Anritsu Advancing beyond

Automated Bit Error Rate (BER) Testing

- Far End Loopback BER -

Network Master Pro MT1000A/MT1040A

1. Introduction

This document explains use of scenarios to automate BER testing using the Network Master Pro MT1000A/MT1040A. The scenarios are used to evaluate WDM networks. The BER testing scenarios are applied to Ethernet, SDH/SONET, OTN, and Fibre Channel standards in the system that the fiber far-end of the WDM network is looped-back.

The scenario files (Table 1) are classified into four types for different standards where XX indicates the scenario file version.

Table 1 Scenario Files.

File Name	Standard
EtherBER_XX.obcfg	Ethernet
SdhSonetBER_XX.obcfg	SDH/SONET
OtnBER_XX.obcfg	OTN
FcBER_XX.obcf	Fibre Channel

2. Scenario Requirements

The following two conditions and options (Table 2) are required for BER tests for each standard.

Main Frame: MT1000A or MT1040A

Module: MU100010A, MU100011A, MU104011A, MU104014A or MU104015A

Table 2 Required Options.

Standard	MU100010A Option	MU100011A Option	MU104011A/14A/15A Option
Ethernet	001 or 002 Requires 011 or 012 to use 10 GbE	001 or 003	012
SDH/SONET	001 or 002 Requires 051 or 052 to use STM64/OC192	001 or 003	082
OTN	001 or 002 Requires 081 or 022 to use OTU2	001 or 003	052
Fibre Channel	001 or 002 Requires 091 or 092 to use 8G FC or 10G FC	004 or 005 Requires 091 to use 16G FC	092

3. Test Setup

A) WDM Network

The fiber far-end is assumed to be looped-back.

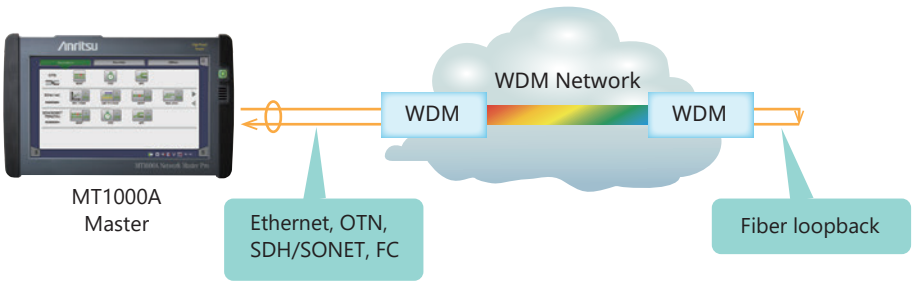


Figure 1 Test Setup for WDM Network.

B) Stand-alone Testing

Users can execute scenarios on a stand-alone MT1000A without a WDM network connection as follows:

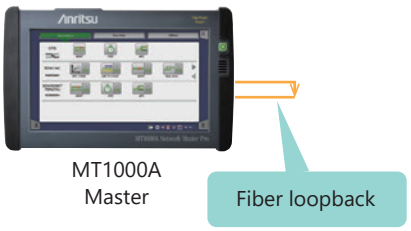


Figure 2 Stand-alone Test Setup.

Figure 3 shows the MT1000A/MT1040A connection ports.

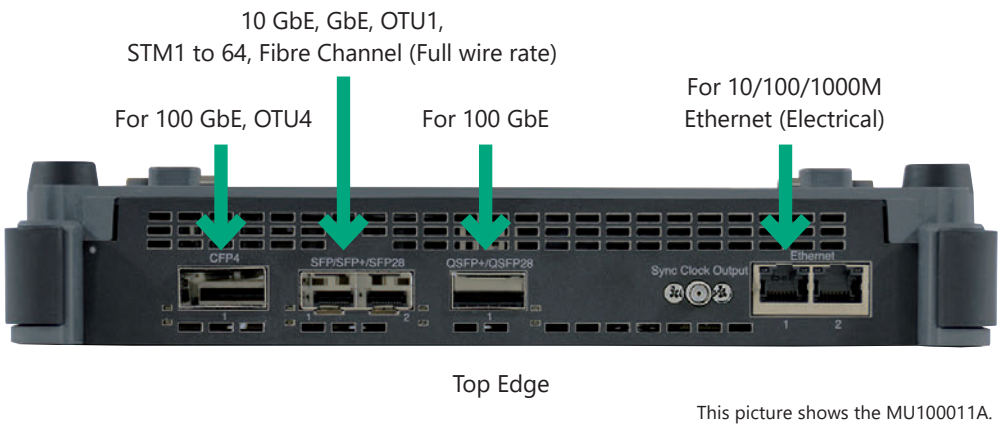


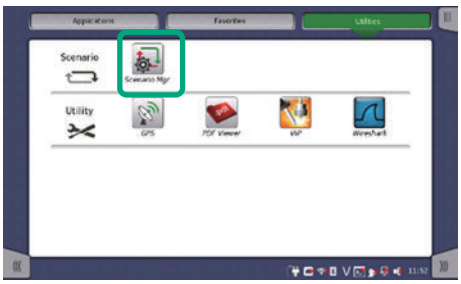
Figure 3 Connection Ports.

4. How to Register Scenario

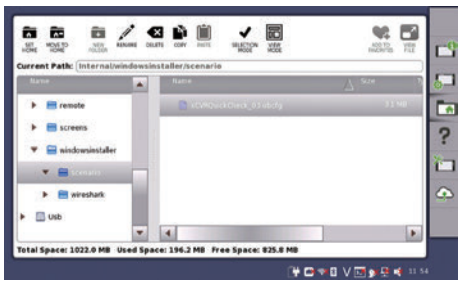
1. After unzipping the downloaded file, copy the file named **.obcfg* (see Table 1) to a USB memory stick and insert the stick into the MT1000A/MT1040A.

2. Start *Scenario.Mgr* by touching the  icon on the MT1000A/MT1040A *Utilities* screen.

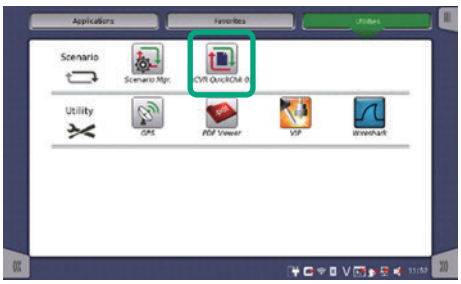
3. Select the scenario to register at the  icon at the screen top-right.



Starting *Scenario.Mgr*



Selecting Scenario



Registering Scenario

Figure 4 Setting Screens.

5. How to Execute Scenario

This section describes a scenario execution sequence. The test is executed automatically after setting parameters.

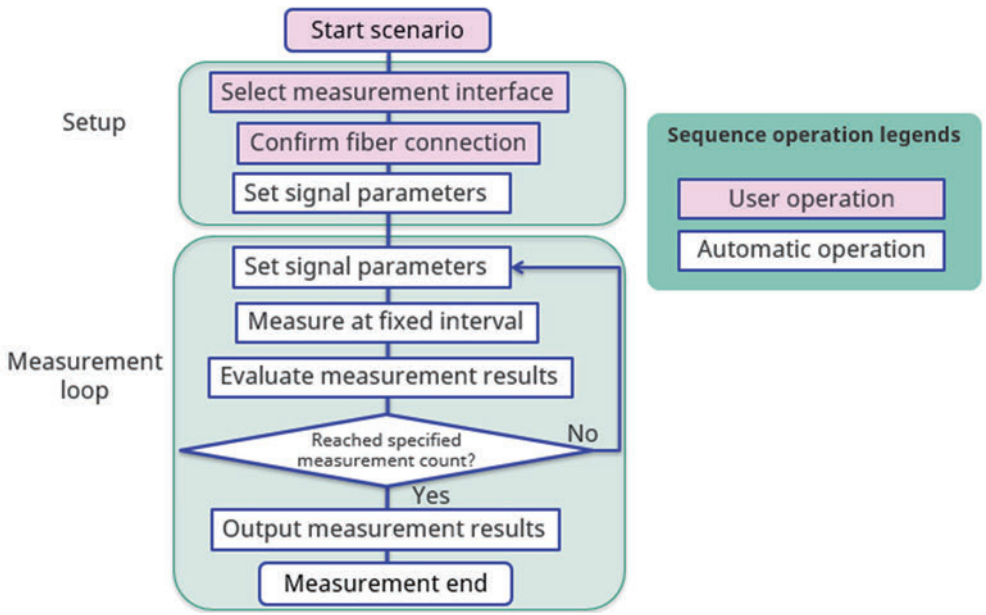
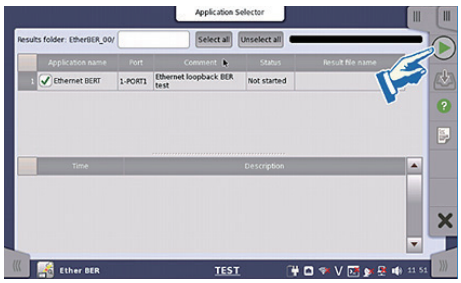


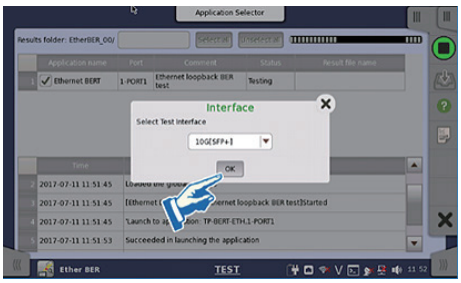
Figure 5 Example Scenario Sequence.

I. Touch *Ether BER* on the *Utilities* screen and then touch the start  icon on the *Application Selector* screen. Next, select a measurement interface at the *Interface* window and touch *OK*.

Start *Ether BER*

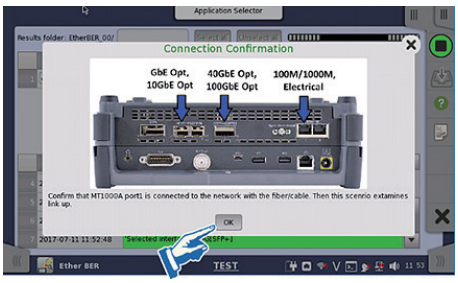


Touch *Start* icon

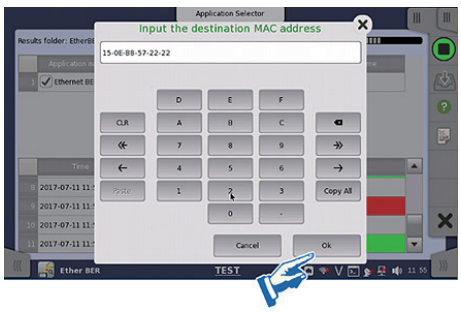


Select Measurement Interface

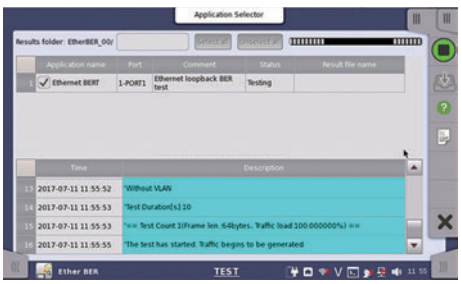
II. Confirm the fiber connection port at the *Connection Confirmation* window and touch *OK*.



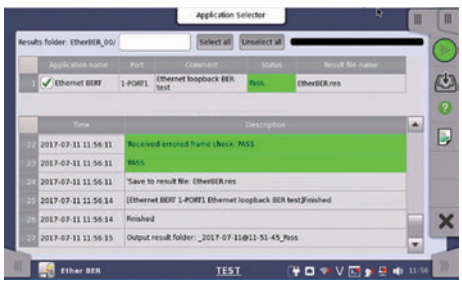
III. Input the destination MAC address at the *Input the destination MAC address* window and touch *OK*.



IV. The test scenario starts automatically after completing the above steps.



Test Progress Screen



Test Results Screen

6. Pass/Fail Conditions

Pass/Fail conditions are listed in the following table.

Table 3 Pass/Fail Conditions.

Standard	Pass/Fail Conditions
Ethernet	Fail condition: 1. Bit count pattern error 2. Error Frame Pass condition: Neither fail condition 1 nor 2 occurs
SDH/SONET	
OTN	
Fibre Channel	Fail condition: 1. Count difference between Send Frame and Receive Frame 2. Error Pass condition: Neither fail condition 1 nor 2 occurs

7. Sample Test Scenario Parameters

The sample test scenario parameters are listed below. These parameters are incorporated into global functions. Users can change the global function values before executing a scenario.

A) Ethernet scenario global functions

Type	Name	Comment	Default
LIST_STR	G_AUTO_NEG	100M electrical auto-negotiation	OFF
VALUE	G_CASE_NUM	Measurement times	1
MAC	G_MAC_DA	Destination MAC address Queried when set to 00-00-00-00-00-00	00-00-00-00-00-00
LIST_STR	G_IPV4_ENABLE	IPv4 enable/disable	OFF
IPV4	G_IPV4_SA	Measuring instrument IPv4 address Queried when set to 0.0.0.0	0.0.0.0
IPV4	G_IPV4_DA	Destination IPv4 address Queried when set to 0.0.0.0	0.0.0.0
IPV4	G_GATEWAY	Gateway address	192.168.0.1
IPV4	G_NETMASK	Network mask address	255.255.255.0
VALUE	G_CASE1_SIZE	Measurement loop 1 frame length (bytes)	64
:	:	Measurement loops 2 - 7 frame length (bytes)	:
VALUE	G_CASE8_SIZE	Measurement loop 8 frame length (bytes)	1522
VALUE	G_CASE1_LOAD	Measurement loop 1 traffic load (%)	100.0000
:	:	Measurement loops 2 - 7 traffic load (%)	:
VALUE	G_CASE8_LOAD	Measurement loop 8 traffic load (%)	1.0000
VALUE	G_MEAS_TIME	Measurement time(s)	10
LIST_STR	G_VLAN_ENABLE	VLAN enable/disable	OFF
VALUE	G_VLAN_NUM	VLAN stage (1 or 2)	1
VALUE	G_VLAN1_VID	VLAN1 VID	0
VALUE	G_VLAN2_VID	VLAN2 VID	0
VALUE	G_VLAN1_PRI	VLAN1 priority	0
VALUE	G_VLAN2_PRI	VLAN2 priority	0

B) SDH/SONET scenario global functions

Type	Name	Comment	Default
LIST_STR	G_IF	Measurement IF (queried when undecided)	Undecided
VALUE	G_CASE_NUM	Measurement count	1
VALUE	G_CASE_TIME	Measurement time (s)	1
LIST_STR	G_PATTERN	Bulk payload pattern	PRBS9

C) OTN scenario global functions

Type	Name	Comment	Default
LIST_STR	G_IF	Measurement IF (queried when undecided)	Undecided
VALUE	G_CASE_NUM	Measurement count	1
VALUE	G_CASE_TIME	Measurement time (s)	1
LIST_STR	G_PATTERN	Bulk payload pattern	PRBS9

D) Fibre Channel scenario global functions

Type	Name	Comment	Default
VALUE	G_SOUR_ID	Send source ID	0
VALUE	G_DEST_ID	Destination ID	0
VALUE	G_TX_TIME	Send time (s)	5
VALUE	G_RATE	Circuit load (%)	100.0000
VALUE	G_FRAME_LEN_START	Start frame length (multiple of 4; bytes)	40
VALUE	G_FRAME_LEN_END	End frame length (multiple of 4; bytes)	44
VALUE	G_FRAME_LEN_STEP	Frame length step (bytes)	4

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