



Layer 2 Control Plane (L2CP) Transparency Testing

- Carrier Ethernet Network Service Activation -

Network Master Pro MT1000A/MT1040A

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1. Introduction

This document explains use of scenario to automate testing for the Layer 2 control protocols (L2CP). In this test scenario, Network Master Pro MT1000A/MT1040A generates L2CP traffic with various Layer 2 protocols (see Table2), measures the difference between the transmitted and received frame counts, and displays as easy-to-understand color-coded Pass/Fail icons.

There are many L2CP serving network functions, such as STP (Spanning Tree Protocol), CDP (Cisco Discovery Protocol), Ethernet OAM, etc. Customers subscribing to network carrier wide-area Ethernet circuits use L2CP and expect the Ethernet circuit to be 'transparent' in terms of Layer 2 control.

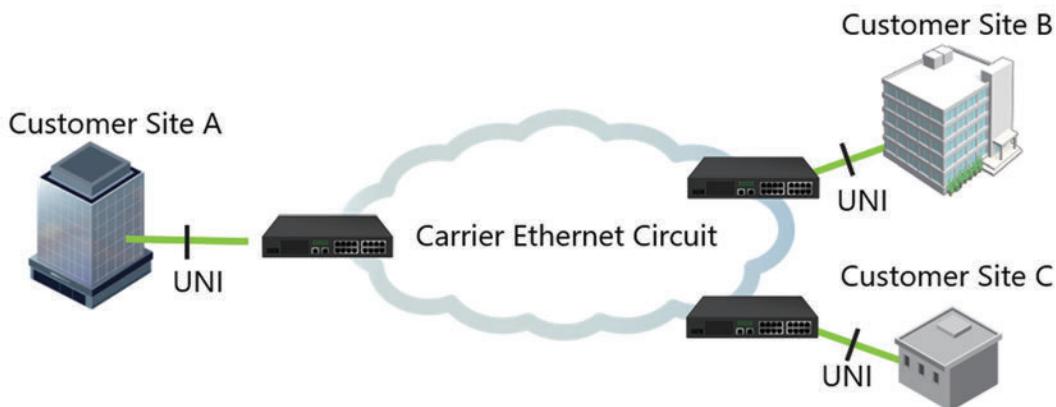


Figure 1 Ethernet Service

To meet this expectation, decision points are located at each UNI (Fig. 1). The decision points take one of three actions for every L2CP frame: Discard, Peer, or Pass, based criteria agreed with customers.

Table 1 Action Taken at Decision Point

Action	Description
Discard	Discards L2CP frame that is neither propagated nor delivered
Peer	Processes L2CP frame by appropriate protocol entity in carrier's network
Pass	Fowards L2CP frame in same manner as service data frames

At service activation, the service provider must confirm the network is configured correctly. The test methodology is shown in Fig. 2.

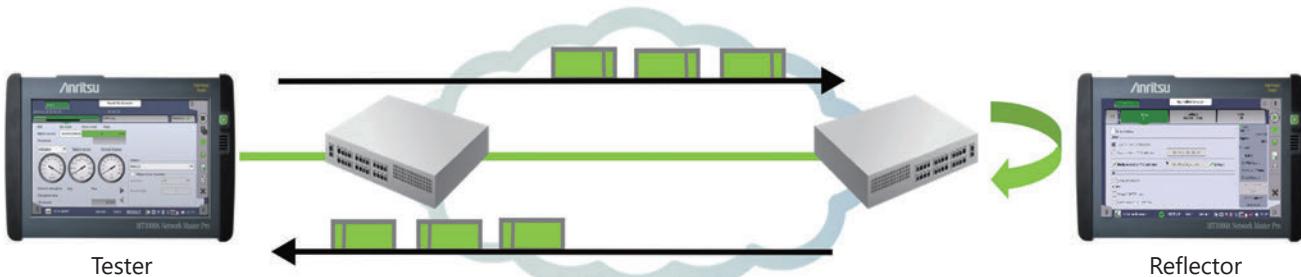


Figure 2 L2CP Transparency Test

The tester generates L2CP traffic with various Layer 2 protocols. This traffic is looped-back at the far-end with the reflector and the tester counts received frames to confirm that the transmitted and received frame counts match.

2. MT1000A/MT1040A Test Features

2.1 Supported Protocols

The MT1000A/MT1040A generates traffic with the following protocols.

Table 2 Supported Layer 2 Control Protocols

Category	Protocols
Spanning Tree Protocol	STP, Rapid STP, Multi STP
Public L2CP	GMRP, GVRP, LLDP, SPB, LACP, LAMP, Link-OAM, E-LMI, MMRP, MVRP, MSRP, MIRP, IEEE 802.1X (EAP), ESCM, IEEE 1588 (PTP), VDP, PE-CSP
Cisco Protocols	CDP, VTP, PagP, UDLD, DTP, ISL, PSVT+(LLC, SNAP), STP UL Fast, VLAN Bridge STP

2.2 Supported Encapsulations

Table 3 Supported Encapsulations

Encapsulation	Protocols
None	Direct Ethernet interface
VLAN	IEEE 802.1Q-compliant Ethernet with VLAN tag
Q-in-Q	IEEE 802.1ad-compliant Ethernet with two VLAN tag layers

2.3 Supported Bit Rates

Table 4 lists Bit rates supported by test modules.

Table 4 Supported Layer 2 Control Protocols

Category	Protocols
MU100010A	10/100/1000M Electrical, 1 GbE, 10 GbE (Optical)
MU100011A	10/100/1000M Electrical, 1 GbE, 10 GbE, 25 GbE, 40 GbE, 100 GbE
MU104011A	10/100/1000M Electrical, 1 GbE, 10 GbE, 25 GbE, 40 GbE, 100 GbE
MU104014A	10/100/1000M Electrical, 1 GbE, 10 GbE, 25 GbE, 40 GbE, 100 GbE, 200 GbE, 400 GbE
MU104015A	10/100/1000M Electrical, 1 GbE, 10 GbE, 25 GbE, 400 GbE

Note:

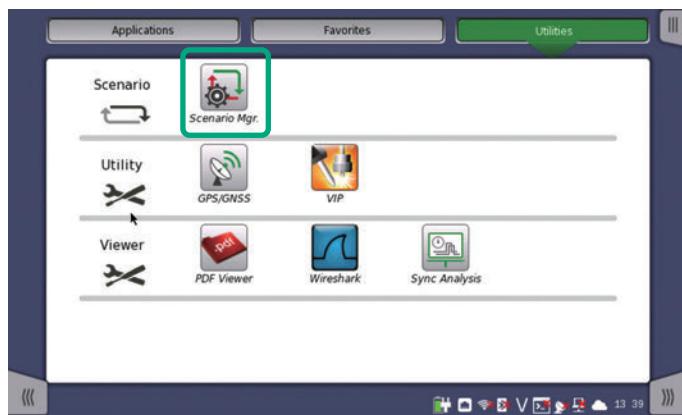
The test scenario L2CP always uses Port 1. If your MT1040A has two Ethernet modules, use the one closest to the front panel (LCD).

3. How to Install

Anritsu supports L2 Transparency test functionality as an add-on scenario. This add-on scenario can be downloaded from the Anritsu web site. This section explains the installation procedure.

1. After unzipping the downloaded file, copy the file named *L2CP.obcfg* to a USB memory stick and insert the stick into the MT1000A/MT1040A.

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



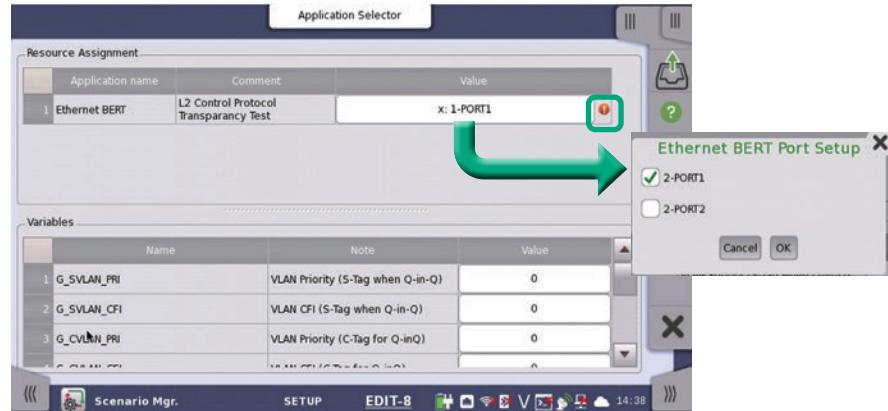
3. Touch the icon  to import the *L2CP.obcfg* file from the USB stick. The test scenario L2CP is registered after importing the scenario file. The version number is shown in this screen table.

Application Selector				
	Icon	Test name	Note	Edit Export Delete Show/Hide
1		L2CP	Layer2 Control Protocol Transparency Test Ver1.0	Hide

4. Touch *Edit* to set test parameters in the following.

Application Selector				
	Icon	Test name	Note	Edit Export Delete Show/Hide
1		L2CP	Layer2 Control Protocol Transparency Test Ver1.0	Hide

5. Depending on the module configuration,  may be displayed. In this case, touch x: 1-PORT1 and place a checkmark in 2-PORT1.



6. Some test parameters can be set here. Once changed, they are backed-up and are applied each time the L2CP test is run.

Variables		
Name	Note	Value
1 G_CVLAN_PRI	VLAN Priority (C-Tag for Q-inQ)	0
2 G_CVLAN_CFI	VLAN CFI (C-Tag for Q-inQ)	0
3 G_SVLAN_PRI	VLAN Priority (S-Tag when Q-inQ)	0
4 G_SVLAN_CFI	VLAN CFI (S-Tag when Q-inQ)	0
5 G_TOTAL_FRAME	How many L2CP frame generate	10
6 G_RCV_TIMEOUT	How long wait for loopback (ms)	5000
7 G_CAPTURE	Packet Capture (0=Off, 1=On)	0

Table 5 Test Parameters (Backed-up)

Parameter	Description (Value Range)
G_CVLAN_PRI, G_CVLAN_CFI	VLAN tag priority (0 to 7) and CFI (0 or 1) bit. When Q-in-Q is applied, these values are applied to Customer VLAN tag. (Default: both zero)
G_SVLAN_PRI, G_SVLAN_CFI	Service VLAN tag priority (0 to 7) and CFI (0 or 1) bit. This is available only when Q-in-Q is applied. (Default: both zero)
G_TOTAL_FRAME	Number of L2CP frames MT1000A/MT1040A generates during each protocol test (10 to 1,000; default: 10)
G_RCV_TIMEOUT	Maximum required wait time until frames return from network far-end (1,000 to 60,000; default 50,000) (ms)
G_CAPTURE	Frame capture for troubleshooting available when 1 (0 or 1; default: 0)

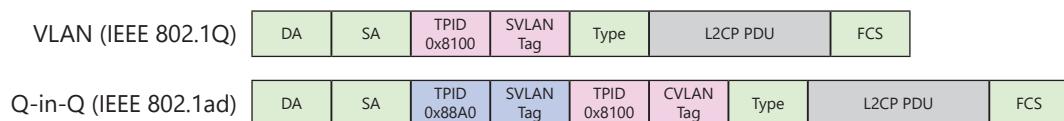
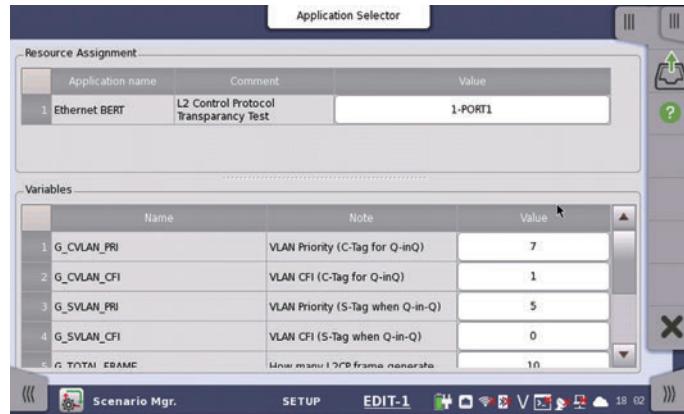
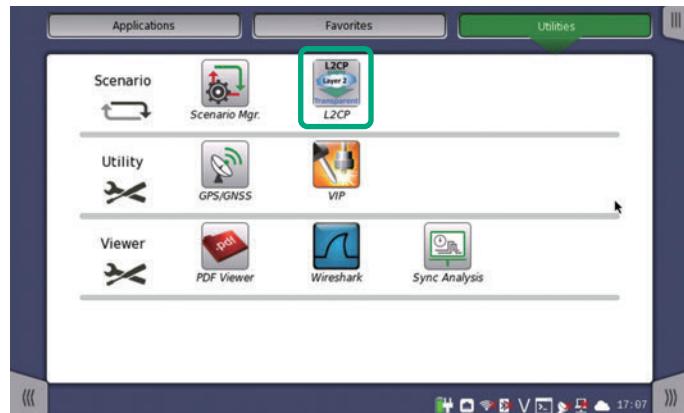


Figure 3 CVLAN and SVLAN Allocation

7. Touch the  icon to quit *Scenario Manager*.



8. A new icon of the test scenario L2CP is registered on the MT1000A/MT1040A Utilities screen.



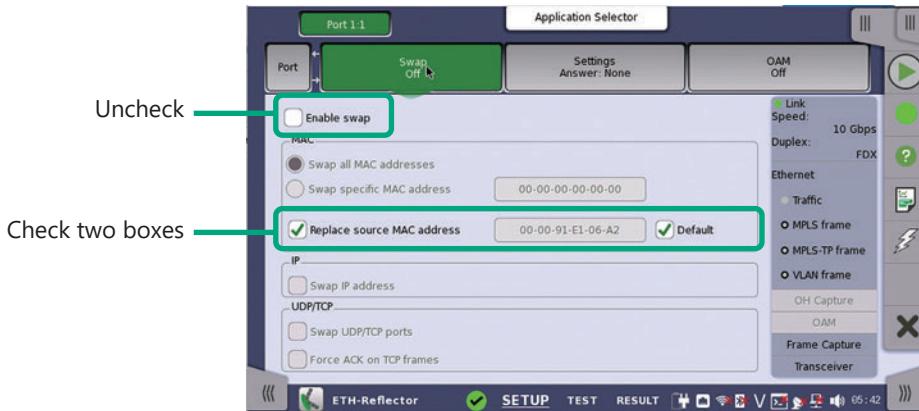
4. Test Operation

4.1 Reflector Setup

1. Start the MT1000A/MT1040A using as the reflector and select the interface of the Port.



2. Set the source MAC address on the reflector.



3. Touch the icon to start the reflector.

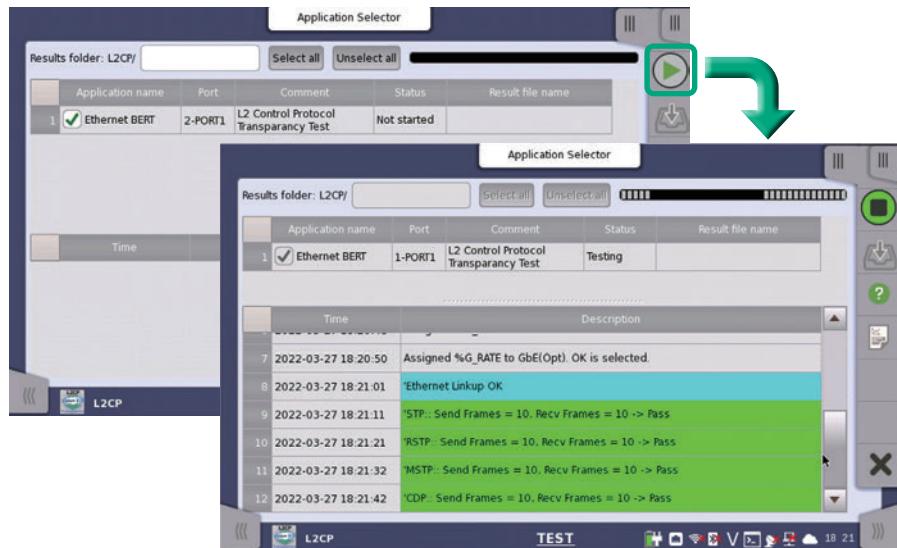


4.2 How to Start Test

1. Touch the L2CP icon to start the test scenario.



2. Touch the icon to start a test.



Touch the icon and stop the test.

3. The MT1000A/MT1040A will request the following parameter settings:

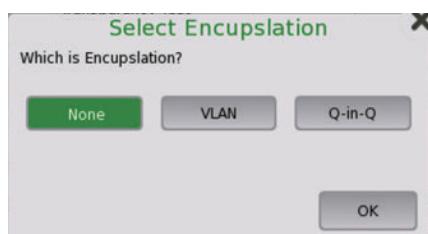
- ① Which L2 control protocol to generate
- ② Encapsulation (None or VTAN or Q-in-Q)
- ③ Which Ethernet rate to be used on MT1000A.

The rate options depend on which module is mounted on the MT1000A/MT1040A.

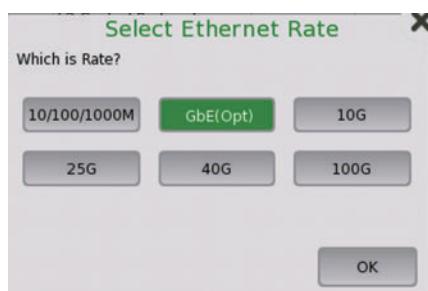
① Protocol Selection



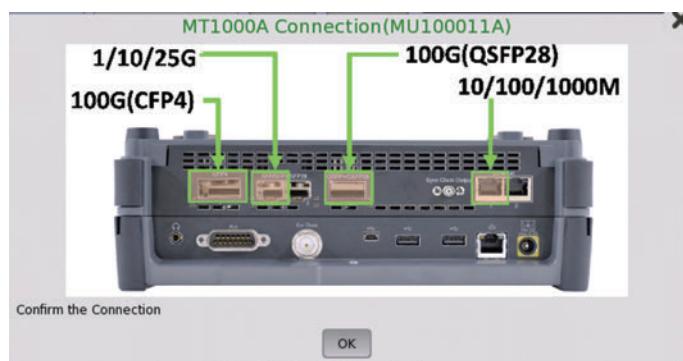
② Encapsulation Selection



③ Ethernet Rate



4. The MT1000A/MT1040A checks establishment of an Ethernet Link after setting all parameters. If the Link is not up, the following message is displayed on the screen. In this case, confirm the connection between the network and the MT1000A/MT1040A.

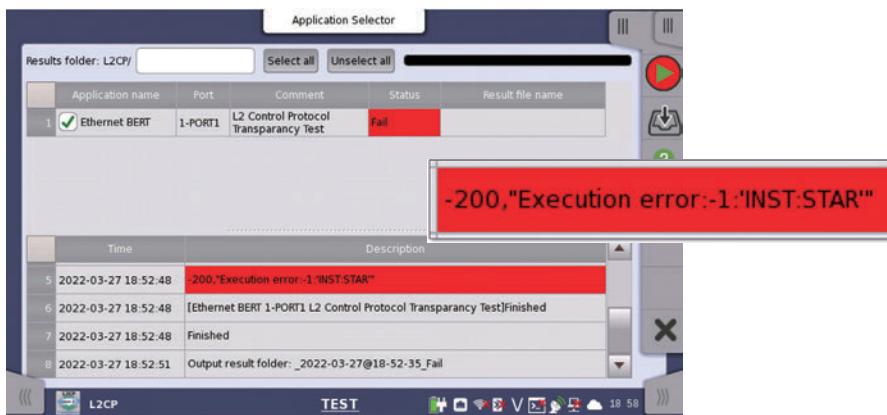


Note:

The test scenario L2CP always uses Port 1. If the MT1040A has two Ethernet modules, use the one closest to the front panel (LCD).

4.3 Why Test Fails at Beginning?

If Fail is displayed immediately after starting the test, there are two possible reasons.



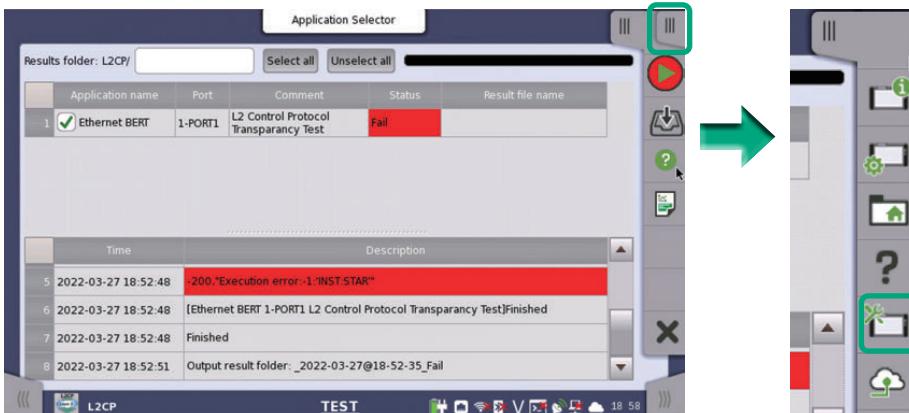
Reason 1: Module configuration mismatch

Refer to Section 3 of this document to match the configuration.

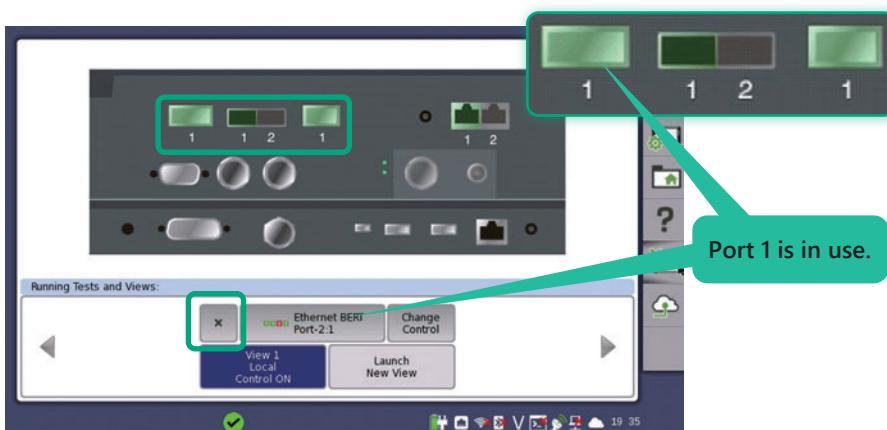
Reason 2: Hardware already in use

Check whether the hardware is already in use as follows.

1. Touch the icon at the top-right corner to display the slide-out toolbar. Touch the displayed icon.



2. Ports in use are highlighted in green.



3. Touch the icon to release the port.

4.4 How to Check Results

The test pass/fail verdict is displayed in green or red, respectively.

This screenshot shows the Application Selector interface for an L2CP test. The results table indicates a single test named "Ethernet BERT" on port "1-PORT1" with a status of "Pass". Below the table, a log window displays several entries, all of which are green, indicating successful frame transmission and reception. The log entries include:

- 9 2022-03-27 18:52:33 'STP.. Send Frames = 10, Recv Frames = 10 -> Pass'
- 10 2022-03-27 18:52:43 'RSTP.. Send Frames = 10, Recv Frames = 10 -> Pass'
- 11 2022-03-27 18:52:54 'MSTP.. Send Frames = 10, Recv Frames = 10 -> Pass'
- 12 2022-03-27 18:52:58 [Ethernet BERT 1-PORT1 L2 Control Protocol Transparency Test]Finished
- 13 2022-03-27 18:52:58 Finished
- 14 2022-03-27 18:52:59 Output result folder: _2022-03-27@18-51-39_Pass

Result Example (Pass)

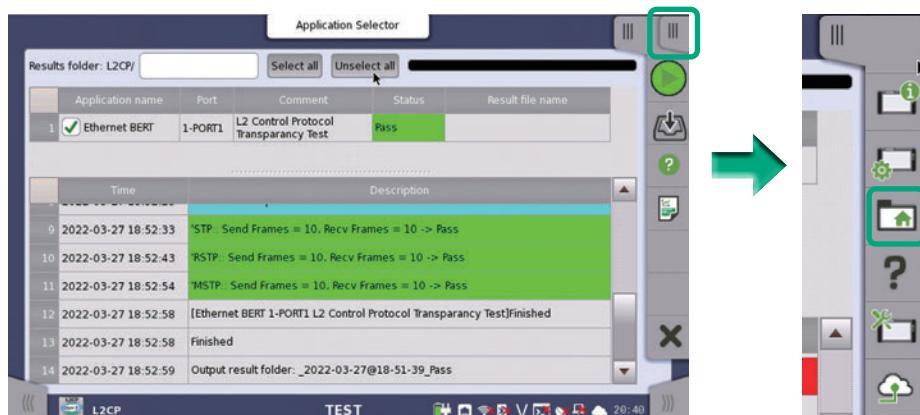
This screenshot shows the Application Selector interface for an L2CP test. The results table indicates a single test named "Ethernet BERT" on port "1-PORT1" with a status of "Fail". Below the table, a log window displays several entries. The entry at index 11 is red, indicating a failure. The log entries include:

- 8 2022-03-29 19:35:23 'Ethernet Linkup OK'
- 9 2022-03-29 19:35:33 'STP.. Send Frames = 10, Recv Frames = 10 -> Pass'
- 10 2022-03-29 19:35:43 'RSTP.. Send Frames = 10, Recv Frames = 10 -> Pass'
- 11 2022-03-29 19:35:58 'MSTP.. Send Frames = 10, Recv Frames = 6 -> Fail'
- 12 2022-03-29 19:36:09 'CDP.. Send Frames = 10, Recv Frames = 10 -> Pass'
- 13 2022-03-29 19:36:19 'VTP.. Send Frames = 10, Recv Frames = 10 -> Pass'

Result Example (Fail)

Irrespective of whether the test is passed or failed, a report file is saved automatically to the MT1000A/MT1040A internal storage. The file-access procedure is described below.

1. Touch the icon at the top-right corner to display the slide-out toolbar. Touch the displayed icon.



2. The file browser is displayed. Locate report files in the path Internal/Scenario_logs/L2CP.

This screenshot shows the file browser interface with the following details:

- Current Path:** Internal/Scenario_logs/L2CP/_2022-03-27@17-59-41_Pass
- File List:**
 - Internal
 - SEEK_Taihi
 - Scenario_logs
 - L2CP
 - _2022-03-27@17-39-39_Pass
 - _2022-03-27@17-59-41_Pass
 - 2022-03-27@18-20-15_Fail
- Log Files:**
 - CommandLog.txt (19 KB, txt File)
 - L2CPpcap (2 KB, pcap)
 - SequenceLog.txt (8 KB, txt)
 - Summary_obres (3 KB, obres)
 - Summary_pdf (7 KB, pdf File)
- Storage Information:**
 - Total Space: 1022.0 MB
 - Used Space: 210.1 MB
 - Free Space: 811.9 MB

A new folder named `YYYY-MM-DD@HH-MM-SS_Pass/fail` is created each time a test is started.

3. The following table explains the items in this file.

Table 6 Files Saved in Report Folder

File Name	Description
Summary_.pdf	All information on GUI during test
Summary_.obres	
L2CP.pcap	Frames captured during test. This file is saved optionally by the scenario. See Section 3 for how to enable frame capture.
*.res	The file name is <protocol name>.res. (e.g., STP.res). The test scenario L2CP saves this file automatically when a test detects failure to loopback all sent frames. A separate file is created for each failed protocol.
CommandLog.txt	Internal log for troubleshooting (for debugging when users customize own scenario)
SequenceLog.txt	



Specifications are subject to change without notice.

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