



Getting Started with RFC 2544 testing

August 2010

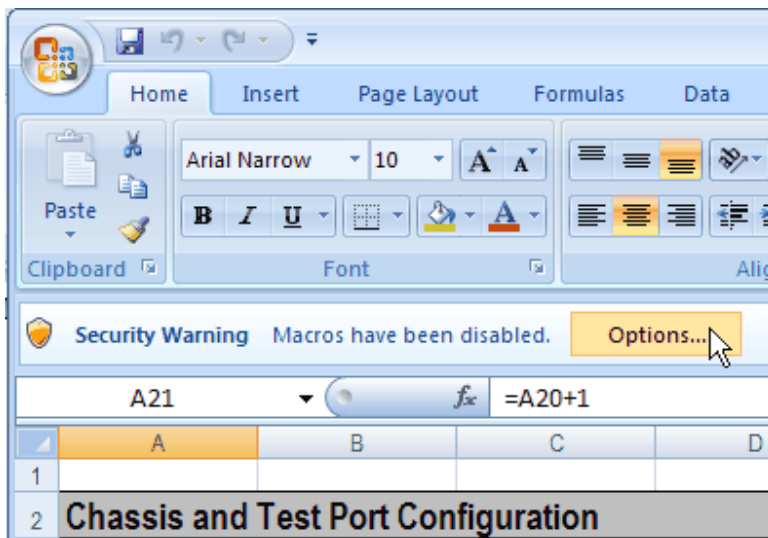
Installation

This note explains how to get started with the MS Excel based RFC 2544 test suite for the Xena test platform.

The RFC 2544 test suite requires a PC with a Windows XP, Windows Vista, or Windows 7 operating system with a MS Excel 2003 or newer version.

The RFC 2544 is implemented in a MS Excel worksheet using the Visual Basic for Applications (VBA) programming language which is an integral part of MS Excel.

1. Open the xena_rfc2544_vxx.xls file
2. When Excel opens, click the "Options..." buttons to enable the VBA programming of the RFC 2544 test suite:




3. Select "Enable this content", and press "OK":



By selecting the directory of the xena_rfc2544_vxx.xls file as a secure location, you can avoid this

security warning the next time you open the Excel workbook, by following the following steps:

Excel

1. Click the **Microsoft Office Button** , and then click **Excel Options**.
2. Click **Trust Center**, click **Trust Center Settings**, and then click **Trusted Locations**.
3. If you want to create a trusted location that is not local to your computer, select the **Allow trusted locations on my network (not recommended)** check box.
4. Click **Add new location**.

IMPORTANT We recommended that you don't make your entire Documents or My Documents folder a trusted location. Doing so creates a larger target for a hacker to potentially exploit and increases your security risk. Create a subfolder within Documents or My Documents, and make only that folder a trusted location.
5. In the **Path** box, type the name of the folder that you want to use as a trusted location, or click **Browse** to locate the folder.
6. If you want to include subfolders as trusted locations, select the **Subfolders of this location are also trusted** check box.
7. In the **Description** box, type what you want to describe the purpose of the trusted location.
8. Click **OK**.

4. The RFC 2544 worksheet should now be open, and enabled for running the RFC 2544 test suite, and your Excel screen view should look like this:

Chassis and Test Port Configuration								
Chassis number	Xena Networks	Password	Username	Chassis Name	Chassis Model	Ports per Module		
0	87.51.204.150	xena	rtc2544	-	-	-	User Input Cell	
1							Read only cell	
2								
3								
Port number	Chassis num	Module num	Physical Port	Speed (Mbps)	Interface	Rx Link Sync	EAST/WEST	
0	0	0	0	-	-	-		
1	0	0	1	-	-	-		
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
Port number	IP addr	MAC addr (hex)	ARP/PING reply	Auto Negotiation	Pause mode	Loop mode	IFG	Adjust (ppm)
0	0.0.0.0	0x020000029070	OFF	F10G	OFF	NONE	20	0
1	0.0.0.0	0x020000029071	OFF	F10G	OFF	NONE	20	0
2								

User Input Cell
Read only cell

CONNECT

UPLOAD
PORT CFG

Running the RFC2544 test

Worksheet “Connect” setup

Before you can begin running tests (see Figure 1):

- Physically connect your PC to a Xena chassis using an Ethernet connection.
- Set up Xena chassis and port connections in the Excel worksheet “Connect”
- Establish a connection to a Xena chassis from the Excel worksheet “Connect”
- Connect the Xena test ports to a DUT/SUT.

Chassis and Test Port Configuration						
Chassis number	Xena Networks	Password	Username	Chassis Name	Chassis Model	Ports per Module
0	87.51.204.150	xena	rfc2544	-	-	-
1						
2						
3						

Port number	Chassis num	Module num	Physical Port	Speed (Mbps)	Interface	Rx Link Sync	EAST/WEST
0	0	0	0	-	-	-	-
1	0	0	1	-	-	-	-
2							
3							

Figure 1 Connect

Specify the test port configurations (see Figure 2):

- Set the IP address of the test port, if testing is to be performed at L3
- For tri-speed ports, set the speed mode to AUTO (default), or forced 10/100/1000Mbit/s

Port number	IP addr	MAC addr (hex)	ARP/PING reply	Auto Negotiation	Pause mode	Loop mode	IFG	Adjust (ppm)
0	0.0.0.0	0x020000029070	OFF	F10G	OFF	NONE	20	0
1	0.0.0.0	0x020000029071	OFF	F10G	OFF	NONE	20	0
2								
3								

Figure 2 Test Port Configuration

Worksheet “TestCfg” setup

Use default settings, or manually specify the test parameters for the RFC 2544 tests (see Figure 3):

- Set the packet size
- Set global learning packet settings
- Set the trial duration period, per test
- Set the rates which are to be tested from min to max, specify the step value, and set “Custom Test Plan = No”). Or, select “Custom Test Plan = Yes”, and specify the range of rates to be tested for each individual packet size in the “TestPlan” worksheet.

Test Configuration		
Packet Size	Type	IEEE Standard
	Start from	64
	Stop at	64
	Step size	64
Learning packets	Learning mode	Every Trial
	Learning retries	1
THROUGHPUT Test	Duration (sec)	1
	Initial rate (%)	100.00
	Min. Rate (%)	0.10
	Max. Rate (%)	100.00
	Resolution (%)	0.50
	Acceptable Loss (%)	0.00
	Custom Test Plan (y/n)	No
LOSS Test	Duration (sec)	1
	Initial rate (%)	50.00
	Step rate (%)	10.00
	Max. Rate (%)	100.00
	Custom Test Plan (y/n)	No
LATENCY Test	Duration (sec)	1
	Initial rate (%)	50.00
	Step rate (%)	25.00
	Max. Rate (%)	100.00
	Custom Test Plan (y/n)	No
	Auto set Max rate = Throughput result	Yes
	Auto set Initial rate = Throughput result	Yes
BACK-to-BACK Test	Duration (sec)	0.1
	Initial rate (%)	50.00
	Step rate (%)	25.00
	Max. Rate (%)	100.00

Figure 3 Test Configuration

Worksheet “TestPlan” setup

An example test plan is shown in Figure 4, where IEEE standard packet sizes are setup to be tested.

THROUGHPUT Test						LOSS Test				LATENCY Test				BACK-to-BACK Test			
Frame size (bytes)	Initial rate (%)	Min rate (%)	Max rate (%)	Resolution (%)	Acpt Loss (%)	Frame size (bytes)	Initial rate (%)	Step rate (%)	Max rate (%)	Frame size (bytes)	Initial rate (%)	Step rate (%)	Max rate (%)	Frame size (bytes)	Initial rate (%)	Step rate (%)	Max rate (%)
64	100.00	0.10	100.00	0.50	0.00	64	50.00	10.00	100.00	64	50	25	100	64	50.00	25.00	100.00
128	100.00	0.10	100.00	0.50	0.00	128	50.00	10.00	100.00	128	50	25	100	128	50.00	25.00	100.00
256	100.00	0.10	100.00	0.50	0.00	256	50.00	10.00	100.00	256	50	25	100	256	50.00	25.00	100.00
512	100.00	0.10	100.00	0.50	0.00	512	50.00	10.00	100.00	512	50	25	100	512	50.00	25.00	100.00
1024	100.00	0.10	100.00	0.50	0.00	1024	50.00	10.00	100.00	1024	50	25	100	1024	50.00	25.00	100.00
1280	100.00	0.10	100.00	0.50	0.00	1280	50.00	10.00	100.00	1280	50	25	100	1280	50.00	25.00	100.00
1518	100.00	0.10	100.00	0.50	0.00	1518	50.00	10.00	100.00	1518	50	25	100	1518	50.00	25.00	100.00

Figure 4 Custom Test Plan

Worksheet “TestPairs” setup

The final test configuration step is to specify the port test pairs. A test pair defines unidirectional traffic flow from a source to a destination test port. An example of a bi-directional test between test port 0 and test port 1 is shown in Figure 5. Test pairs can only be defined between EAST/WEST, where EAST/WEST are groups of test ports as defined by the user on sheet “Connect”

Test Pairs			
Pair Number	Src Port	Dest Port	Header Template
0	Port 0 (0/0/0)	Port 1 (0/0/1)	ETH
1	Port 1 (0/0/1)	Port 0 (0/0/0)	ETH
2			
3			
4			
5			
6			
7			
8			
9			

The Header content is automatically generated based on the selected header template, and test pairs source MAC address (SMAC), the test pairs destination MAC address (DMAC), the test pairs source IP address (SIP), the test pairs destination IP address (DIP). The values of VID1, VID2, IP1, MAC1 can also be inserted into the header template definitions

Figure 5 Test Pair Definitions

Specify for each test pair the content and definition of the packet headers. Six predefined header types can be selected: Ethernet, Ethernet with VLAN tag, Ethernet with stacked VLAN tag (Q-in-Q), Ethernet with IPv4, Ethernet with VLAN tag and IPv4, and Ethernet with stacked VLAN tag (Q-in-Q) and IPv4.

The pre-defined header definitions are specified in the header template section (see Figure 6), and are made up from a combination of absolute hex numbers and field mnemonics which are automatically converted into their corresponding absolute value which is shown next to the header template selection field.

Header Templates		
Header Template	Header Segments	Header Definition (hex)
ETH	ETHERNET	0x[DMAC][MAC1]0000
ETH-VL	ETHERNET VLAN	0x[DMAC][SMAC]81000[VID1]0000
ETH-Q-in-Q	ETHERNET VLAN VLAN	0x[DMAC][SMAC]91000[VID1]81000[VID2]0000
ETH-IP	ETHERNET IP	0x[DMAC][SMAC]0800450000000000000000000000[SIP][DIP]
ETH-VL-IP	ETHERNET VLAN IP	0x[DMAC][SMAC]8100[VID1]0800450000000000000000000000[SIP][DIP]
ETH-Q-in-Q-IP	ETHERNET VLAN VLAN IP	0x[DMAC][SMAC]91000[VID1]81000[VID2]0800450000000000000000000000[SIP][DIP]

Field (optional)	Value
[VID1] (dec)	0
[VID2] (dec)	1
[IP1]	192.168.1.1
[MAC1] (hex)	0x112233445566

Figure 6 Header Templates

Run Worksheet “Run.Throughput/Loss/Latency/Backtoback”

Finally, to start the tests, push the START or START ALL button in either the Run.Throughput, Run.Loss, Run.Latency, or Run.Backtoback sheet (see Figure 7).

THROUGHPUT Test

Test duration (sec): 1	Number of pairs: 2		
Minimum frame size (byte): 64	Initial rate (%): 100.00	<input type="button" value="RUN"/>	<input type="button" value="RUN ALL"/>
Maximum frame size (byte): 64	Min. Rate (%): 0.10	<input type="button" value="STOP"/>	<input type="button" value="READY TO RUN"/>
Step frame size (byte): 64	Max. Rate (%): 100.00		
Packet size function (Step/IEEE): IEEE Standard	Resolution (%): 0.50		
Custom Test Plan (y/n): No	Acceptable Loss (%): 0.00		

Frame size (bytes)	Passed rate (%)	<0-to-1> (packets/sec)	<1-to-0> (packets/sec)	Total (packets/sec)	Total Loss (packets)	Total Loss (%)

Figure 7 Start the testing

View Test Results Summary Reports and Charts

If testing completes successfully, review results in the “Results” and “Charts” sheets. The sheet are always automatically updated before/after that user start a test(s).

Xena Networks RFC 2554 - Throughput Test Results

Test duration (sec): 1
 Number of pairs: 2
 Date 9-Sep-2009
 Time 2:59 PM

Maximum port-pair throughput with no loss

	64	128	256	512	1024
10000M Max Rate (pps)	19531250	9765625	4882812	2441406	1220703
Passed rate (%)	61.37	100.00	100.00	100.00	100.00
Acceptable loss percent	0.00	0.00	0.00	0.00	0.00
<0-to-1> (pps)	11985702	9765625	4882812	2441406	1220703
<1-to-0> (pps)	11985702	9765625	4882812	2441406	1220703
<0-to-1> (%)	61.37	100.00	100.00	100.00	100.00
<1-to-0> (%)	61.37	100.00	100.00	100.00	100.00

Figure 8 Sample Test Report

Xena Networks RFC 2554 - Throughput Test Results

Test duration (sec): 1
 Number of pairs: 2
 Date 8-Sep-2009
 Time 11:59 PM
 Test Pair(s) SUMMARY

Frame Size	64	128	256	512	1024	1280	1518
Theoretical Throughput	19531250	9765625	4882812	2441406	1220703	976562	823451
Throughput	17578125	7812500	4882812	2441406	1220703	976562	823451

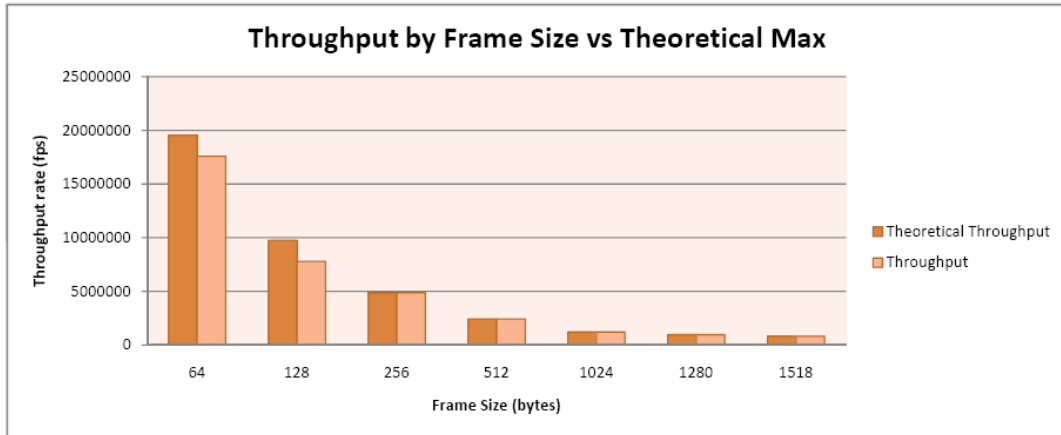


Figure 9 Sample Test Result Chart