Product Introduction

MS9740A
Optical Spectrum Analyzer
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Product Introduction

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Anritsu Corporation
Overview

**Improved Production Efficiency**
**Reduced Measurement and Inspection Times**

Reduce the manufacturing costs is a key issue for makers of active optical devices. Measuring instruments for device evaluation are expected to increase productivity by shortening inspection times. The MS9740A reduces the total time from waveform sweeping to data transfer to external control equipment and supports simple analysis procedures, offering excellent cost performance and better productivity.

- Wavelength sweeping time $< 0.2$ s/5 nm
- Dynamic range performance $\geq 58$ dB
- 30 pm minimum resolution
- $-90$ dBm minimum light-reception sensitivity

**MS9740A Optical Spectrum Analyzer**

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Overview

- **Easy Operation:**
  When a mouse is connected, the familiar Windows GUI makes menu selection and parameter setting an easy and convenient alternative to setting using panel keys.

- **Internal Memory Function:**
  Up to 1000 files can be saved to internal memory.

- **Full Range of Interfaces:**
  Supports Ethernet (TCP/IP) and GPIB (option) interfaces

- **50% Less Power Consumption:**
  The MS9740A consumes 10% (75 VA) less power than the MS9710C.

- **Lightweight:**
  Weighing in at under 15 kg, the MS9740A is the world’s lightest benchtop spectrum analyzer (at December 2009).

- **Supports SM and MM Fibers**

- **Large 8.4-inch LCD**
Sweep | Analysis | Transfer

Spectrum measurement at **0.2 s/5 nm** real-time sweeping

High-speed waveform sweeping and range processing support spectrum measurement at 0.2 s/5 nm. The spectrum change and variation in noise level can be monitored in real time and the waveform light source can be switched in real time too.

See the demonstration!
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Reduces Measurement and Inspection Times

Fast measurement time from waveform sweeping to data transfer!

GPIB Interface, SMSR Measurement Time (DFB-LD), VBW=10 kHz,
Resolution: 0.1 nm, Sweep Width: 5 nm, Sampling Point: 501

Measurement times slashed by huge 80%

Previous Model

MS9740A
Seven Application Modes

At evaluation of LD characteristics, analysis items and methods can be tailored to the spectrum, such as a single DFB-LD spectrum, multiple discrete-wavelength FP-LD, wideband LED, etc. The MS9740A has seven modes (DFB-LD, FP-LD, LED, PMD, Opt Amp, WDM, LD Module) matching the measurement target.

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Example of Optical Transceiver Measurement

- Wavelength sweeping time <0.2 s/5 nm
- Dedicated applications for evaluating active optical devices
- Supports SM and MM fibers as well as LC connectors
Example of Optical Transceiver Measurement

*Displays all analysis results required for active optical device on one screen.*

This application measures test items, such as center wavelength, optical level, OSNR, etc., required for LD module tests, and displays the results on one screen.

- **LD-Module Test Items**
  - Center wavelength, level
  - OSNR (actual measured value)
  - OSNR (noise level per nm)
  - SMSR
  - Spectrum width
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Conventional OSA...

DFB-LD Mode analysis
Evaluation of single vertical mode spectrum

WDM Mode analysis
Analyzes OSNR
*New automatic resolution conversion (dB/nm) function added to MS9740A

FP-LD Mode analysis
Evaluation of multiple discrete-wavelength spectrum

Regardless of whether the spectrum is DFB-LD or FP-LD, the MS9740A analyzes basic optical module items on one screen. And it supports batch transmission of these results via remote control.
Passive Optical Device Measurement

Wide dynamic range and high-resolution support for passive optical device evaluation

- Dynamic range performance ≥ 58 dB (0.4 nm from peak wavelength)
- 30 pm minimum resolution
- –90 dBm minimum light-reception sensitivity

The MS9740A supports signal evaluation with wide dynamic range and high-resolution, such as measurement of narrow-band filters and OSNR analysis of WDM signals.
Trace A: Capture base waveform with wideband light source

Trace B: Capture filter characteristics waveform

Trace C: Analyze loss characteristics with Trace A and B difference
Up to 10 waveforms displayed on one screen saved in one file

The MS9740A has a large waveform memory for saving up to 10 waveforms and a wavelength difference calculation function, making it easy to evaluate devices such as optical switches.

- Display up to 10 waveforms on one screen
- Save 10 analyzed waveforms in one file
- Save up to 1,000 files to internal memory

Save 10,000 waveforms to internal memory
Optical Bandpass Filter Measurement Solution

Transmittance Evaluation

Batch Measurement of Optical Bandpass Filter Transmittance

The WDM Filter analysis function supports efficient evaluation of optical bandpass filter transmittance characteristics

WDM Filter Function Measurements

- Signal Level
- Peak Signal No.
- Signal Wavelength
- Spacing (Wavelength)
- Pass Band
- Ripple
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Optical Bandpass Filter Measurement Solution

**Insertion Loss Evaluation**

- evaluated by finding the difference in the measured results when the filter (DUT) is inserted and not inserted
- Filter Insertion Loss Analysis using Trace Mode

Filter Analysis by Waveform Difference Comparison

Multi-waveform trace
WDM Signal Analysis

Wide dynamic range and high-resolution support WDM signal measurements at 100-GHz or 50-GHz intervals with margin

- Dynamic range performance $\geq 58$ dB (0.4 nm from peak wavelength)
- 30 pm minimum resolution
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WDM Signal Analysis

*Simultaneous spectrum analysis of multiple waveforms*

Up to 300 channels can be analyzed and information required for WDM signal analysis, such as center wavelength, level, SNR, etc., is displayed on one screen.
EDFA Analysis

The MS9740A calculates the gain and NF automatically from the optical input and output to the optical fiber amplifier.

- Pulse Method
- Spectrum Division Method
- PLZN Nulling Method

Pout output waveform after amplification

Pin output waveform before amplification
Optical Level Variation Evaluation

The Min Hold and Max Hold functions are convenient for measuring long-term variation in optical level. It displays real-time maximum and minimum levels on-screen.
Easy Optical Fiber Connection

- **Supports SM and MM fibers**
  - One MS9740A unit supports measurement of both SM and MM fibers. Moreover, fiber light-reception is used for optical input. Backscatter attenuation of $<35$ dB (1300/1550 nm) assures accurate DUT backscatter measurement.

- **Supports LC connector**
  - Exchangeable optical receiver connectors assures support for FC, SC, ST and DIN; LC connector used by active optical devices are supported too.
Transfer Data to External PC Controller

- **Batch transmission of analyzed data**
  - For example, center wavelength, optical level and OSNR analyzed by the LD-Module application can be transferred as a batch to the external PC controller, supporting easy data management.

- **Transfer BMP and PNG image files**
  - Screen image (BMP, PNG) data captured by the MS9740A can be transferred to the external PC controller. This is convenient when saving screen images separately from binary data.
Remote Tool Package

- MS9740A Remote Tool Package
  - The Remote Tools Package includes the quick-start guide, sample programs, C# class library, and LabVIEW Driver.
  - This package can be downloaded from the Anritsu site.
    - Sample Programs: MS9740A control program created using Visual Basic
    - C# Class Library: DLL using NET framework
    - LabVIEW Driver: NI LabVIEW 7.1 driver

Anritsu Web site

GPIB, Ethernet

Remote Command Language
- Native
- SCPI

Remote Tool
- Sample Program
- C# Class Library
- LabVIEW Driver

Note:
When controlling the MS9740A remotely using the Ethernet port, a VISA*1 driver must be installed in the PC controller. We recommend using NI-VISA™2 from National Instruments™ (NI hereafter) as the VISA driver. More detail information of NI-VISA™ usage, please refer to the MS9740A product brochure.

Glossary of Terms:
*1: VISA: Virtual Instrument Software Architecture
I/O software specification for remote control of measuring instruments using interfaces such as GPIB, Ethernet, USB, etc.
*2: NI-VISA™
World de facto standard I/O software interface developed by NI and standardized by the VXI Plug&Play Alliance.

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Wavelength Calibration Function

Wavelength accuracy of ±20 pm is assured by calibrating the wavelength using the Light Source for Wavelength Calibration (Opt-002) after performing automatic optical-axis alignment. In addition, the MS9740A has a function for automatically calibrating wavelength if the ambient temperature and pressure change, based on the first calibration data.

Wavelength calibration using Opt-002 with an acetylene absorption cell assures ±20 pm wavelength accuracy (C/L band). This accuracy is not assured when using an external light source, such as a DFB-LD. See the catalog for details.
Weighing in at under 15 kg, the MS9740A is the world’s lightest benchtop spectrum analyzer (at December 2009).

Consuming under 75 VA, or less than half its predecessors, it’s also eco-friendly too. And not only does it save power, it’s quiet as well, making it the ideal benchtop companion.
Note