

MU120138A

10 Gigabit Ethernet Module

MD1230B
Data Quality Analyzer

MP1590B
Network Performance Tester

MU120138A

Next-Generation 10GbE Module

Product Overview



Anritsu Corporation

Express Flow 10GbE module

MU120138A – 10 Gigabit Ethernet Module



- Option-01 Clock Measurement
- Option-03 LFS
- 10GBASE-SR/LR/ER

Multiport

- 4 ports/Module
- 20 ports/Main Frame
- SFP+ Interface

QoS

- Multi-Flow Counter
 - Real-time counter with 255 flows max.
 - 255 flows/port

Low Layer

- Cross PRBS
- Clock Measurement
- Link Flap

Module Lineup

Express Flow Modules



MU120131A 10/100/1000M Ethernet Module



MU120132A Gigabit Ethernet Module



MU120138A 10 Gigabit Ethernet Module

Enhanced Performance Tests

10M/100M/1000M I/F(MU120131A),
Multi-flow Counter, Multiple VLAN,
Clock Tolerance, 1 ms Traffic Monitor(excludes
10GbE I/F), PON, Multiport

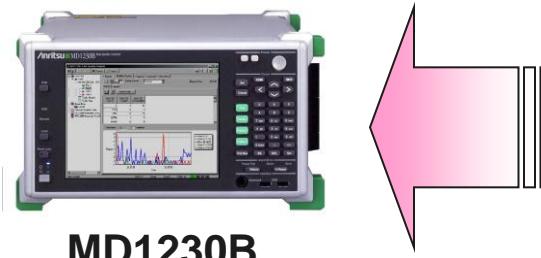
Key Features

Key Features

- **High Port Density Module**
- **Multi-Flow Counter**
- **Physical Layer Measurement**
 - ✧ Packet BER Measurement
 - ✧ Clock Tolerance
 - ✧ Link Flap
- **Latency Distribution Measurement**
- **Other Features**
 - ✧ Wireshark/Ethereal® Calling
 - ✧ Remote Control/Multi-User
 - ✧ Ethernet OAM
- **Power-Saving Design**

Key Features – High Port Density Module

- **High Port Density Modules**



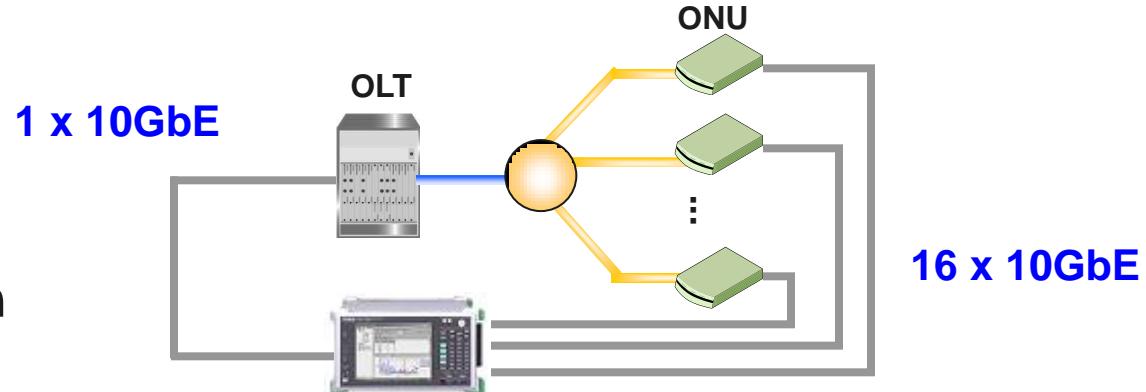
MD1230B



20 ports!

**5 modules max. work simultaneously
Flexible combination with other modules**

MP1590B: 3 modules max. (up to 12 ports per one mainframe)



**One instrument covers
10 GEPON systems with
16 splits.**

Key Features – Multi-Flow Counter (1/3)

- **Multi-Flow Counter**



Flow:

255 flows/port

Flow Condition: Max 4 IDs (16 bits x 4)

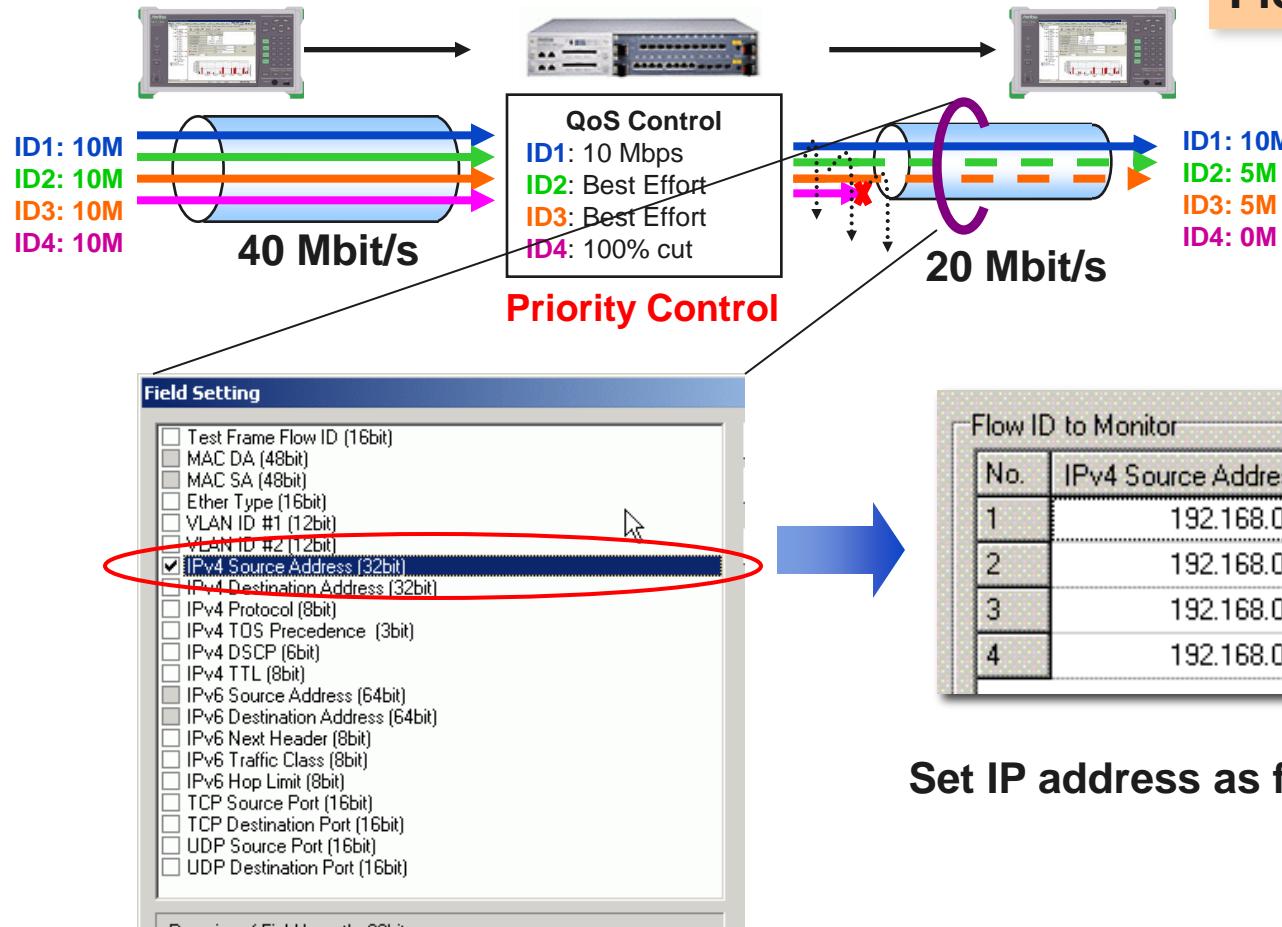
Measurements:

Transmit/Receive frames
Transmit/Receive bits
Rate
Latency
Sequence Errors

One instrument supports 255 flows
(more in Statistics Mode).

Key Features – Multi-Flow Counter (2/3)

- Multi-Flow Counter



Key Features – Multi-Flow Counter (3/3)

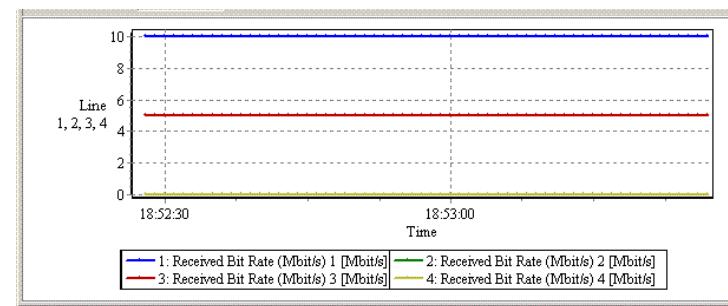
- Multi-Flow Counter

Step 2 Flow Measurement



Throughput of Each Flow

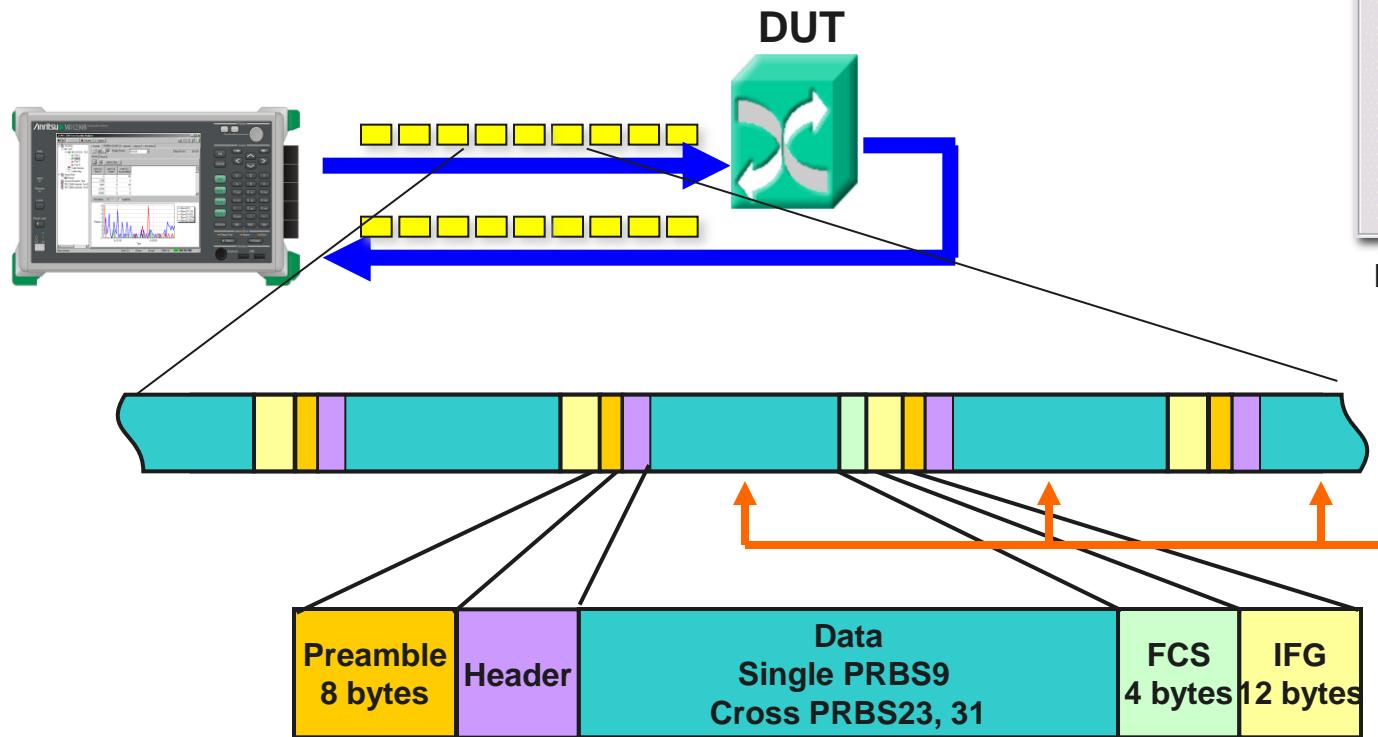
ID1 →	Received Bit Rate (Mbit/s) 1	10.000Mbit/s
ID2 →	Received Bit Rate (Mbit/s) 2	5.000Mbit/s
ID3 →	Received Bit Rate (Mbit/s) 3	5.000Mbit/s
ID4 →	Received Bit Rate (Mbit/s) 4	0Mbit/s
	Received Bit Rate (Mbit/s) Other	0Mbit/s
	Received Rate (%) 1	1.31%
	Received Rate (%) 2	0.66%



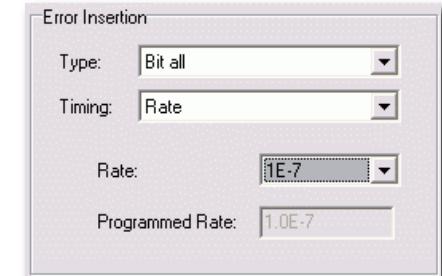
Latency

Current Latency (us) 1	0.304us
Current Latency (us) 2	0.304us
Current Latency (us) 3	0.304us
Current Latency (us) 4	-

- **Packet BER Measurement**
 - ◆ BER of PRBS Pattern in Ethernet Data Field
 - ◆ Bit Error Insertion



Error Insertion

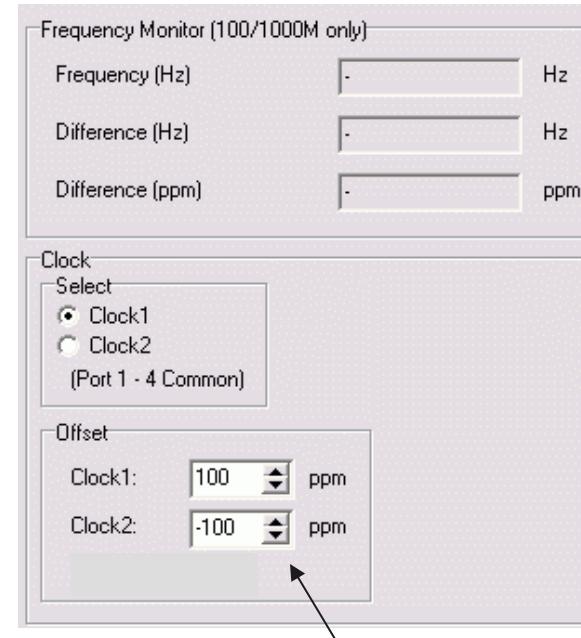
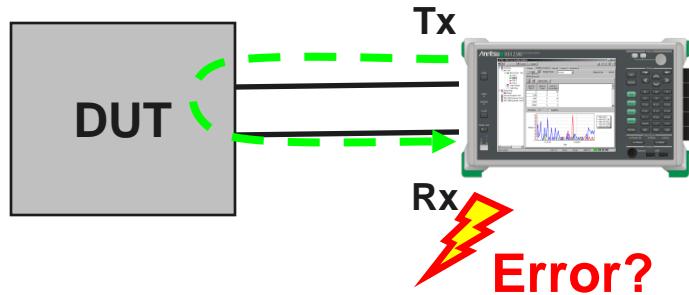


Rate/Programmable Rate

A continuous PRBS pattern is inserted in each frame in the Cross Mode.

- **Clock Tolerance**

Clock Tolerance



-100 to +100 ppm

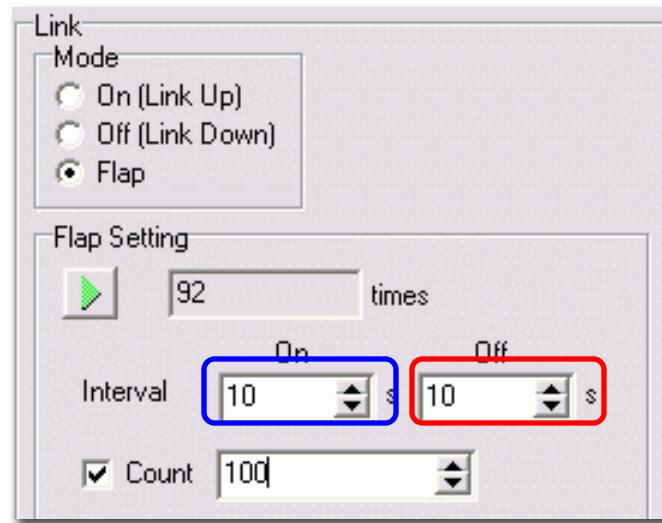
Clock Monitor

Frequency (Hz)	28,368
Frequency difference(Hz)	698
Frequency Offset (ppm)	21.016

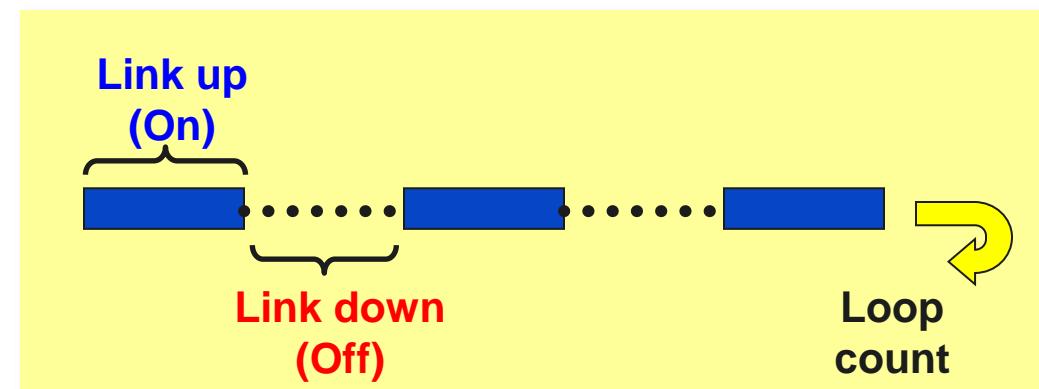
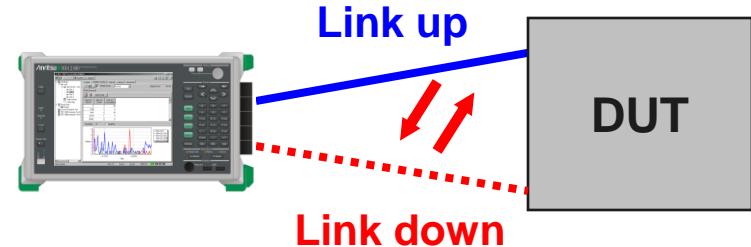
- + Multiport frequency monitoring
- + Log function for long-term monitoring

Key Features – Physical Layer Measurement (3/3)

- Link Flap



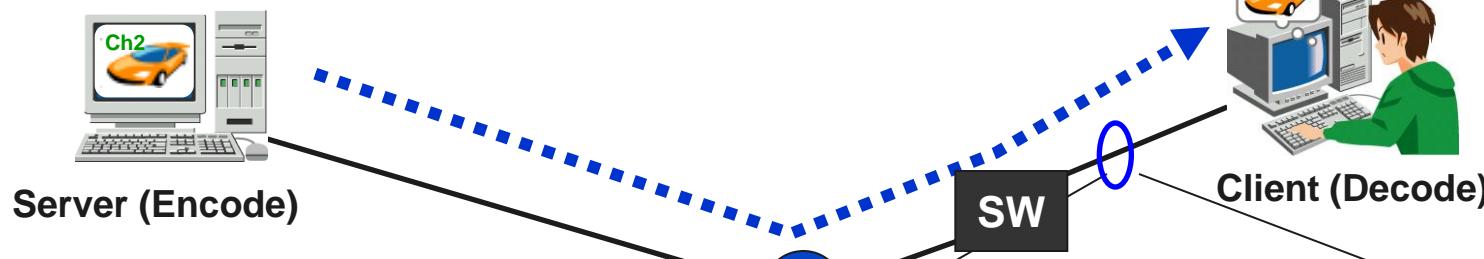
Link Flap



Key Features – Latency Distribution Measurement

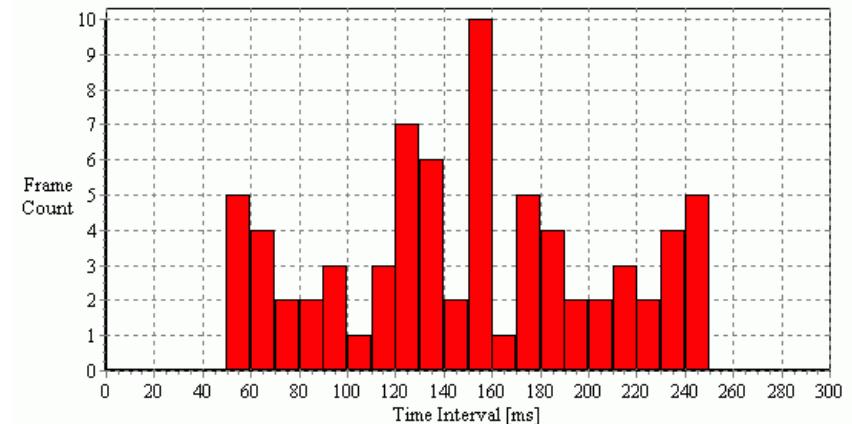
- **Latency Distribution Measurement (Latency Histogram)**

IP Streaming



Latency Histogram

- Confirm traffic fluctuation
- Filter any flow

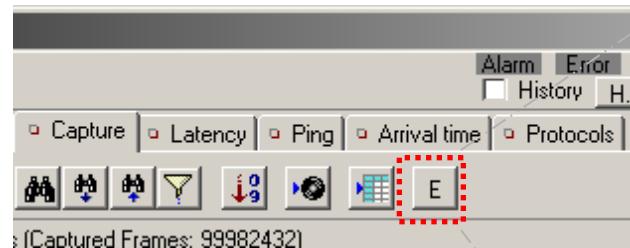


Delay Distribution Measurement Screen

Key Features – Others (1/3)

- **Wireshark/Ethereal® Calling**

The add-on Wireshark®/Ethereal® Protocol Analysis Engine supports the latest protocols.



No.	Time	Source	Destination	Protocol	Info
1	0.000000	4e:95:a9:62:48:95	cc:74:23:57:67:e5	0x20d9	Ethernet II
2	-0.540429	80:04:21:3a:53:cc	1f:ab:41:be:b6:f2	0x469c	Ethernet II
3	-0.380223	aa:cd:02:b3:21:07	65:32:2d:c9:3c:3b	0xb9a6	Ethernet II
4	0.219557	63:df:65:d4:b7:ec	7f:2f:23:ae:88:78	0x61b1	Ethernet II
5	-0.310766	32:fd:f5:af:8f:f8	89:c2:6d:94:17:57	0xfecf	Ethernet II
6	0.303066	24:f4:7e:62:da:f6	89:07:1d:13:ba:9c	0x49cf	Ethernet II
7	0.278671	c8:e2:34:91:f2:11	b8:2d:20:02:20:ab	0xdd32	Ethernet II
8	-0.480380	f7:bc:be:ba:ed:4e	88:53:c3:6f:26:bc	0xeace	Ethernet II
9	-0.322822	a6:7b:b3:94:44:6c	97:e6:d0:bc:6a:bc	0xbd1f	Ethernet II
10	-0.551672	e3:cd:71:ca:a2:68	1f:3e:4a:e1:1a:e1	0x5929	Ethernet II

Frame 1 (64 bytes on wire, 64 bytes captured)
Ethernet II, Src: 4e:95:a9:62:48:95, Dst: cc:74:23:57:67:e5
Data (50 bytes)
0000 cc 74 23 57 67 e5 4e 95 a9 62 48 95 20 d9 94 db .t#Wg.N. .bH. ...
0010 10 07 4d 29 00 eb c4 96 78 7b 6b e4 0a 95 f2 0f ..M).... x{k....
0020 8f 38 af 22 b3 f4 43 4e b4 9f 7b 3d 66 4a 74 a4 :8."..CN ..{f}t.
0030 7b 73 03 18 01 7d 53 22 2c 5d do 95 56 95 44 1f {s...}S" ,]..V.D.

Ethereal® is registered trademarks of Ethereal, Inc.

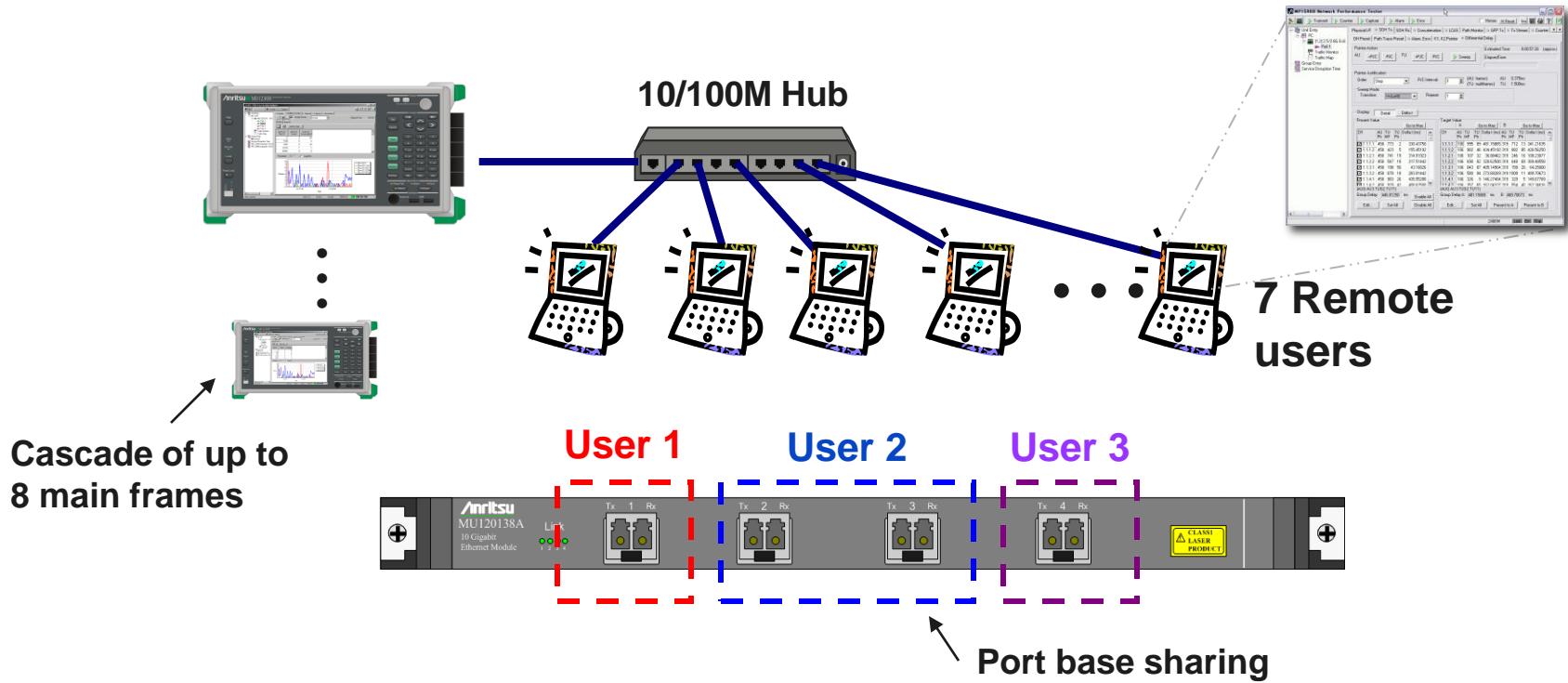
Wireshark® is registered trademarks of Gerald Combs.

This open-source software is free but must be installed by the customer.

Key Features – Others (2/3)

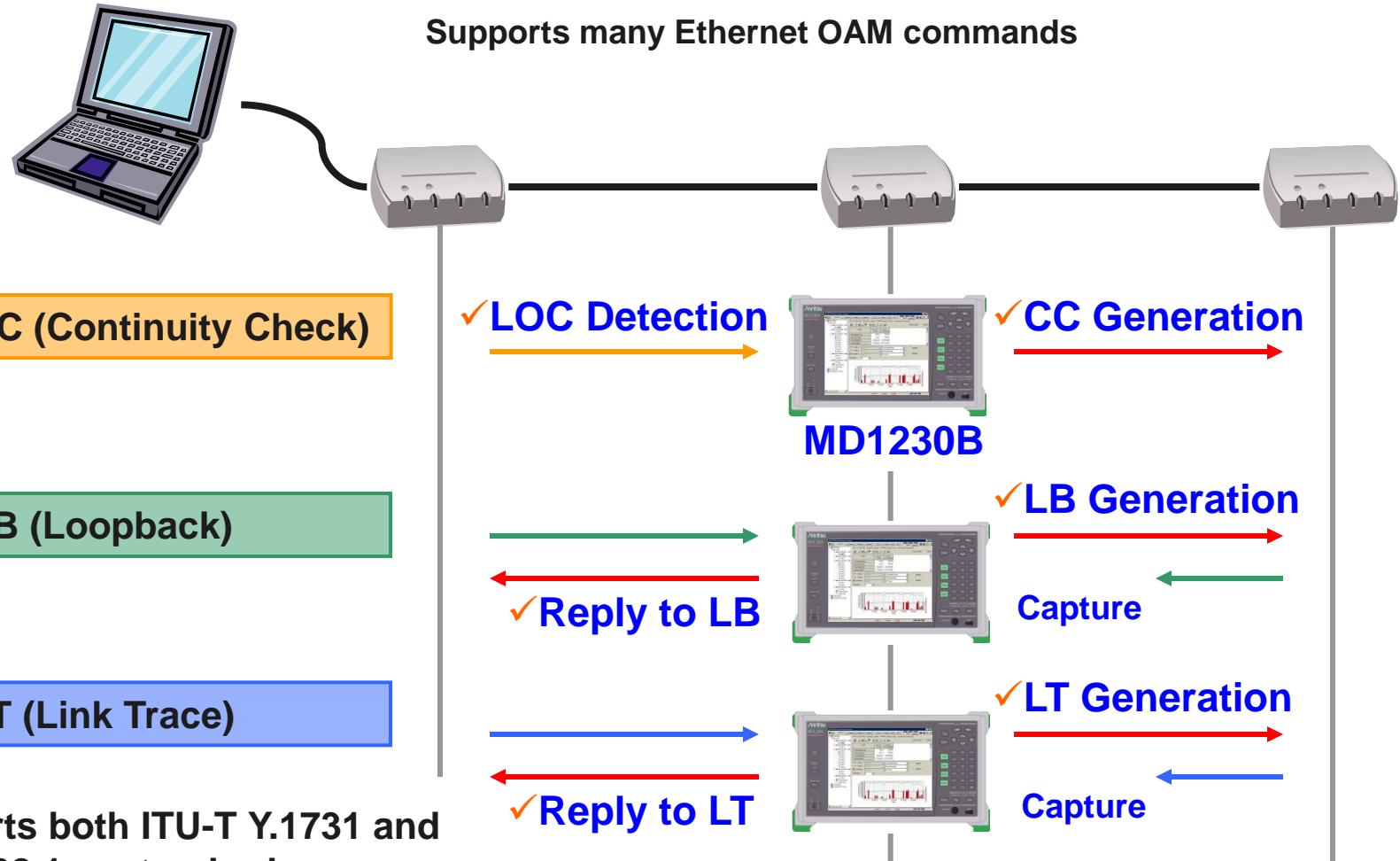
- **Remote Control/Multi-User**

Remote control software supports simultaneous operation by 8 users with the same GUI as local operation.



Key Features – Others (3/3)

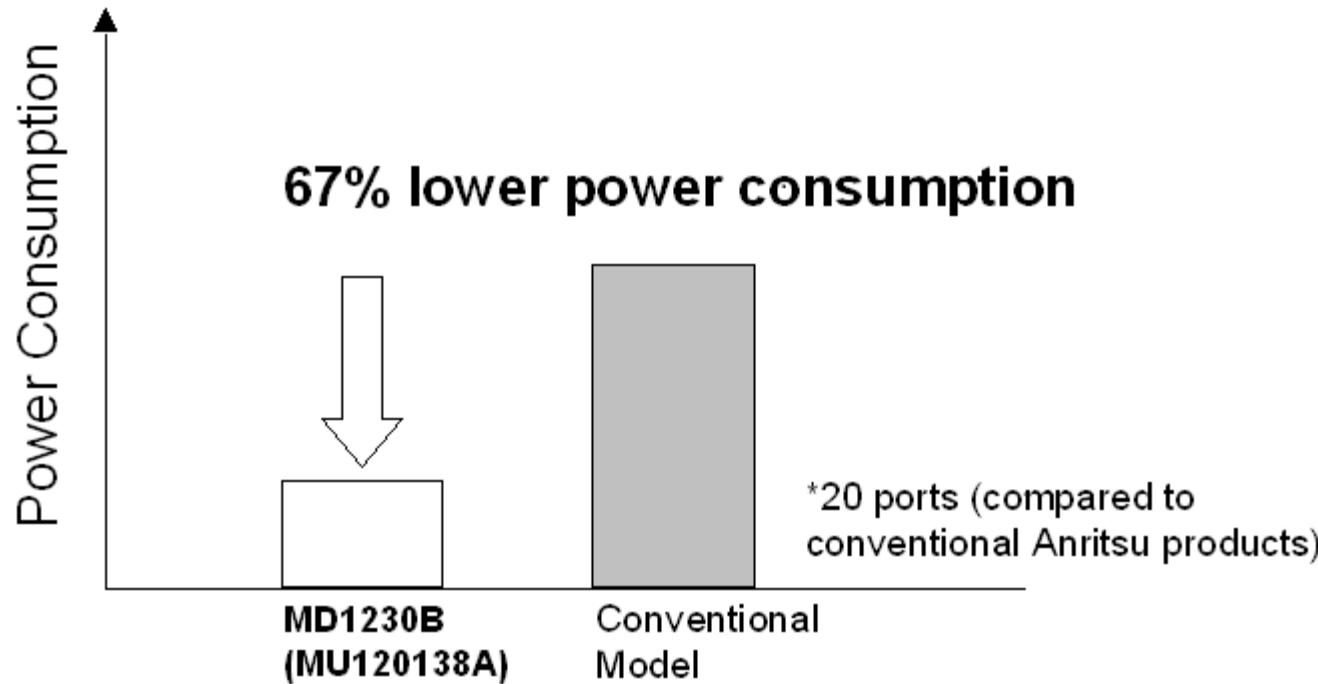
- Ethernet OAM



Key Features – Power-Saving Design

- **Power-Saving Design**

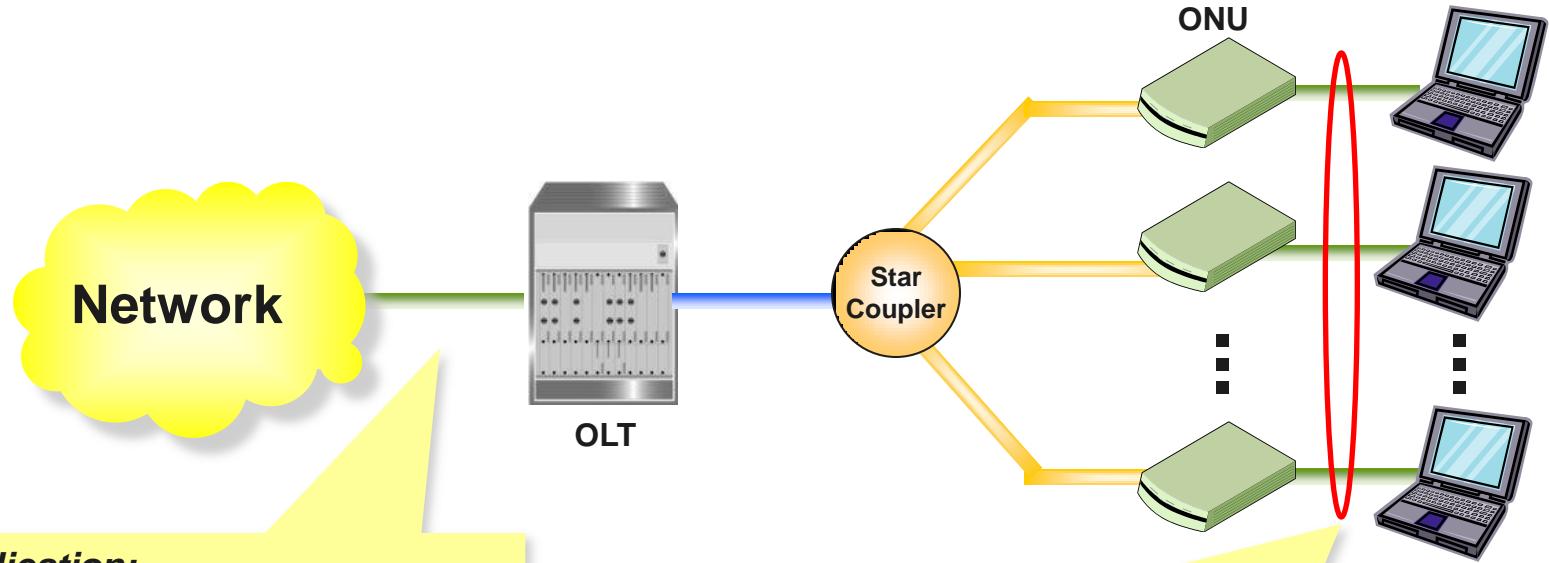
Power consumption has been reduced to about one-third the conventional level, helping prevent global warming.



Applications

PON Solution

PON Solution



Application:

QoS of each ONU in Upstream
Total Performance



Multi-Flow Counter
Multi-stream Generation

Application:

Simultaneous measurement of
performance and QoS of multiple ONUs

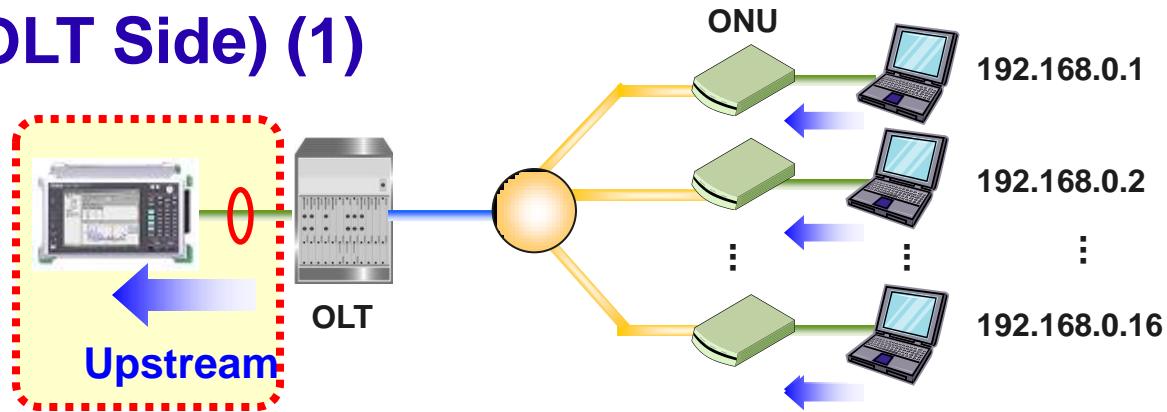


Grouping Measurement
Low-cost Multiport Measurement

PON Solution

PON Measurement (OLT Side) (1)

QoS measurement of each ONU from upstream generated by OLT



Field Setting

<input type="checkbox"/> Test Frame Flow ID (16bit)
<input type="checkbox"/> MAC DA (48bit)
<input type="checkbox"/> MAC SA (48bit)
<input type="checkbox"/> Ether Type (16bit)
<input type="checkbox"/> VLAN ID #1 (12bit)
<input type="checkbox"/> VLAN ID #2 (12bit)
<input checked="" type="checkbox"/> IPv4 Source Address (32bit)
<input type="checkbox"/> IPv4 Destination Address (32bit)
<input type="checkbox"/> IPv4 Protocol (8bit)
<input type="checkbox"/> IPv4 TOS Precedence
<input type="checkbox"/> IPv4 DSCP (6bit)
<input type="checkbox"/> IPv4 TTI (8bit)

Flow ID to Monitor

No.	IPv4 Source Address
1	192.168.0.1
2	192.168.0.2
3	192.168.0.3
4	192.168.0.4

Step 1

Capture flow of each ONU using IP address as ID.

Step 2

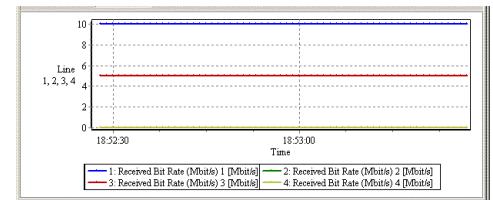
Check QoS of each ONU.

Multi-Flow Counter

ID	Received Bit Rate (Mbit/s) 1	Received Bit Rate (Mbit/s) 2	Received Bit Rate (Mbit/s) 3	Received Bit Rate (Mbit/s) 4	Received Bit Rate (Mbit/s) Other	Received Rate (%) 1	Received Rate (%) 2
ID1 →	10.000Mbit/s					1.31%	0.00%
ID2 →	5.000Mbit/s						
ID3 →	5.000Mbit/s						
ID4 →	0Mbit/s						

- Throughput
- Latency
- Frame Loss

measured to confirm QoS for each ID



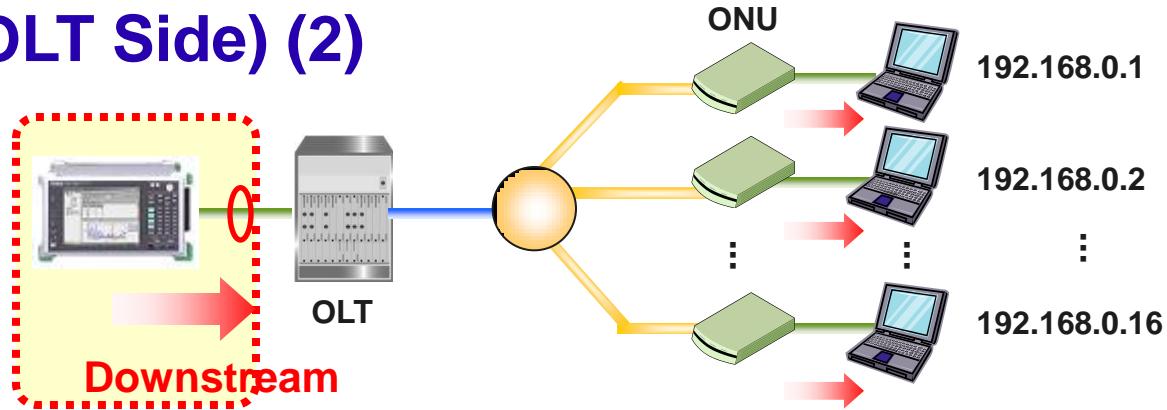
Latency based on ID

Current Latency (μs) 1	0.304μs
Current Latency (μs) 2	0.304μs
Current Latency (μs) 3	0.304μs
Current Latency (μs) 4	-

PON Solution

PON Measurement (OLT Side) (2)

Downstream generation
to evaluate total network
throughput



Multiple Tx Streams

The screenshot shows a software interface for managing multiple downstream transmission streams. On the left, a table lists 12 streams, each defined by an ID, distribution type (Next), length (Auto), protocol (IPv4), VLAN (None), and errors (None). Stream 7 is highlighted with a red dashed box. To the right of the table, a detailed configuration window for Stream 7 is open. This window includes tabs for Stream Control (Frame Setting, Signal, Ethernet, IPv4, Data Fields, Error Insertion), Frame Format (Frame View, Total Length, Preamble, SFD, DA, SA, TAI), and Header Checksum (Auto, Options). The Stream Control tab shows specific settings for flags (e.g., Bit 0: 0 - Don't Fragment, Bit 2: 0 - Last Fragment), fragment offset (0), time to live (64), and protocol (Auto). The Frame Format tab displays the IEEE 802.3 frame structure with fields: Preamble (12 bytes), SFD (1 byte), DA (6 bytes), SA (6 bytes), and TAI (2 bytes).

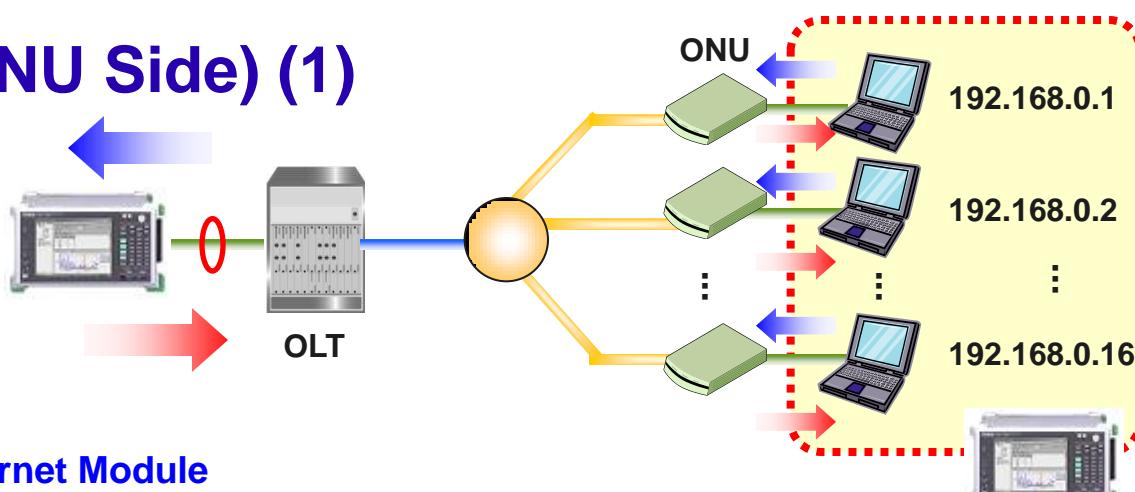
The following parameters can be set individually in downstream data using the Multiple Tx Stream method.

- Address: MAC, IP
- Client Data Format: TCP, UDP, IPv6, User Define, etc.
- VLAN: Q-in-Q
- Frame Length: 48 to 10,000 bytes
- And more

PON Solution

PON Measurement (ONU Side) (1)

Cost-effective evaluation of multiple ONUs



MU120131A 10M/100M/1000M Ethernet Module



- 10/100/1000 BASE-T
- 12 ports

MU120132A Gigabit Ethernet Module



- 1000 BASE-SX/LX/LE/LR
- 8 ports

MU120138A 10 Gigabit Ethernet Module



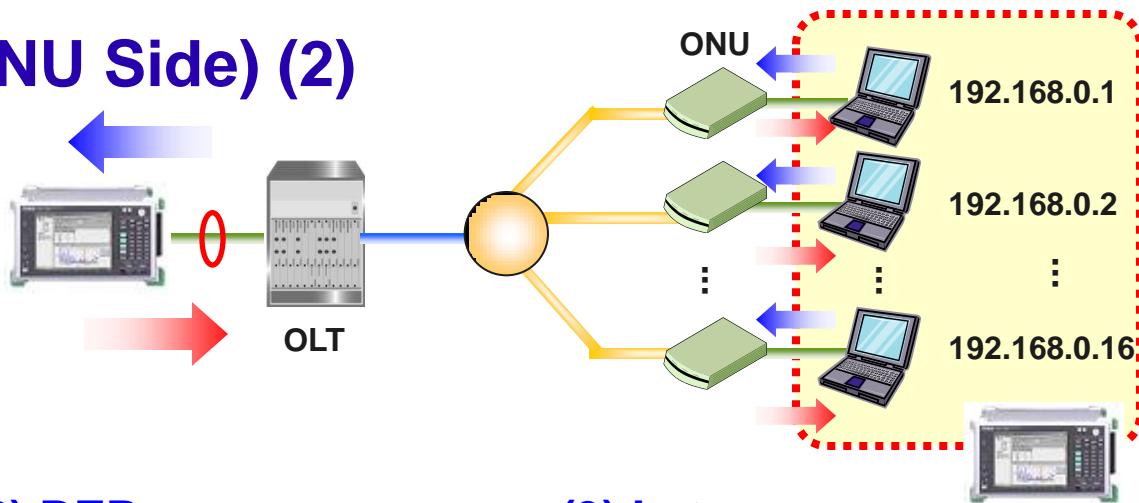
- 10G BASE-SR/LR/ER
- 4 ports

Full line-up of modules supporting every multiple ONU configuration
The **MD1230B** is a cost-effective solution supporting multiple interfaces and multiport systems, including both 10GbE and GbE.

PON Solution

PON Measurement (ONU Side) (2)

One-shot QoS evaluation
of multiple ONUs using
Throughput, Latency, BER,
etc.



(1) Throughput

Name	Unit1:3:1 Current	Unit1:3:2 Current	Unit1:3:3 Current	Unit1:3:5 Current
Transmitted Bit Rate (bit/s)	11,650bit/s	20,609bit/s	8,394bit/s	16,598bit/s
Transmitted Bit Rate (%)	13.00%	69.00%	4.00%	40.00%
Transmitted Byte	31,788	10,607	9,048	8,957
Transmitted Frame	15,132	10,047	1,173	25,402
Received Bit Rate (bit/s)	13,716bit/s	27,928bit/s	2,643bit/s	30,448bit/s
Received Bit Rate (%)	42.00%	93.00%	61.00%	48.00%
Received Byte	30,744	3,278	5,932	31,807
Received Frame	32,358	8,505	3,843	25,411

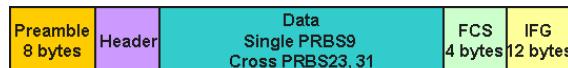
Multi-counter display

(2) BER

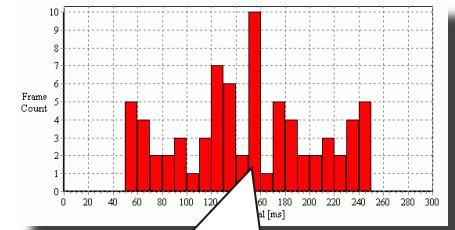
PRBS Frame Error Count	28,703	28,703
PRBS Frame Error Rate	2.7E-03	0
PRBS Bit Error Count	9,894	9,894
PRBS Bit Error Rate	2.7E-03	0

BER evaluation of each ONU at 1-bit resolution

Frame pattern for BER measurement



(3) Latency



Basic delay measurement plus Latency Histogram support statistical analysis of network changes.

Note

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