

# MS9740A

## Optical Spectrum Analyzer

---

# **MS9740A**

# **Optical Spectrum Analyzer**

# **Product Introduction**

**February 2014**

**Anritsu Corporation**

# MS9740A Product Introduction

---

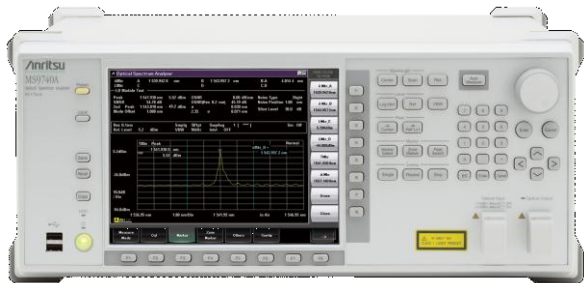
## Overview

*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

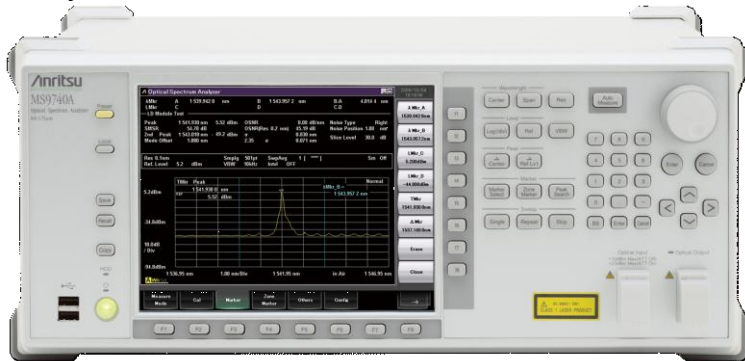
---

# MS9740A Product Introduction

## 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.



### ➤ Supports SM and MM Fibers

### ➤ Large 8.4-inch LCD

### ➤ 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.

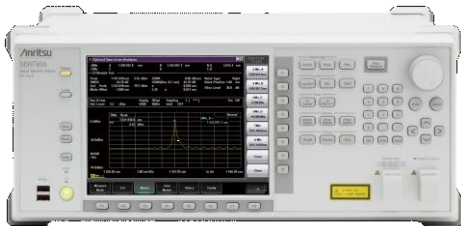
### ➤ Lightweight:

Weighing in at under 15 kg, the MS9740A is the world's lightest benchtop spectrum analyzer (at December 2009).

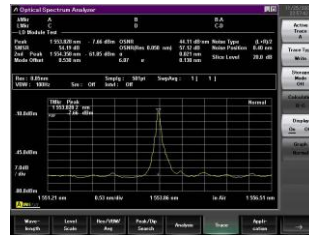
# MS9740A Product Introduction

## Reduces Measurement and Inspection Times

Sweep



Analysis

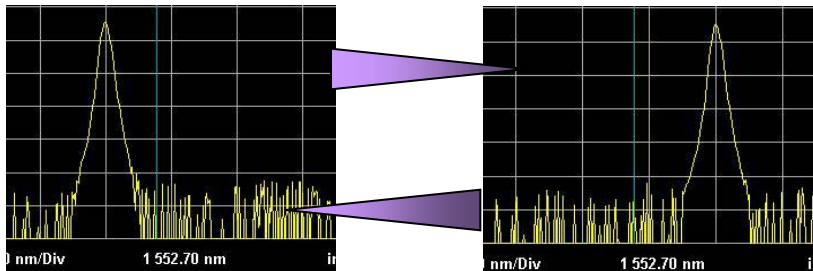


Transfer



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.



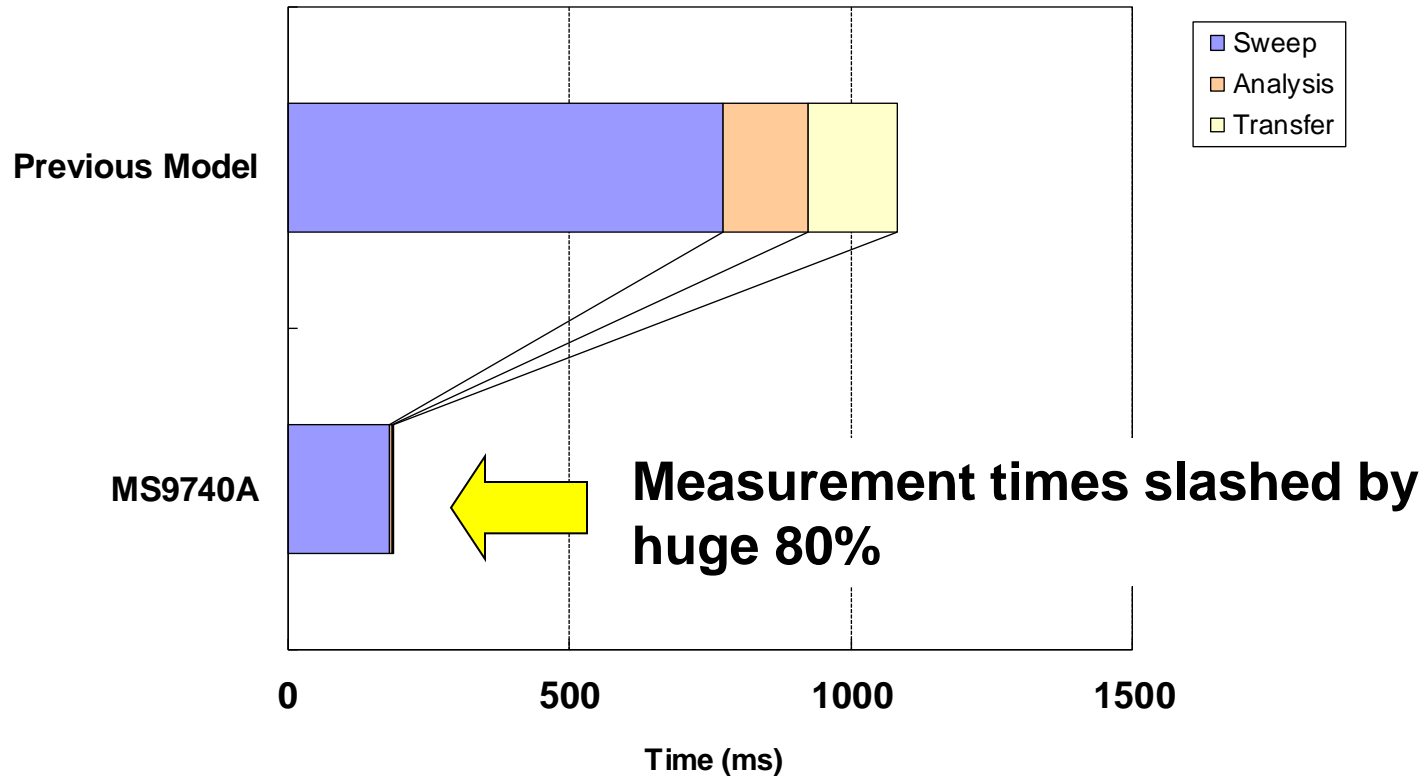
**See the demonstration!**

# MS9740A Product Introduction

## 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



# MS9740A Product Introduction

---

## Seven Application Modes

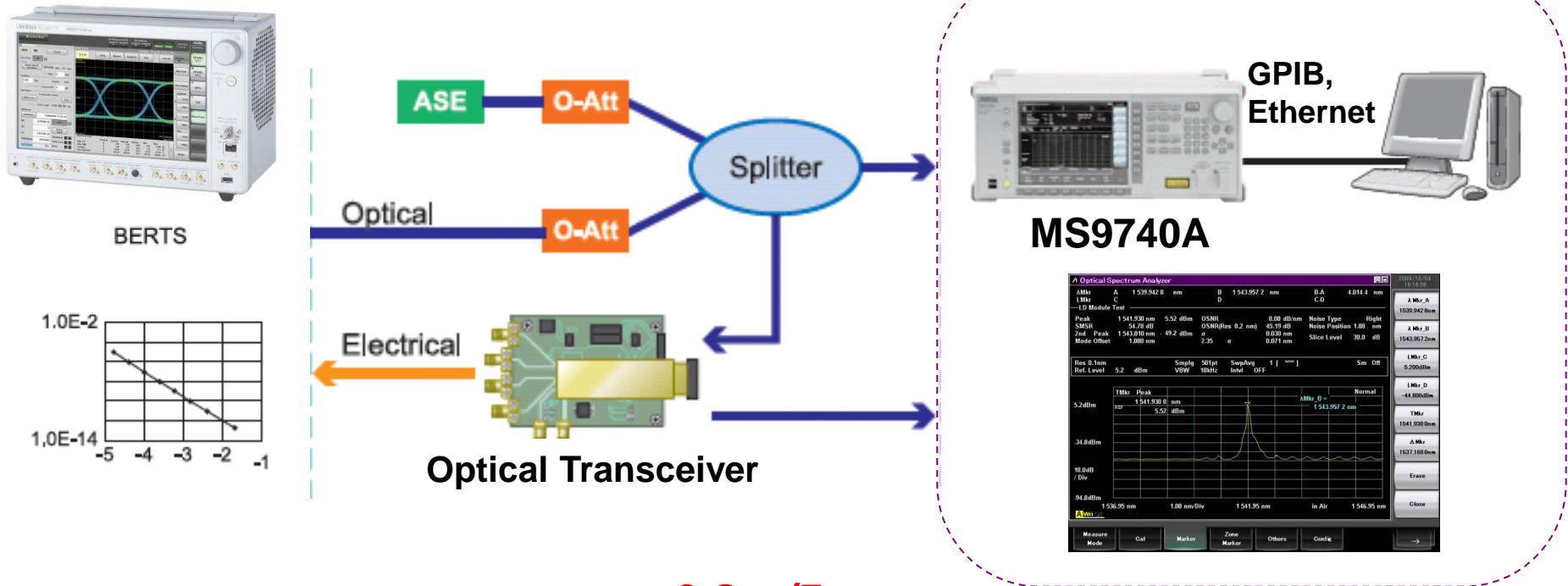
At evaluation of LD characteristics, analysis items and methods can be tailored to the spectrum, such as a single DFB-LD spectrum, multiple discrete-wavelength FP-LD, wideband LED, etc.

The MS9740A has seven modes (DFB-LD, FP-LD, LED, PMD, Opt Amp, WDM, LD Module) matching the measurement target.

Test Target	
LD Module	Evaluation of optical-transceiver characteristics
DFB-LD	Evaluation of single vertical-mode spectrum
FP-LD	Evaluation of multiple discrete-wavelength spectrum
LED	Evaluation of wideband light source spectrum
PMD	Evaluation of PMD characteristics of optical fiber
Opt. Amp	Evaluation of gain and NF characteristics of fiber amplifier (EDFA)
WDM	Evaluation of WDM signal spectrum for up to 300 wavelengths (channels)

# MS9740A Product Introduction

## 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

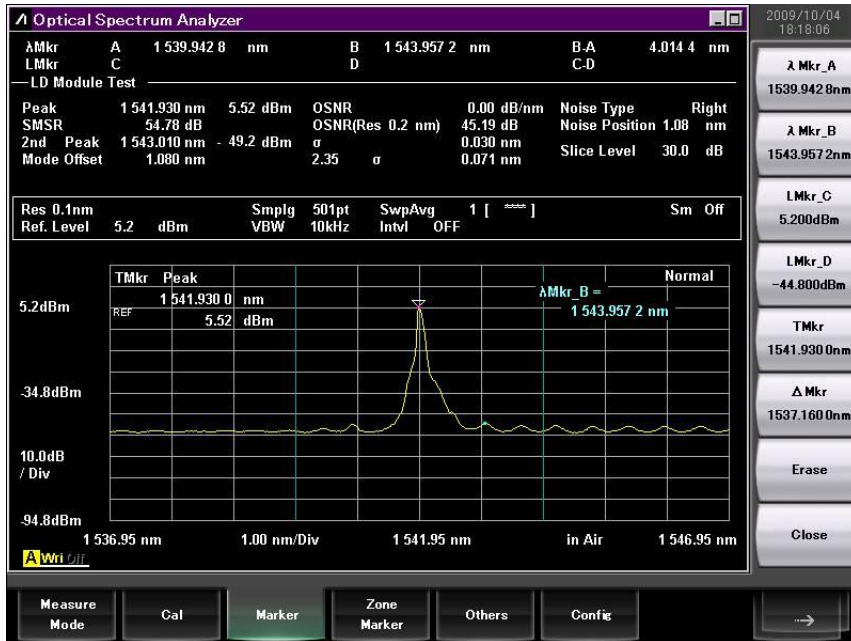


# MS9740A Product Introduction

## 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

# MS9740A Product Introduction

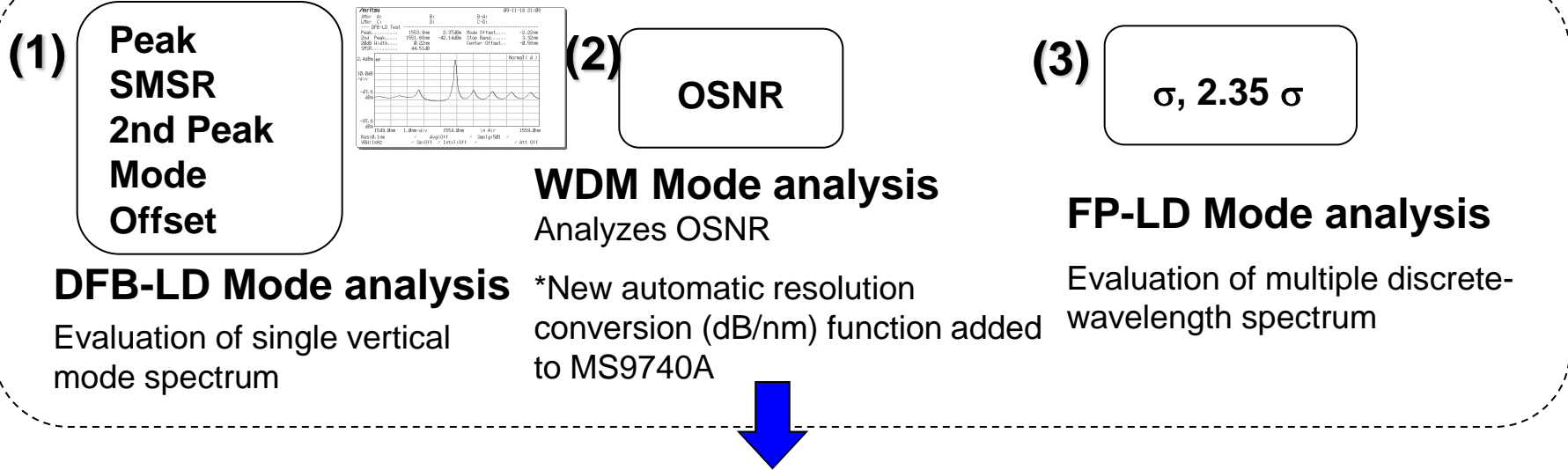
(1)

LD Module Test						
Peak	1 541.930 nm	5.52 dBm	OSNR	0.00 dB/nm	Noise Type	Right
SMSR	54.78 dB					
2nd Peak	1 543.010 nm	- 49.2 dBm	$\sigma$	0.030 nm	Slice Level	30.0 dB
Mode Offset	1.080 nm		2.35 $\sigma$	0.071 nm		

(2)

(3)

## Conventional OSA...

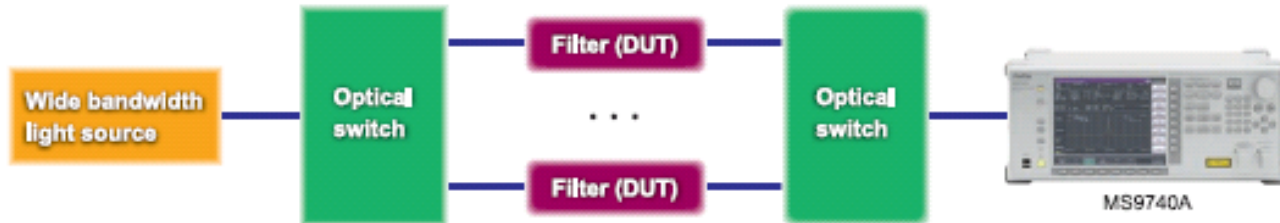


Regardless of whether the spectrum is DFB-LD or FP-LD, the MS9740A analyzes basic optical module items on one screen. And it supports batch transmission of these results via remote control.

# MS9740A Product Introduction

## Passive Optical Device Measurement

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



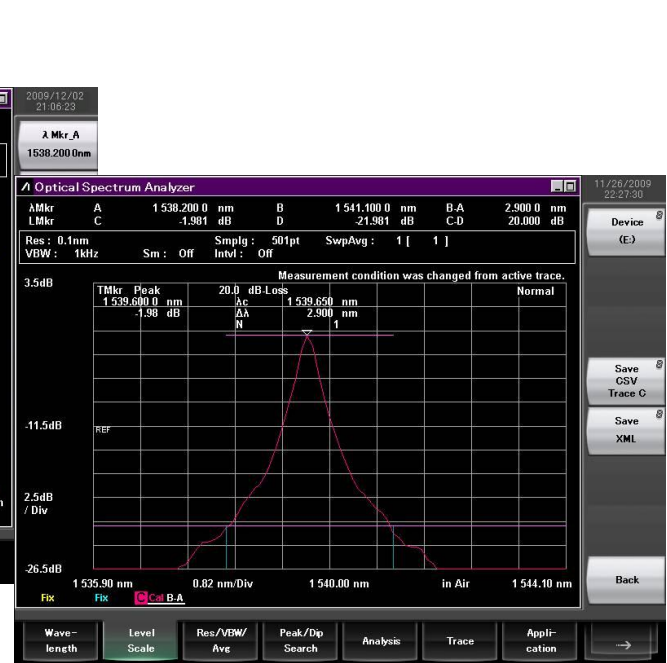
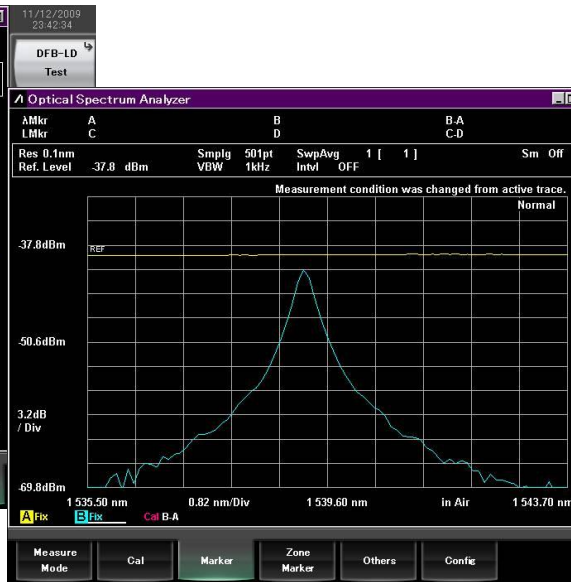
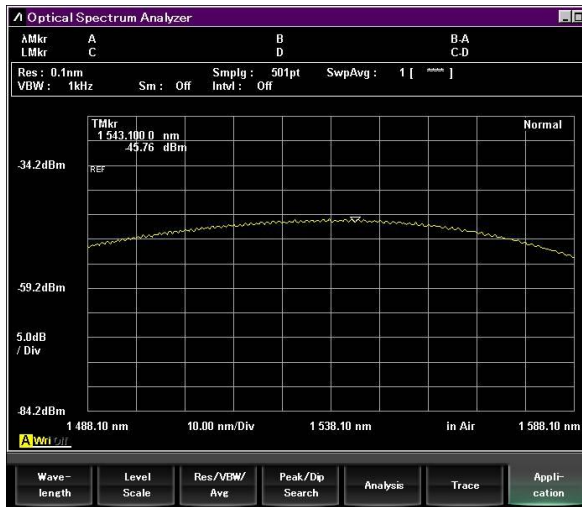
- Dynamic range performance  $\geq 58$  dB (0.4 nm from peak wavelength)
- 30 pm minimum resolution
- $-90$  dBm minimum light-reception sensitivity

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.

# MS9740A Product Introduction

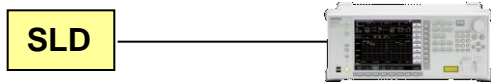
## Optical Passive Device Measurement

### OPBF Loss characteristics evaluation



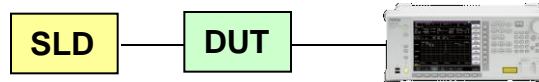
#### Trace A:

Capture base waveform with wideband light source



#### Trace B:

Capture filter characteristics waveform



#### Trace C:

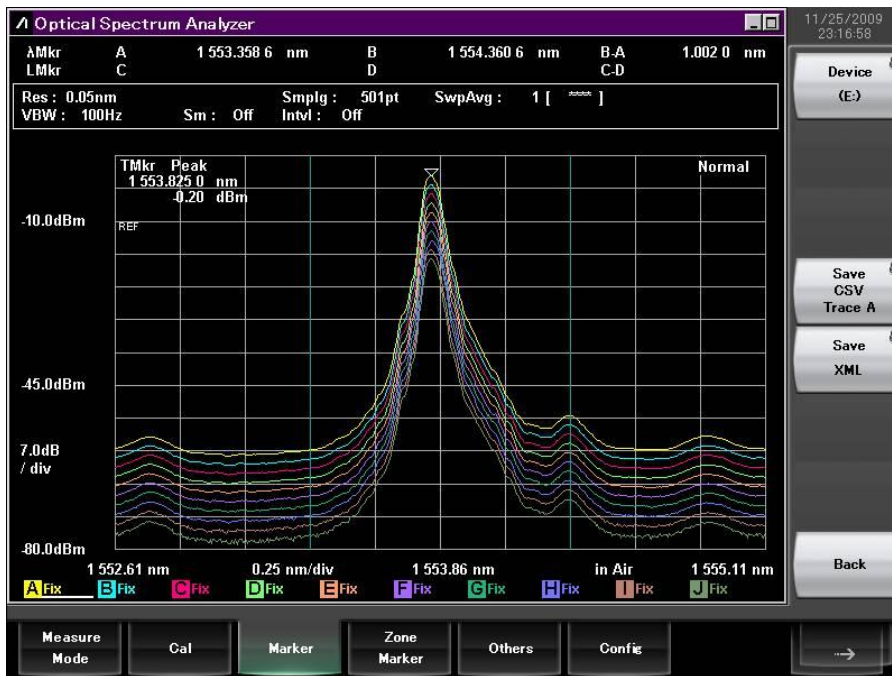
Analyze loss characteristics with Trace A and B difference

# MS9740A Product Introduction

## Optical Passive Device Measurement

*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

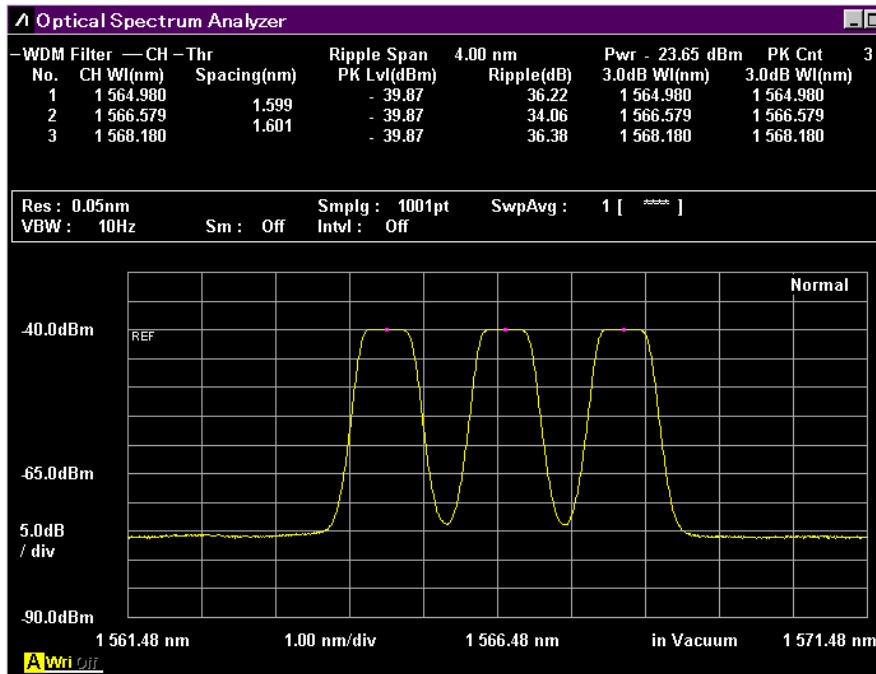
**Save 10,000 waveforms to internal memory**

# MS9740A Product Introduction

## 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

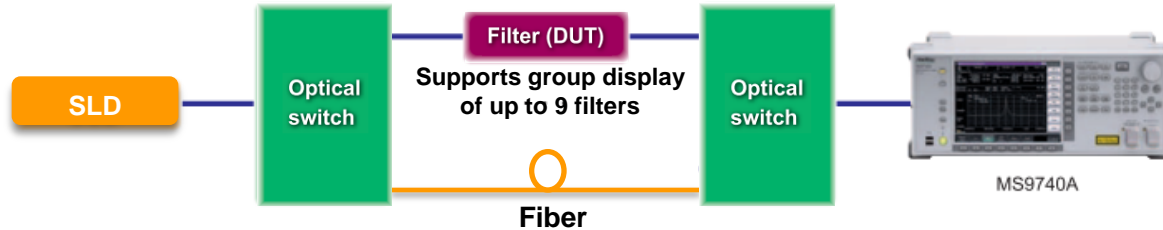
- Signal Level
- Peak Signal No.
- Signal Wavelength
- Spacing (Wavelength)
- Pass Band
- Ripple

# MS9740A Product Introduction

## Optical Bandpass Filter Measurement Solution

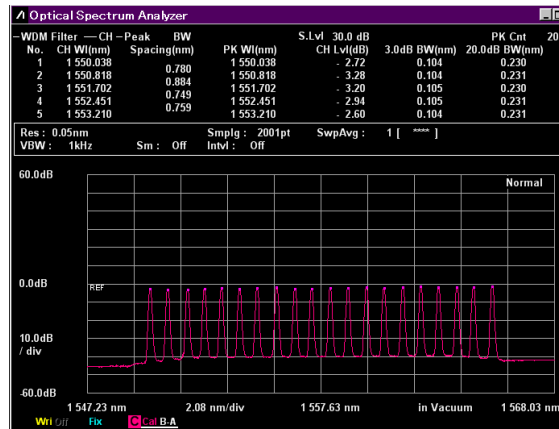


### Insertion Loss Evaluation

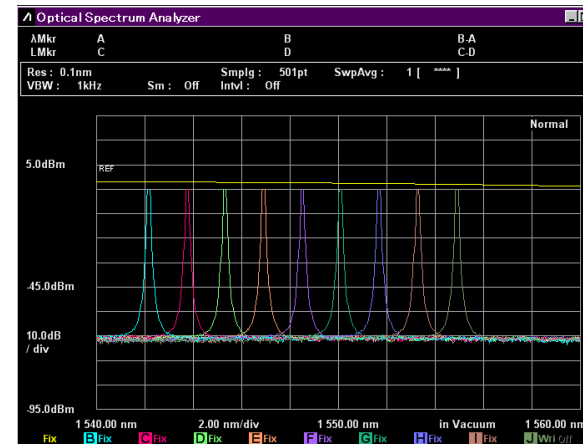


➤ evaluated by finding the difference in the measured results when the filter (DUT) is inserted and not inserted

➤ Filter Insertion Loss Analysis using Trace Mode



Filter Analysis by Waveform Difference Comparison

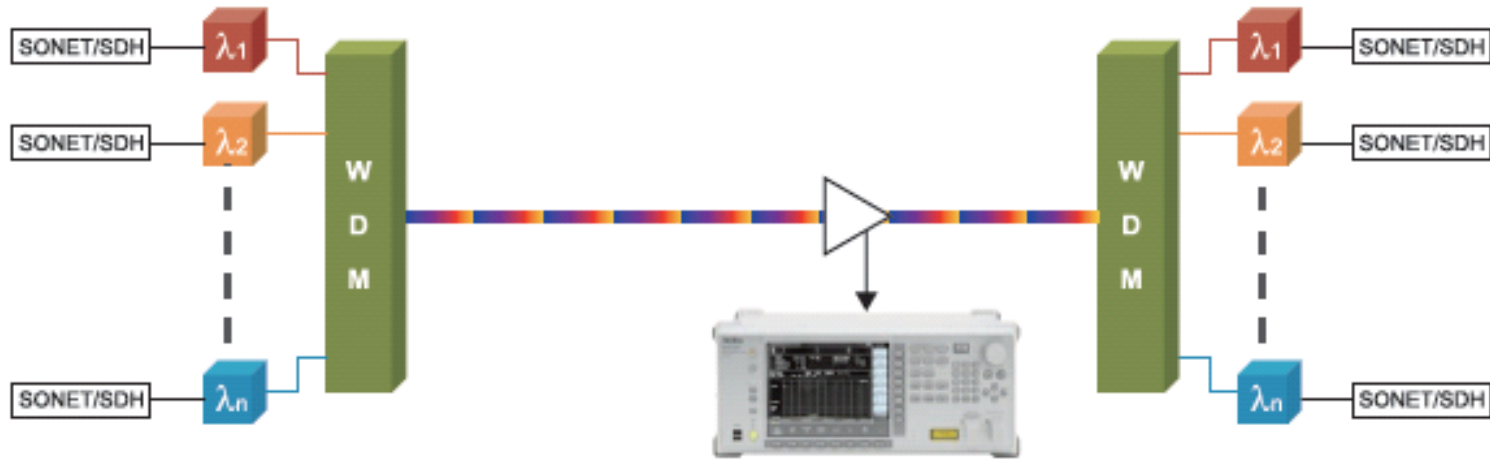


Multi-waveform trace

# MS9740A Product Introduction

## 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

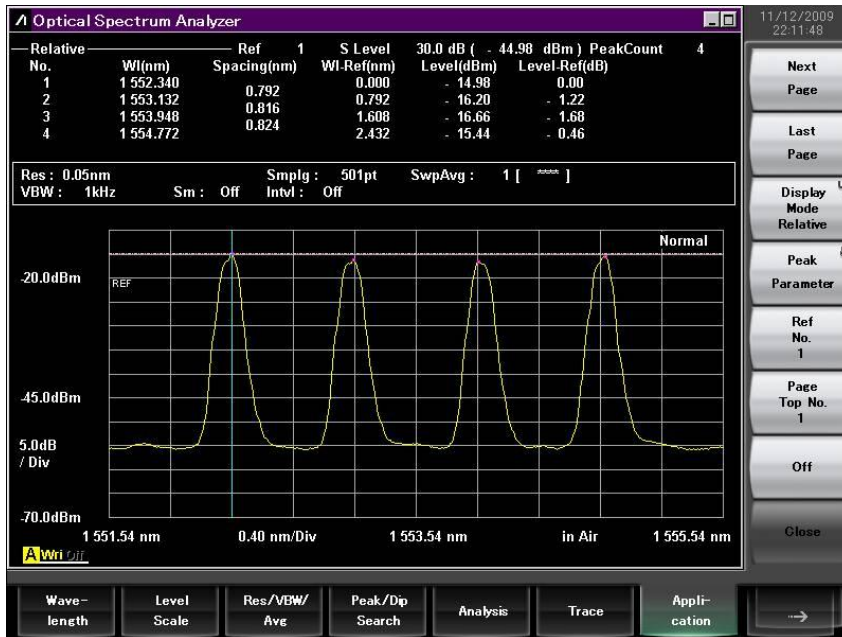


# MS9740A Product Introduction

## WDM Signal Analysis

### *Simultaneous spectrum analysis of multiple waveforms*

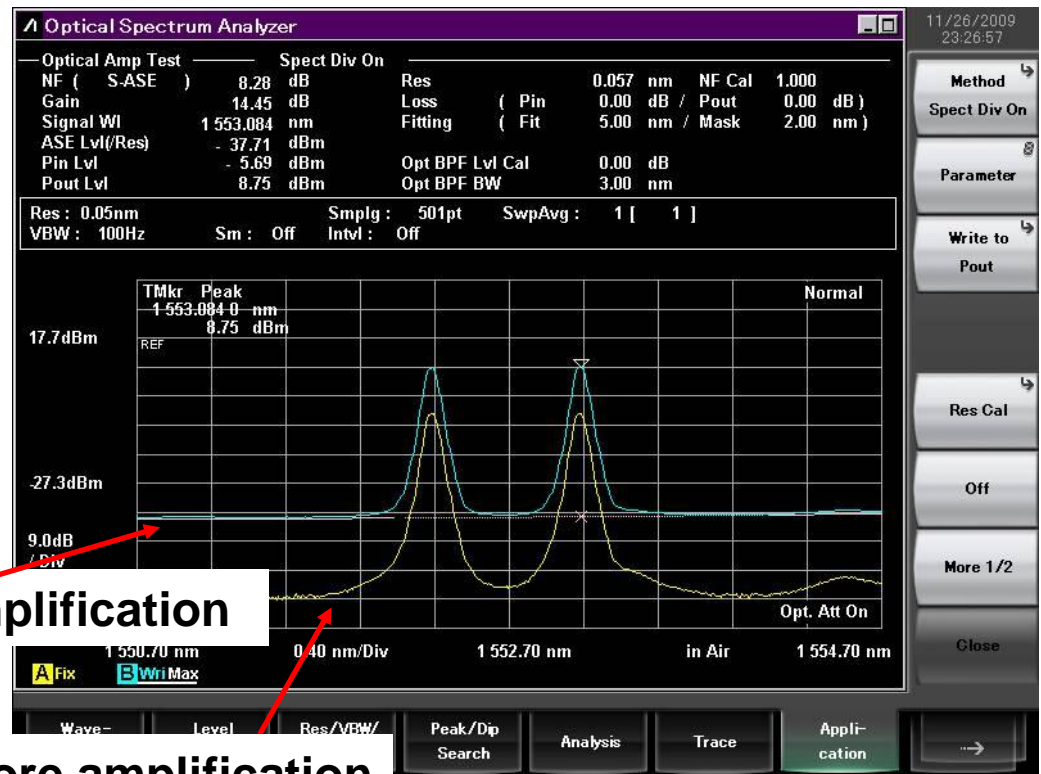
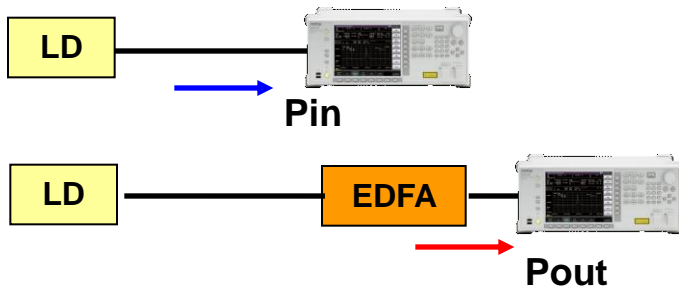
Up to 300 channels can be analyzed and information required for WDM signal analysis, such as center wavelength, level, SNR, etc., is displayed on one screen.



# MS9740A Product Introduction

## 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

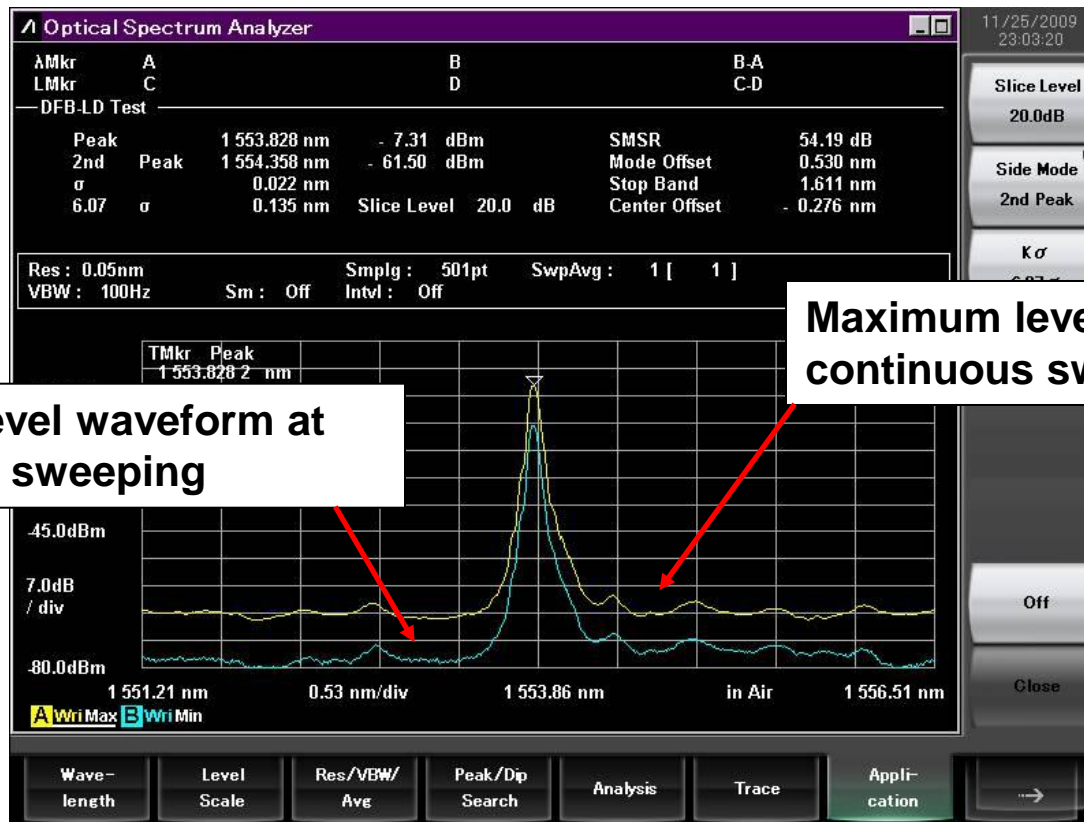
Pout output waveform after amplification

Pin output waveform before amplification

# MS9740A Product Introduction

## 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.



# MS9740A Product Introduction

---

## Easy Optical Fiber Connection

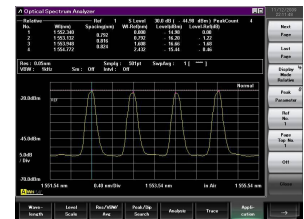
- **Supports SM and MM fibers**
  - ✓ One MS9740A unit supports measurement of both SM and MM fibers. Moreover, fiber light-reception is used for optical input. Backscatter attenuation of <35 dB (1300/1550 nm) assures accurate DUT backscatter measurement.
- **Supports LC connector**
  - ✓ Exchangeable optical receiver connectors assures support for FC, SC, ST and DIN; LC connector used by active optical devices are supported too.

# MS9740A Product Introduction

## 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.



# MS9740A Product Introduction

## Remote Tool Package



### ➤ MS9740A Remote Tool Package

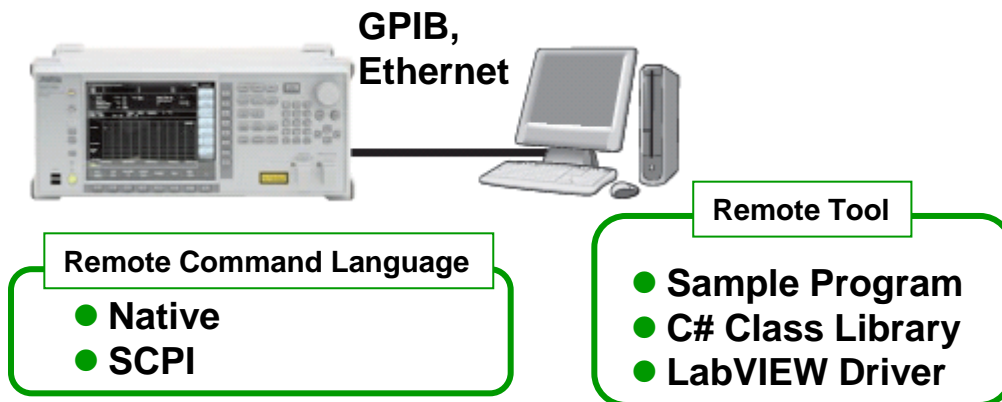
- ✓ The Remote Tools Package includes the quick-start guide, sample programs, C# class library, and LabVIEW Driver.

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

<http://www.anritsu.com/ja-JP/Downloads/Manuals/Quick-Start-Guide/DWL10292.aspx>



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.

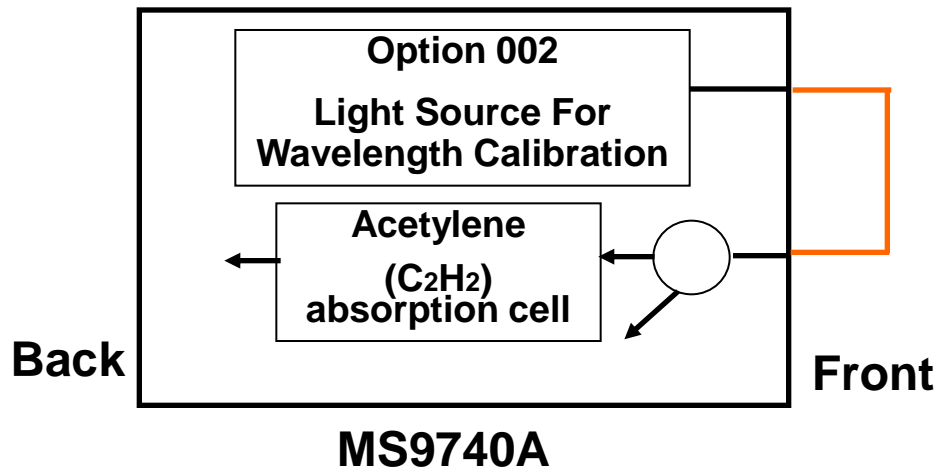
Trademarks:

- National Instruments™, NI™, NI-VISA™ and National Instruments Corporation are all trademarks of National Instruments Corporation.

# MS9740A Product Introduction

## Wavelength Calibration Function

Wavelength accuracy of  $\pm 20$  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  $\pm 20$  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.

# MS9740A Product Introduction

---

**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.**





# MS9740A Product Introduction

---

## Note

● **United States**

**Anritsu Company**

1155 East Collins Blvd., Suite 100, Richardson,  
TX 75081, U.S.A.  
Toll Free: 1-800-267-4878  
Phone: +1-972-644-1777  
Fax: +1-972-671-1877

● **Canada**

**Anritsu Electronics Ltd.**

700 Silver Seven Road, Suite 120, Kanata,  
Ontario K2V 1C3, Canada  
Phone: +1-613-591-2003  
Fax: +1-613-591-1006

● **Brazil**

**Anritsu Eletrônica Ltda.**

Praça Amadeu Amaral, 27 - 1 Andar  
01327-010 - Bela Vista - São Paulo - SP - Brazil  
Phone: +55-11-3283-2511  
Fax: +55-11-3288-6940

● **Mexico**

**Anritsu Company, S.A. de C.V.**

Av. Ejército Nacional No. 579 Piso 9, Col. Granada  
11520 México, D.F., México  
Phone: +52-55-1101-2370  
Fax: +52-55-5254-3147

● **United Kingdom**

**Anritsu EMEA Ltd.**

200 Capability Green, Luton, Bedfordshire, LU1 3LU, U.K.  
Phone: +44-1582-433200  
Fax: +44-1582-731303

● **France**

**Anritsu S.A.**

12 avenue du Québec, Bâtiment Iris 1- Silic 612,  
91140 VILLEBON SUR YVETTE, France  
Phone: +33-1-60-92-15-50  
Fax: +33-1-64-46-10-65

● **Germany**

**Anritsu GmbH**

Nemetschek Haus, Konrad-Zuse-Platz 1  
81829 München, Germany  
Phone: +49-89-442308-0  
Fax: +49-89-442308-55

● **Italy**

**Anritsu S.r.l.**

Via Elio Vittorini 129, 00144 Roma, Italy  
Phone: +39-6-509-9711  
Fax: +39-6-502-2425

● **Sweden**

**Anritsu AB**

Kistagången 20B, 164 40 KISTA, Sweden  
Phone: +46-8-534-707-00  
Fax: +46-8-534-707-30

● **Finland**

**Anritsu AB**

Teknobulevardi 3-5, FI-01530 VANTAA, Finland  
Phone: +358-20-741-8100  
Fax: +358-20-741-8111

● **Denmark**

**Anritsu A/S (Service Assurance)**

**Anritsu AB (Test & Measurement)**

Kay Fiskers Plads 9, 2300 Copenhagen S, Denmark  
Phone: +45-7211-2200  
Fax: +45-7211-2210

● **Russia**

**Anritsu EMEA Ltd.**

**Representation Office in Russia**

Tverskaya str. 16/2, bld. 1, 7th floor.

Russia, 125009, Moscow

Phone: +7-495-363-1694

Fax: +7-495-935-8962

● **United Arab Emirates**

**Anritsu EMEA Ltd.**

**Dubai Liaison Office**

P O Box 500413 - Dubai Internet City

Al Thuraya Building, Tower 1, Suit 701, 7th Floor

Dubai, United Arab Emirates

Phone: +971-4-3670352

Fax: +971-4-3688460

● **India**

**Anritsu India Private Limited**

2nd & 3rd Floor, #837/1, Binnamangla 1st Stage,

Indiranagar, 100ft Road, Bangalore - 560038, India

Phone: +91-80-4058-1300

Fax: +91-80-4058-1301

● **Singapore**

**Anritsu Pte. Ltd.**

11 Chang Charn Road, #04-01, Shriro House  
Singapore 159640  
Phone: +65-6282-2400  
Fax: +65-6282-2533

● **P.R. China (Shanghai)**

**Anritsu (China) Co., Ltd.**

Room 2701-2705, Tower A,  
New Caohejing International Business Center  
No. 391 Gui Ping Road Shanghai, 200233, P.R. China  
Phone: +86-21-6237-0898  
Fax: +86-21-6237-0899

● **P.R. China (Hong Kong)**

**Anritsu Company Ltd.**

Unit 1006-7, 10/F., Greenfield Tower, Concordia Plaza,

No. 1 Science Museum Road, Tsim Sha Tsui East,

Kowloon, Hong Kong, P.R. China

Phone: +852-2301-4980

Fax: +852-2301-3545

● **Japan**

**Anritsu Corporation**

8-5, Tamura-cho, Atsugi-shi, Kanagawa, 243-0016 Japan

Phone: +81-46-296-1221

Fax: +81-46-296-1238

● **Korea**

**Anritsu Corporation, Ltd.**

5FL, 235 Pangyoyeok-ro, Bundang-gu, Seongnam-si,

Gyeonggi-do, 463-400 Korea

Phone: +82-31-696-7750

Fax: +82-31-696-7751

● **Australia**

**Anritsu Pty. Ltd.**

Unit 21/270 Ferntree Gully Road, Notting Hill,

Victoria 3168, Australia

Phone: +61-3-9558-8177

Fax: +61-3-9558-8255

● **Taiwan**

**Anritsu Company Inc.**

7F, No. 316, Sec. 1, NeiHu Rd., Taipei 114, Taiwan

Phone: +886-2-8751-1816

Fax: +886-2-8751-1817

Please Contact: