

Modular Portable Instrument Supporting Transmission and Optical Physical Layer Tests

CMA5000a

Multi-Layer Network Test Platform

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**Modular Portable Instrument Supporting
Transmission and Optical Physical Layer Tests**

Anritsu Corporation

CMA5000a Multi-Layer Network Test Platform

CMA5000a

- The all-in-one, portable CMA5000a supports network transmission and optical physical layer tests for installation and maintenance.
 - ◆ Transmission
 - SDH/SONET
 - Ethernet
 - ◆ Optical physical layer
 - Fiber end test
 - Loss test
 - OTDR
 - Chromatic dispersion
 - Polarization mode dispersion
 - Spectrum analysis



Applications

- **Supports fiber installation to transmission equipment setup with tests required for network commissioning, performance measurement and troubleshooting**
 - ◆ **Transmission equipment setup and performance tests**
 - DWDM Wavelength measurement
 - Transmission system conformance tests
(1.5 Mbit/s to 10 Gbit/s, SDH/SONET, 10/100/1000/10G Ethernet)
 - ◆ **Optical fiber installation**
 - Fiber end face damage check
 - Transmission loss/OTDR measurements
 - Chromatic and polarization mode dispersion measurements

Modular Structure

- One mainframe supports full range of versatile measurements by changing modules
 - ◆ Transmission systems (modules)
 - SDH/SONET (UTA, XTA)
 - Ethernet (UTA, XTA, GigE II)
 - ◆ Optical physical layer (modules)
 - Fiber end face check (VIP)
 - Loss test (OTDR)
 - Optical Time Domain Reflectometer (OTDR)
 - Chromatic dispersion (CD-OTDR)
 - Polarization mode dispersion (PMD)
 - Spectrum analyzer (OSA)



Mainframe Types and Modules

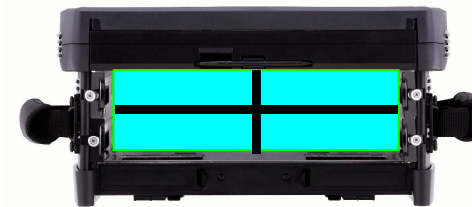
- Two mainframes models allowing greater flexibility
 - ◆ SBA: Two bays up for up two modules
 - ◆ MBA: Four bays for up to four modules
- Multiple measurement modules can be set and operated simultaneously in one mainframe.







SBA



MBA

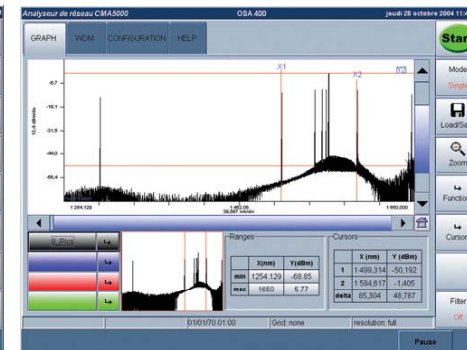


 <p>Bays empty USB Connection ◆ VIP</p>	 <p>1 bay used ◆ GigE II ◆ OTDR ◆ CD-OTDR</p>	 <p>2 bays used ◆ UTA ◆ XTA</p>	 <p>4 bays used ◆ OSA ◆ PMD</p>
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Intuitive Operation Screens

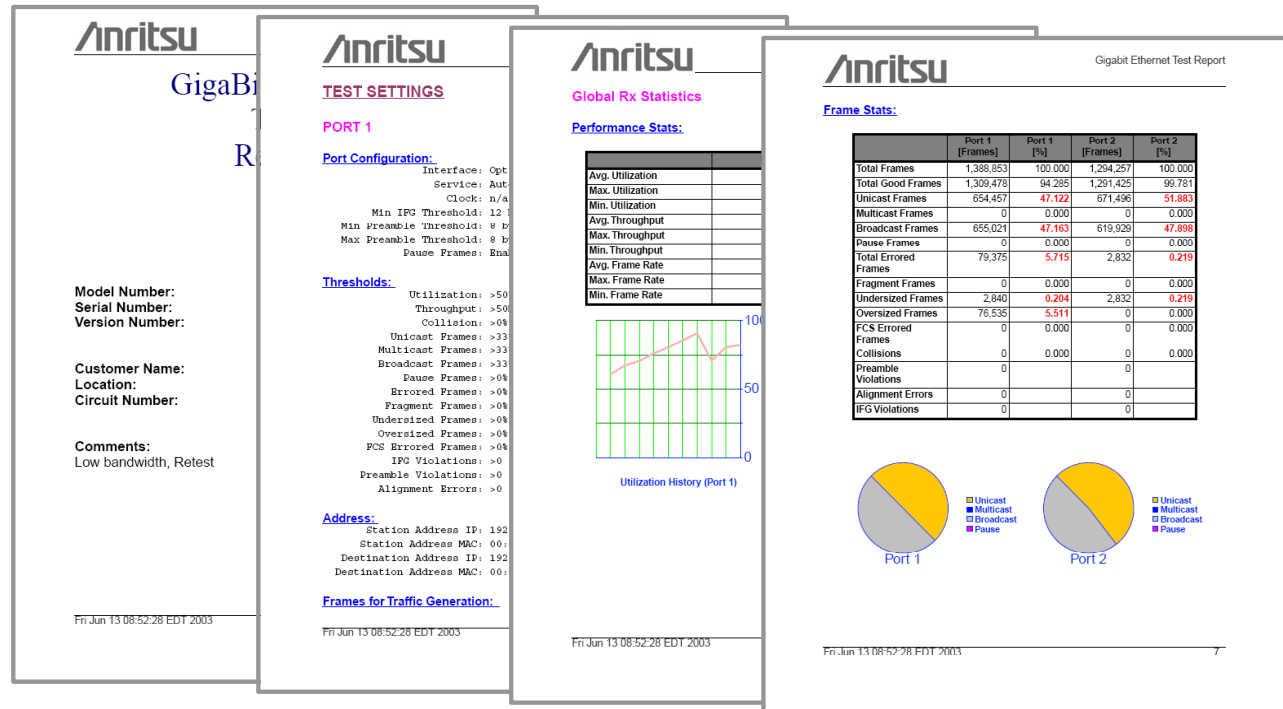
- Intuitive user interface cuts training and operation time
 - ◆ 10.4" LCD with touch panel allowing quick and direct access to many functions
 - ◆ Same GUI for all module interfaces insuring constant and simple operations



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Measurement Reports

- Easy auto-generation of measurement reports
 - ◆ Display measurement conditions and results
 - ◆ Print and save in PDF format
 - ◆ Insert customer logo



Model Number:
Serial Number:
Version Number:

Customer Name:
Location:
Circuit Number:

Comments:
Low bandwidth, Retest

Fri Jun 13 08:52:28 EDT 2003

TEST SETTINGS

PORT 1

Port Configuration:
Interface: Opt
Service: Aut
Clock: n/a
Min IPG Threshold: 12
Min Preamble Threshold: 0
Max Preamble Threshold: 0
Pause Frames: Bna

Thresholds:
Utilization: >50
Throughput: >50
Collision: >04
Unicast Frames: >33
Multicast Frames: >33
Broadcast Frames: >33
Pause Frames: >04
Errored Frames: >04
Fragment Frames: >04
Undersized Frames: >04
Oversized Frames: >04
FCS Errored Frames: >04
IFO Violations: >0
Preamble Violations: >0
Alignment Errors: >0

Address:
Station Address IP: 192
Station Address MAC: 00:
Destination Address IP: 192
Destination Address MAC: 00:

Frames for Traffic Generation:

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Global Rx Statistics

Performance Stats:

	Port 1 [Frames]	Port 1 [%]	Port 2 [Frames]	Port 2 [%]
Avg. Utilization				
Max. Utilization	1,309,478	94.285	1,291,425	99.781
Min. Utilization				
Avg. Throughput				
Max. Throughput				
Min. Throughput				
Avg. Frame Rate				
Max. Frame Rate				
Min. Frame Rate				

Utilization History (Port 1)

Frame Stats:

	Port 1 [Frames]	Port 1 [%]	Port 2 [Frames]	Port 2 [%]
Total Frames	1,388,853	100.000	1,294,257	100.000
Total Good Frames	1,309,478	94.285	1,291,425	99.781
Unicast Frames	654,457	47.122	671,496	51.883
Multicast Frames	0	0.000	0	0.000
Broadcast Frames	655,021	47.163	619,929	47.898
Pause Frames	0	0.000	0	0.000
Total Errored Frames	79,375	5.715	2,832	0.219
Fragment Frames	0	0.000	0	0.000
Undersized Frames	2,840	0.204	2,832	0.219
Oversized Frames	76,535	5.511	0	0.000
FCS Errored Frames	0	0.000	0	0.000
Collisions	0	0.000	0	0.000
Preamble Violations	0	0.000	0	0.000
Alignment Errors	0	0.000	0	0.000
IFO Violations	0	0.000	0	0.000

Port 1

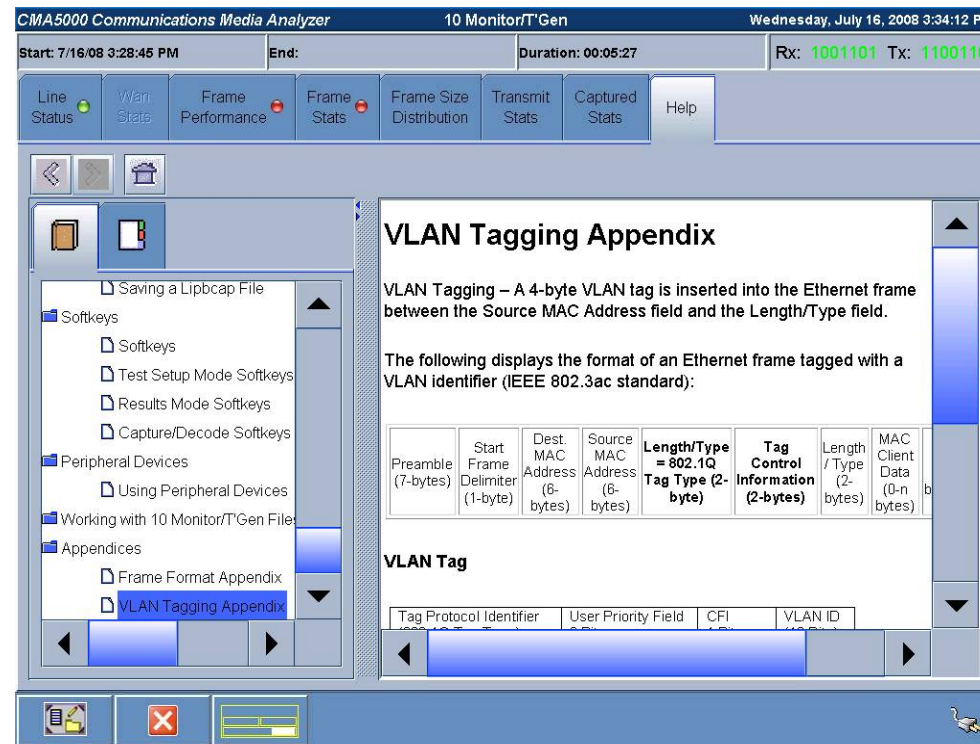
Port 2

Legend: Unicast (Yellow), Multicast (Blue), Broadcast (Green), Pause (Purple)

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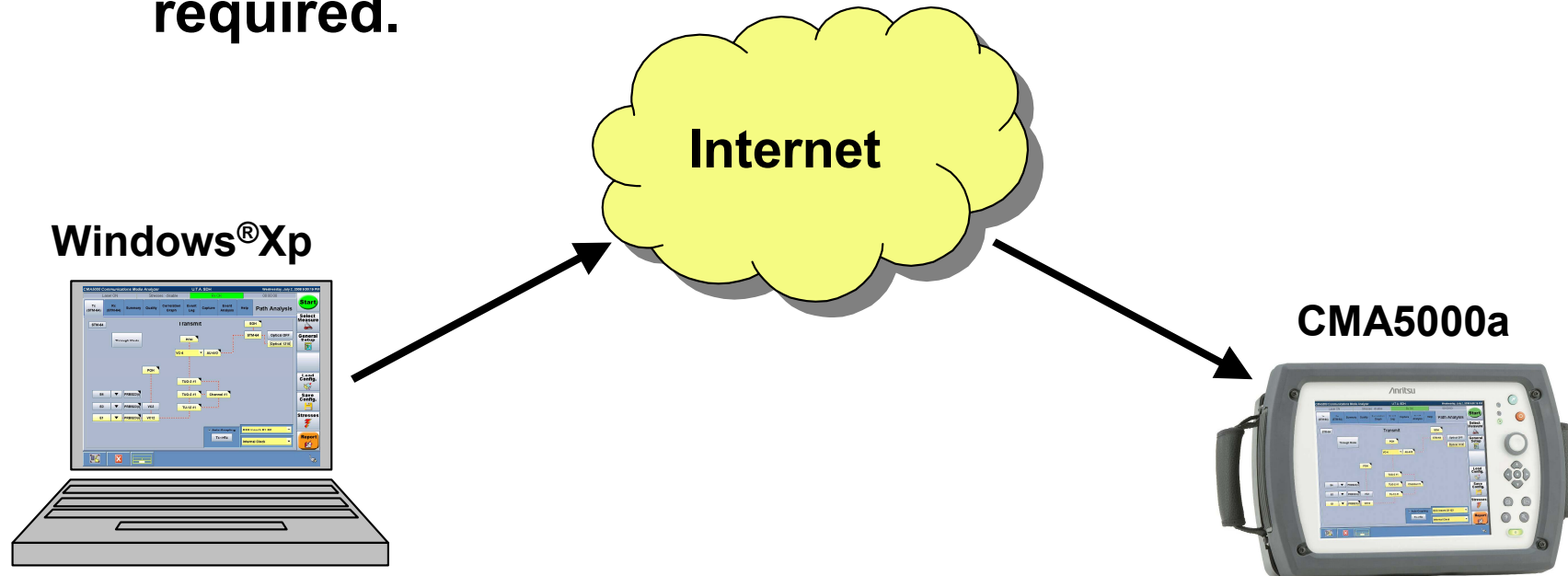
Online Help

- Easy to search indexed online help
Removing issues caused by losing the instruction manual
 - ◆ Operation methods and glossary of terms



Remote Control

- Supports control over Ethernet
 - ◆ Constant remote monitoring
 - ◆ A lesser experienced engineer could allow an expert to access to the subject matter for more detail testing, if required.



**Direct remote operation
by engineer**

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Operation Panel

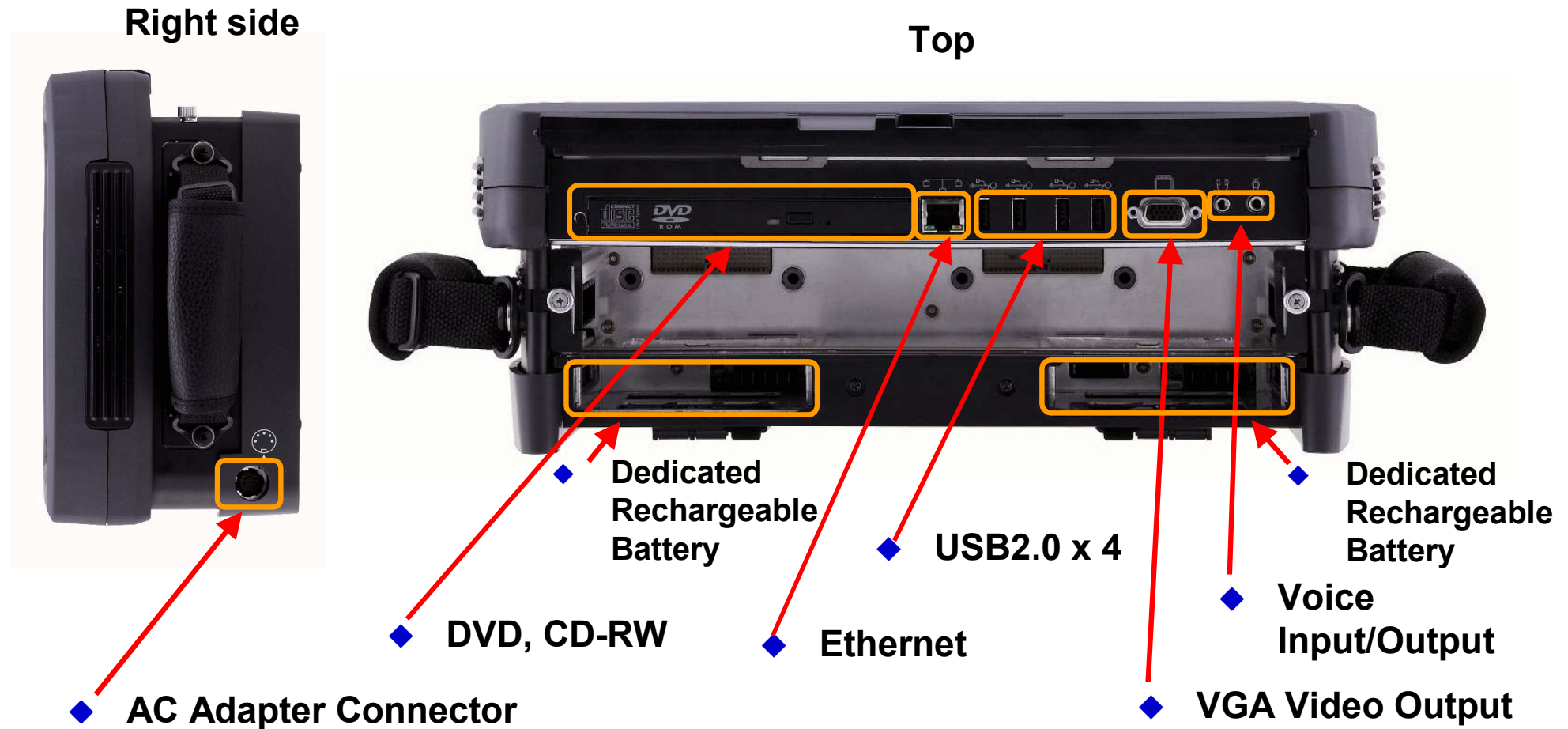
- Touch-screen operation of all main functions except power-on
- Operation by rotary encoder and up/down keys



Slide 10

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Main Frame I/O



Slide 11

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Main Frame Specifications

Item	Specification
Platform	SBA: Modules in 2 bays MBA: Modules in 4 bays
CPU/Memory/HDD	Celeron 733 MHz/512 MB/40 GB
OS	Windows®Xp Pro SP2
Display	10.4", 1024 x 768 pixel touch panel LCD
Media Drive	DVD/CD-RW built-in
Interface	Voice IN/OUT, VGA OUT, USB2.0 x 4 10/100 Ethernet
Power	100 to 240 Vac auto-switching, 50/60Hz, 150 W, Li-ion dedicated battery (Std / Max) SBA: (1 / 2), MBA: (2 / 2)
Dimensions (mm)	SBA: 246 x 371 x 140 MBA: 246 x 371 x 180
Weight (kg)	SBA: 5.9 MBA: 6.81

Modules

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UTA: 10 Gigabit Ethernet SDH/SONET, OTN

- One unit supports 10 GbE (LAN-PHY, WAN-PHY), SDH/SONET (156M to 10G), OTN (OTU1, 2)
- Supports 850, 1310, 1550 nm wavelengths by changing XFP and SFP optical modules

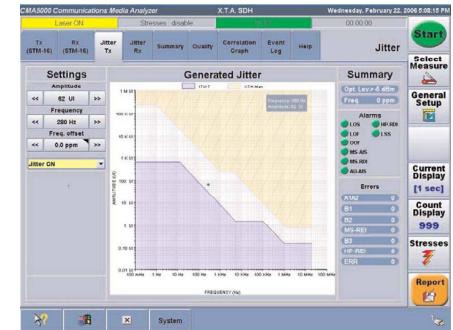


Frame	Function
10 GbE	LAN-PHY, WAN-PHY, VLAN RFC2544, BERT, Capture
SDH/SONET	STM1 to 64, OC3 to 192 Mapping down to DS1/E1 APS, Round Trip Delay, Through Mode NGN monitoring
OTN	OTU-1, OTU-2, 11.049G/FEC, 11.095G/FEC, 0.182 FEC Evaluation

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XTA: SDH/SONET up to 10G Jitter/Wander (to 2.5G)

- Choice of three types: 1.5M to 622M, up to 2.5G, and up to 10G
 - ◆ Supports 1310 and 1550 nm optical wavelengths from 156M to 2.5G and one of 1310 or 1550 nm for 10G
 - ◆ Supports electrical Interfaces from 1.5M to 156M
 - ◆ Supports Jitter/Wander and NGN measurements up to 2.5G



Functions

1.5M (DS1) to 622M, up to 2.5G, up to 10G

Concatenation

Through Mode

ITU-T M.2100, M2101.1, M2101

ITU-T G821, G826, G828

Tandem Connection Monitoring

ATM over SDH/SONET

Path Analysis

Round Trip Delay

NGN (LCAS, VCA, Differential Delay) *

Jitter/Wander up to 2.5G *

* Jitter/Wander, NGN or 10G not a combination of them

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GigE II: 10/100/1000M Ethernet

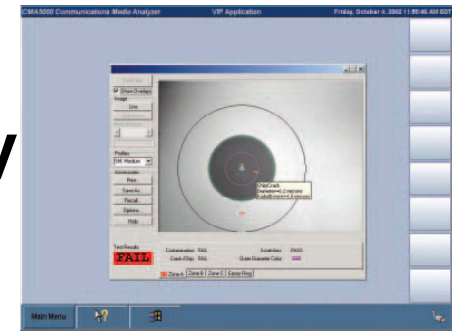
- Supports simultaneous measurement at two ports
- Optical/electrical interface selection for each port
- IP jitter measurement function allowing QoS measurements used to qualify network such as IPTV and VoIP



Functions	
10/100/1000M Auto-negotiation ON/OFF RFC2544 VLAN Tag BERT Through Mode	TCP/UDP encoding IP Jitter measurement Reflector Frame quality display Tx/Rx frame number difference display

VIP: Optical Fiber End Face Test

- Supports test of connector end face quality to know cause up to 75% of optical network faults on high speed links
 - ◆ USB Connection
 - ◆ Adapters support main connectors, including polished angle
 - ◆ User configurable connector quality pass/fail software

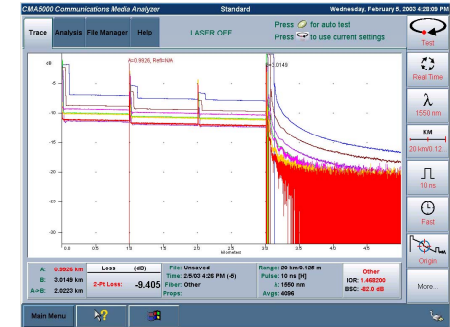


Functions	
Fiberscope for x400 magnification End face image save function	Adapters for 1.25 and 2.5 mm for patch cords, FC, SC, and ST connectors

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OTDR: Optical Time Domain Reflectometer

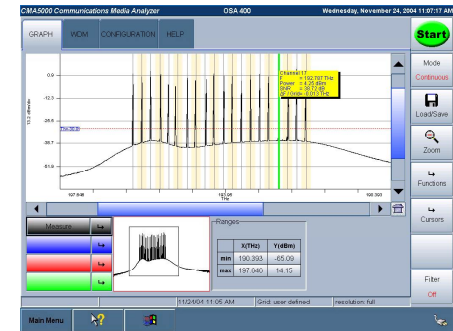
- Select measurement wavelengths from 850 to 1650 nm, and dynamic range from 26 to 50 dB
 - ◆ Fiber break auto-search
 - ◆ Simultaneous display of 8 traces for comparison
 - ◆ Loss measurement using stabilized light source and power meter
 - ◆ Find faults using visible light source



Functions	
OTDR Loss Measurement Visible Optical Source	PON Measurement Function

OSA: Optical Spectrum Analysis

- Excellent DWDM optical spectrum analysis
 - ◆ 1250 to 1650 nm
 - ◆ High dynamic range of 65 dB (± 50 GHz from peak)
 - ◆ Built-in channel drop function (OSA400)

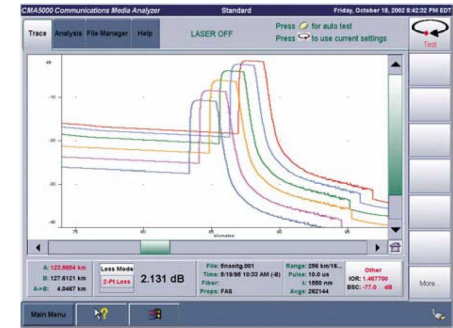


Functions	
WDM, CWDM Spectrum Analysis WDM Table List EDFA Measurement Drift Measurement	Channel Drop Function (OSA400)

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CD-OTDR: Chromatic Dispersion Analysis

- Chromatic dispersion evaluation using OTDR technology
 - ◆ Measurement using 1310/1550/1625 nm wavelengths
- Measurement range from 1310 to 1625 nm
- Measurement in under 4 minutes with optical fibers less than 50 km

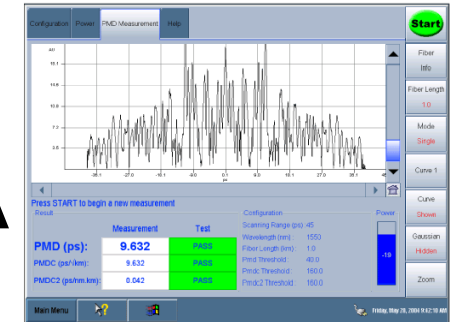


Functions	
Chromatic Dispersion OTDR Loss Measurement	

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PMD: Polarization Mode Dispersion Analysis

- Excellent accuracy, measurement based on interferometry compliant with TIA/EIA FOTP-124 and IEC60793-1-48 standards
- Measurement in 1310/1550/1625 nm bands
- Measurement in 8 seconds at 45 ps range



Functions	
Single Measurement	
Multi-Fiber Measurement	
Histogram Measurement	

Summary

- Two CMA5000a mainframe models and full line of modules support transmission and optical physical layer tests for fiber network installation and maintenance
- Intuitive operation cuts training and operation times

Module	Functions
UTA	10GbE, 156M to 10G SDH/SONET, OTN (OTU-1, OTU-2)
XTA	1.5M to 10G SDH/SONET, up to 2.5G Jitter/Wander, up to 2.5G NGN
GigE II	10/100/1000M Ethernet, 2 ports
VIP	Fiber End Face Test
OTDR	50 dB max. Dynamic Range, Loss Test, Visible Light Source
OSA	Optical Spectrum Analysis
CD-OTDR	Chromatic Dispersion Analysis
PMD	Polarization Mode Dispersion

Appendix

Differences between CMA5000a and CMA5000

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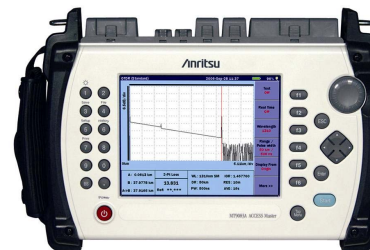
Differences between CMA5000a and CMA5000

- **CMA5000a Features**

- ◆ High-speed data saving using four USB2.0 ports
- ◆ High-speed software upgrade using USB2.0 memory
- ◆ High-speed OS install using DVD
 - CMA5000 uses two CDs for OS
 - Rental companies require OS reinstall at return
- ◆ Same design as NetworkMaster series



CMA5000a



MT9083A

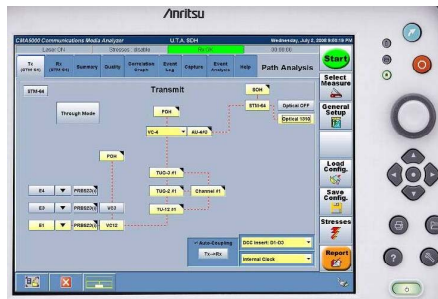


MT9090A

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Differences between CMA5000a and CMA5000

- Similarities between CMA5000a and CMA5000
 - ◆ Easy operation with good reputation



CMA5000a



CMA5000

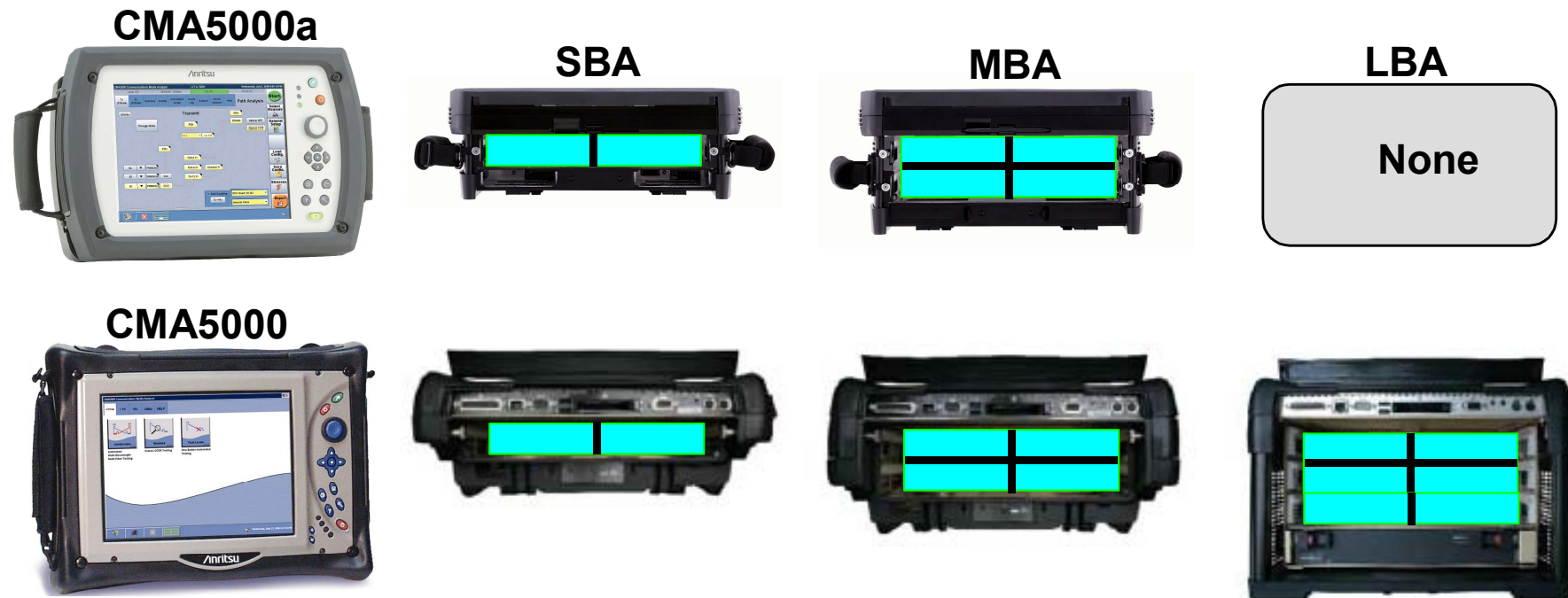
- ◆ Easy portability with similar dimensions and weights

		CMA5000a	CMA5000
SBA	Dimensions (mm)	371(W) x 246(H) x 140(D)	360(W) x 270(H) x 135(D)
	Weight (kg)	5.9	5.4
MBA	Dimensions (mm)	371(W) x 246(H) x 180(D)	360(W) x 270(H) x 171(D)
	Weight (kg)	6.81	6.3

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Differences between CMA5000a and CMA5000

- The CMA5000a offers greater flexibility than the CMA5000
 - ◆ Four USB ports instead of legacy PS/2 interfaces
 - ◆ Greater combination of battery operated modules
 - ◆ Multiple tilt features ensuring easy viewing at different situations
 - ◆ CMA5000 LBA is still available



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