properties :
  - corrected θy, θz stroke : 70˚ → 16˚

I. General Specifications

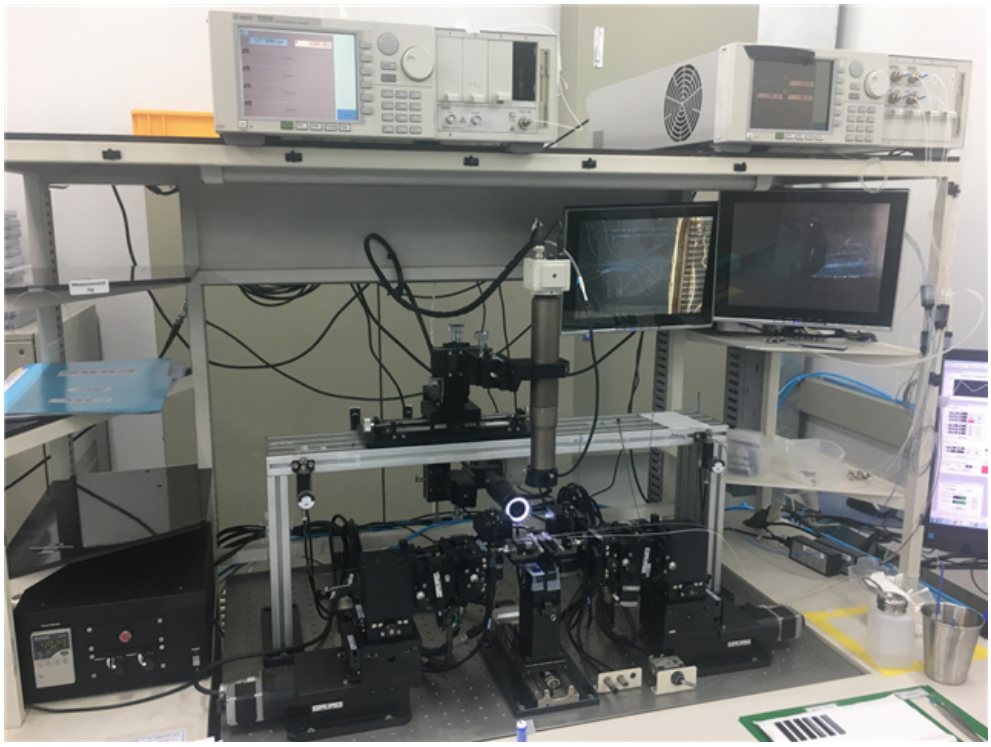


Figure 1: Photo of Optical Device Measurement System

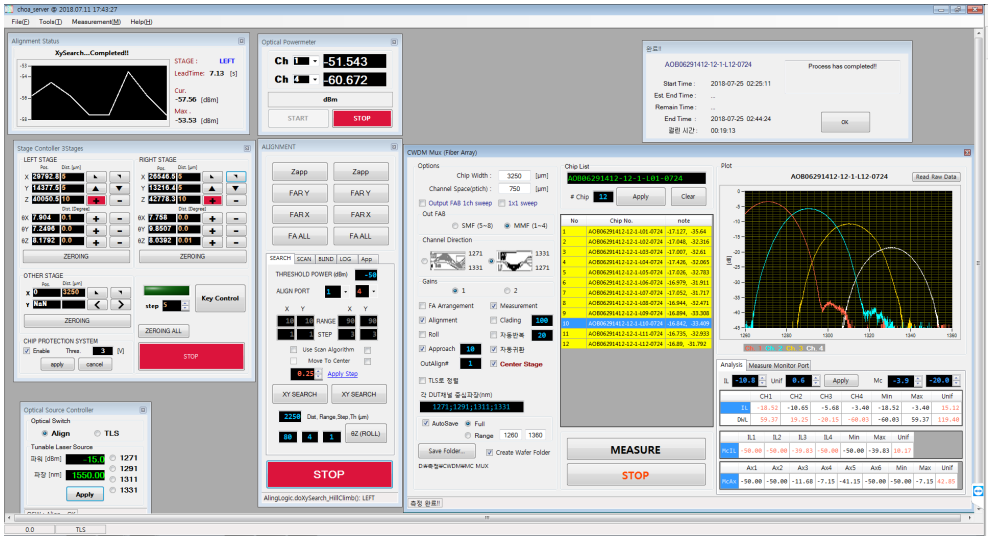


Figure 2: GUI of Control SW

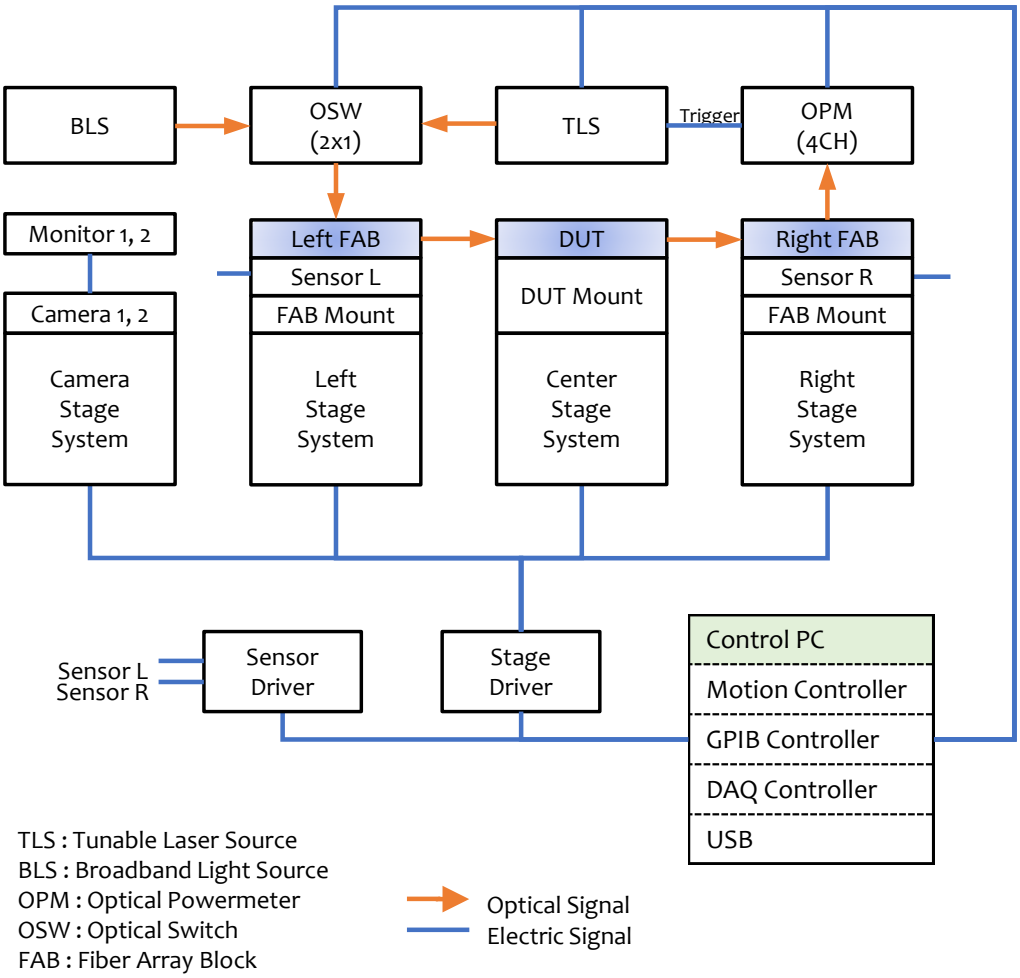


Figure 3: Function Diagram of Optical Device Measurement System

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

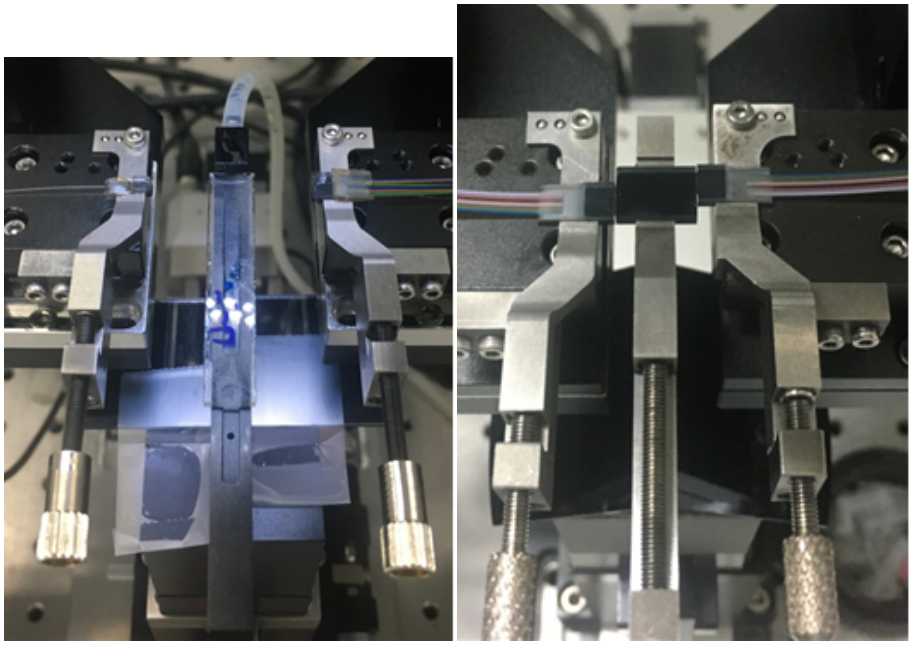
• Pass Band (1dB, 3dB)

- Wavelength range at which the transmittance is larger than 1dB or 3dB

II. Mounting Jigs

A. DUT Mounting Scheme

- Air lock and screw lock mount



(a) Air Lock (b) Screw Lock

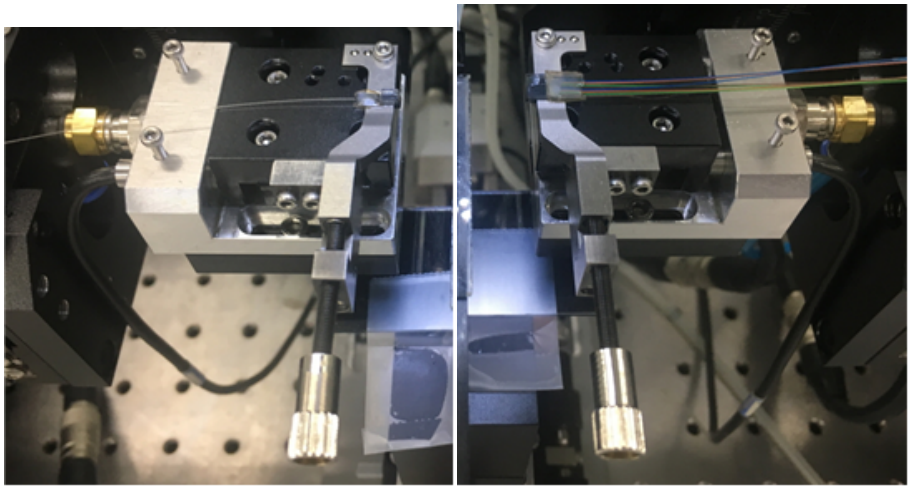
Figure 4: DUT Mounting Jig

B. Mountable DUT Dimensions

- Air Lock Mount : Width 5 - 150mm, Length 60 - 150mm
- Screw Lock Mount : Width 5 - 30mm, Length 6 - 150mm

C. Mountable FAB Dimensions

- Width 1 - 15mm



(a) Left (b) Right

Figure 5: FAB Mounting Jig

D. FAB Section Angle

- 0°, -8°, +8° from optic axis

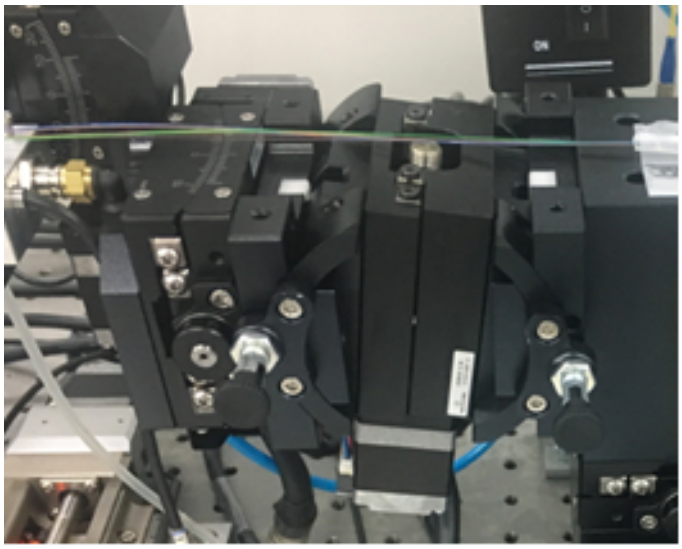
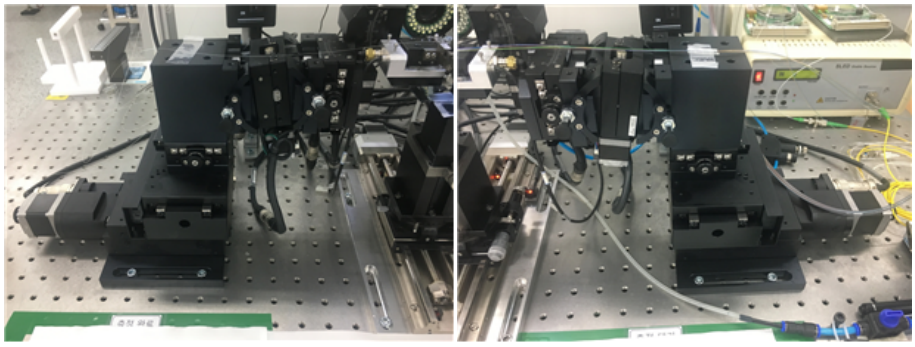


Figure 6: FAB Section Angle Selector

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, θx, θy, θz)
  - Right Stage : 6 axes(X, Y, Z, θx, θy, θz)
  - Center Stage : 1 axes
  - Camera Stage : 1 axes



(a) Left Stage System (b) Right Stage System

Figure 7: Left & Right Aligner

B. Stage Properties

Axis	Stroke	Mechanical Resolution	Min. Controllable Distance
X	20 mm	1.0 μm	0.05 μm
Y	20 mm	1.0 μm	0.05 μm
Z	70 mm	1.0 μm	0.05 μm
θx	16 °	0.003°	0.00015°
θy	16 °	0.0032°	0.00016°
θz	16 °	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	±2.5pm[1)]
Absolute Wavelength Accuracy	±10pm[2)3)]
Wavelength Repeatability	±1.5pm[2)]
Maximum Sweep Speed	200nm/s
Minimum Sweep Step	0.001nm
Maximum Output Power	+13dBm
Signal To Source Spontaneous Emissions Ratio	70dB/nm[4)]
Operating Temperature	+10°C to +35°C
Operating Humidity	< 80% R.H.
Line Power	AC 100–240V ±10%, 50-60Hz, 280VA max
Trigger Bandwidth	100kHz
GPIB Interface Performance	300kB/s[5)]
GPIB Interface Function Code	SH1, AH1, T6, L4, SR0, RL1, PP0, DC1, DT0, CO. SCPI standard[6)]

1) 24 hours at constant temperature ±1K

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 GPIB interface

B. Optical Powermeters

Sensor Element	InGaAs Photodiode
Wavelength Range	1250nm – 1650nm
Power Range	-80dBm – +10dBm
Maximum Safe Power	+16dBm
Averaging Time	1µs – 10s
Applicable Fiber Type	Standard SM/MM ≤62.5µm, NA≤0.24
Data Logging Capability	2 buffers/port, 1M samples/buffer
Dynamic Range At Logging Mode	> 63dB[1)]
Frequency Response (3dB Cutoff Frequency)	250kHz[2)]
Total Uncertainty	±2.5%[3)]
Polarization Dependent Responsivity	< ±0.01dB (1250nm to 1580nm)[4)]
Noise Peak-To-Peak	< 7pW[5)]
Noise 2σ	< 0.8nW[6)]
Port Seperation	> 85dB[7)] (CW)
Return Loss	> 57dB (1280nm to 1580nm)
Line Power	AC 100–240V ±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±5°C, temperature constant within ±1K after zeroing

2) 1µs 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 ±0.4nm

4) Ambient temperature 23±5°C, SMF straight connector

5) 1s of averaging time, 300s observation time, ambient temperature 23±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)

(TBD)