**Optical Method Micro Structural Waveguide Insertion Loss Measurement System**

Optical method insertion loss measurement system targeting on micro structural waveguide device such as silicon photonics waveguide module, single-mode waveguide module, near-field optical device, etc.

**Product Overview**
This is optical method insertion loss measurement system targeting on micro structural waveguide device, using Synos' optical beam irradiation and detection measurement optics M-Scope type J. It is possible to execute high speed and efficient insertion loss measurement of micro structural waveguide device such as silicon photonics waveguide device, single-mode waveguide module, near-field optical device and so on.

This system does not require the time consuming peak search alignment that is adopted in conventional optical fiber alignment method. This system adopts combined method of image processing & peak search alignment, aiming at shortening measurement throughput drastically.

By using this system, anyone can easily repeat and reproduce insertion loss measurement with semi-automatic alignment control software. Furthermore, it is possible to built up automatic and high speed insertion loss measurement system of micro structural waveguide device, applicable for mass production testing. This is best for efficient insertion loss measurement for micro structural waveguide device.

**Feature**
- This system equips Synos' optical measurement optics M-Scope type J/PF
- M-Scope type J/PF is the optical system developed for beam irradiation & detection measurement. This optics has coaxial observation camera port as well as optical measurement port using optical fiber, so it enables the position adjustment of incident measurement light by observing objective image directly. In combination with image processing and peak power search method, it becomes possible to shorten measurement throughput drastically.
- Polarization-free type optical fiber connect port is adopted and reduced the influence of polarization in measurement.
- Possible to select objective lens. Optical magnification is max 100x. Possible to choose NIR type objective lens, HR (High Resolution) type objective lens, etc.
- Maximum optical magnification for observation is 100x, applicable to observe edge of micro structural waveguide chip such as Si photonics waveguide device, near-field optical device etc.
- It irradiates the core diameter edge onto sample surface with 1:1 magnification and detects the light from sample surface. Any optical fibers with different core diameters can be used as having conjugation conditions with optical fiber alignment.
- By selection of observation detector, it becomes possible to measure from visible to IR spectral range.
- For visible-1100nm: High resolution digital CCD detector ISA011
- For 950-1700nm: InGaAs high sensitivity NIR detector ISA041H2 series
- Dedicated image processing and automatic alignment software is prepared. In combination with various high precision motorized stage system, it is possible to built up high speed and high accuracy automatic loss measurement system, applicable to mass production test.

**Application**
- Insertion loss measurement of micro structural waveguide such as Silicon photonics device, near-field optical device, etc.
- Observation of output beam profile and output edge condition of Silicon photonics device, near-field optical device, etc.
- Analysis of optical transmission characteristics of Silicon photonics device, near-field optical device, etc.

**Block diagram of “Optical method microstructural waveguide insertion loss measurement system”**

- **Input Side Optics**
  - Hi resolution digital CCD detector / ISA011 (400nm-1100nm)
  - InGaAs high sensitivity NIR detector / ISA041H2 (950nm-1700nm)
- **Output Side Optics**
  - Hi resolution digital CCD detector / ISA011 (400nm-1100nm)
  - InGaAs high sensitivity NIR detector / ISA041H2 (950nm-1700nm)

- **System Control / Data Processing**
  - System control / data analysis
  - Software: System control, Image processing, Stage control, Measurement instrument control, Data analysis, System management
  - PC for data analysis and system control
  - LCD monitor, 1/F board

- **Measurement Instrument**
  - Optical measurement optics M-Scope type J/PF (with variable spot size converter unit)

- **Stage System for Input Side Optics**
  - Motor controller, Motor driver etc.

- **Stage System for Output Side Optics**
  - Motor controller, Motor driver etc.

- **Control System**
  - Motor driver etc.

- **Image Sensor Selection**
  - Hi resolution digital CCD detector / ISA011 (400nm-1100nm)
  - InGaAs high sensitivity NIR detector / ISA041H2 (950nm-1700nm)

- **LIGHT SOURCE**
  - LD light source
  - SLD light source
  - ASE light source etc.

- **OPTION ACCESSORY, PERIPHERALS**
  - Shield box
  - Vibration isolated table

- **System Rack**

- **Software...**
  - System control
  - Image processing
  - Stage control
  - Measurement instrument control
  - Data analysis
  - System management

- **Image Sensor Selection**
  - Hi resolution digital CCD detector / ISA011 (400nm-1100nm)
  - InGaAs high sensitivity NIR detector / ISA041H2 (950nm-1700nm)

- **Optical Measurement System / Measurement Station Part**

- **Optical Evaluation and Analysis System / Optical Insertion Loss Measurement System**

- **Micro Structural Waveguide Insertion Loss Measurement System**

- **Software...**
  - System control
  - Image processing
  - Stage control
  - Measurement instrument control
  - Data analysis
  - System management

- **PC for data analysis and system control**
  - LCD monitor, 1/F board

- **Optical Spectrum Analyzer etc.**

- **Optical Powermeter**

- **Shield box**

- **Vibration isolated table**

- **Motor controller**

- **Motor driver etc.**

- **Stage System for Input Side Optics**

- **Stage System for Output Side Optics**

- **System Rack**

- **Software...**
  - System control
  - Image processing
  - Stage control
  - Measurement instrument control
  - Data analysis
  - System management

- **PC for data analysis and system control**
  - LCD monitor, 1/F board

- **Optical Spectrum Analyzer etc.**

- **Optical Powermeter**