Network Master

Optical Channel Analyzer

Dedicated field test solution for installation and troubleshooting of CWDM access network

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CWDM background

- WDM: technology to increase bandwidth capacity
  - Transmit different signals at different wavelengths over the same fiber optic cable
  - DWDM: widely implemented in long-haul networks
  - CWDM: cost-effective solution to maximize network capacity in the access, metro and regional network segments

- DWDM (Dense Wavelength Division Multiplexing)
  - up to 160 wavelengths in the C&L band
  - But this is expensive:
    - Cooled lasers,
    - Amplifiers: need to check OSNR along the network

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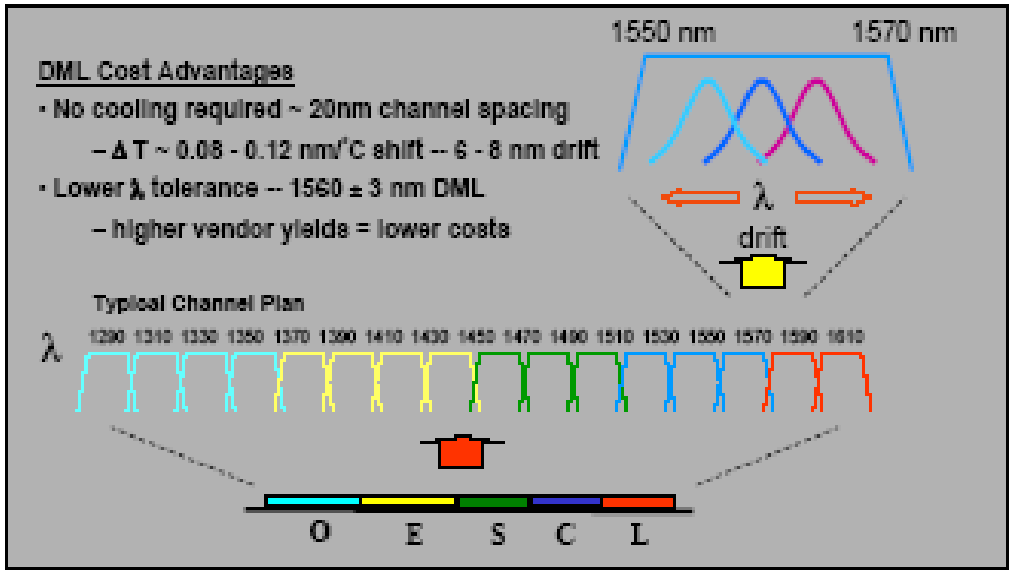
CWDM background

- CWDM : Coarse Wavelength Division Multiplexing
  - ITU defined 18-channel grid from 1271 to 1611nm
  - 20nm spacing allows use of uncooled lasers
  - Typical applications are metro up to 80km



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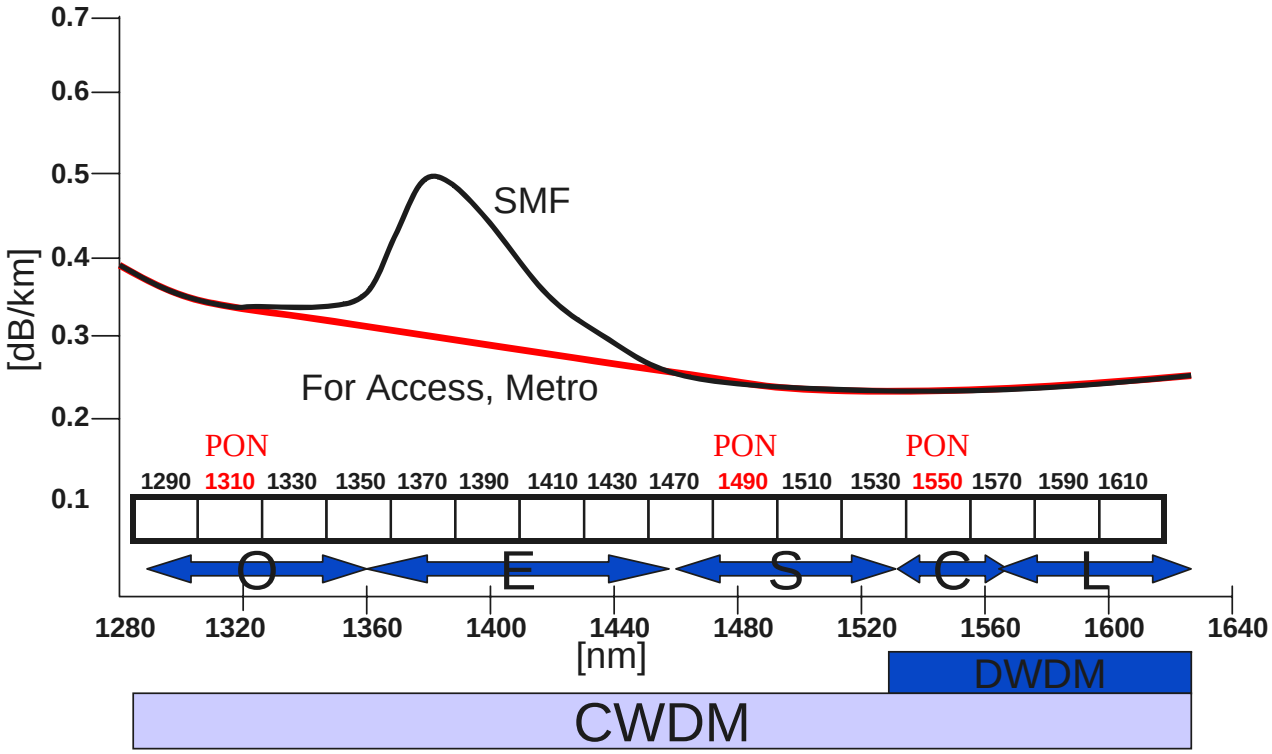
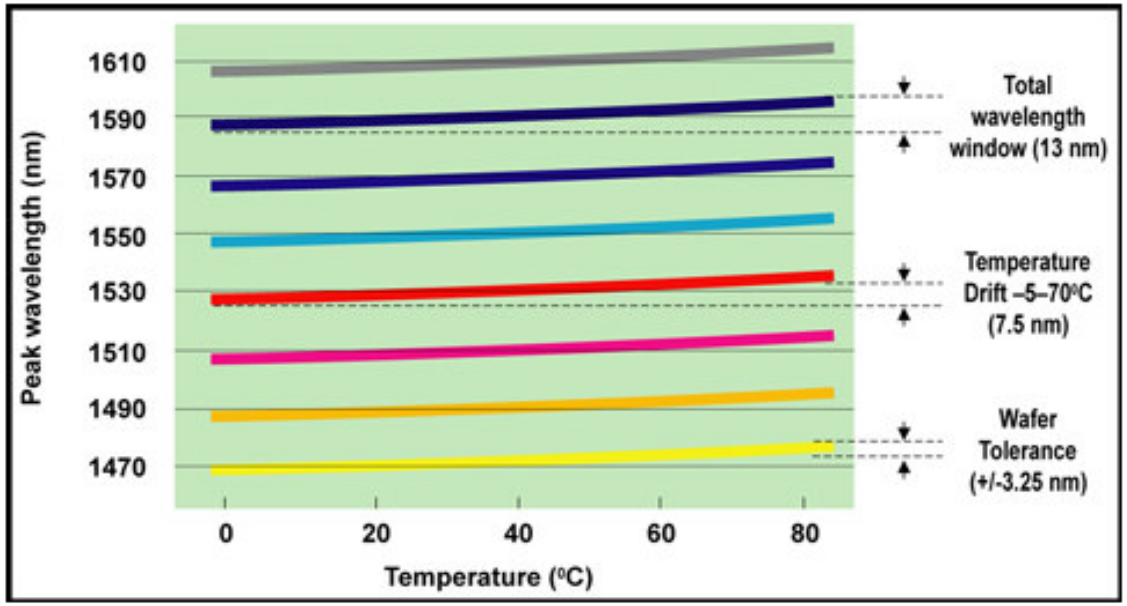
CWDM background

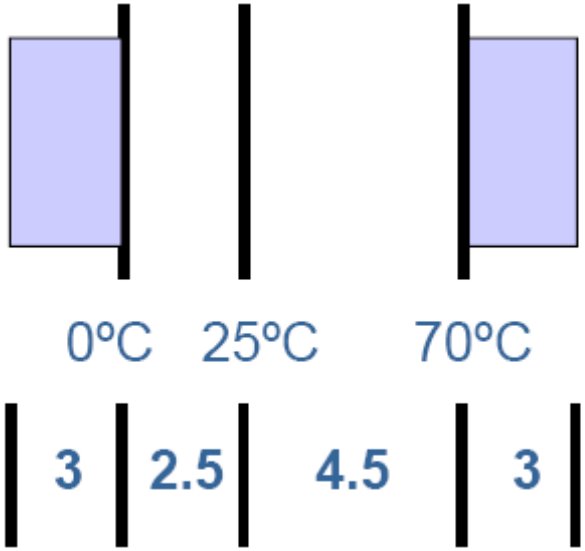
- Large band : 1271 to 1611 nm
  - Take advantage of latest fiber « All wave » transmission



CWDM challenges

- Use of low cost uncooled lasers means high wavelength drift and centering uncertainty





- Wavelength drift = Power drop after filtering by non-flat filters
  - crucial to measure both power and wavelength to determine or prevent cause of issue

CWDM challenges

- large band covering
  - To measure a CWDM signal a powermeter calibrated at each CWDM wavelength is essential

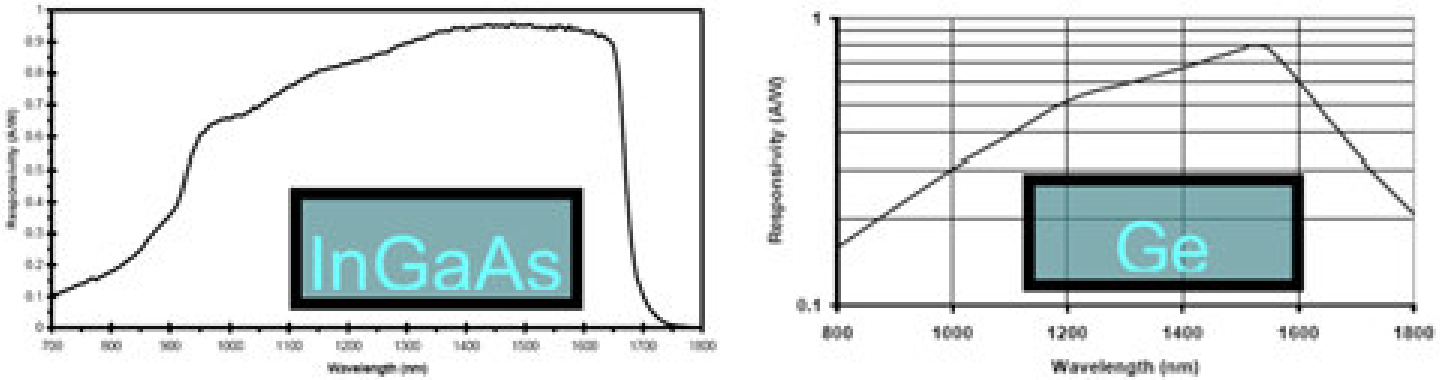


Figure 7. Detector response as a function of wavelength

1351nm is not the same as 1310 !

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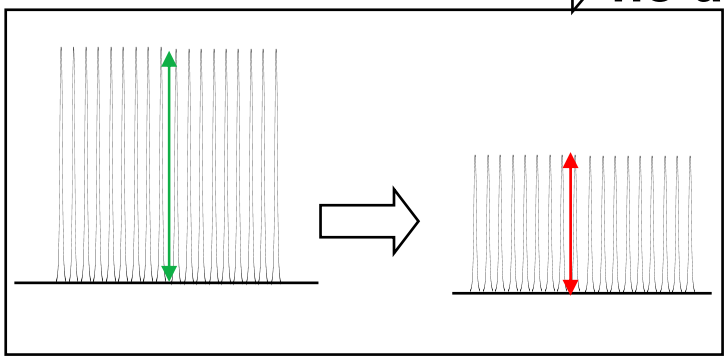
What users have today for CWDM testing

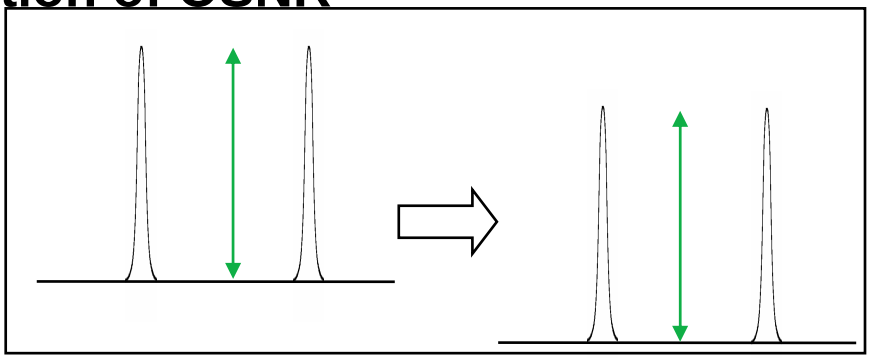
- Full OSA (Optical Spectrum analyser)
  - Benchtop OSA (MS9710 like)
  - Field OSA (CMA5000 like)
    - Still around 8kg
    - Moving parts inside the instruments
    - Around 8s measurement for 400nm
    - Expensive, with unnecessary features:

The ITU-T standard doesn't recommend testing OSNR for CWDM networks: No use of optical amplifier in CWDM network

⇨ no degradation of OSNR



DWDM



CWDM

What users have today for CWDM testing

- Passive CWDM filters + Power Meter
  - Cheap but complex solution: need of well-trained technicians
  - Need a referencing routine to have power accuracy
  - Do not give wavelength information: not suitable for troubleshooting
  - No easy comparison to ITU-T classes

Need for a new tool !

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Introducing the Network Master Optical Channel Analyser (OCA)

Replacement of standard Optical Spectrum Analyzer for testing CWDM networks (Coarse Wavelength Division Multiplexing)

Product Overview

- Power and wavelength management tool for CWDM networks:
  - Fast and accurate measurement of Power and Wavelength over the 18 CWDM channels
  - Easy monitoring of Wavelength and Power drifts
  - Compliant to ITU-T G.695 and G.694.2 standards
  - Pre-stored or user-defined threshold values for easy Go/No Go testing
  - Short boot-up and warm-up times plus long battery life
  - Power meter operation with measurement of the total incident power
  - Compact and lightweight design for maximum portability in the field

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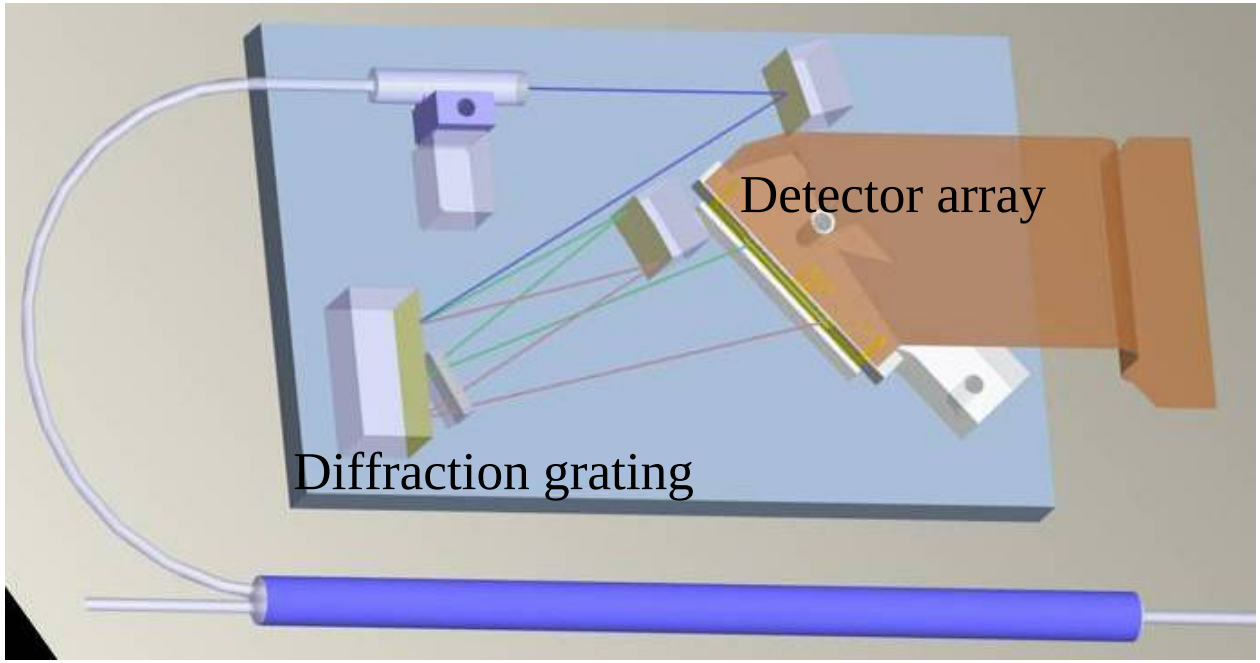
OCA Technology Background

- Monochromator with no moving part



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Key Features to Remember

- A field dedicated tool
  - Rugged, light weight and small size
  - large screen displaying an overview of all the CWDM channels at a glance.
    - Ease measurements in any environment on field
- A CWDM dedicated tester
  - Compliant to ITU-T G.695 standard
  - fast comparison with user definable threshold values
    - Fast and reliable measurements
- A cost-effective solution
  - low price instrument
  - friendly software interface (pass and fail indicators)
    - easy to use for any skill level, reducing the need for training
    - low cost alternative to more complex OSA

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Target Applications

- **Installation, commissioning & maintenance of CWDM access networks**
  - **Palm size instrument**
  - **booting up in 15s**
  - **reaching stability in 5 min in any environment**
  - **clearly displaying all the channels in 2s**

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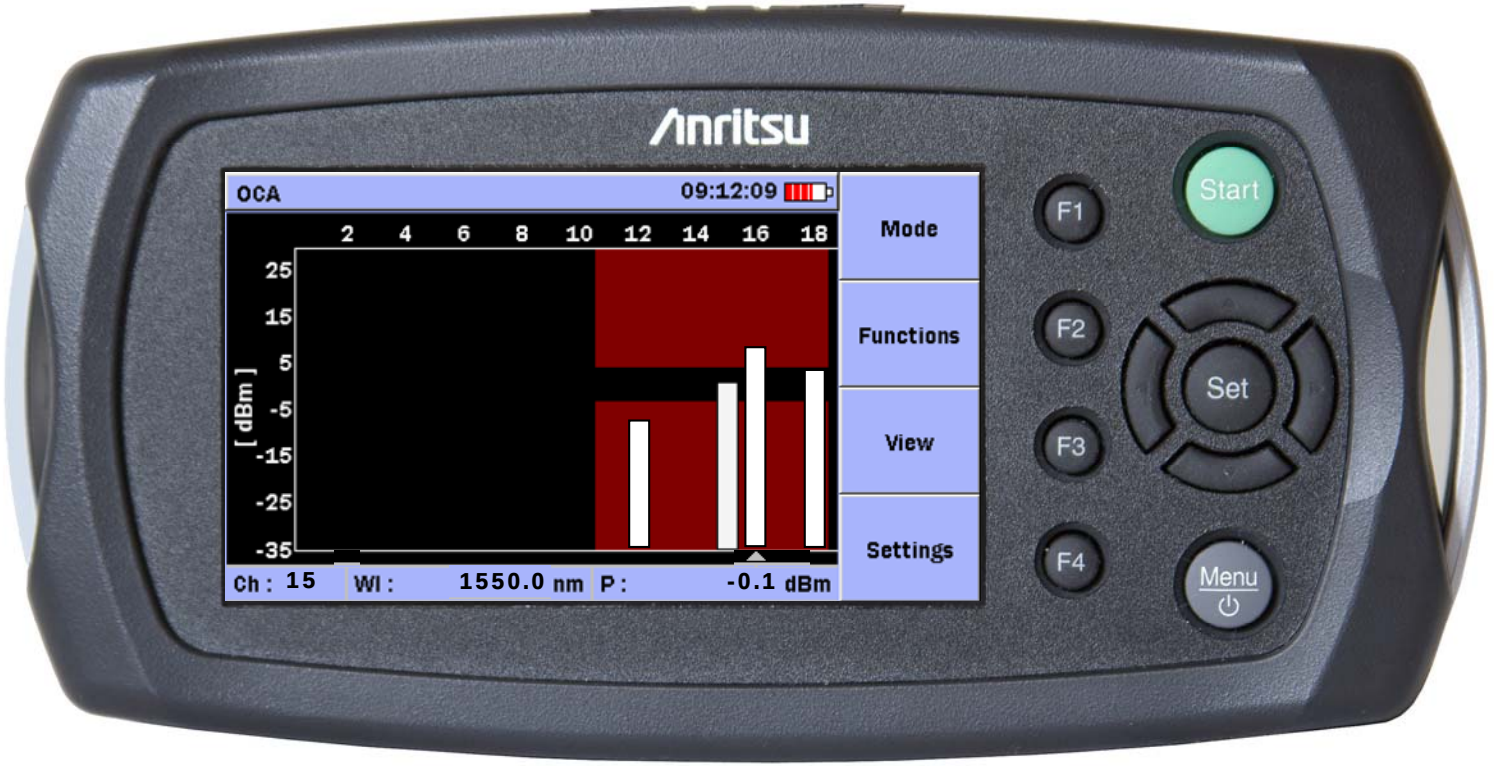
OCA Strong Points

- **Faster than any OSA**



- **Fast CWDM channels overview in graph display**

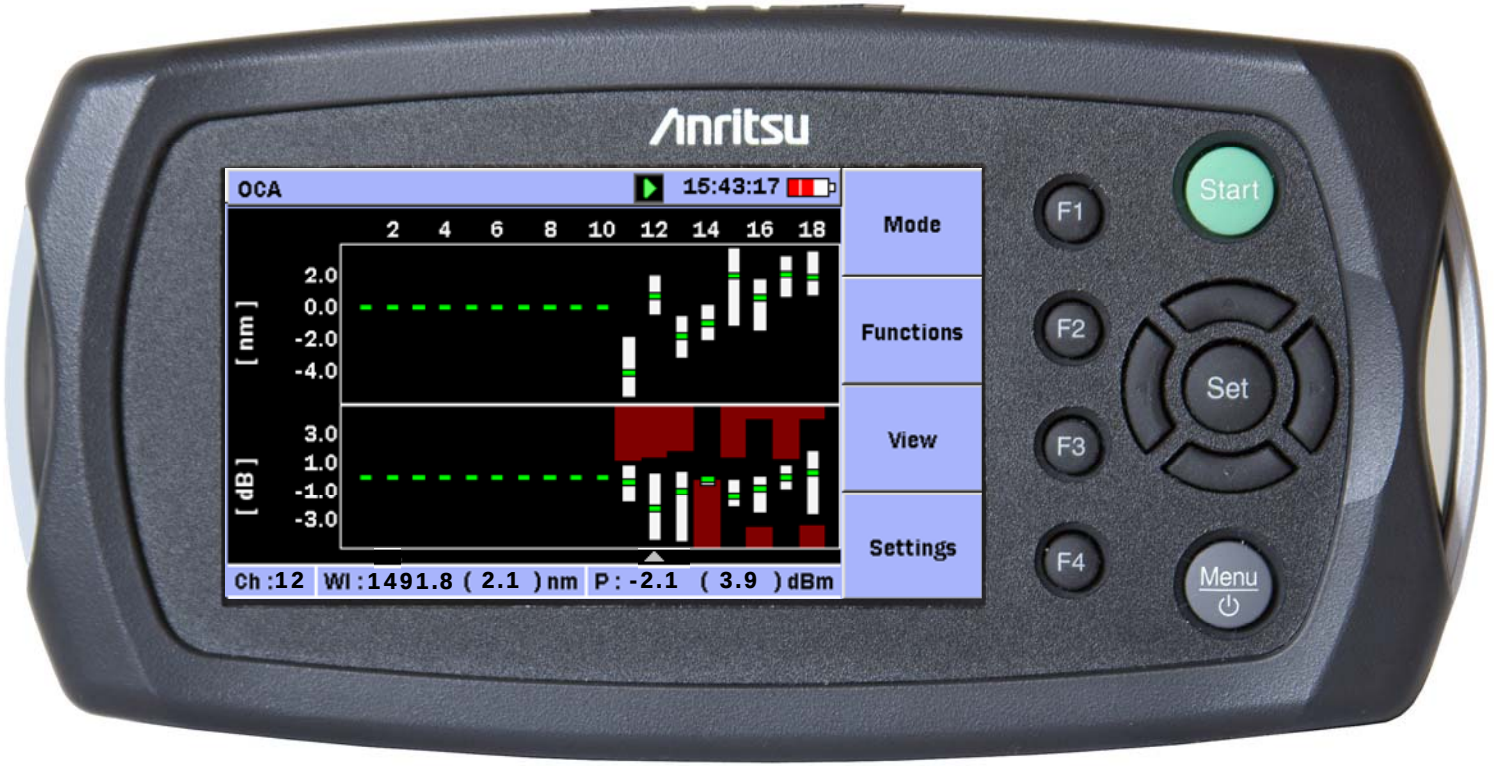
OCA Strong Points

- **Faster than any OSA**

- **Fast CWDM channels overview in table display**

OCA Strong Points

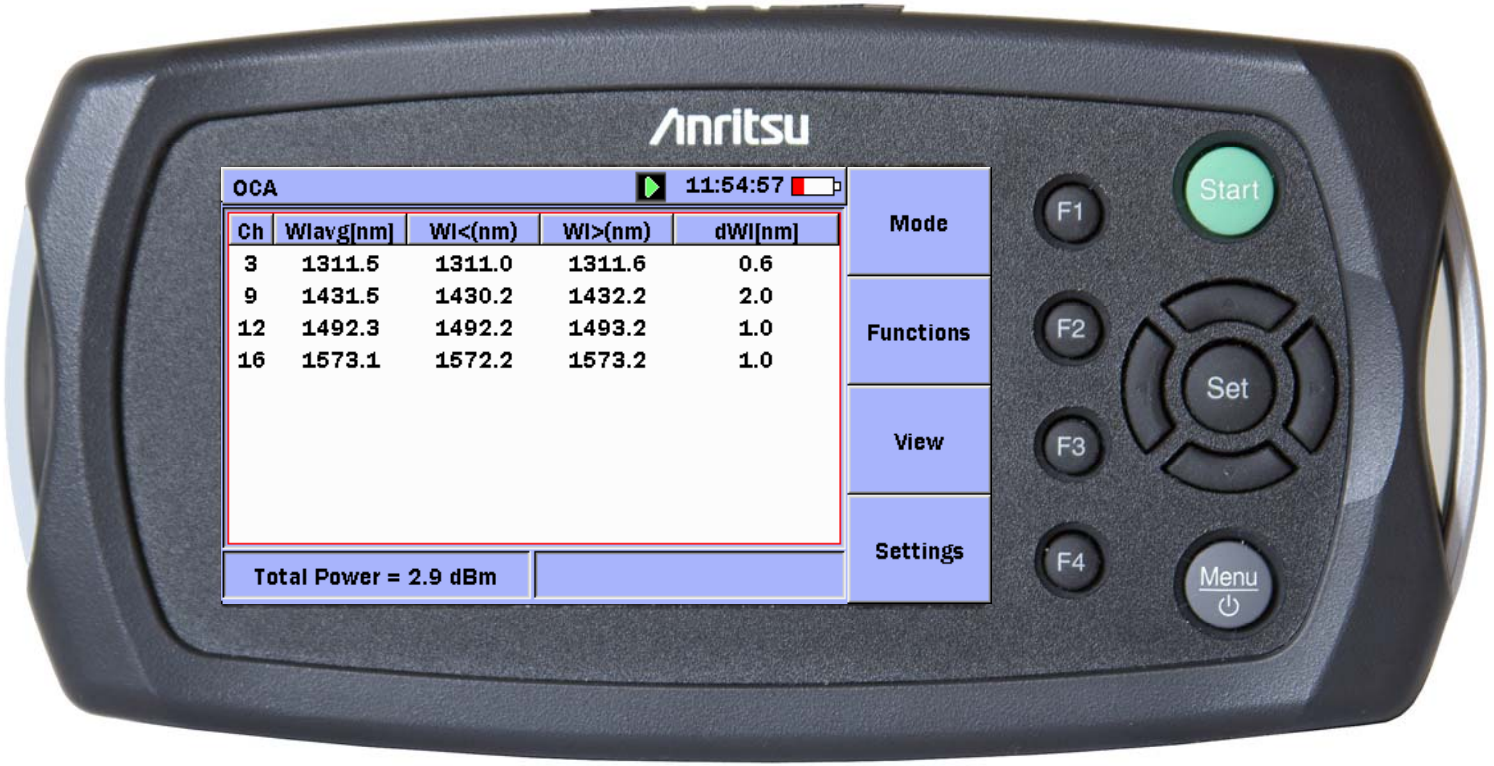
- Faster than any OSA



- Fast CWDM channels drift overview in graph display

OCA Strong Points

- Faster than any OSA



- Fast CWDM channels drift overview in table display

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OCA Strong Points

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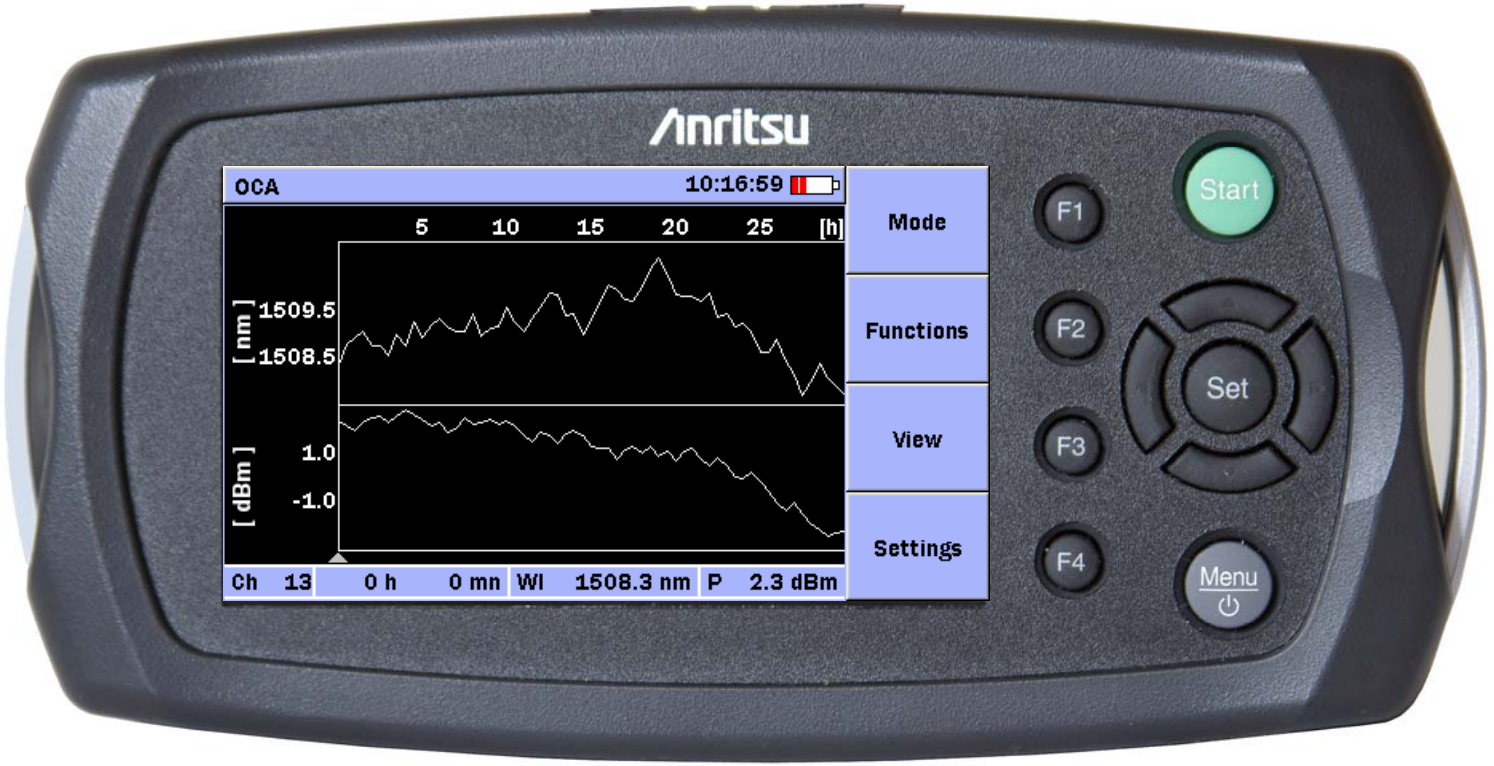

- **one channel drift over time in graph display**

Instruments for CWDM signal analysis

	Standard OSA	Anritsu OCA	CWDM filter + power meter
cost	☹	☺	☺
size	☹	☺	😐
Power Accuracy	☺	☺	☹
Wavelength accuracy	☺	☺	NA
Ease of use	😐	☺	☹
Standard compliancy	OK	OK	NO

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Specifications

Model	MU909020A
Number of channels	All 18 CWDM channels, compliant to ITU-T G.694.2
Channel pass band	+/- 6.5 nm, compliant to ITU-T G.695
Channel wavelength accuracy	+/- 1 nm*2
Power range per channel	+10 dBm to –40 dBm
Channel power accuracy	+/- 0.5 dB *1
Channel power linearity	+/- 0.3 dB *2
Total power accuracy	+/- 0.5 dB *1
Total power linearity	+/- 0.3 dB *2
Maximum total safe power	+17 dBm
Maximum channel safe power	+13 dBm
Instrument repeatability	+/- 0.2 dB *1
Channel imbalance (adjacent	> 12 dB *2 , 3
Polarization Dependant Loss	+/- 0.3 dB

*1: measured at -10 dBm
*2: Signal from +10 dBm to -35 dBm
*3: for wavelengths spacing > 15 nm. Channel imbalance > 15 dB for wavelengths spacing > 20 nm

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Configurations

1) Select Mainframe

Model/Order #	Description
MT9090A	Mainframe with color LCD

2) Select Module

Includes battery pack, AC charger/adapter, standard soft case, and strap, operation manual on CD

Model/Order #	Description
MU909020A	Base module

3) Select Connector Interface

Model/Order #	Description
MU909020A-050	OCA with PC optical connector
MU909020A-060	OCA with APC optical connector

Configurations

4) Select Connector Adapter

One adapter included at no charge – must be added as a separate line item.

Model/Order #	Connector Type
MU909020A-037	FC (PC: Model -050 only)
MU909020A-040	SC (PC: Model -050 only)
MU909020A-025	FC-APC (APC: Model -060 only)
MU909020A-026	SC-APC (APC: Model -060 only)

5) Select Accessories

Must be added as separate line items.

Model/Order #	Description
G0203A	Replacement AC Adaptor
G0202A	Replacement NiMH battery pack
B0601A	Standard soft case
Z1023A	Strap
B0602A	Deluxe soft case
CD005568	Hardcopy MT9090A/MU909020A Operation manual
CD005780	Hardcopy MT9090A/MU909020A Quick Reference Guide
MU909020A-ES210	12 month extended warranty (total 2 years warranty)
MU909020A-ES310	24 month extended warranty (total 3 years warranty)

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Thank you for your time!

Questions?

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