

LINEEYE

Network tester for RFC-2544

LE-580FX-F2544

Users manual

The first edition

Instruction

Thank you for your purchase of LE-580FX.

To use it correctly, you are advised to read and understand this instruction manual thoroughly. Keep this together with the warranty. If you encounter any problems, you will find helpful information in this manual.

NOTICE

It is prohibited to reprint or duplicate any part of the whole of this instruction manual without prior permission from LINEEYE.

The content of this instruction manual and specifications of the products are subject to change without any notice.

This instruction manual has been designed and edited with great care to give you all necessary information. If you have any questions, feel free to direct your inquiries to LINEEYE.

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USER LIMITATION

This product has been developed for the purpose of using as an analyzer only.

When you use this product with the following devices that are required to function with a high degree of reliability, safety and accuracy, use it under considering the safe design of the system in order to maintain reliability and safety for that system;

- *Devices that are directly related to transportation such as airplanes, trains, cars etc.

- *Devices for crime prevention and disaster privension.

- *Each kind of safety devices and so on.

This product has not been developed for the use that needs exclusively high reliability and safety:

aerospace apparatus, trunk communication apparatus, nuclear control apparatus, medical apparatus related with life maintenance etc. Therefore, do no use for those purposes.

Safety Information

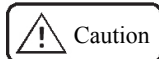
Read this first !!

This Safety Information includes the following important information in order to not only have you learn the right way to use the analyzer, but also prevent you from causing damage to people and property. Before using, please read the main contents after you understand the following symbols & marks.



Warning

Should the device be used without following these symbols, there is a possibility of accidents, such as a death or a serious injury, occurring.



Caution

Should the device be used without following these symbols, there is a possibility of accidents, such as an injury ^{*1}, and material damage ^{*2} occurring.

*1 "Injury" indicates injury, burn and electric shock, or the like which does not require hospitalization or the extended hospital visit.

*2 "Material damage" indicates damage related to a house, a building, furniture, apparatus, livestock or a pet.



Warning

- Do not disassemble, modify or repair analyzer.

This may result in an injury, an electric shock, fire, explosion and/or a breakdown due to overheating.

- Stop using the analyzer immediately when smoke or smells emanate from itself.

Continuous use may result in an electric shock, a burn and/ or fire.

- Keep the product away from water.

Failure to do so may result in the heat generation, an electric shock and/or unit malfunction.

- Do not use deteriorated cables (damage etc.).

This may result in the heat generation and fire.

- Do not use in the place which generates inflammable gas etc.

This may result fire.



Caution

- Do not use and keep this product in the following places:

a)The places exposed to the direct rays of the sun.

b)The places with the humidity and temperature exceeding the tolerance level, and with a rapid temperature change.

c)The places with much dust and moisture.

d)The places near the objects which generate heat (the heater etc.).

Using in these places may result unit malfunction and /or injury.

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8. Notice

Any matter not specified in this agreement will be governed by and constructed in accordance with copy right law and related laws.

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1. Introduction

LE-580FX F2544 is a user-friendly and automated test suite based on industry-standard RFC-2544 to generate and analyze the packets to evaluate the performances of Throughput, Latency, Packet Loss, and Back-to-Back of Ethernet switches or routers via LE-580FX device. The real-time display of test results and customized report forms provide an effective way to examine and organize the data for reports or records.

1.1 Specifications

Item	Description
Platform	LE-580FX
Operating System	Windows 2000, Windows XP, Windows Vista
Pre-built	Throughput, Latency, Packet Loss, Back-to-Back, Run All tests
Report	Test report in text format(Excel is required.)
Configuration	Text file and GUI

<Attention>

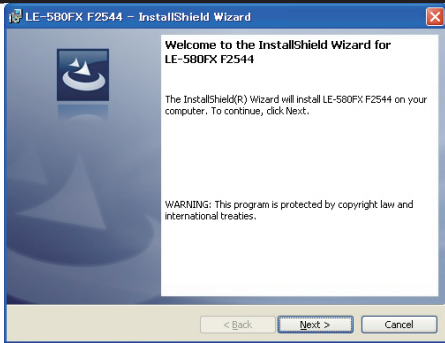
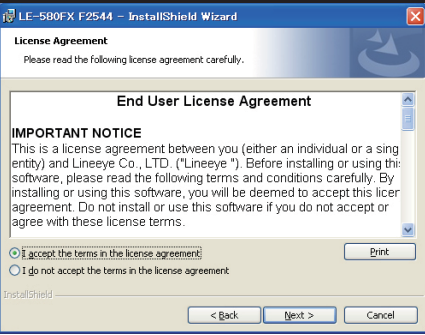
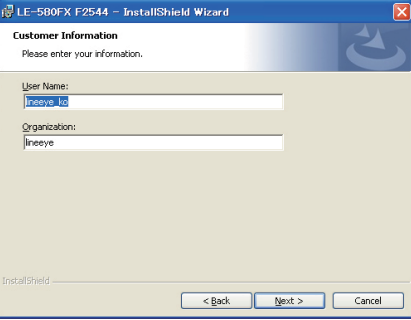
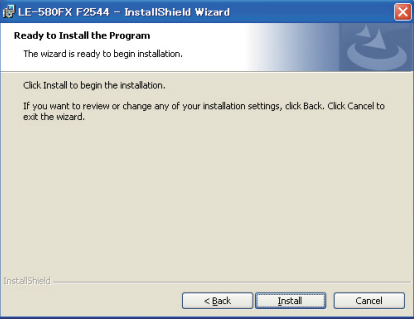
If the measurement will not progress after stating with "Link error" though LAN cables are connected to LE-580FX device, it may be from error between LE-580FX device and PC.

Please close LE580FX F2544, and connect LE-580FX device to PC with Y-cable again.

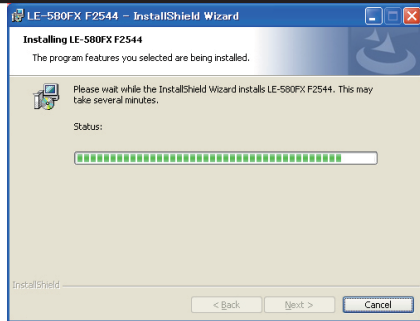
2. Software Installation and Uninstallation

2.1 Installation

Double click LE-580FX F2544setup.exe.

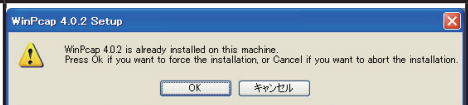
<p style="text-align: center;">1</p>  <p>Start LE-580FX F2544 installation. Click Next to go to next step.</p>	<p style="text-align: center;">2</p>  <p>Read License Agreement carefully before selecting to accept all terms and then click Next for next step.</p>
<p style="text-align: center;">3</p>  <p>Type in user name and organization for customer information. Then click Next for next step.</p>	<p style="text-align: center;">4</p>  <p>Review and confirm installation settings. Click Install for next step.</p>

5



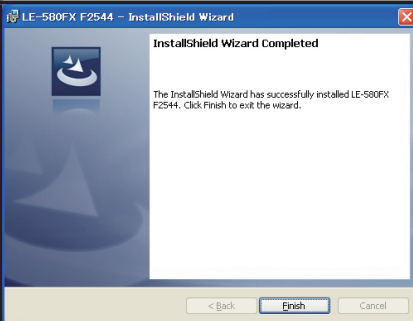
LE-580FX F2544 Installation is in progress.

6



If Winpcap has been already installed to PC, the window that asks if you want it to be installed again. Please click "Cancel".

7



LE-580FX F2544 has been Installed successfully.
Click Finish to exit the Wizard.

8

The icon  appears on the desktop.

2.2 Uninstallation

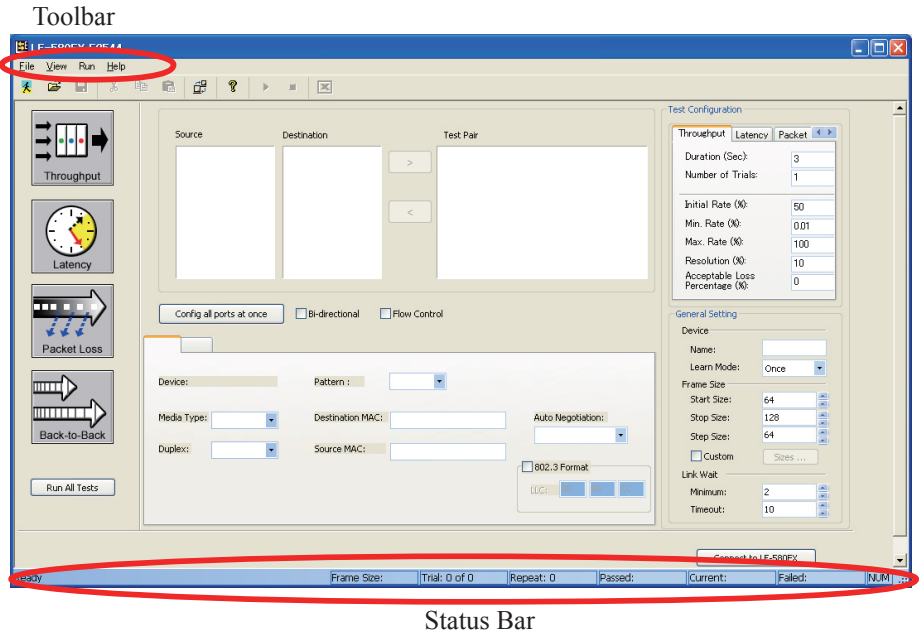
If applications do not work properly, it may be necessary to uninstall the software. Or before updating a new version of the software, the previous version must be uninstalled first.

There are two ways to uninstall LE-580FX F2544: Start Menu or Control Panel.

- Start Menu: Click on Windows Start menu → Programs → Lineeye → LE-580FX F2544 → Uninstall LE-580FX F2544.
- Control Panel: Activate the Control Panel → Add/Remove Programs → LE-580FX F2544 → Change/Remove.

3. Main Window

The main window of the user interface is illustrated below. The top-level menu includes the following major parts: File, View, Run and Help.

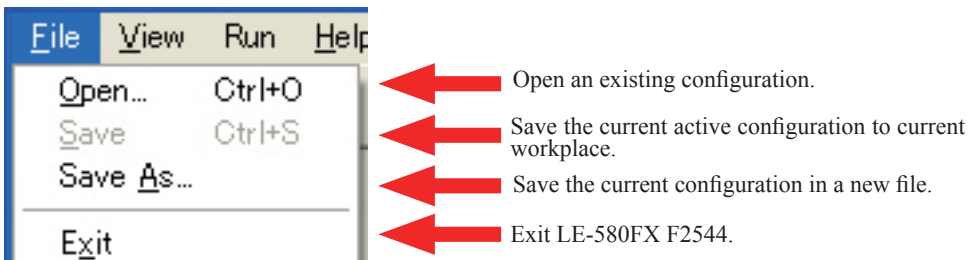


3.1 Main Menu

3.1.1 Menu Toolbar

File View Run Help The menu toolbar on the top includes four submenus (File, View, Run, Help).

3.1.2 File

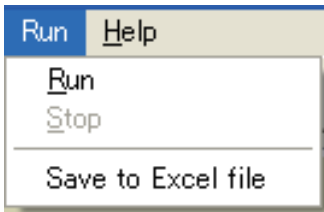


3.1.3 View



- Bring out the status bar in bottom window.
- Switch window between results and configuration.

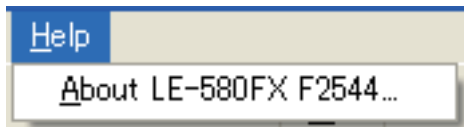
3.1.4 Run



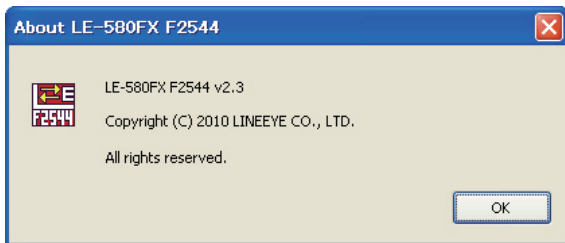
- Run whichever the prior test(s).
- Stop whichever the test(s) in progress.
- Save current results to an Excel file.

None of these functions without "Stop" could be available and activated after any test is run.

3.1.5 Help




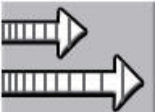


- Show information of LE-580FX F2544 version.



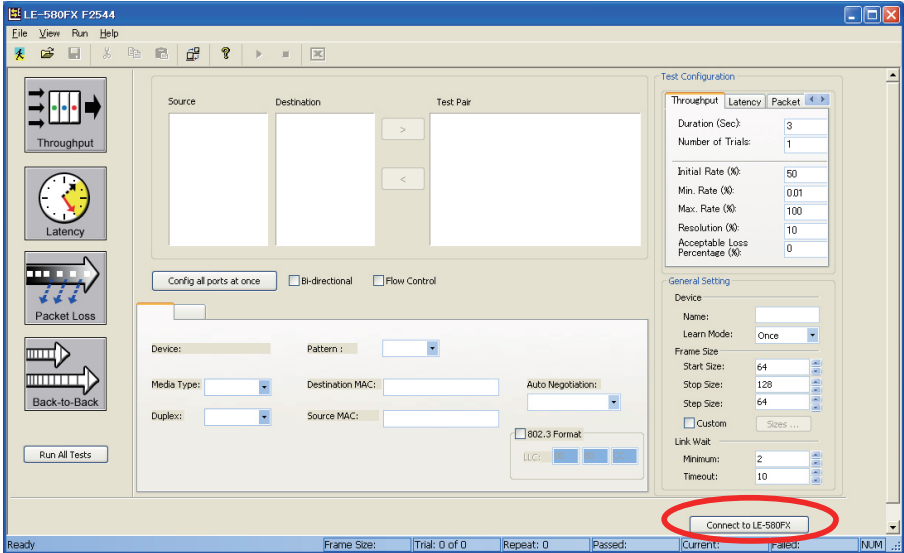
3.2 Test Criteria

The icon buttons on the left of the main window are described in the table below.

Item	Description
 <p>Throughput</p>	<p>Throughput test. Determine the maximum throughput rate at which a DUT can support the transmission of packets without dropping a single one.</p>
 <p>Latency</p>	<p>Latency test. Measure the time a DUT takes to forward a packet while loading.</p>
 <p>Packet Loss</p>	<p>Packet loss test. Measure the percentage of packets which are not forwarded due to lack of resource.</p>
 <p>Back-to-Back</p>	<p>Back-to-back test. Measure the buffer capacity of the DUT by sending bursts of traffic at the maximum frame rate and by measuring the longest burst size for which no packet is dropped.</p>
<p>Run all tests</p>	<p>Run all four tests in sequence.</p>

3.3 Connect to LE-580FX F2544

Click the **Connect to LE-580FX** button (at the lower right corner of the main window) to connect LE-580FX F2544 program to LE-580FX device to bring out all available ports to be tested.



3.4 Port Setting

3.4.1 Source Port and Destination Port

Source	Destination
Port A Port B	Port A Port B

Click the port in each table to pick out the source and destination port and use arrow key to pair them off. Release the ports by using reverse arrow keys .

3.4.2 Test Pairs

Test Pair
Port A-->Port B

The table in Test Pairs shows which pairs are chosen to be tested in order.

3.5 Port Configuration

Port A Port B

Device: LE-580FX Pattern: All 0s

Media Type: 100M Destination MAC: 0022A2000002 Auto Negotiation: Nway

Duplex: Full Source MAC: 0022A2000001

802.3 Format

LLC: PA PS

Set up the port configuration details for the test pairs by clicking 2 tabs first, including media type, duplex mode, protocol, destination and source MAC addresses and so on.

Item	Description
<p>Media Type: 100M</p> <p>Duplex: Full</p>	Select media type in 100 Mbps or 10 Mbps.
<p>Media Type: 100M</p> <p>Duplex: Full</p>	Choose duplex mode in Full or in Half.
<p>Pattern: All 0s</p> <p>Destination MAC: 0022A2000002</p>	Select the pattern from four types.
<p>Destination MAC: 0022A2000002</p> <p>Source MAC: 0022A2000001</p>	Display the MAC addresses of Destination and Source.

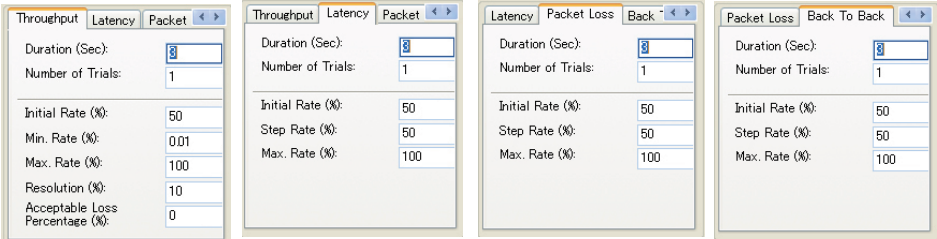
<input type="checkbox"/> Flow Control	Activate flow control to enforce transmitting port to send packets in same speed with receiving port.
Auto Negotiation: <input type="text" value="Nway"/> <input type="text" value="Force"/> <input type="text" value="Nway"/>	Auto Negotiation allows in Force or in Nway.
<input checked="" type="checkbox"/> 802.3 Format LLC: <input type="text" value="AA"/> <input type="text" value="AA"/> <input type="text" value="03"/>	Check the box for LLC (Logical Link Control Protocol) for 802.3 format.
<input type="checkbox"/> Bi-directional	Check <input type="checkbox"/> Bi-directional button to run the test in two-way mode.
<input type="button" value="Config all ports at once"/>	Click <input type="button" value="Config all ports at once"/> button to bring out a table that could be configured with multiple ports at one time.

Config All Ports							
Port No.	Device	Media Type	Duplex	Pattern	Auto negotiate	Src. MAC	Dst. MAC
A	LE-580FX	100M	Full	All As	Nway	0022A2000001	0022A2000002
B	LE-580FX	100M	Full	All Os	Nway	0022A2000002	0022A2000001

3.6 Test Configuration

3.6.1 Test Criteria

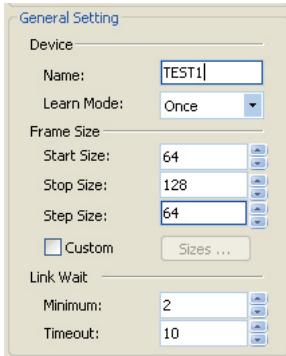
Edit test configuration through the dialogue. Select the tab of any four standard tests and edit the required numbers for the columns.



3.6.2 General Setting

The test is set from DIALOG in the right side of the main menu.

Choose the tab of 4 kinds of standard tests, then input the value in the frame.



"Device":

In "Name", input the test name to be displayed at the test report.

In "Learn mode", this dialogue determines Learning Mode and the times of retry. Learning Mode enables the DUT to build an address table based on received frames from resource address.

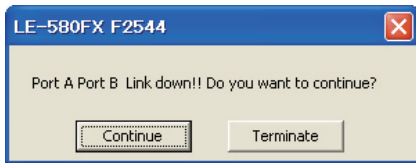
Scroll down the column of Learning Mode to choose from Never, Once or Every Trial for the switch learning mode. Select Never to send packets without learning MAC addresses. Select Once to run frames only one time for MAC addresses when testing.

"Frame size":

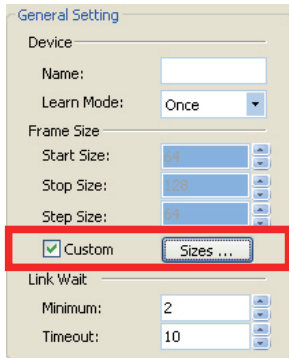
"Start Size" is the size of packets to start the test with, "Stop Size" is the size of packets to stop the test with, and "Step Size" is to define the interval.


"Link wait":

"Minimum" is the time to wait for the link being established. "Timeout" is the maximum time to wait for deciding the timeout.



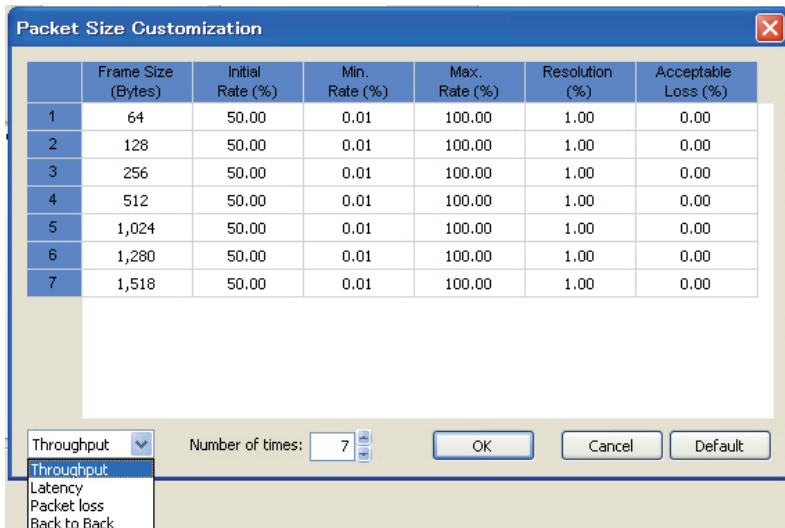
The link error display comes out, when the link has not been established, even if the timeout decision time passes. Choose whether you continue the test.



Check the box of "Custom" and invoke the  button to customize the frame size, initial rate with minimum and maximum percentages, resolution percentage, and acceptable loss percentage in each test.

You can set values below for each test.

Frame Sizes(bytes), Initial Rate(%), Min Rate(%), Max Rate(%), Resolution(%), Acceptable Loss (%).



In the tables, 4 test criteria (shown on the lower left corner of each table) can be edited with individual test items via Custom for sizes.

4. Test Result

Test results are presented in 4 separate test categories, 1 report and 1 log forms. There are differences, between tests with general settings and the ones with customized packet sizes, which can be illustrated below.

4.1 Throughput Result

General Test

Frame Size (bytes)	Passed Rate (%)	Port A -> Port B	Port B -> Port A	Total
64	100.00	148.800	148.800	297.618
128	100.00	84.450	84.450	168.918

Customized Test

Frame Size (bytes)	Passed Rate (%)	Port A -> Port B	Port B -> Port A	Total
64	100.00	148.000	148.000	297.618
128	100.00	84.450	84.450	168.918
256	100.00	45.209	45.209	90.517
512	100.00	23.699	23.699	47.398
1024	100.00	11.873	11.873	23.846
1280	100.00	8.615	8.615	17.230
1518	100.00	6.127	6.127	12.254

The duration time, packet length, transmission rate can all be customized to meet with the desired condition.

4.2 Latency Result

General Test

Frame Size (bytes)	Rate Tested (%)	Port A -> Port B	Average(RTT)	Port B -> Port A	Average(RTT)
64	50.00	8.800	9.12	3.604	4.00
64	75.00	9.800	9.14	3.604	4.02
64	100.00	9.200	9.30	4.004	4.18
128	50.00	13.800	14.23	3.364	3.89
128	75.00	13.800	14.13	3.364	3.88
128	100.00	14.000	14.51	3.764	4.27

Customized Test

Frame Size (bytes)	Rate Tested (%)	Port A -> Port B	Average(RTT)	Port B -> Port A	Average(RTT)
64	50.00	0.450	0.65	0.000	0.00
64	75.00	0.450	0.65	0.000	0.00
64	100.00	0.450	0.65	0.000	0.00
128	50.00	0.450	0.64	0.000	0.00
128	75.00	0.450	0.64	0.000	0.00
128	100.00	0.450	0.64	0.000	0.00
256	50.00	0.450	0.73	0.000	0.00
256	75.00	0.450	0.65	0.000	0.00
256	100.00	0.450	0.65	0.000	0.00
512	50.00	0.450	0.71	0.000	0.00
512	75.00	0.450	0.71	0.000	0.00
512	100.00	0.450	0.71	0.000	0.00

The load generated can be customized in accordance with different packet length and last for a specified period of time.

4.3 Packet Loss Result

General Test

Packet Loss Test

Testing interval: 20100312 20:47:42 - 20100312 20:48:33

Duration (sec): 9

Min. Frame Size: 64 Initial Rate (%): 70.00

Max. Frame Size: 128 Stop Rate (%): 15.00

Stop Frame Size: 64 Max. Rate (%): 100.00

Frame Size (bytes)	Rate Tested (%)	Port A → Port B (%)	Port B → Port A (%)	Average
		100MF-100MF	100MF-100MF	
64	70.00	0.00	0.00	0.00
64	85.00	0.00	0.00	0.00
64	100.00	0.00	0.00	0.00
128	70.00	0.00	0.00	0.00
128	85.00	0.00	0.00	0.00
128	100.00	0.00	0.00	0.00

Customized Test

Packet Loss Test

Testing interval: 20100312 12:14:14 - 20100312 12:20:03

Duration (sec): 5

Frame Size (bytes): Initial Rate (%) Stop Rate (%) Max. Rate (%)

64 50.00 10.00 100.00

64 60.00 10.00 100.00

64 70.00 10.00 100.00

64 80.00 10.00 100.00

64 90.00 10.00 100.00

128 50.00 10.00 100.00

128 60.00 10.00 100.00

128 70.00 10.00 100.00

128 80.00 10.00 100.00

128 90.00 10.00 100.00

128 100.00 10.00 100.00

Frame Size (bytes)	Rate Tested (%)	Port A → Port B (%)	Port B → Port A (%)	Average
		100MF-100MF	100MF-100MF	
64	50.00	0.00	0.00	0.00
64	60.00	0.00	0.00	0.00
64	70.00	0.00	0.00	0.00
64	80.00	0.00	0.00	0.00
64	90.00	0.00	0.00	0.00
64	100.00	0.00	0.00	0.00
128	50.00	0.00	0.00	0.00
128	60.00	0.00	0.00	0.00
128	70.00	0.00	0.00	0.00
128	80.00	0.00	0.00	0.00
128	90.00	0.00	0.00	0.00
128	100.00	0.00	0.00	0.00

The loading and the duration time can be customized to simulate scenario. Therefore, this provides a distinct perspective of the performance limits of the DUT in different loading environments.

4.4 Back-to-Back Result

General Test

Back to Back Test

Testing interval: 20100312 20:56:53 - 20100312 21:01:28

Duration (sec): 4

Min. Frame Size: 64 Initial Rate (%) 80.00

Max. Frame Size: 128 Stop Rate (%) 10.00

Stop Frame Size: 64 Max. Rate (%) 100.00

Frame Size (bytes)	Rate Tested (%)	Port A → Port B Burst	Port B → Port A Burst	Total
		100MF-100MF	100MF-100MF	
64	80.00	476,188	476,188	952,376
64	90.00	526,112	526,112	1,052,224
64	100.00	995,238	995,238	1,990,476
128	80.00	270,288	270,288	540,576
128	90.00	304,052	304,052	608,104
128	100.00	337,636	337,636	675,272

Customized Test

Back to Back Test

Testing interval: 20100312 12:28:03 - 20100312 12:41:37

Duration (sec): 8

Frame Size (bytes): Initial Rate (%) Stop Rate (%) Max. Rate (%)

64 50.00 10.00 100.00

64 60.00 10.00 100.00

64 70.00 10.00 100.00

64 80.00 10.00 100.00

64 90.00 10.00 100.00

64 100.00 10.00 100.00

128 50.00 10.00 100.00

128 60.00 10.00 100.00

128 70.00 10.00 100.00

128 80.00 10.00 100.00

128 90.00 10.00 100.00

128 100.00 10.00 100.00

Frame Size (bytes)	Rate Tested (%)	Port A → Port B Burst	Port B → Port A Burst	Total
		100MF-100MF	100MF-100MF	
64	50.00	488,422	488,422	976,844
64	60.00	526,112	526,112	1,052,224
64	70.00	628,887	628,887	1,257,774
64	80.00	714,263	714,263	1,428,526
64	90.00	803,568	803,568	1,607,136
64	100.00	892,854	892,854	1,785,708
128	50.00	252,377	252,377	504,754
128	60.00	304,052	304,052	608,104
128	70.00	364,227	364,227	728,454
128	80.00	408,402	408,402	816,804
128	90.00	452,577	452,577	905,154
128	100.00	500,752	500,752	1,001,504

For each packet length specified in test setting, the test is automatically repeated to provide an accurate perception of the buffer capacity of the DUT under different conditions.

4.5 Reports of Result

General Test

Frame Size (bytes)	100Mb MaxPkt (bytes/sec)	Avg % packet	Accessible Loss (%)
64	148,000	84.469	0
128	180,000	100.000	0
256	148,000	84.469	0

Port A -> Port B	Port A -> Port A	Port B -> Port A
148,000	84,469	148,000
180,000	100,000	180,000
148,000	84,469	148,000

Throughput SUMMARY: Total Port Pairs			
Port A -> Port B	64	128	256
Port A -> Port A	100.000	100.000	100.000
Port B -> Port A	100.000	100.000	100.000

Frame Size (bytes)	Throughput	Latency	Packet Loss	Back to Back	Summary Report	Test Log
64	128					

Customized Test

Frame Size (bytes)	100Mb MaxPkt (bytes/sec)	Avg % packet	Accessible Loss (%)
64	148,000	84.469	0
128	180,000	100.000	0
256	148,000	84.469	0
512	1,024	1,000	0
1,024	1,200	1,518	0
1,536	11,973	8,615	8,127

Port A -> Port B	Port A -> Port A	Port B -> Port A
148,000	84,469	45,289
180,000	100,000	23,486
148,000	84,469	45,289

Throughput SUMMARY: Total Port Pairs						
Port A -> Port B	64	128	256	512	1,024	1,536
Port A -> Port A	100.000	100.000	100.000	100.000	100.000	100.000
Port B -> Port A	100.000	100.000	100.000	100.000	100.000	100.000

Frame Size (bytes)	Throughput	Latency	Packet Loss	Back to Back	Summary Report	Test Log
64	128	256	512	1,024	1,536	

Reports of test results displays every test criteria value in this window, can see each test frames set parameter and total result value.

4.6 Logs of Result


General Test

Test Item	Status	Frame Size (bytes)	Duration (sec)	Throughput (Mbps)	Packet Loss (%)	Error Count
Benchmark Throughput Test 1	Passed	64	798	60.00	14.04	0
LE-5809VF A	---	64	798	60.00	14.04	0
LE-5809VF B	---	64	798	60.00	14.04	0
Benchmark Throughput Test 1	Passed	128	320	75.00	111.806	0
LE-5809VF A	---	128	320	75.00	111.806	0
LE-5809VF B	---	128	320	75.00	111.806	0
Packet	---	128	320	75.00	111.806	0
Benchmark Throughput Test 1	Passed	256	100	130.207	390.623	0
LE-5809VF A	---	256	100	130.207	390.623	0
LE-5809VF B	---	256	100	130.207	390.623	0
Packet	---	256	100	130.207	390.623	0
Benchmark Throughput Test 1	Passed	64	198	93.75	136.600	0
LE-5809VF A	---	64	198	93.75	136.600	0
LE-5809VF B	---	64	198	93.75	136.600	0
Packet	---	64	198	93.75	136.600	0
Benchmark Throughput Test 1	Passed	128	468	100.00	148.808	0
LE-5809VF A	---	128	468	100.00	148.808	0
LE-5809VF B	---	128	468	100.00	148.808	0
Packet	---	128	468	100.00	148.808	0
Benchmark Throughput Test 1	Passed	256	100	130.207	390.623	0
LE-5809VF A	---	256	100	130.207	390.623	0
LE-5809VF B	---	256	100	130.207	390.623	0
Packet	---	256	100	130.207	390.623	0


Customized Test

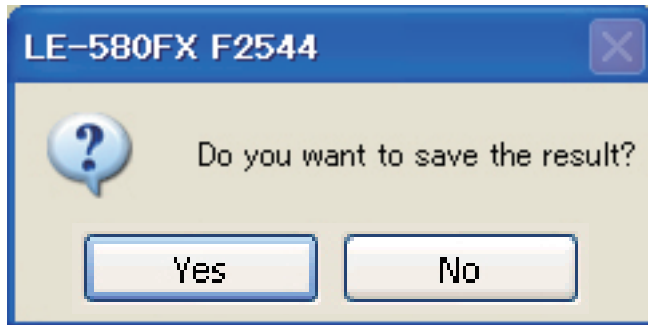
Test Item	Status	Frame Size (bytes)	Duration (sec)	Throughput (Mbps)	Packet Loss (%)	Error Count
Benchmark Throughput Test 1	Passed	256	112	89.22	45.935	134.955
LE-5809VF B	---	256	112	89.22	45.935	134.955
Benchmark Throughput Test 1	Passed	512	43	156.87	135.887	0
LE-5809VF A	---	512	43	156.87	135.887	0
LE-5809VF B	---	512	43	156.87	135.887	0
Packet	---	512	43	156.87	135.887	0
Benchmark Throughput Test 1	Passed	1,024	17	35.244	35.244	0
LE-5809VF A	---	1,024	17	35.244	35.244	0
LE-5809VF B	---	1,024	17	35.244	35.244	0
Packet	---	1,024	17	35.244	35.244	0
Benchmark Throughput Test 1	Passed	1,536	50	52.868	52.868	0
LE-5809VF A	---	1,536	50	52.868	52.868	0
LE-5809VF B	---	1,536	50	52.868	52.868	0
Packet	---	1,536	50	52.868	52.868	0
Benchmark Throughput Test 1	Passed	256	112	89.22	45.935	134.955
LE-5809VF A	---	256	112	89.22	45.935	134.955
LE-5809VF B	---	256	112	89.22	45.935	134.955
Packet	---	256	112	89.22	45.935	134.955
Benchmark Throughput Test 1	Passed	512	43	156.87	135.887	0
LE-5809VF A	---	512	43	156.87	135.887	0
LE-5809VF B	---	512	43	156.87	135.887	0
Packet	---	512	43	156.87	135.887	0
Benchmark Throughput Test 1	Passed	1,024	17	35.244	35.244	0
LE-5809VF A	---	1,024	17	35.244	35.244	0
LE-5809VF B	---	1,024	17	35.244	35.244	0
Packet	---	1,024	17	35.244	35.244	0
Benchmark Throughput Test 1	Passed	1,536	50	52.868	52.868	0
LE-5809VF A	---	1,536	50	52.868	52.868	0
LE-5809VF B	---	1,536	50	52.868	52.868	0
Packet	---	1,536	50	52.868	52.868	0


Logs list detailed operation records by each test item in port pairs.

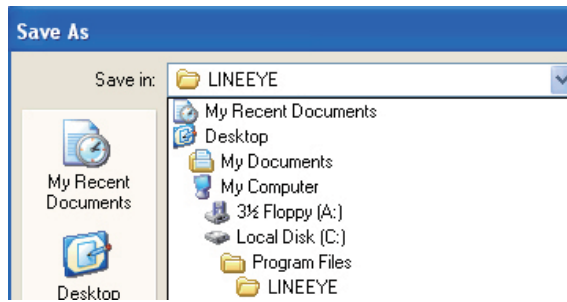
The screen will shift to whichever test in progress. Click on  icon to stop the rest of test(s). The status bar says "Complete" after running all tests as request (and says "Ready" after being changed to the configuration window). Use the tabs in the bottom window to view and read any test results, reports or logs.


4.7 Saving Results

A popup window will appear, after clicking on  icon to go back to configuration window (mail window), to inquire whether to save the result.



Click  icon to save an Excel file.



Click on  icon to go to results window.

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