NuApps-IGMP-RM User's Manual

USM Ver 1.2

Foreword

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Revision History

Date	Version	History
2012/05/17	1.0	First draft version
2012/09/10	1.1	1. Deleting the description of NuApps-IGMP-RM supports operation system Windows 2000.(Page 5)
2012/09/17	1.2	1. Deleting watermark Preliminary. 2. Updating FPGA and Firmware Version. (Page 5) 3. Updating figure for Demo mode. (Page 12) 4. Modifying Main user interface figure. (Page 14, 16) 5. Modifying Port Pairing Setting figure. (Page 19) 6. Modifying Test Config. Setting figure. (Page 19) 7. Updating Language figure. (Page 20) 8. Adding System Requirement figure and description. (Page 20) 9. Adding IGMP V3 Source Filter Test on Sys Info figure. (Page 23) 10. Modifying Port Pairing Config figure. (Page 23) 11. Updating Mixed Class Throughput task figure. (Page 24) 12. Adding IGMP V3 Source Filter Test figure and description. (Page 25) 13. Adding IGMP V3 Source Filter Test description. (Page 26) 14. Updating Port Pairing Config description figure and description. (Page 31-32) 15. Adding IGMP V3 Source Filter Test description. (Page 33) 16. Adding Version 3 description in each task. (Page 34, 37, 40, 43, 46, 49) 17. Adding IGMP V3 Source Filter Test figure and task description. (Page 51-53) 18. Adding IGMP V3 Source Filter Test on Sys Info figure. (Page 54) 19. Adding IGMP V3 Source Filter Test description. (Page 55) 20. Updating Test Report Counter figure and Clear description. (Page 56) 21. Adding IGMP V3 Source Filter Test Report figure and description. (Page 60) 22. Deleting the description of NuApps-IGMP-RM supports operation system Windows 2000.(Page 20)

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1. General Description of NuApps-IGMP-RM

NuApps-IGMP-RM is the professional testing software for Internet Group Management Protocol (IGMP), a communication protocol designed to manage the membership of Internet Protocol multicast groups. IGMP establishes multicast group memberships by connecting IP hosts and adjacent multicast routers. It will be an important protocol when multicast-enabled applications such as webinars, Internet radio/TV, and video/audio conferences are now being used widely over the Internet. From those applications used widely, how to test the equipment becomes an important issue.

NuApps-IGMP-RM must be activated with NuStreams Chassis. NuApps-IGMP-RM is designed for Xtramus Technologies XM-RM series module cards. The table down below contains the XM-RM module cards, FPGA/Firmware versions that are supported by NuApps-IGMP-RM.

Module Cards Support NuApps-IGMP-RM		
Module Card	**FPGA Version**	**Firmware Version**
XM-RM661/671/681	V3.1b034	v1.6b106
XM-RM751/761/781	V4.0b004	v1.6b106
XM-RM731	V3.0b000	v1.6b161
XM-RM881	v1.4b008	V0.9b026
XM-RM881-2	v1.4b008	V0.1b028
XM-RM891	v1.4b008	V1.6b106

∗Note: NuStreams-2000i and NuStreams-600i are required as well.

Also, please make sure that your PC meets the requirements listed in the table down below before installing NuApps-IGMP-RM.

OS	**Windows XP**	**Windows Vista/7**
RAM	512MB RAM	1GB RAM
CPU	Pentium 1.3Ghz or higher	
HDD	10 GB Available Space	

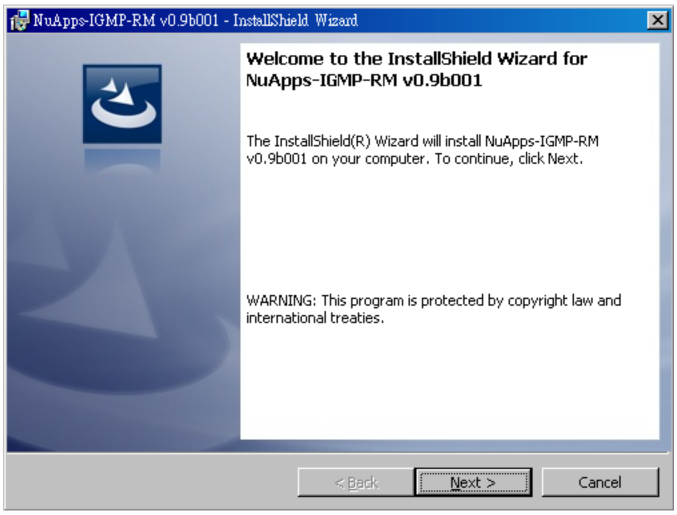
∗Note: Large amount of data will be generated while running NuApps-IGMP-RM. It is recommended to preserve enough available Hard-Disk space to store these data.

2. Installing and Uninstalling NuApps-IGMP-RM

Please follow the steps down below to install NuApps-IGMP-RM.

Installing NuApps-IGMP-RM

1. Double-click NuApps-IGMP-RM installation program and start the installation process.*

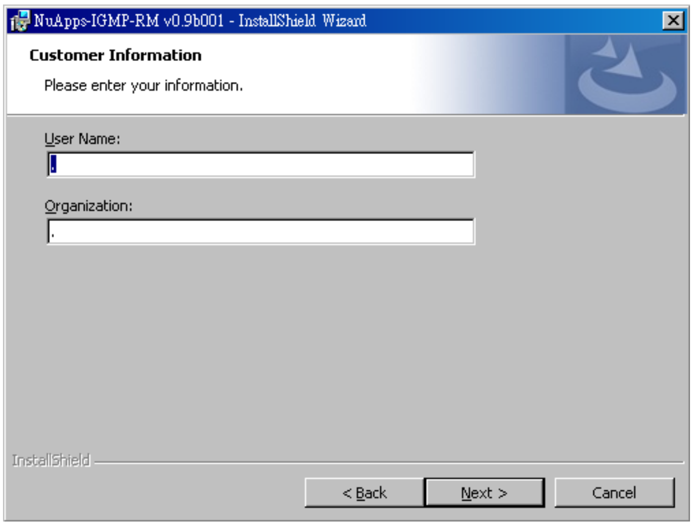


2. InstallShield Wizard is starting to install NuApps-IGMP-RM. If you would like to cancel installation, click **Cancel**, or click **Next** to continue installation.

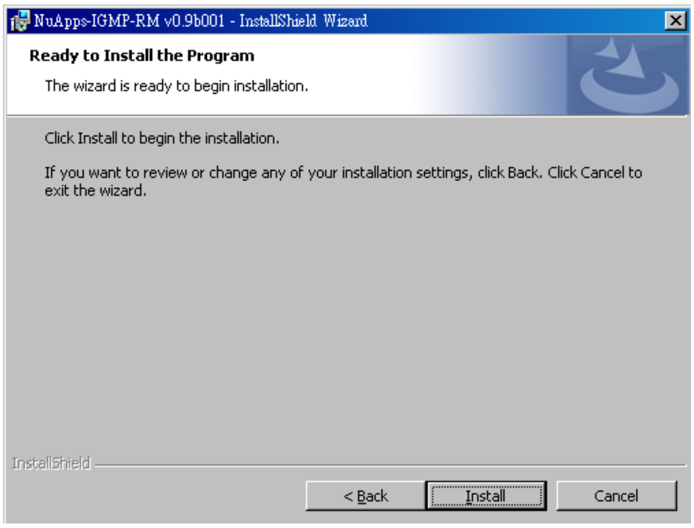
3. After reading the **End User License Agreement**, please select **I accept the terms in the license agreement**, and **Next** to proceed with the installation, or click **Cancel** to cancel installation. You may also click **Back** to return to the previous installation window.

***Note: Due to different Operating Systems or system settings, warning messages might pop up when installing NuApps-IGMP-RM. When this occurs, please choose the options on these pop-up warning messages that allow you to continue installing NuApps-IGMP-RM.**

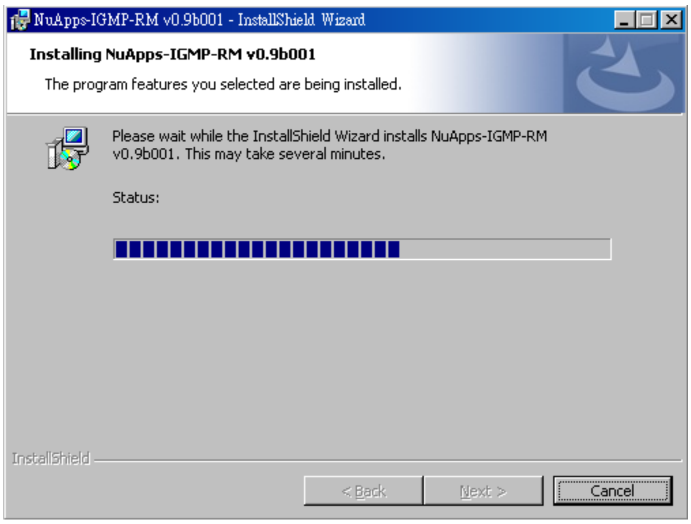
Installing NuApps-IGMP-RM



4. You can change the User/Organization name here, the default name for User/Organization name is “.”. Click the **Next** button to continue with the next step. Click **Back** button to go back to the previous step to modify. And click Cancel to exit this installation wizard.

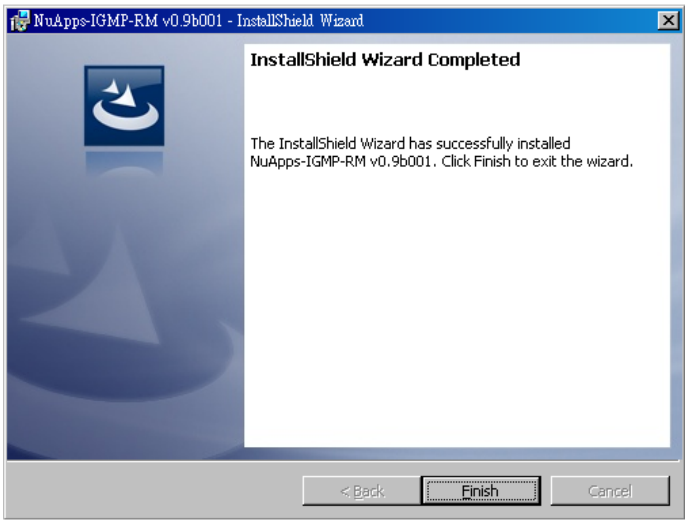


5. This window will ask for your confirmation to start the installation, if anything must be amended, please click **Back** button to go back to the previous step to modify. Click **Install** button to continue.

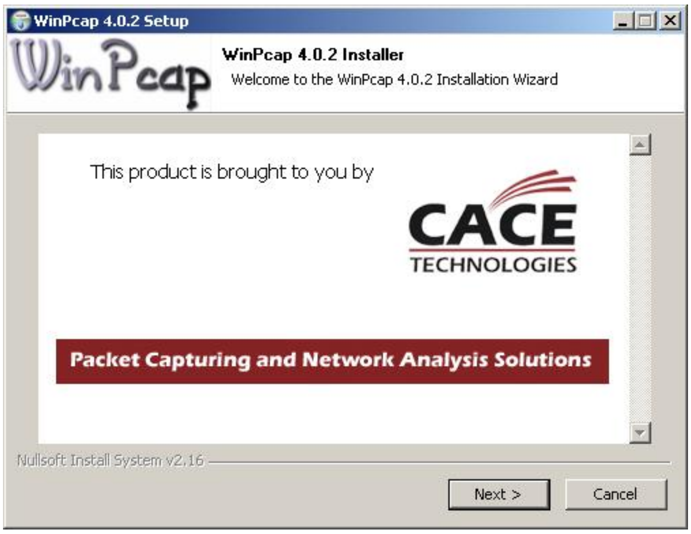


6. InstallShield Wizard is installing NuApps-IGMP-RM.

Installing NuApps-IGMP-RM



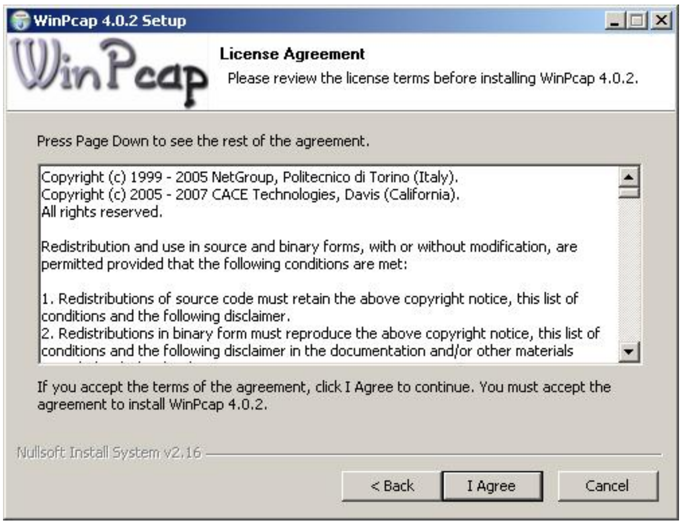
7. NuApps-IGMP-RM installation completes. Click **Finish** button to exit.



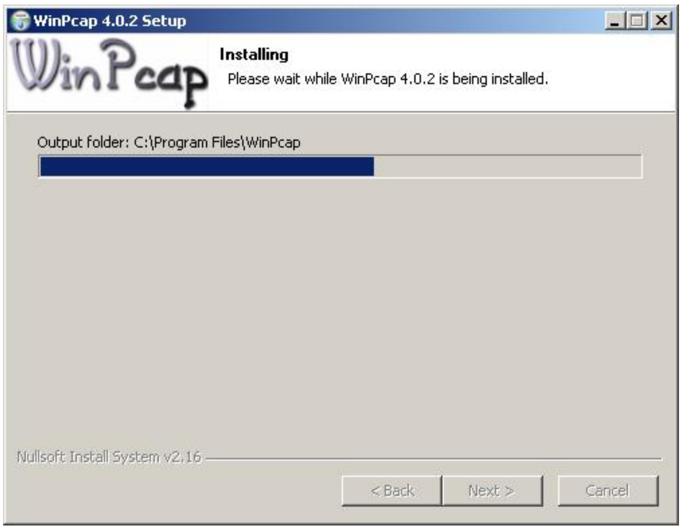
8. If your PC does not have **WinPcap** installed, a **WinPcap Installer** window will pop up. Click **Next** button to get ready to install, or click **Cancel** button to stop. For more detail information regarding to **WinPcap**, please visit their webpage at: www.winpcap.org.

9. WinPcap is preparing to install, or click **Cancel** button to stop at any time.

Installing NuApps-IGMP-RM



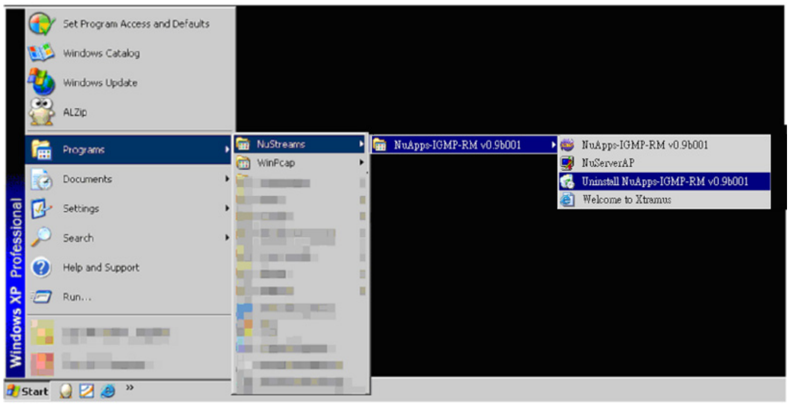
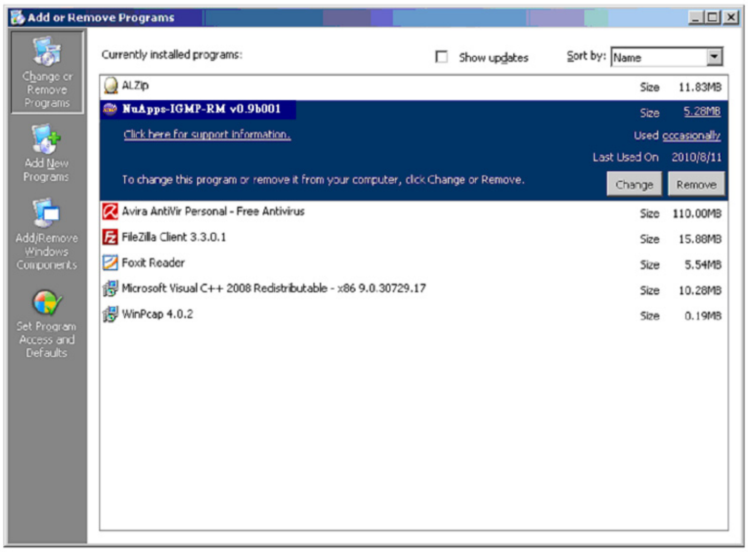
10. Review the license agreement before installing. Click **I Agree** button to continue. It is necessary to accept the agreement to install WinPcap.



11. WinPcap is installing.

12. WinPcap installation completes. Click **Finish** button to close the wizard.

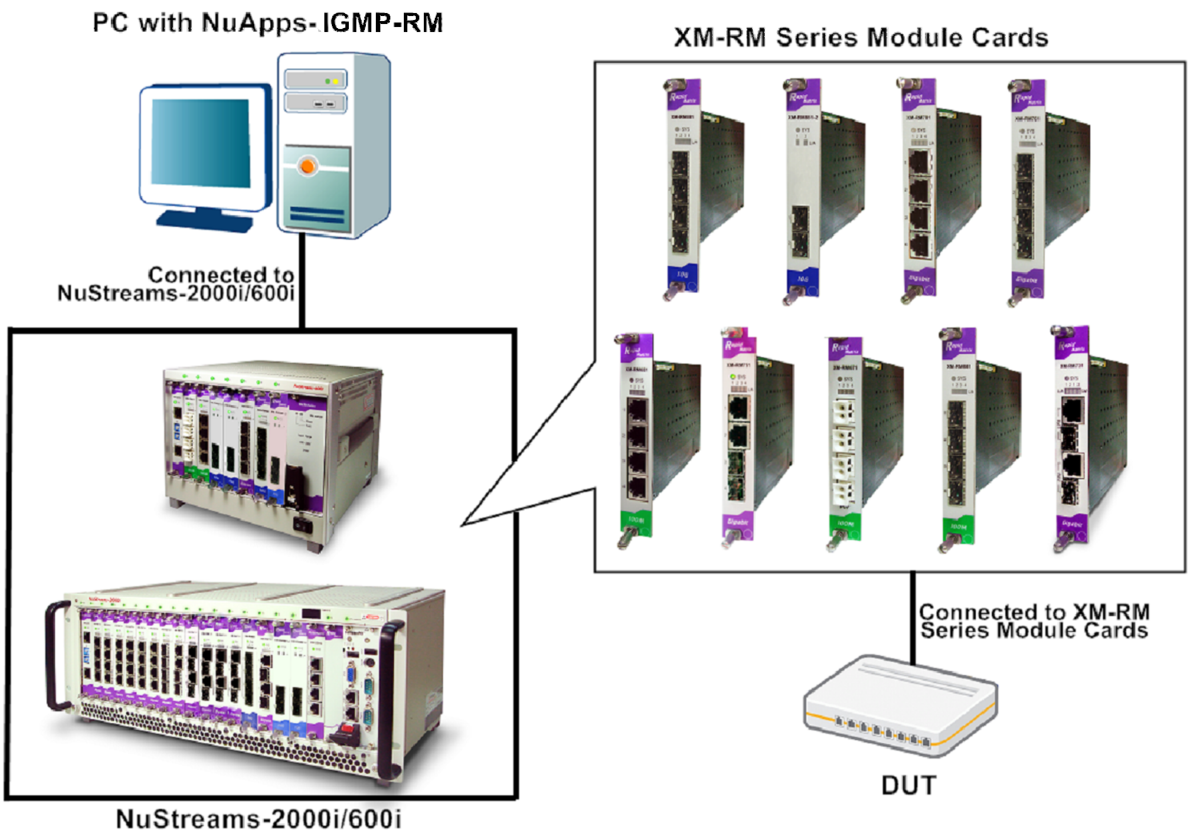
You can uninstall NuApps-IGMP-RM by:

Uninstalling NuApps-IGMP-RM	
	➢ Click **Start** → **Programs** → **NuStreams** → **NuApps-IGMP-RM** → **Uninstall NuApps-IGMP-RM**
	➢ Go to the **Control Panel**, choose **NuApps-IGMP-RM** from installed program list, and click **Remove** to uninstall.

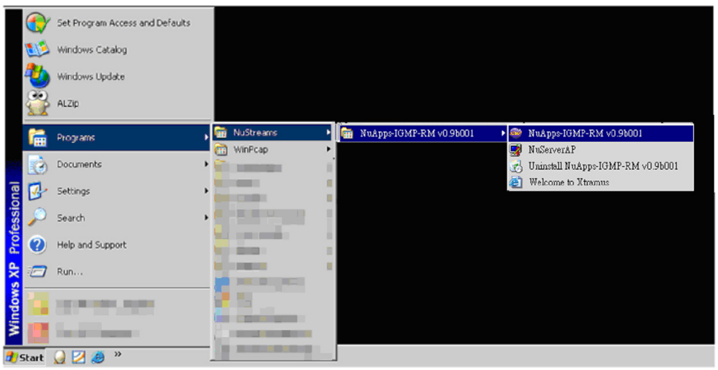
3. NuApps-IGMP-RM Function Overview

3.1. Starting NuApps-IGMP-RM

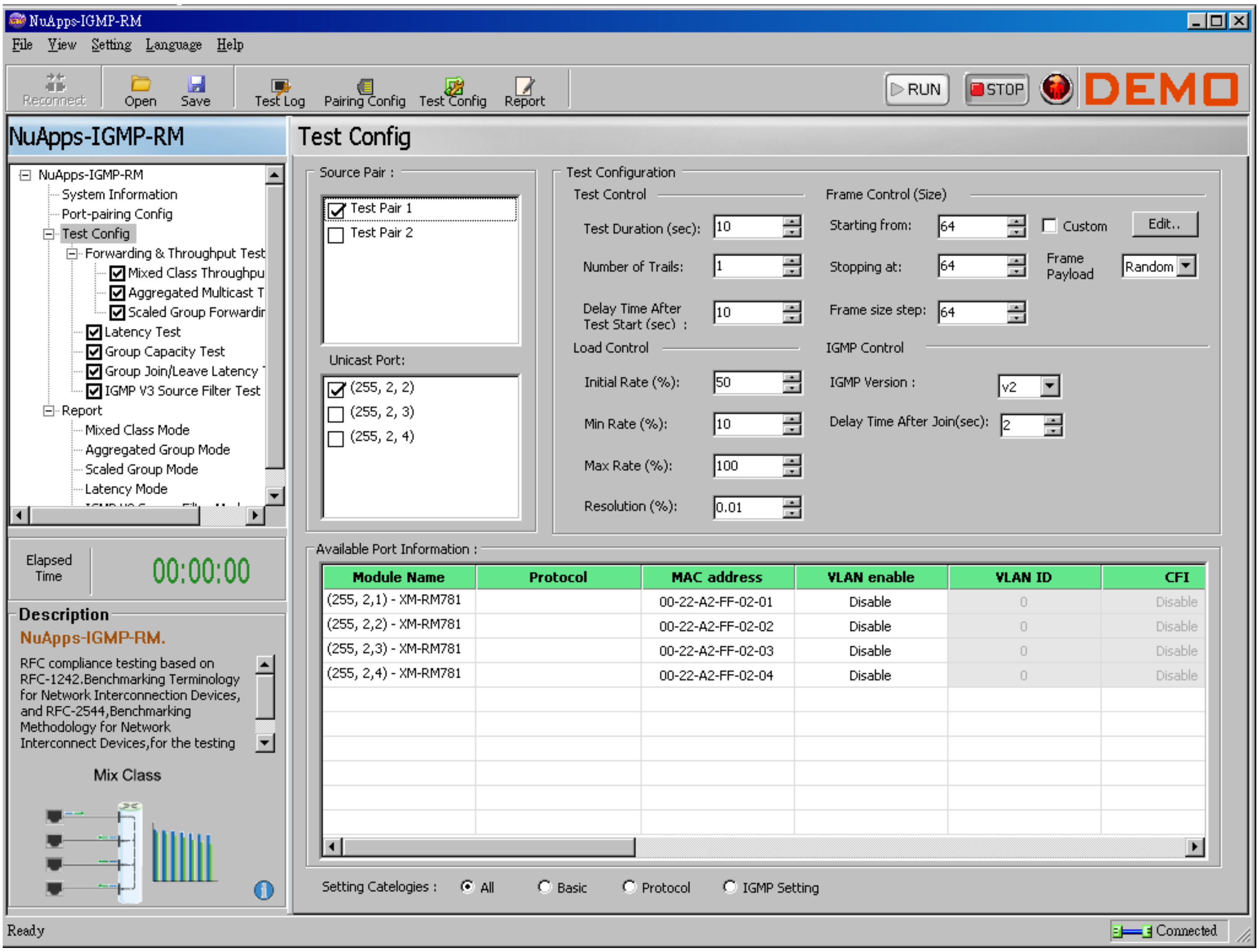
Before starting NuApps-IGMP-RM, the DUT, your PC, and NuStreams-2000i/600i shall be connected properly as shown in the figure down below:



There are two ways to starts NuApps-IGMP-RM:

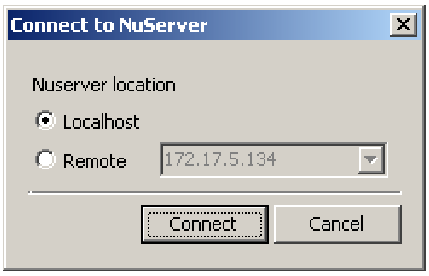
Starting NuApps-IGMP-RM	
	➢ Click **Start → Programs → NuStreams → NuApps-IGMP-RM**
	➢ Double-click NuApps-IGMP-RM icon located on your PC's desktop.

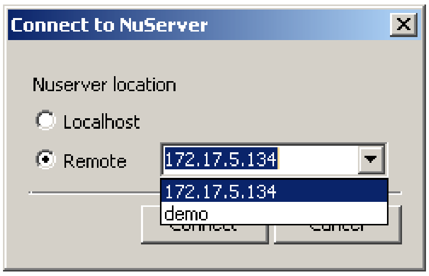
If your PC is not connected with NuStreams-2000i/600i, you can still run NuApps-IGMP-RM under **Demo Mode**. Almost all NuApps-IGMP-RM's functions are available under Demo Mode. However, please note that **Demo Mode is for system demo purposes only**, and does not serve any testing at all.



Please follow the steps down below to starts NuApps-IGMP-RM and NuServer properly.

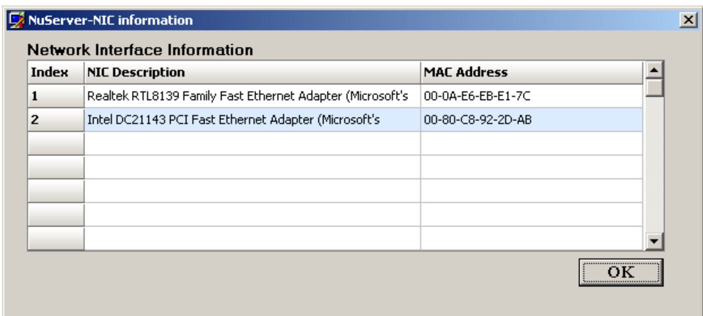
Starting NuServer / NuApps-IGMP-RM





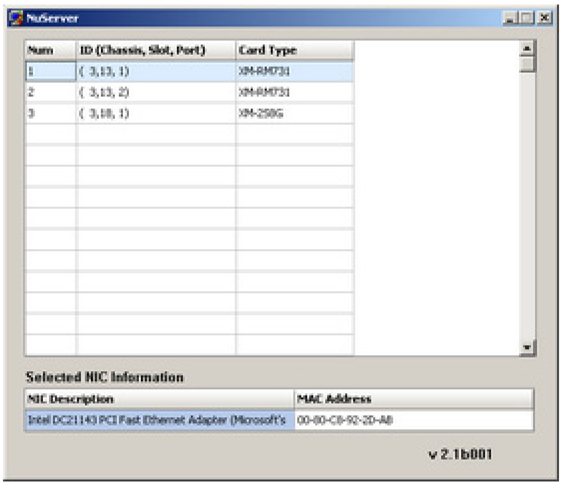
When starting NuApps-IGMP-RM, a “**Connect to NuServer**” window will pop up and asked how you are going to connect to NuServer.

- **Local Host:** Choose this option when you’re running NuApps-IGMP-RM from NuStreams-2000i IPC module or a PC that’s connected to NuStreams-2000i/600i via an RJ45 cable.
- **Remote:** Choose this option when you’re running NuApps-IGMP-RM from other PC located on the network. Choose the IP address which is assigned from NuStreams-2000i/600i from the scroll-down menu, or choose **demo** to enter NuApps-IGMP-RM’s Demo Mode.
- **Connect/Cancel:** Click the Connect/Cancel button to connect to NuStreams-2000i/600i or cancel starting NuApps-IGMP-RM.

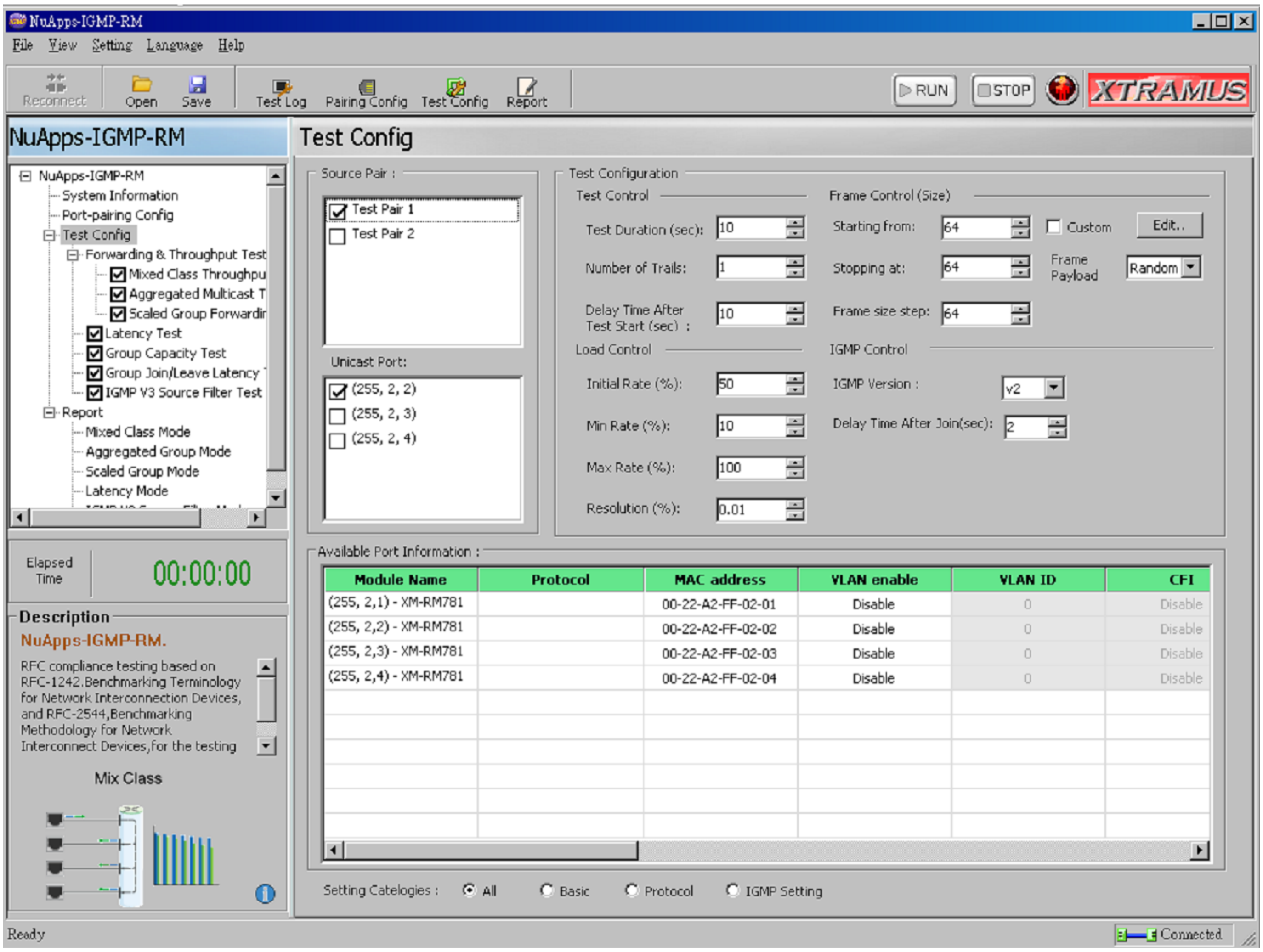


A “**NuServer-NIC Information**” window will pop up. Please select the NIC (Network Interface Card) which is connected to NuStreams -2000i/ 600i’s from the **Network Interface Information** table, and click **OK**. If you’re using NuStreams-2000i’s IPC module, please choose “**Realtek RTL8139 Family Fast Ethernet**”.

Starting NuServer / NuApps-IGMP-RM

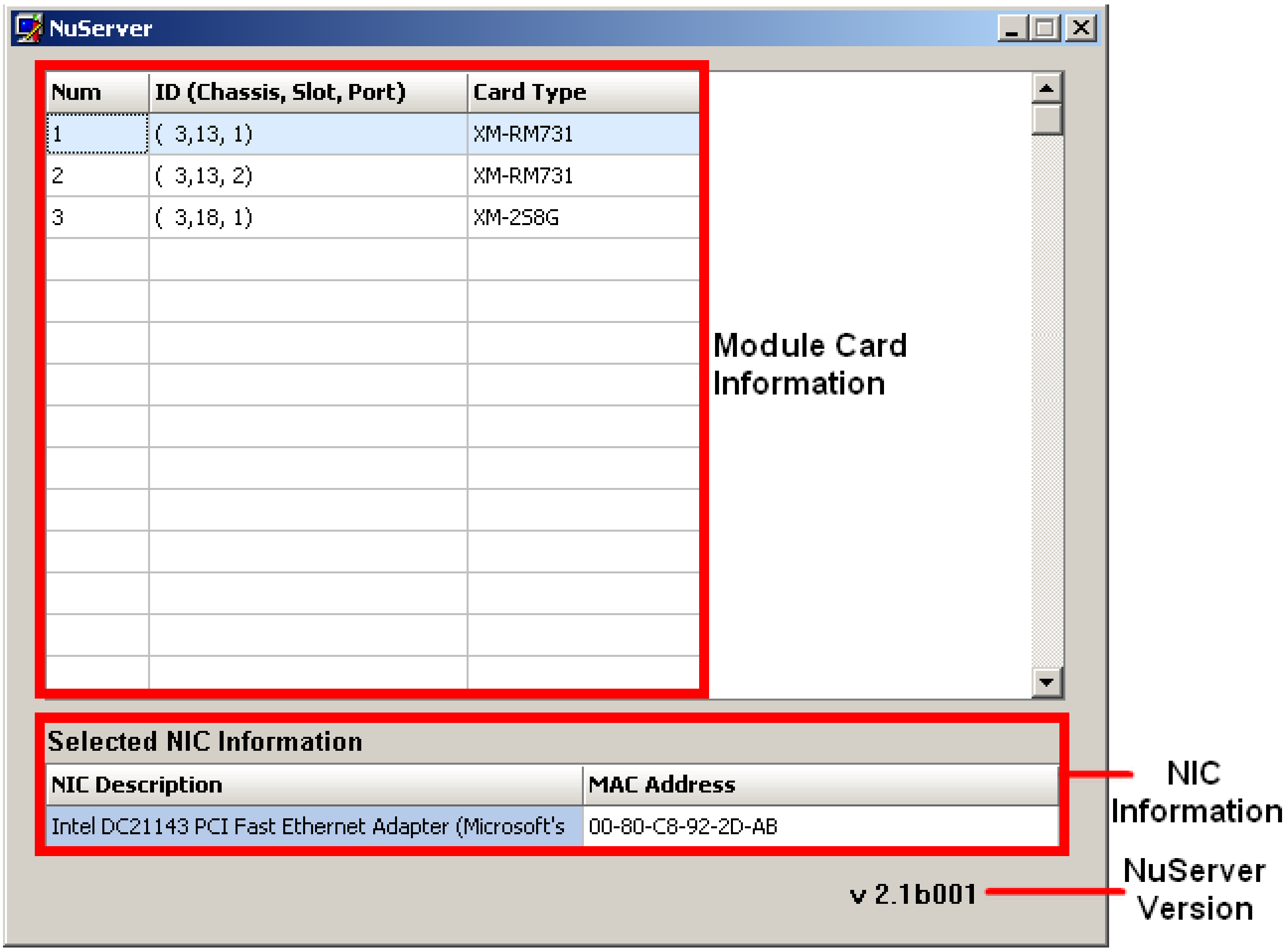


NuServer will connect to the daughter boards, and NuApps-IGMP-RM will start as well.



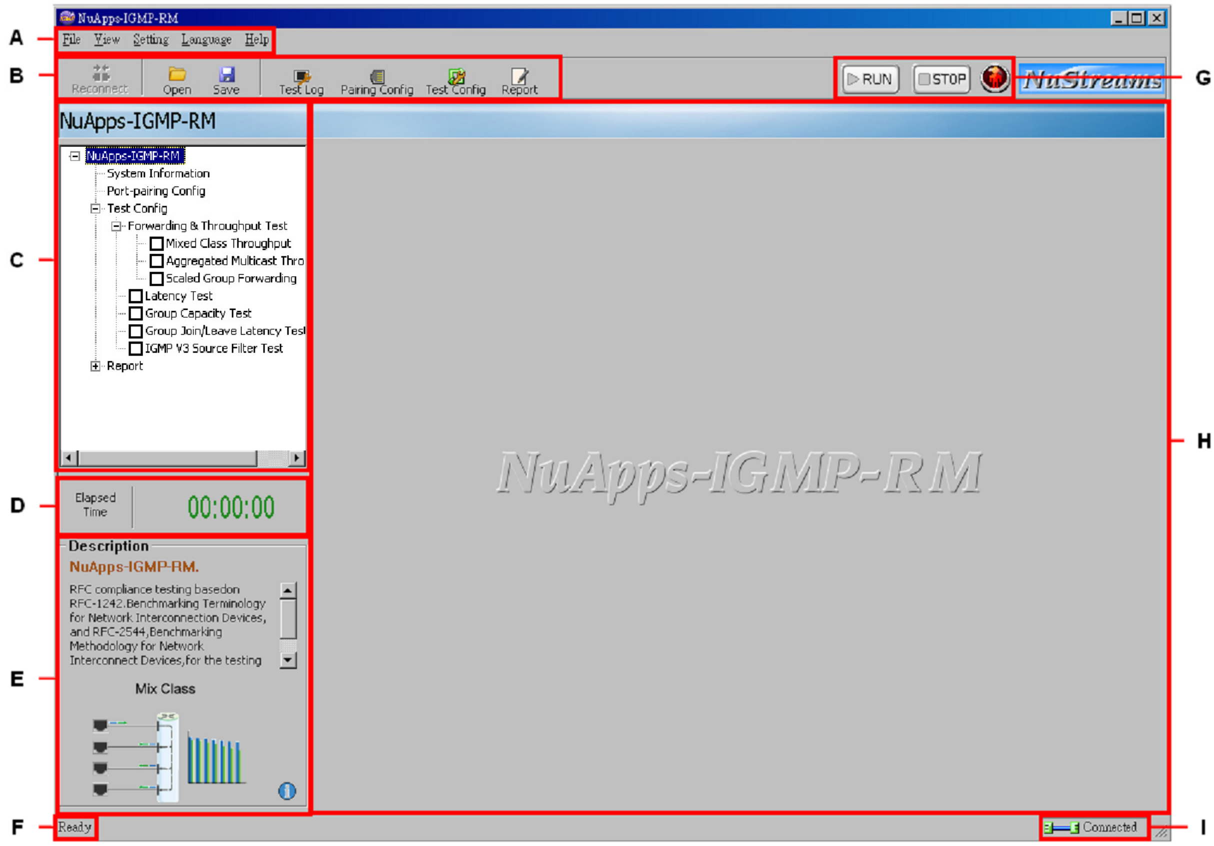
You now have access to NuApps-IGMP-RM's main display window.

3.2. NuServer Window



Description	
Module Card Information	This section displays the information regarding to the model cards that are installed on NuStreams-2000i/600i. Model Card IDs are showed as the format of **(X, Y, Z)** while X is the number of the chassis (which is displayed on NuStreams-2000i/600i), Y is the slot number where this model card is installed, and Z is the available port number located on the model card.
NIC Information	This section displays the detail information (including NIC Model name, NIC's MAC address) regarding to the selected NIC.
NuServer Version	This section displays the version of your NuServer.

3.3. NuApps-IGMP-RM Main Window

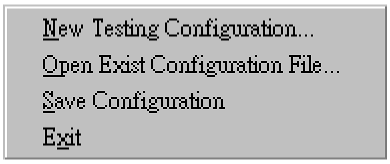


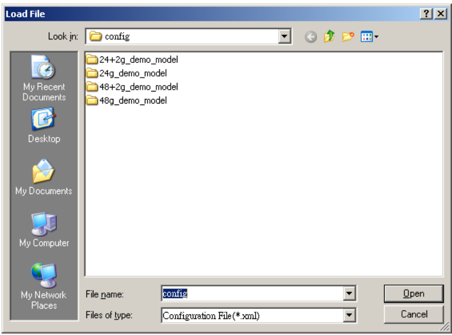
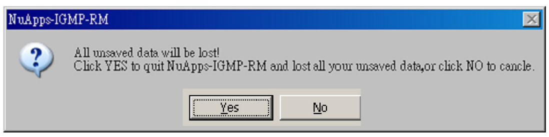
Function Descriptions		
A	**Menu Bar**	The **Menu Bar** allows you to manage test model settings, view module cards information, set the module cards' port and test configuration, change language displayed and access to **Xtramus** website.
B	**Tool Bar**	The **Tool Bar** contains buttons that allow you to reconnect your PC to NuStreams-2000i/600i, load/save test settings, make test/port configurations, and view test log/reports.
C	**System Info/Configuration List**	By clicking the **System Info/Configuration List**, you can view system information, making test/ports configurations, or view test reports on right side **Main Display Screen**.
D	**Elapsed Time**	The **Elapsed Time** field displays the elapsed time during test.
E	**Description**	The **Description** field display brief descriptions regarding to tests.
F	**Status Bar**	The **Status Bar** shows the running status of NuApps-IGMP-RM.
G	**Control Buttons/Test Running Status Icon**	The **Control Buttons** allow you to start/stop tests, and the **Test Running Status Icon** indicates if there's a test running.
H	**Main Display Screen**	You can make detail configurations and view real-time testing diagrams on the **Main Display Screen**.
I	**System Connection Status**	This icon shows the connection status between your PC and NuStreams-2000i/600i.

3.3.1. Menu Bar

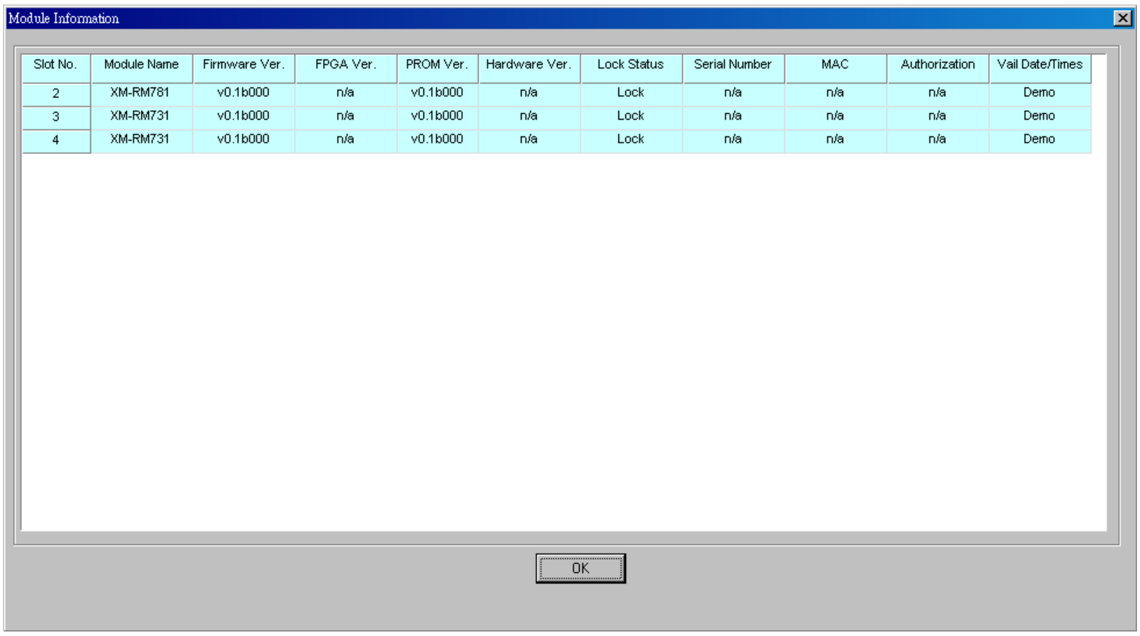
NuApps-IGMP-RM Menu Bar includes configuration options such as **File**, **View**, **Setting**, **Language**, and **Help**. Please refer to the sections down below for detail information regarding to each configuration option.

A. File



File Menu Bar Overview		
New Testing Configuration…	**The New Testing Configuration…** allows the users to lock the ports of your NuStreams-2000i/600i's module cards for task testing. For detail descriptions regarding to the New Model Wizard and its settings, please refer to"**4. Creating Task via New Testing Configuration**".	
Open Exist Configuration File…		Load a previously-saved configuration file and applies these settings to NuApps-IGMP-RM. All the configurations you've made via New Testing Configuration will be saved as a "***.xml**" file, along with several "***.cfg**" files. Please note that these "***.cfg**" files contain test settings as well. Deleting them will cause your "***.xml**" file unable to load properly.
Save Configuration	Choose this option to save your configuration made on **New Testing Configuration….**	
Exit		A prompt pop-up window will ask if you are sure to exit NuApps-IGMP-RM. Click **YES** to exit NuApps-IGMP-RM, or click **NO** to cancel.

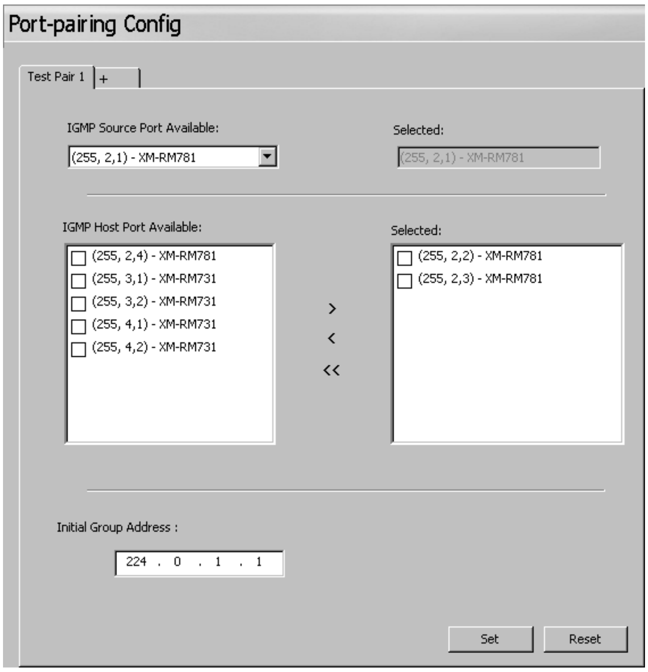
B. View

View Menu Bar Overview	
Module Information	 Choosing this option will pop up a window showing the detail information of your module cards. Click the **OK** button to exit this window.

C. Setting

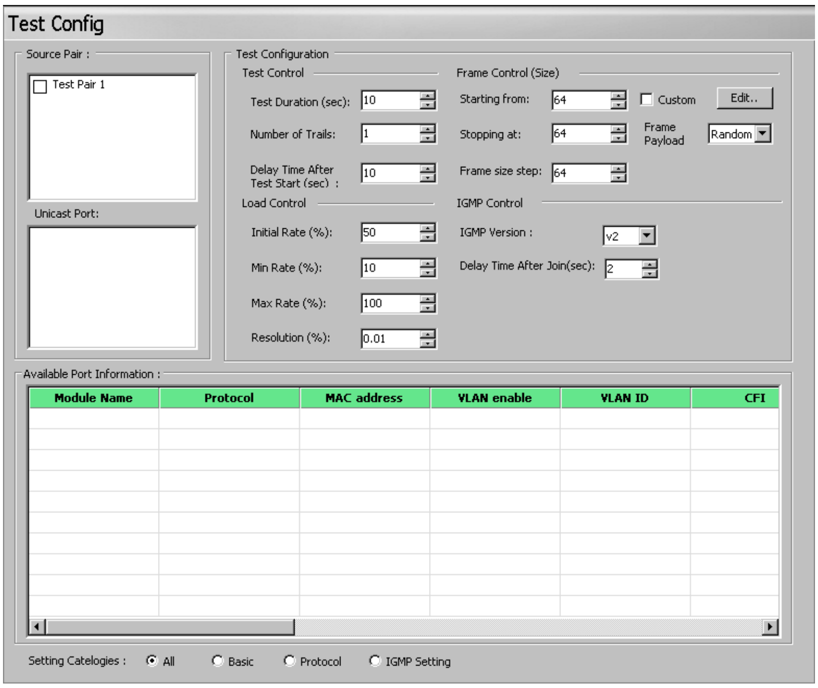
Setting Menu Bar Overview

Port-pairing Setting



From this option, you can set the ports as source/host port. Also, you can set number of groups and the Initial Group address.

Test Setting

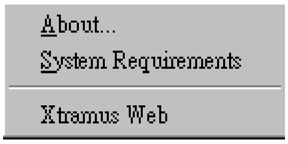


From this option, you can set the parameters for each available test configuration.

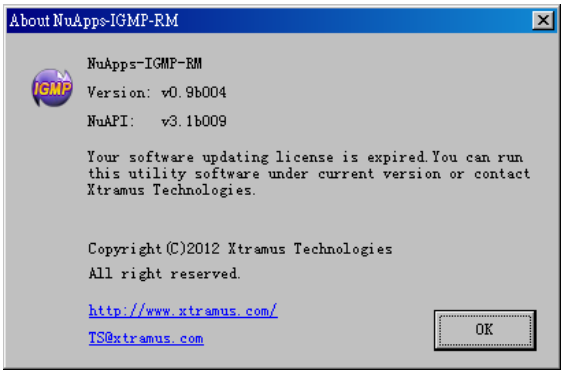
D. Language

Language Menu Bar Overview	
English/ Simplified Chinese	NuApps-IGMP-RM has **2** different languages for its UI available. You can set the language of UI to either **English** or **Simplified Chinese**.

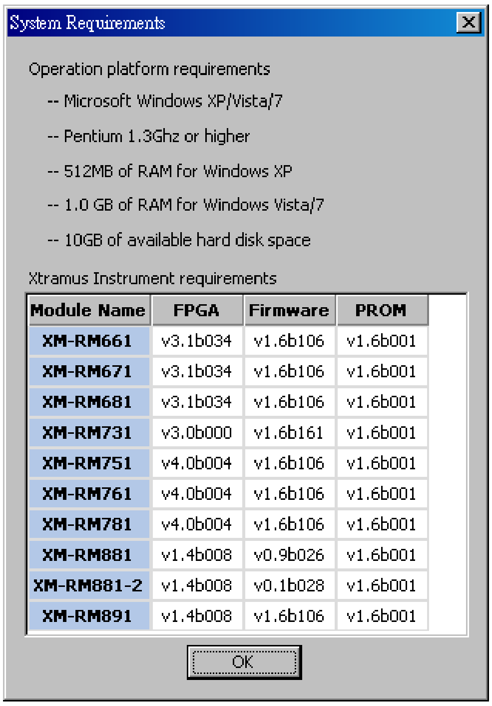
E. Help



<table>
<tr><th colspan="3">Help Menu Bar Overview</th></tr>
<tr><td>About…</td><td>



</td><td>An "About" window will pop up and show detailed system information.</td></tr>
<tr><td>System Requirements</td><td>



Module Name	FPGA	Firmware	PROM
XM-RM661	v3.1b034	v1.6b106	v1.6b001
XM-RM671	v3.1b034	v1.6b106	v1.6b001
XM-RM681	v3.1b034	v1.6b106	v1.6b001
XM-RM731	v3.0b000	v1.6b161	v1.6b001
XM-RM751	v4.0b004	v1.6b106	v1.6b001
XM-RM761	v4.0b004	v1.6b106	v1.6b001
XM-RM781	v4.0b004	v1.6b106	v1.6b001
XM-RM881	v1.4b008	v0.9b026	v1.6b001
XM-RM881-2	v1.4b008	v0.1b028	v1.6b001
XM-RM891	v1.4b008	v1.6b106	v1.6b001

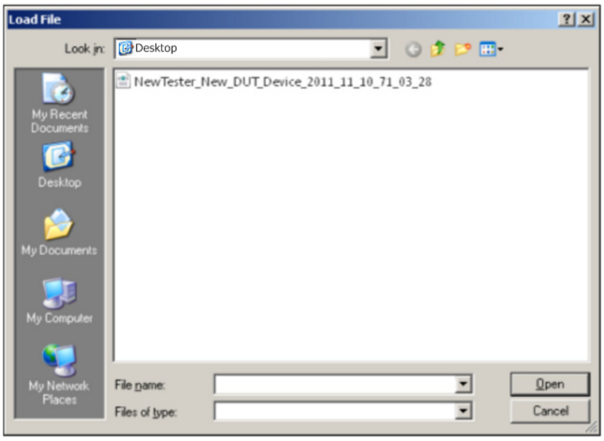
</td><td>A "System Requirements" window will pop up and show the requirements for your PC and the FPGA/Firmware of the module.

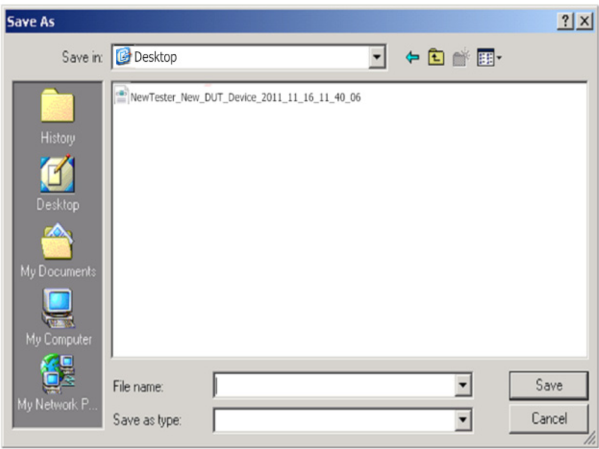
Click the OK button to exit the "System Requirements" pop-up window.</td></tr>
<tr><td>Xtramus Web</td><td colspan="2">Click this option to access the Xtramus official website.</td></tr>
</table>

3.3.2. Quick Launch Buttons

The Quick Launch Buttons allow you to reconnect your NuStreams-2000i/600i, Open/Save the current settings, see the test log/Report, and set the ports/test configuration.

Reconnect	
	If the connection between your PC and NuStreams-2000i/600i is down, a "**Disconnected**" icon  will be shown in "**System Connection Status**". Press **Reconnect** button  to re-establish the connection between your PC and NuStreams-2000i/600i. If the connection has been established successfully, a message window will pop up, and the "**System Connection Status**" will be shown as "**Connected**".

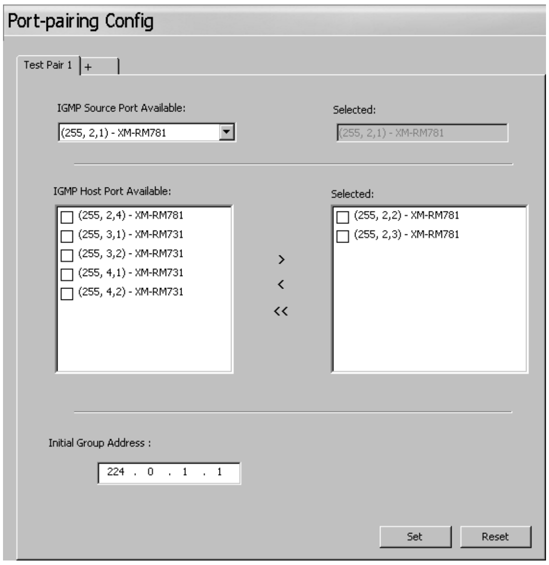
Open		
		If you have a previously saved configuration setting file stored in your PC, you can load it and apply all the setting you've made by clicking the "**Open**" button on the **Tool Bar**. All configuration files are saved in the format of "∗**.xml**".

Save		
		You can save the current test settings with the **Save** button on the **Quick Launch Buttons**. Configuration files are saved in the format of "***.xml**".

Test Log

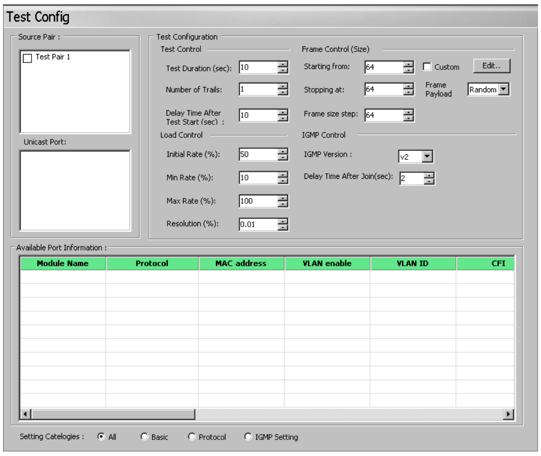
Clicking this button will pop up a window showing the Log of the test result.

Pairing Config



From this option, you can set the ports as source/host port. Also, you can set number of groups and the Initial Group address.

Test Config

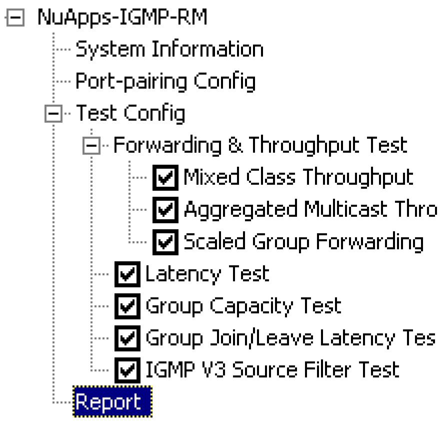


From this option, you can set the test parameters of each task test.

Report

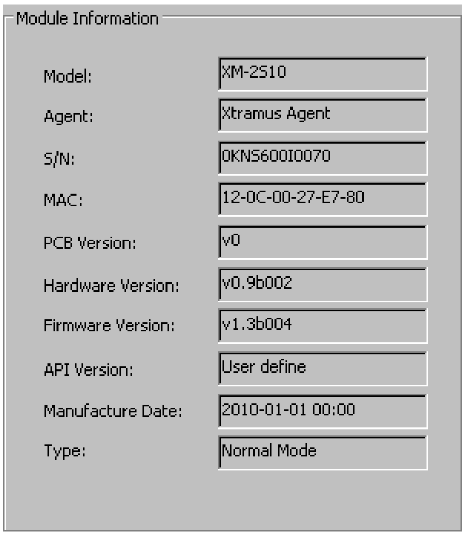
Clicking this button will pop up a window showing the test result of your tasks.

3.3.3. System Info/Configuration List



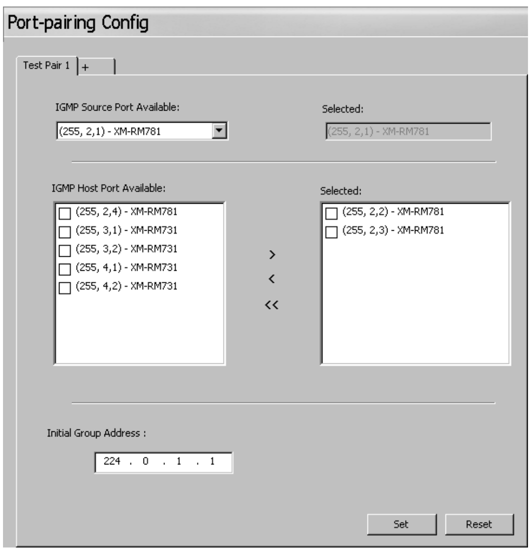
By clicking the **System Info/Configuration List**, you can view system information, making test/ports configurations, or view test reports on right side **Main Display Screen**.

System Information

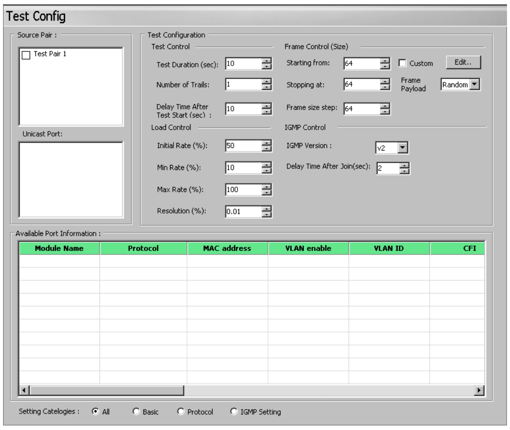
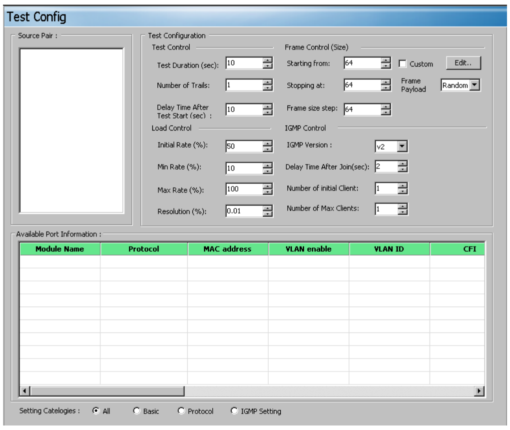
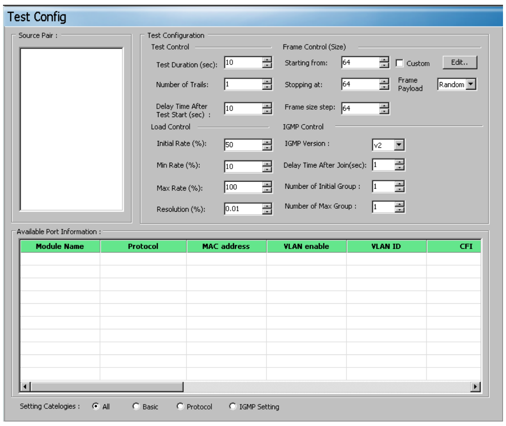
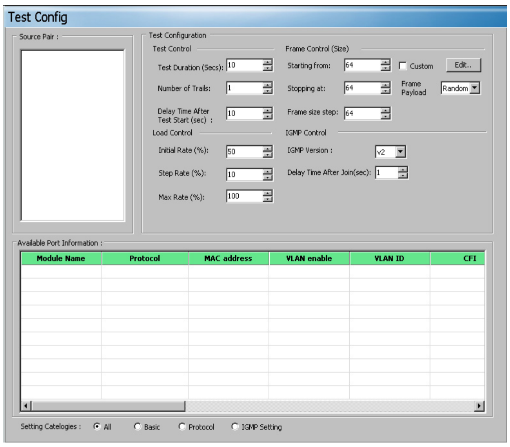


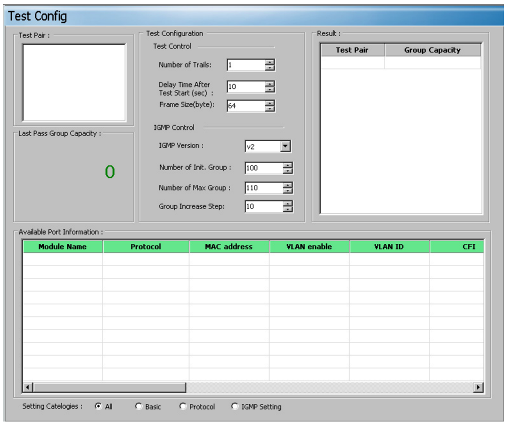
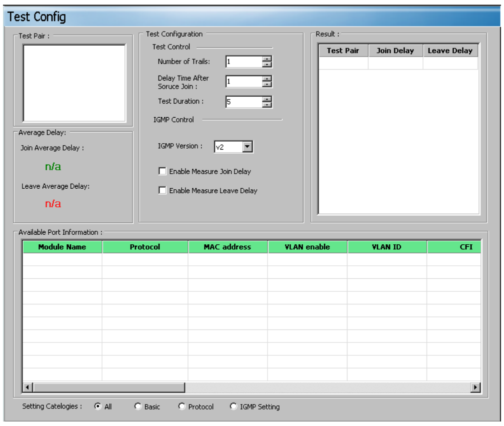
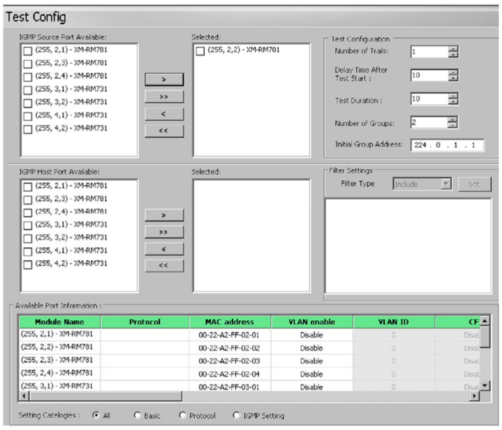
By clicking the **System Information** on the **System Info/Configuration List**, the **System Information** screen will be shown on the **Main Display Screen** located on the right side of NuApps-IGMP-RM's main window.

Port-pairing Config



By clicking the **Port-pairing Config** on the **System Info/Configuration List**, the **Port-pairing Configuration** screen will be shown on the **Main Display Screen** located on the right side of NuApps-IGMP-RM's main window, allowing you to make settings for NuStreams-2000i/600i ports.

Test Config		
Mixed Class Throughput		This test measures the DUT's ability to operate heterogeneous traffic stream, source port will send an aggregated traffic stream which consists of a mixture of unicast and multicast packets to every destination ports. For more detail description about this test, please refer to **5.1. Mixed Class Throughput**.
Aggregated Multicast Throughput		This test offer multicast traffic at an initial offered load to all destination ports in fixed parameter of setting. An iterative binary search algorithm used to find the maximum rate at which none of the offered frames are dropped is determined while N destination. For more detail description about this test, please refer to **5.2. Aggregated Multicast Throughput**.
Scaled Group Forwarding		This test measures the maximum non-drop offered load in which the destination test port(s) join an initial number of multicast groups on the first iteration. For more detail description about this test, please refer to **5.3. Scaled Group Forwarding**.
Latency Test		This test provides the measurement of latency from the collection methodology for latency in RFC-2544. The destination ports collect a set of latency measurements M over a certain period of time, where M is composed of maximum and minimum latency. For more detail description about this test, please refer to **5.4. Latency Test**.

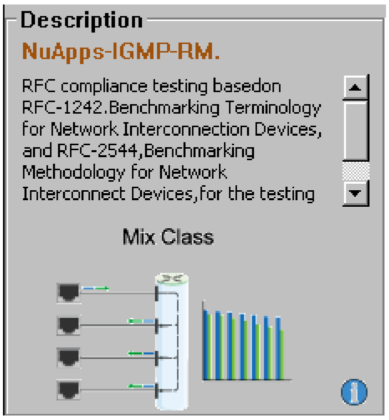
Test Config		
Group Capacity Test		The objective of this test is to determine the maximum number of multicast groups a device or system under test can support while maintaining the ability to forward multicast frames to all multicast groups registered to that device or system under test. For more detail description about this test, please refer to **5.5. Group Capacity Test**.
Group Join/Leave Latency Test		The objective of this test is to determine the time duration it takes a device or system under test to process a successful IGMP group membership report (leave report). For more detail description about this test, please refer to **5.6. Group Join/Leave Latency Test**.
IGMP V3 Source Filter Test		The objective of this test is to compare if the quantity of packet received by host port is the same as the predicted quantity to evaluate the operation of the DUT. For more detail description about this test, please refer to **5.7. IGMP V3 Source Filter Test**.

Report
By clicking the **Report** on the **System Info/Configuration List**, it will pop up a window showing the test result of your tasks.

3.3.4. Elapsed Time

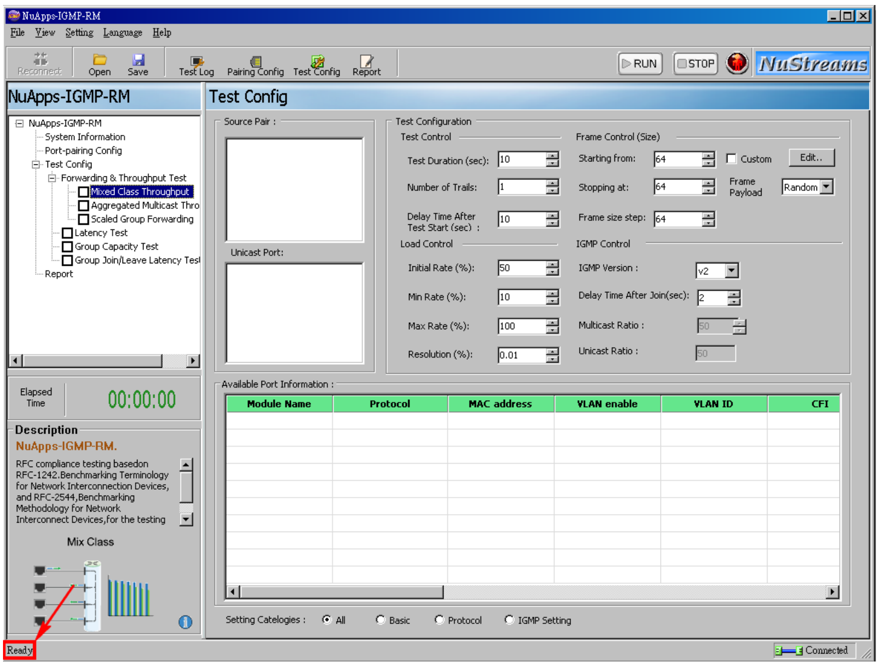
The Elapsed Time allows you to know the time spent during tests.

3.3.5. Description



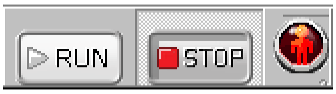
The Description displays brief descriptions of NuApps-IGMP-RM. If you click the  button, the detailed information of the **Mixed Class Throughput**, **Aggregated Multicast Throughput**, **Scaled Group Forwarding**, **Latency Test**, **Group Capacity Test**, **Group Join/Leave Latency Test** and **IGMP V3 Source Filter Test** will be showed on the **Main Display Screen** to the right.

3.3.6. Status Bar



The **Status Bar** indicated by the arrow above shows the running status of NuApps-IGMP-RM. The running status includes: “**Testing**”, “**Performing testing**”, “**Ready**” and others.

3.3.7. Control Buttons/Test Running Status Icon



The **Control Buttons** allow you to start/stop tests, and the **Test Running Status Icon** indicates if there's a test running.

Control Buttons	
	Start test
	Stop test

Test Running Status Icon	
	No Test is running
	Test is running

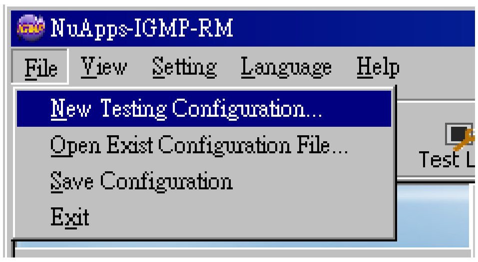
4. Creating Task via Testing Configuration

When performing tests with your DUT on NuApps-IGMP-RM for the first time, you have to create a new set of test settings to run the test.

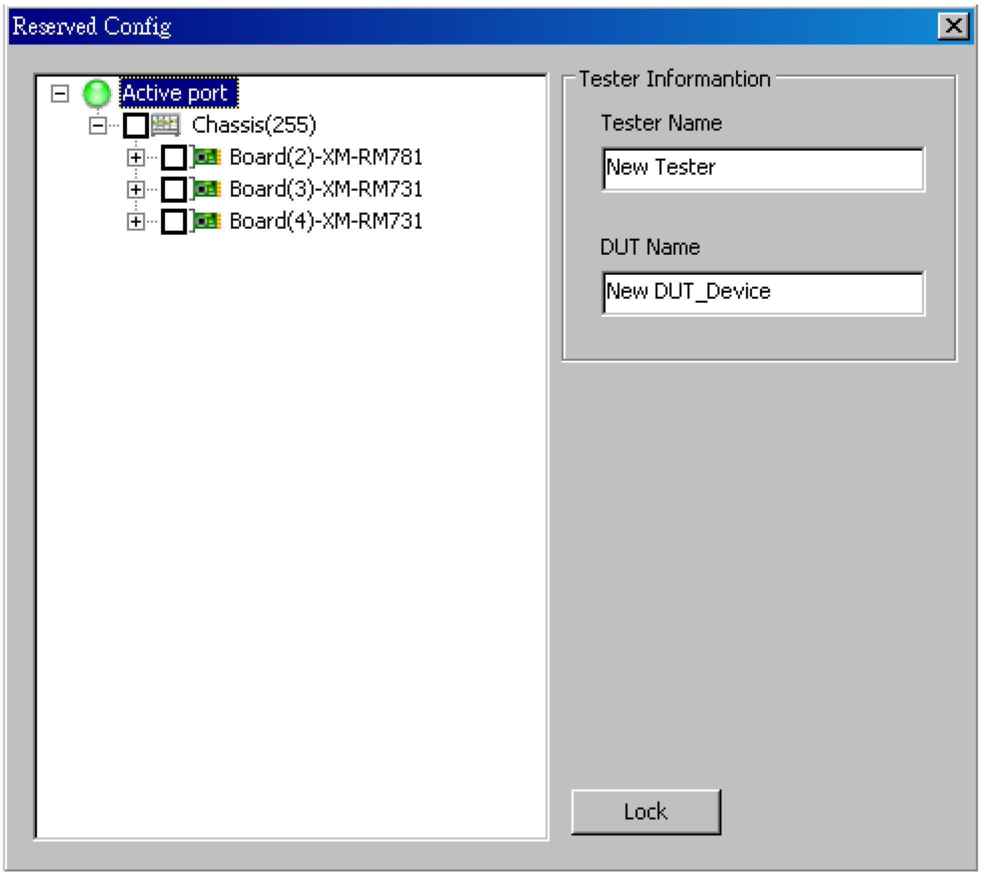
Before starting to create a new task via **New Testing Configuration**, please be sure that:

- All module cards (such as XM-RM751, XM-RM761, or XM-RM781) are installed on chassis (such as NuStreams-2000i/600i) properly.
- The chassis (such as NuStreams-2000i/600i) is powered-on and is connected to a PC (or IPC module installed on NuStreams-2000i) according to "**3.1. Starting NuApps-IGMP-RM**".

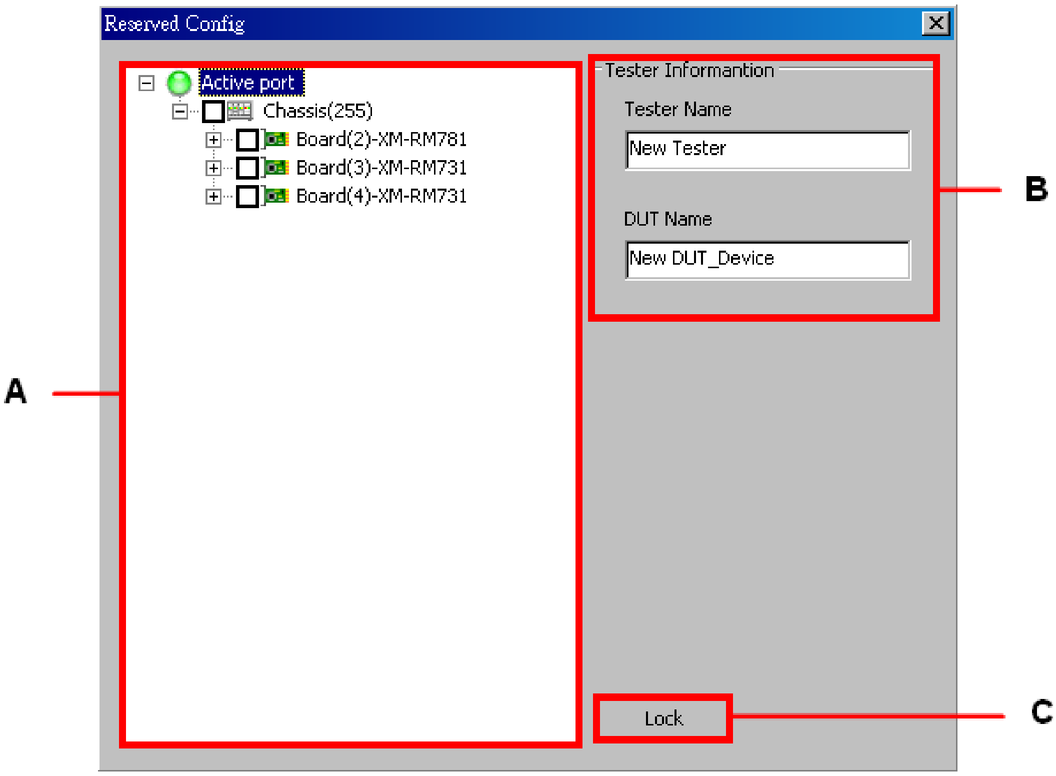
To start using **New Testing Configuration**, please click **File** on the Menu Bar, and choose **New Testing Configuration…** as shown in the figure down below.

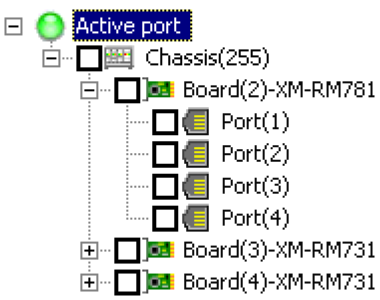


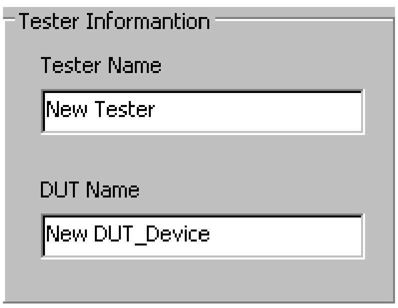
A "**Reserved Config**" window will pop up. All module cards that are installed on the chassis will be displayed here.



4.1. Selecting Active Ports from Installed Module Cards

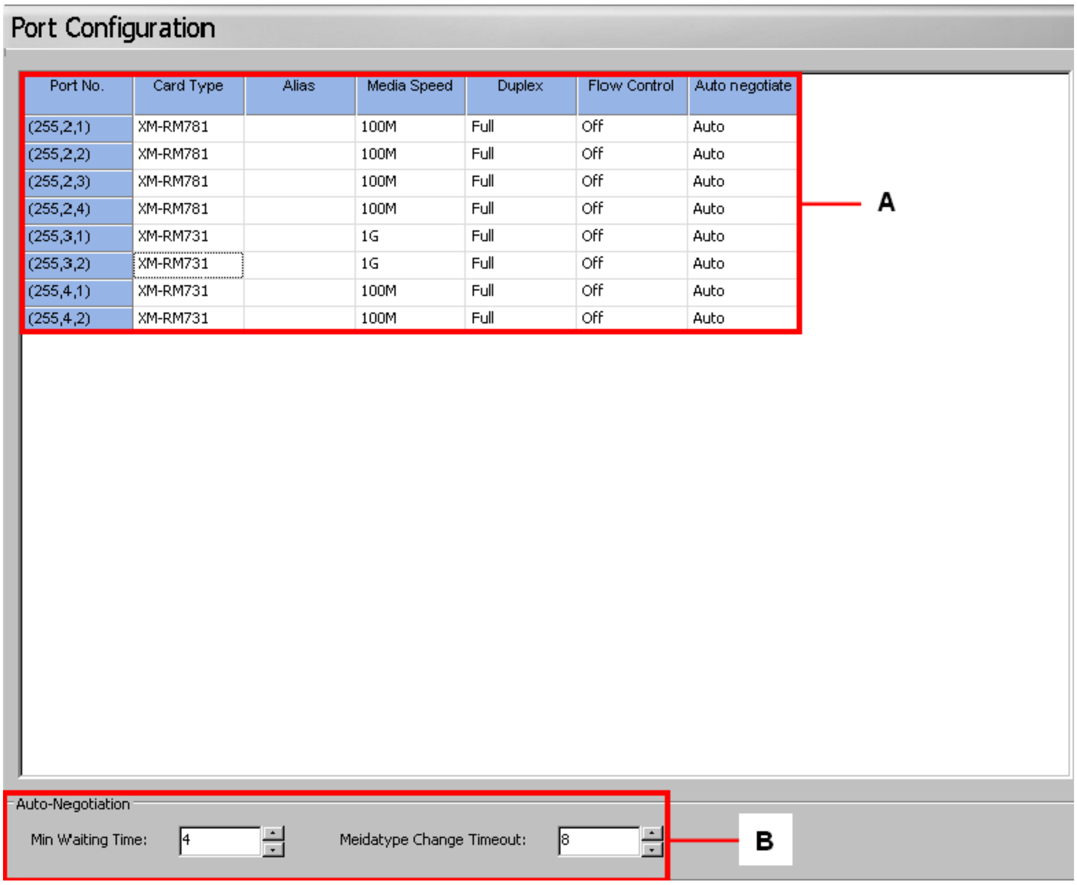


A. Active Port Tree Style Tab	
	All the module cards, along with their Active Ports are listed here in this field. You can fold/unfold the tree style tab by clicking ⊟/⊞ icons. Also, you can lock/unlock the port by clicking ☑ icon.

B. Tester Information	
	You can input the Tester name and DUT's model name here in this field.

C. Lock	
	Clicking this button will reserve the chosen module card's port(s) for task testing.

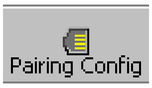
4.2. Port Configuration



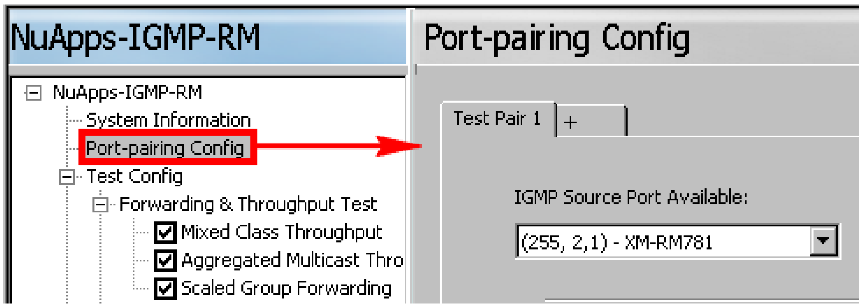
A. Port Status Overview	
Port No.	Shows the each port by (**chassis number, module card's slot, port number**).
Card Type	Shows the module card type.
Media Speed	Depending on the current module card, you can click the field and scroll down to select different media speed.
Duplex	Shows the current duplex. Note: Half or Full option will be available soon.
Flow Control	Shows the status of flow control. Note: On or Off option will be available soon.
Auto negotiate	Shows the status of auto negotiation. Note: Auto or Force will be available soon.

B. Auto-Negotiation	
Min Waiting Time	You can set here the minimum waiting time for auto negotiation.
Mediatype Change Timeout	You can set here the limit for timeout during change of media type.

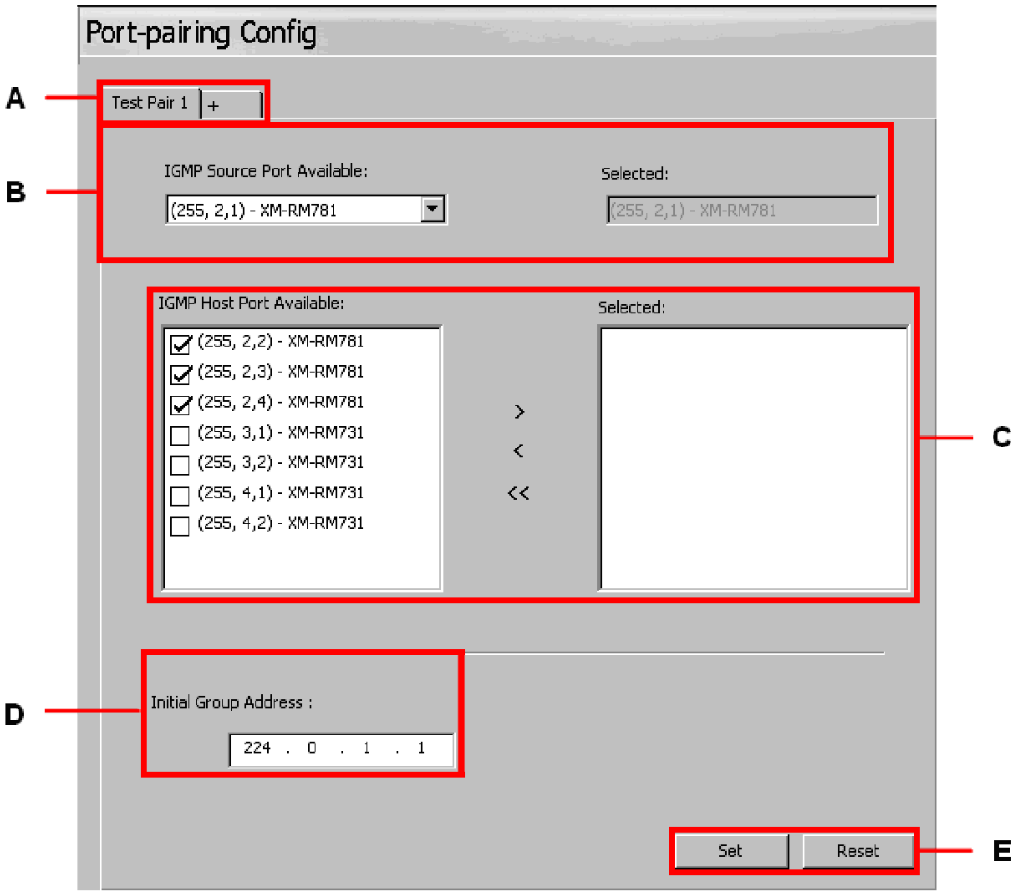
4.3. Port-pairing Config

After setting the port configuration, you have to set port-pairing configuration. You can access the port-pairing configuration window by clicking the 

button from the tool bar. Or by clicking the **Port-pairing Config** option on the **System Info/Configuration List** to access the port pairing configuration window as shown below:



Please refer to the Port-pairing Config window below for a better understanding on its functions:



Functions of port-pairing configuration window:

A. Create Test Pair: You can select each Test Pair 1 for changing theirs settings here. You can also create new **Test Pair** window by clicking the **+** button.

B. Choose your source port: Scroll down the **IGMP Source Port Available** field to select the port as source port. Please note that each port is displayed as **(chassis number, module cards' slot, port number) – XM-RM modules type**. The selected port will be displayed on the **Selected** field to the right.

C. Choose your host port: Select the port to be added on the group from the left side **IGMP Host Port Available** and click on the **>** button to move the selected port(s) to the right side **Selected** field. You can return the port(s) from **Selected** field to **IGMP Host Port Available** by selecting the port and click the **<** button. If you click the **<<** button, than all the ports from the **Selected** field will return to the **IGMP Host Port Available** field.

D. Set your group: Type your initial group address on the left side address field.

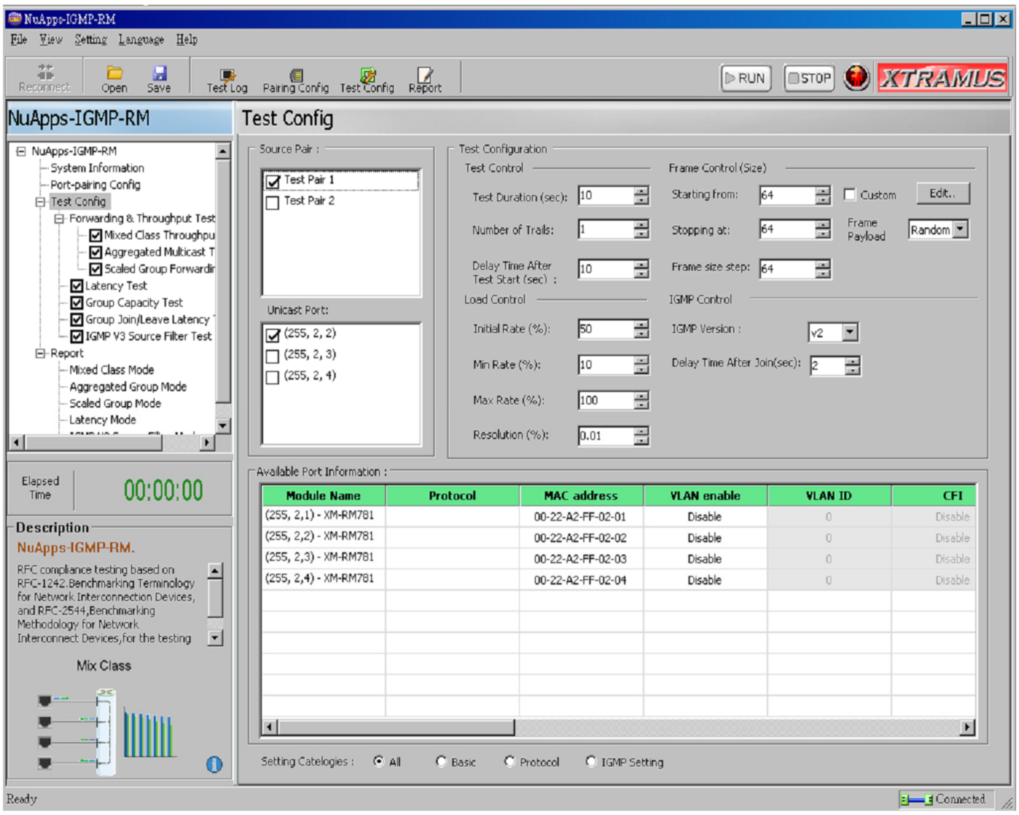
E. Apply the settings: If you are finished with the settings above, please click the **Set** button to apply the settings or **Reset** to restart with the settings.

5. NuApps-IGMP-RM Test Modes

The NuApps-IGMP-RM supports 6 test modes: **Mixed Class Throughput**, **Aggregated Multicast Throughput**, **Scaled Group Forwarding**, **Latency Test**, **Group Capacity Test**, **Group Join/Leave Latency Test** and **IGMP V3 Source Filter Test**.

After selecting the module cards' port(s), as previous described on **4. Creating Task via Testing Configuration**, please refer to the section down below for detailed description of each test modes and theirs respectively setting options.

5.1. Mixed Class Throughput



The objective of this test mode is to determine the throughput of a Device or System under test (DUT or SUT) when both unicast class frames and multicast class frames are offered simultaneously to a fixed number of interfaces.

This test also measures the DUT's ability to operate heterogeneous traffic stream, source port sending an aggregated traffic stream which consists of a mixture of unicast and multicast packets to every destination ports.

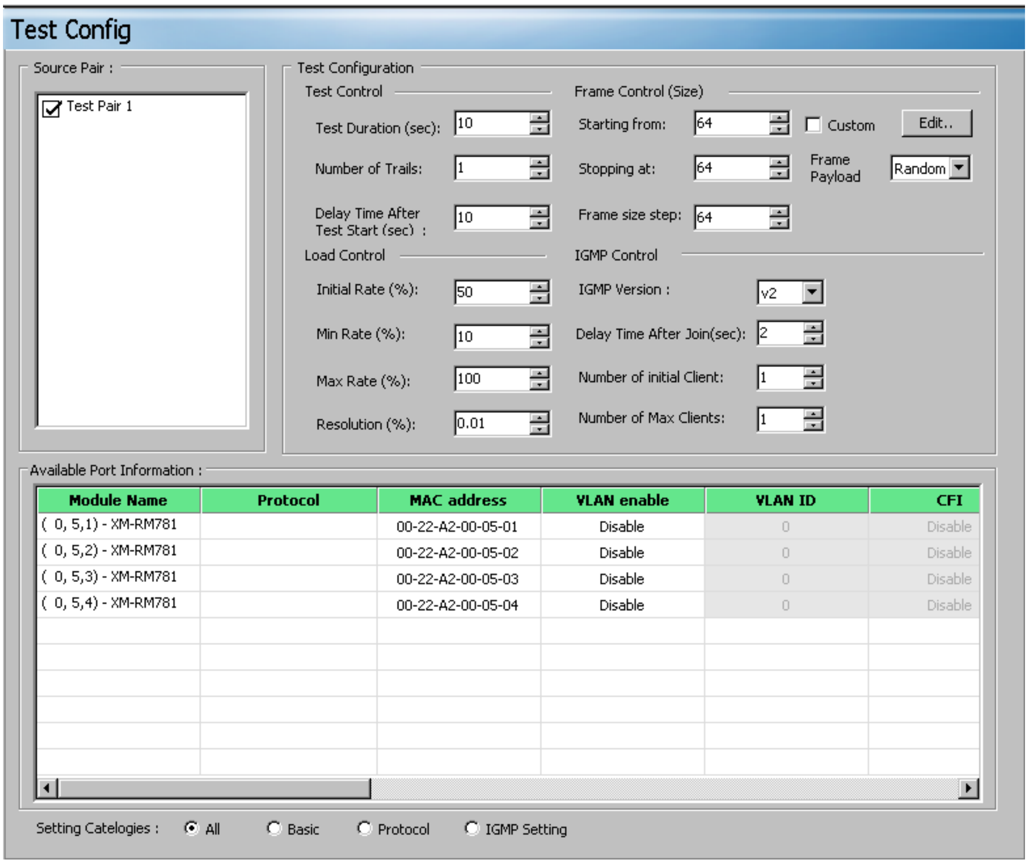
Port setting	
Source Pair	You can choose the previous set Test Pair to be used on the Mixed Class Throughput test.
Unicast Port	You can select a port for unicast test.

Test Configuration		
Test Control	**Test Duration (sec)**	The duration of time (in seconds) for the test.
	Number of Trails	The number of times of the test.
	Delay Time After Test Start (sec)	The time interval for starting a test.
Frame Control (size)	**Starting from**	Set the initial frame size (bytes) here. The default setting is 64 bytes.
	Stopping at	Set the final frame size (bytes) here. The default setting is 64 bytes.
	Frame size step	The frame size to be added on every cycle.
	Custom/Edit…	Activating the **Custom** function will activate the settings made on **Edit…**. The **Edit…** option includes settings for Frame Size, Initial Rate, Min. Rate, Max. Rate and Resolution.
	Frame Payload	The Frame Payload includes: Random, Increase, 0x55AA, 0x00FF, All 1 and All 0.
Load Control	**Initial Rate (%)**	The initial packet loading in percentage.
	Min Rate (%)	The minimum packet loading in percentage.
	Max Rate (%)	The maximum packet loading in percentage.
	Resolution (%)	The deviation before reach the maximum rate.
IGMP Control	**IGMP Version**	There are version 1, version 2 and version 3 as option. The version 1 only support membership query and report (Join), the version 2 support both Join and Leave.
	Delay Time After Join (sec)	The time interval for sending the Join packets.

Available Port Information	
Module Name	The name of the current module card under this test mode. It is based on (chassis number, module card' slot, port number).
MAC address	The MAC address of the current module card's ports.
VLAN enable	You can choose to Enable or Disable the VLAN function.
VLAN ID	If you enable the VLAN function, you will be able to set the VLAN ID here.
CFI	Enable or Disable the Canonical Format Indicator (CFI) function.
VLAN Priority	If you enable the VLAN function, you will be able to set the VLAN Priority here, in which the range is between 0-7.
IP Address	Set the IP address for the current port.
Gateway IP	Set the IP of your Gateway.
Mask	Set the Subnet Mask here.
Current LinkStatus	Shows the current link status in speed/duplex/autonegotiation.
Media Speed	Set the media speed of your module card.
Duplex	Set the Duplex for Full or Half.
Autonegotiation	Set the as Auto negotiate or Force the system to run task on the set media speed.
Group IP	Shows the IP address of the group under test.
Number of Group	Shows the number of group under test.

Setting Categories	
All	Shows all the available port information.
Basic	Shows only **Current Link Status, Media Speed, Duplex** and **Autonegotiation** information.
Protocol	Shows only **Protocol, MAC address, VLAN enable, VLAN ID** and **CFI** information.
IGMP Setting	Shows only **Group IP** and **Number of Group** information.

5.2. Aggregated Multicast Throughput



The objective of this test mode is to determine the maximum rate at which none of the offered frames to be forwarded through N destination interfaces of the same multicast groups are dropped.

This test also provides multicast traffic at an initial offered load to all destination ports in fixed parameter of setting. An iterative binary search algorithm used to find the maximum rate at which none of the offered frames are dropped is determined while N destination. All iteration will increase the destination port and to find the maximum non-drop provided load.

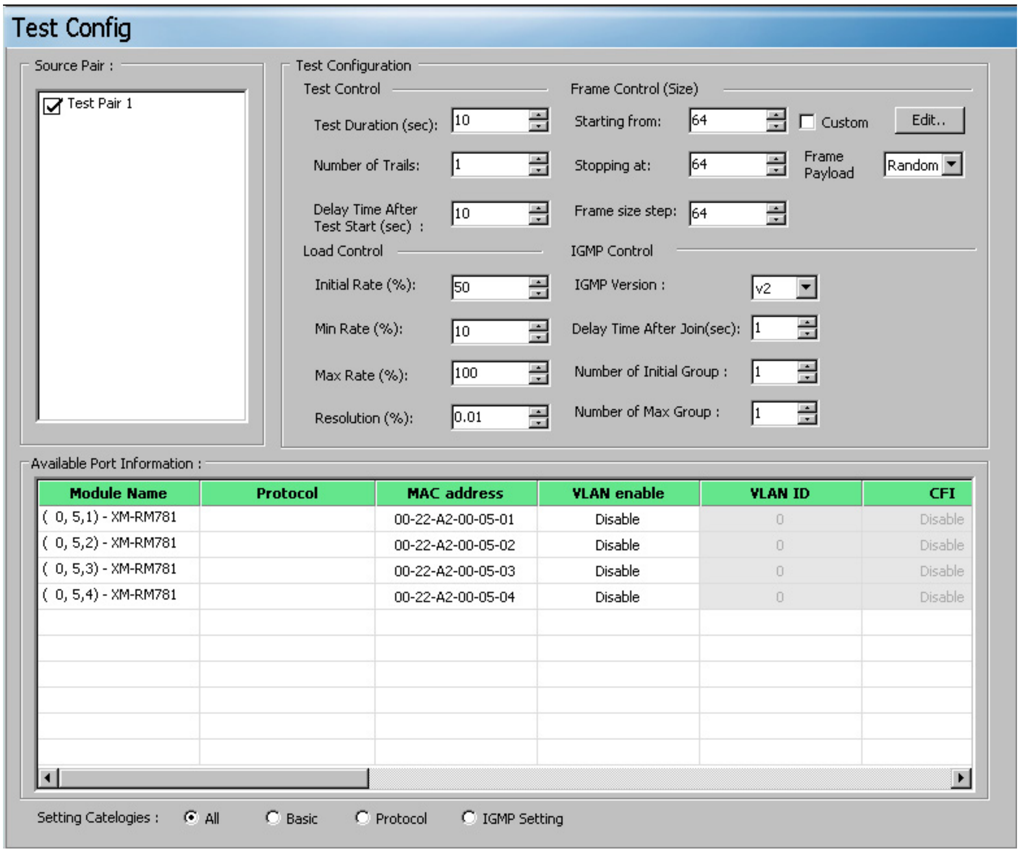
Port setting	
Source Pair	You can choose the previous set **Test Pair** to be used on the **Aggregated Multicast Throughput** test.

Test Configuration		
Test Control	**Test Duration (sec)**	The duration of time (in seconds) for the test.
	Number of Trails	The number of times of the test.
	Delay Time After Test Start (sec)	The time interval for starting a test.
Frame Control (size)	**Starting from**	Set the initial frame size (bytes) here. The default setting is 64 bytes.
	Stopping at	Set the final frame size (bytes) here. The default setting is 64 bytes.
	Frame size step	The frame size to be added on every cycle.
	Custom/Edit…	Activating the **Custom** function will activate the settings made on **Edit…**. The Edit… option includes settings for Frame Size, Initial Rate, Min. Rate, Max. Rate and Resolution.
	Frame Payload	The Frame Payload includes: Random, Increase, 0x55AA, 0x00FF, All 1 and All 0.
Load Control	**Initial Rate (%)**	The initial packet loading in percentage.
	Min Rate (%)	The minimum packet loading in percentage.
	Max Rate (%)	The maximum packet loading in percentage.
	Resolution (%)	The deviation before reach the maximum rate.
IGMP Control	**IGMP Version**	There are version 1, version 2 and version 3 as option. The version 1 only support membership query and report (Join)**,** the version 2 support both Join and Leave.
	Delay Time After Join (sec)	The time interval for sending the Join packets.
	Number of initial Client	You can set the number of the clients from the start of the test.
	Number of Max Clients	You can set the maximum number of the clients for this test.

Available Port Information	
Module Name	The name of the current module card under this test mode. It is based on (chassis number, module card' slot, port number).
MAC address	The MAC address of the current module card's ports.
VLAN enable	You can choose to Enable or Disable the VLAN function.
VLAN ID	If you enable the VLAN function, you will be able to set the VLAN ID here.
CFI	Enable or Disable the Canonical Format Indicator (CFI) function.
VLAN Priority	If you enable the VLAN function, you will be able to set the VLAN Priority here, in which the range is between 0-7.
IP Address	Set the IP address for the current port.
Gateway IP	Set the IP of your Gateway.
Mask	Set the Subnet Mask here.
Current LinkStatus	Shows the current link status in speed/duplex/autonegotiation.
Media Speed	Set the media speed of your module card.
Duplex	Set the Duplex for Full or Half.
Autonegotiation	Set the as Auto negotiate or Force the system to run task on the set media speed.
Group IP	Shows the IP address of the group under test.
Number of Group	Shows the number of group under test.

Setting Categories	
All	Shows all the available port information.
Basic	Shows only **Current Link Status, Media Speed, Duplex** and **Autonegotiation** information.
Protocol	Shows only **Protocol, MAC address, VLAN enable, VLAN ID** and **CFI** information.
IGMP Setting	Shows only **Group IP** and **Number of Group** information.

5.3. Scaled Group Forwarding



The objective of this test mode is to determine the forwarding rate as a function of tested multicast groups for a fixed number of tested device or system under test (DUT or SUT) ports.

The destination test port(s) join an initial number of multicast groups on the first iteration to measure the maximum non-drop provided load. The number of multicast groups joined by each destination test port is then scaled in following iterations and the forwarding rate is measured.

Note: the total number of multicast groups joined must not exceed the multicast group capacity of the DUT/SUT.

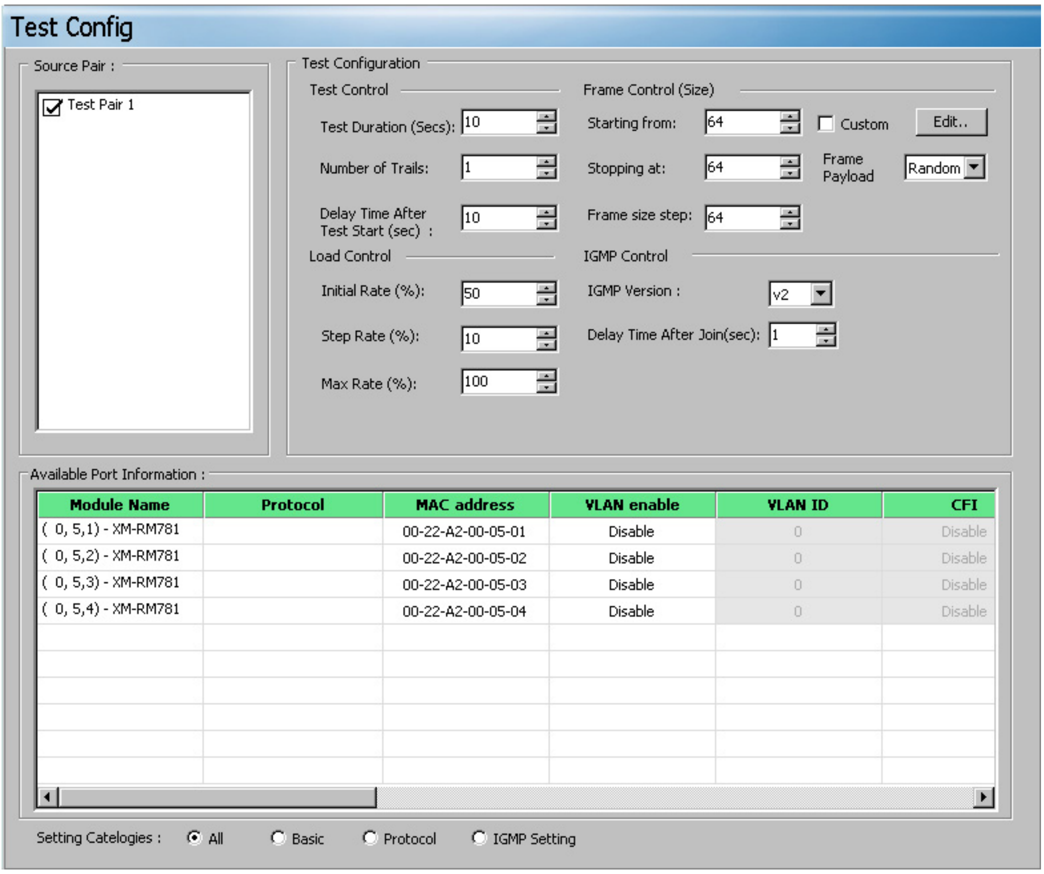
Port setting	
Source Pair	You can choose the previous set **Test Pair** to be used on the **Scaled Group Forwarding** test.

Test Configuration		
Test Control	**Test Duration (sec)**	The duration of time (in seconds) for the test.
	Number of Trails	The number of times of the test.
	Delay Time After Test Start (sec)	The time interval for starting a test.
Frame Control (size)	**Starting from**	Set the initial frame size (bytes) here. The default setting is 64 bytes.
	Stopping at	Set the final frame size (bytes) here. The default setting is 64 bytes.
	Frame size step	The frame size to be added on every cycle.
	Custom/Edit…	Activating the **Custom** function will activate the settings made on **Edit…**. The Edit… option includes settings for Frame Size, Initial Rate, Min. Rate, Max. Rate and Resolution.
	Frame Payload	The Frame Payload includes: Random, Increase, 0x55AA, 0x00FF, All 1 and All 0.
Load Control	**Initial Rate (%)**	The initial packet loading in percentage.
	Min Rate (%)	The minimum packet loading in percentage.
	Max Rate (%)	The maximum packet loading in percentage.
	Resolution (%)	The deviation before reach the maximum rate.
IGMP Control	**IGMP Version**	There are version 1, version 2 and version 3 as option. The version 1 only support membership query and report (Join), the version 2 support both Join and Leave.
	Delay Time After Join (sec)	The time interval for sending the Join packets.
	Number of initial Client	You can set the number of the clients from the start of the test.
	Number of Max Clients	You can set the maximum number of the clients for this test.

Available Port Information	
Module Name	The name of the current module card under this test mode. It is based on (chassis number, module card' slot, port number).
MAC address	The MAC address of the current module card's ports.
VLAN enable	You can choose to Enable or Disable the VLAN function.
VLAN ID	If you enable the VLAN function, you will be able to set the VLAN ID here.
CFI	Enable or Disable the Canonical Format Indicator (CFI) function.
VLAN Priority	If you enable the VLAN function, you will be able to set the VLAN Priority here, in which the range is between 0-7.
IP Address	Set the IP address for the current port.
Gateway IP	Set the IP of your Gateway.
Mask	Set the Subnet Mask here.
Current LinkStatus	Shows the current link status in speed/duplex/autonegotiation.
Media Speed	Set the media speed of your module card.
Duplex	Set the Duplex for Full or Half.
Autonegotiation	Set the as Auto negotiate or Force the system to run task on the set media speed.
Group IP	Shows the IP address of the group under test.
Number of Group	Shows the number of group under test.

Setting Categories	
All	Shows all the available port information.
Basic	Shows only **Current Link Status, Media Speed, Duplex** and **Autonegotiation** information.
Protocol	Shows only **Protocol, MAC address, VLAN enable, VLAN ID** and **CFI** information.
IGMP Setting	Shows only **Group IP** and **Number of Group** information.

5.4. Latency Test



The objective of this test mode is to produce a set multicast latency measurement from a single, multicast ingress interface of a device or system under test (DUT or SUT) through multiple, egress multicast interfaces of that same DUT/SUT as provided by the metric Multicast Latency.

The measurement if latency from the collection methodology for latency in RFC 2544. Destination ports collect a set of latency measurements M over a certain period of time, where M is composed of maximum and minimum latency.

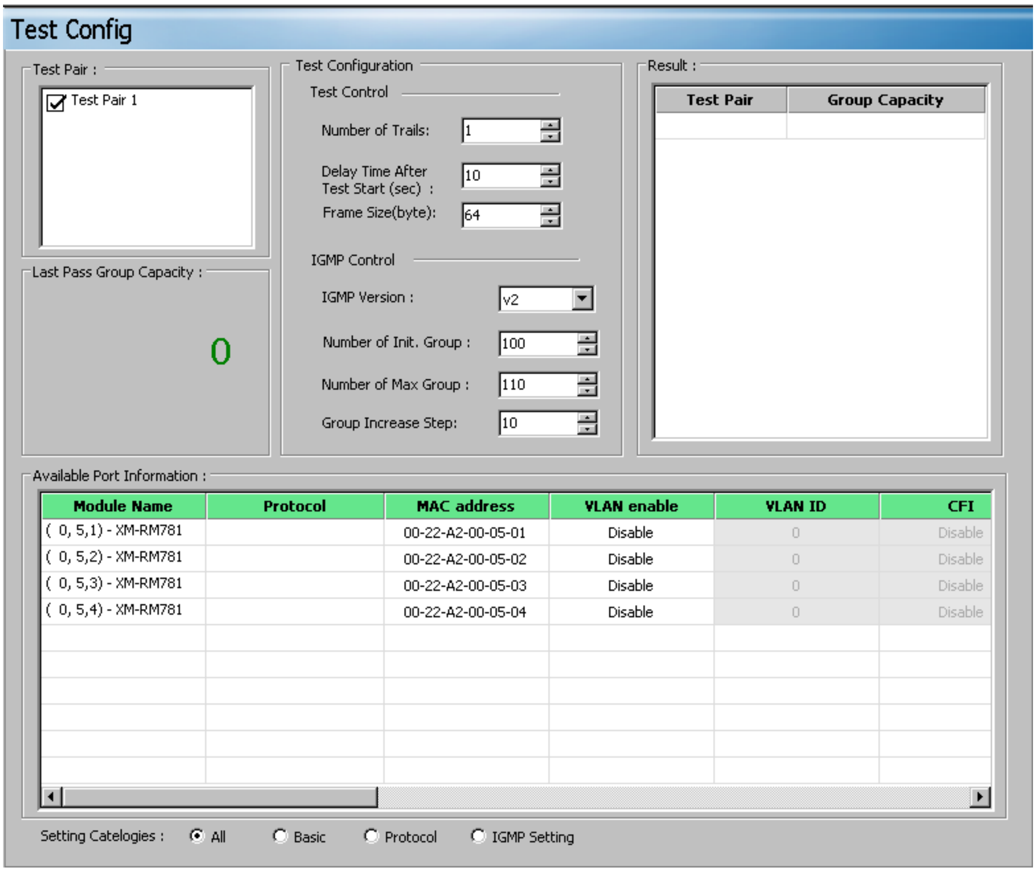
Port setting	
Source Pair	You can choose the previous set **Test Pair** to be used on the Latency test.

Test Configuration		
Test Control	**Test Duration (sec)**	The duration of time (in seconds) for the test.
	Number of Trails	The number of times of the test.
	Delay Time After Test Start (sec)	The time interval for starting a test.
Frame Control (size)	**Starting from**	Set the initial frame size (bytes) here. The default setting is 64 bytes.
	Stopping at	Set the final frame size (bytes) here. The default setting is 64 bytes.
	Frame size step	The frame size to be added on every cycle.
	Custom/Edit…	Activating the **Custom** function will activate the settings made on **Edit…**. The Edit… option includes settings for Frame Size, Initial Rate, Min. Rate, Max. Rate and Resolution.
	Frame Payload	The Frame Payload includes: Random, Increase, 0x55AA, 0x00FF, All 1 and All 0.
Load Control	**Initial Rate (%)**	The initial packet loading in percentage.
	Step Rate (%)	The rate percentage to be added on every cycle.
	Max Rate (%)	The maximum packet loading in percentage.
IGMP Control	**IGMP Version**	There are version 1, version 2 and version 3 as option. The version 1 only support membership query and report (Join), the version 2 support both Join and Leave.
	Delay Time After Join (sec)	The time interval for sending the Join packets.

Available Port Information	
Module Name	The name of the current module card under this test mode. It is based on (chassis number, module card' slot, port number).
MAC address	The MAC address of the current module card's ports.
VLAN enable	You can choose to Enable or Disable the VLAN function.
VLAN ID	If you enable the VLAN function, you will be able to set the VLAN ID here.
CFI	Enable or Disable the Canonical Format Indicator (CFI) function.
VLAN Priority	If you enable the VLAN function, you will be able to set the VLAN Priority here, in which the range is between 0-7.
IP Address	Set the IP address for the current port.
Gateway IP	Set the IP of your Gateway.
Mask	Set the Subnet Mask here.
Current LinkStatus	Shows the current link status in speed/duplex/autonegotiation.
Media Speed	Set the media speed of your module card.
Duplex	Set the Duplex for Full or Half.
Autonegotiation	Set the as Auto negotiate or Force the system to run task on the set media speed.
Group IP	Shows the IP address of the group under test.
Number of Group	Shows the number of group under test.

Setting Categories	
All	Shows all the available port information.
Basic	Shows only **Current Link Status, Media Speed, Duplex** and **Autonegotiation** information.
Protocol	Shows only **Protocol, MAC address, VLAN enable, VLAN ID** and **CFI** information.
IGMP Setting	Shows only **Group IP** and **Number of Group** information.

5.5. Group Capacity Test



The objective of this test mode is to determine the maximum number of multicast groups that a device or system under test (DUT or SUT) can support while maintaining the ability to forward multicast frames to all multicast groups registered to that DUT/SUT.

One or more destination test ports of DUT/SUT will join an initial number of multicast groups. After a minimum delay, the source test ports must transmit to each group at a specified provided load. If at least one frame for each multicast group is forwarded properly by the DUT/SUT on each participating egress interface, the iteration is said to pass at he current capacity.

Port setting	
Source Pair	You can choose the previous set **Test Pair** to be used on the Latency test.

Last Pass Group Capacity
Shows the current pass group capacity of this test.

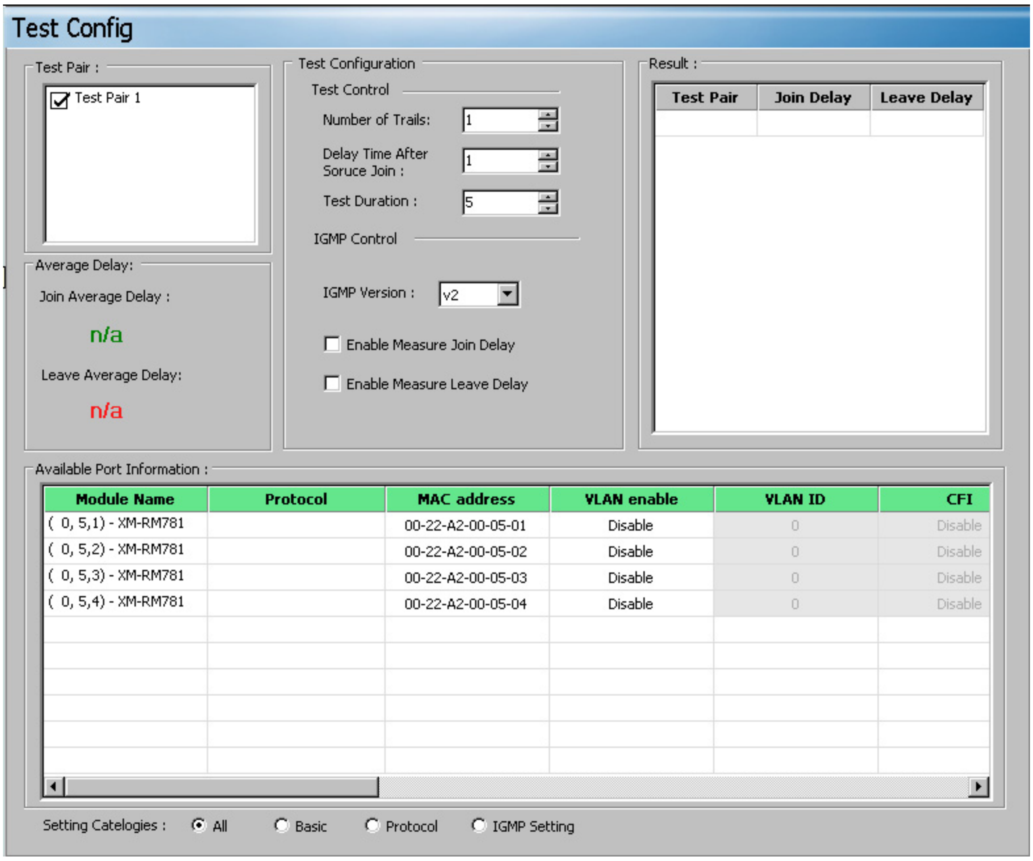
Test Configuration		
Test Control	Frame Size (byte)	Set the size of the packet to be sent.
	Number of Trails	The number of times of the test.
	Delay Time After Test Start (sec)	The time interval for starting a test.
IGMP Control	IGMP Version	There are version 1, version 2 and version 3 as option. The version 1 only support membership query and report (Join), the version 2 support both Join and Leave.
	Number of Init. Group	Set the initial number of group.
	Number of Max Group	Set the maximum number of group
	Group Increase Step	Set the number of group to be added on every cycle until reach the maximum group.

Result	
Test Pair	Shows the current test pair.
Group Capacity	Shows each port capacity.

Available Port Information	
Module Name	The name of the current module card under this test mode. It is based on (chassis number, module card' slot, port number).
MAC address	The MAC address of the current module card's ports.
VLAN enable	You can choose to Enable or Disable the VLAN function.
VLAN ID	If you enable the VLAN function, you will be able to set the VLAN ID here.
CFI	Enable or Disable the Canonical Format Indicator (CFI) function.
VLAN Priority	If you enable the VLAN function, you will be able to set the VLAN Priority here, in which the range is between 0-7.
IP Address	Set the IP address for the current port.
Gateway IP	Set the IP of your Gateway.
Mask	Set the Subnet Mask here.
Current LinkStatus	Shows the current link status in speed/duplex/autonegotiation.
Media Speed	Set the media speed of your module card.
Duplex	Set the Duplex for Full or Half.
Autonegotiation	Set the as Auto negotiate or Force the system to run task on the set media speed.
Group IP	Shows the IP address of the group under test.
Number of Group	Shows the number of group under test.

Setting Categories	
All	Shows all the available port information.
Basic	Shows only **Current Link Status, Media Speed, Duplex** and **Autonegotiation** information.
Protocol	Shows only **Protocol, MAC address, VLAN enable, VLAN ID** and **CFI** information.
IGMP Setting	Shows only **Group IP** and **Number of Group** information.

5.6. Group Join/Leave Latency Test



The objective of this test mode is to determine the time duration that allows the device or system under test to process a successful IGMP group membership report (leave report).

Port setting	
Source Pair	You can choose the previous set **Test Pair** to be used on the Latency test.

Average Delay	
Join Average Delay	The average time delay for joining a group.
Leave Average Delay	The average time delay foe leaving a group.

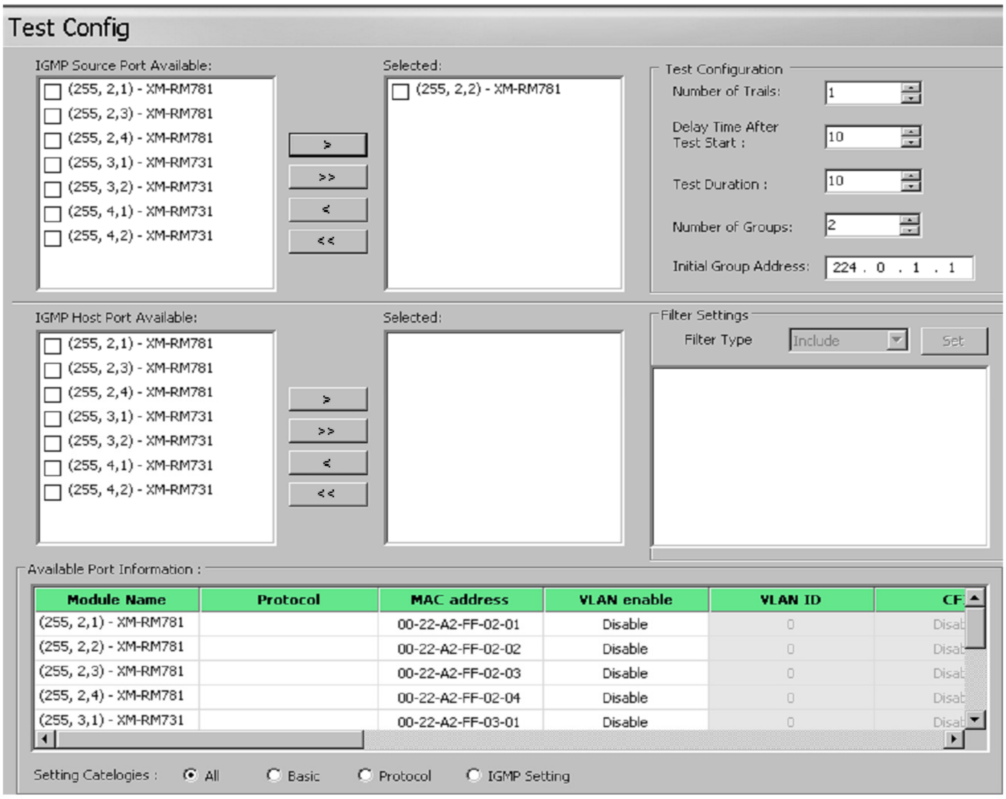
Test Configuration		
Test Control	**Test Duration**	Time duration of the test.
	Number of Trails	The number of times of the test.
	Delay Time After Source Join	The time delay for preparation of the next Test Pair test.
IGMP Control	**IGMP Version**	There are version 1, version 2 and version 3 as option. The version 1 only support membership query and report (Join), the version 2 support both Join and Leave.
	Enable Measure Join Delay	Selecting this option will enable the system to report the time delay for joining a group.
	Enable Measure Leave Delay	Selecting this option will enable the system to report the time delay for leaving a group.

Result	
Test Pair	Shows the current test pair.
Join Delay	The average time delay for joining a group of each group.
Leave Delay	The average time delay for leaving a group of each group.

Available Port Information	
Module Name	The name of the current module card under this test mode. It is based on (chassis number, module card' slot, port number).
MAC address	The MAC address of the current module card's ports.
VLAN enable	You can choose to Enable or Disable the VLAN function.
VLAN ID	If you enable the VLAN function, you will be able to set the VLAN ID here.
CFI	Enable or Disable the Canonical Format Indicator (CFI) function.
VLAN Priority	If you enable the VLAN function, you will be able to set the VLAN Priority here, in which the range is between 0-7.
IP Address	Set the IP address for the current port.
Gateway IP	Set the IP of your Gateway.
Mask	Set the Subnet Mask here.
Current LinkStatus	Shows the current link status in speed/duplex/autonegotiation.
Media Speed	Set the media speed of your module card.
Duplex	Set the Duplex for Full or Half.
Autonegotiation	Set the as Auto negotiate or Force the system to run task on the set media speed.
Group IP	Shows the IP address of the group under test.
Number of Group	Shows the number of group under test.

Setting Categories	
All	Shows all the available port information.
Basic	Shows only **Current Link Status, Media Speed, Duplex** and **Autonegotiation** information.
Protocol	Shows only **Protocol, MAC address, VLAN enable, VLAN ID** and **CFI** information.
IGMP Setting	Shows only **Group IP** and **Number of Group** information.

5.7. IGMP V3 Source Filter Test

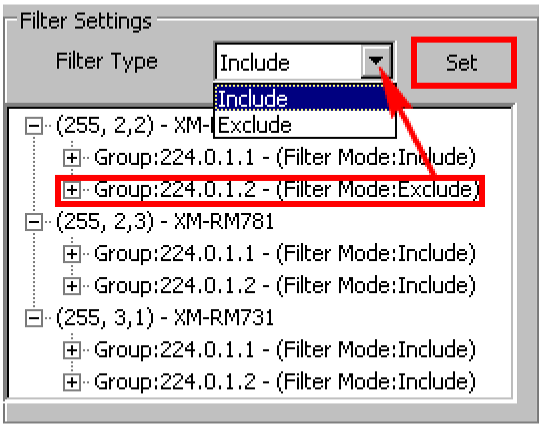


The objective of this test is to compare if the quantity of packet received by host port is the same as the predicted quantity to evaluate the operation of the DUT.

Port setting	
IGMP Source Port	You can choose the port group to be the source port on this field. Please select the port by clicking on its ☐, and than click the **>** button to confirm the selection.
IGMP Host Port	You can choose the port group to be the host port on this field. Please select the port by clicking on its ☐, and than click the **>** button to confirm the selection.
Selected	All the selected **Source/Host** port will be moved on its respectively **Selected** field. If you want to cancel a selection, please select the port from the **Selected** field and click **<** button. If you want to cancel all the selection, please click the **<<** button. You can confirm a multiple selection of ports by clicking the **>>** button.

Test Configuration	
Number of Trails	The number of times of the test.
Delay Time After Test Start	The time delay for preparation of the next Test Pair test.
Test Duration	Time duration of the test.
Number of Groups	You can set the number of groups for this test.
Initial Group Address	You can modify the Group Address on this field.

Filter Settings



On this option, you can set the group to be excluded or included on filter mode.

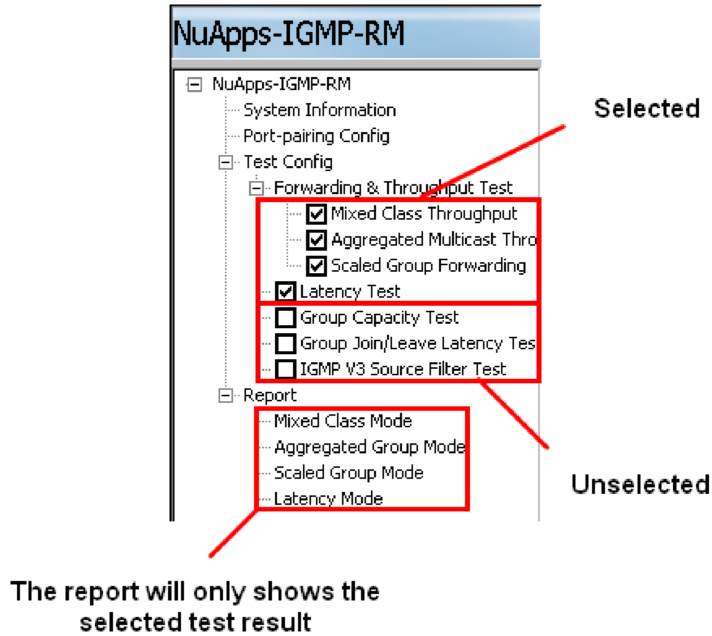
Please select the group as indicated by the figure above, and than click the **Include/Exclude** option by scrolling down the **Filter Type** field, and than click **Set** button to confirm the settings.

Available Port Information	
Module Name	The name of the current module card under this test mode. It is based on (chassis number, module card' slot, port number).
MAC address	The MAC address of the current module card's ports.
VLAN enable	You can choose to Enable or Disable the VLAN function.
VLAN ID	If you enable the VLAN function, you will be able to set the VLAN ID here.
CFI	Enable or Disable the Canonical Format Indicator (CFI) function.
VLAN Priority	If you enable the VLAN function, you will be able to set the VLAN Priority here, in which the range is between 0-7.
IP Address	Set the IP address for the current port.
Gateway IP	Set the IP of your Gateway.
Mask	Set the Subnet Mask here.
Current LinkStatus	Shows the current link status in speed/duplex/autonegotiation.
Media Speed	Set the media speed of your module card.
Duplex	Set the Duplex for Full or Half.
Autonegotiation	Set the as Auto negotiate or Force the system to run task on the set media speed.
Group IP	Shows the IP address of the group under test.
Number of Group	Shows the number of group under test.

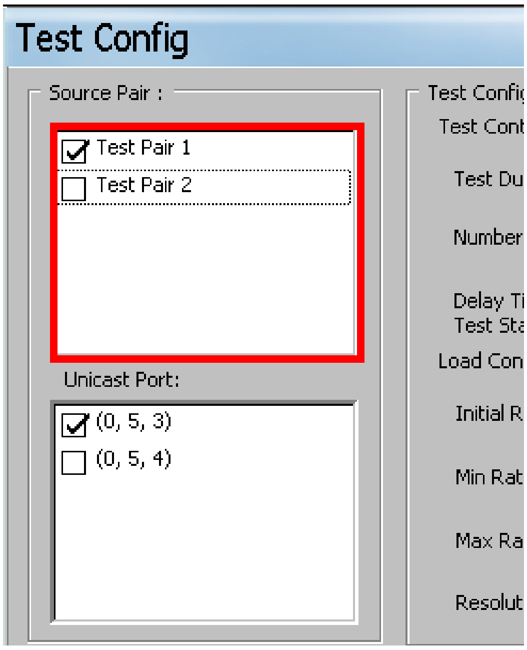
Setting Categories	
All	Shows all the available port information.
Basic	Shows only **Current Link Status, Media Speed, Duplex** and **Autonegotiation** information.
Protocol	Shows only **Protocol, MAC address, VLAN enable, VLAN ID** and **CFI** information.
IGMP Setting	Shows only **Group IP** and **Number of Group** information.

6. Run Test, Test Result & Report

Before starting to run a task, you must activate the test you want to run by clicking on the test mode of **System Info/Configuration List** shown below. The unselected test mode will not run during testing.



Please also select the Port Pair that you want to run for testing. Please note that multiple selecting of Port Pair is possible.

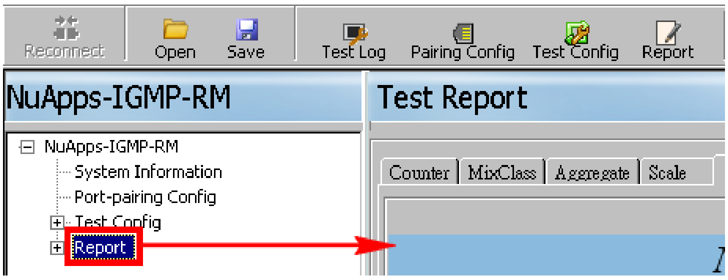
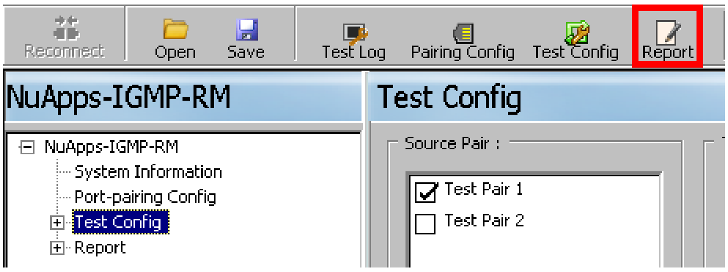


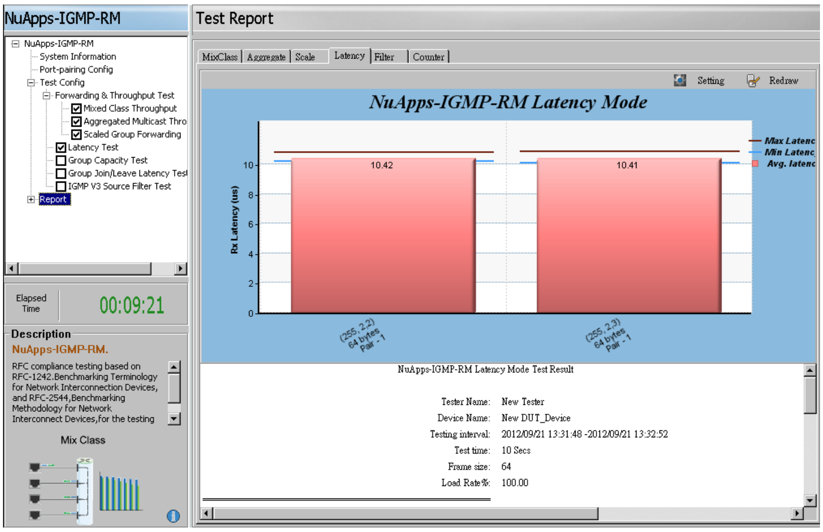
After finishing with the settings, you can click on the up right side  button to start to run all tasks.

Also you can stop the test running whenever you click on the  button.

6.1. Accessing the test report

The results, statics and charts are displayed and can be checked on the **Main Display Screen**. There are two ways to view **Report**:

Accessing Report	
	Click **Report** located on **System Info/Configuration List**.
	Click the **Report** button located on **Quick Launch Buttons**.

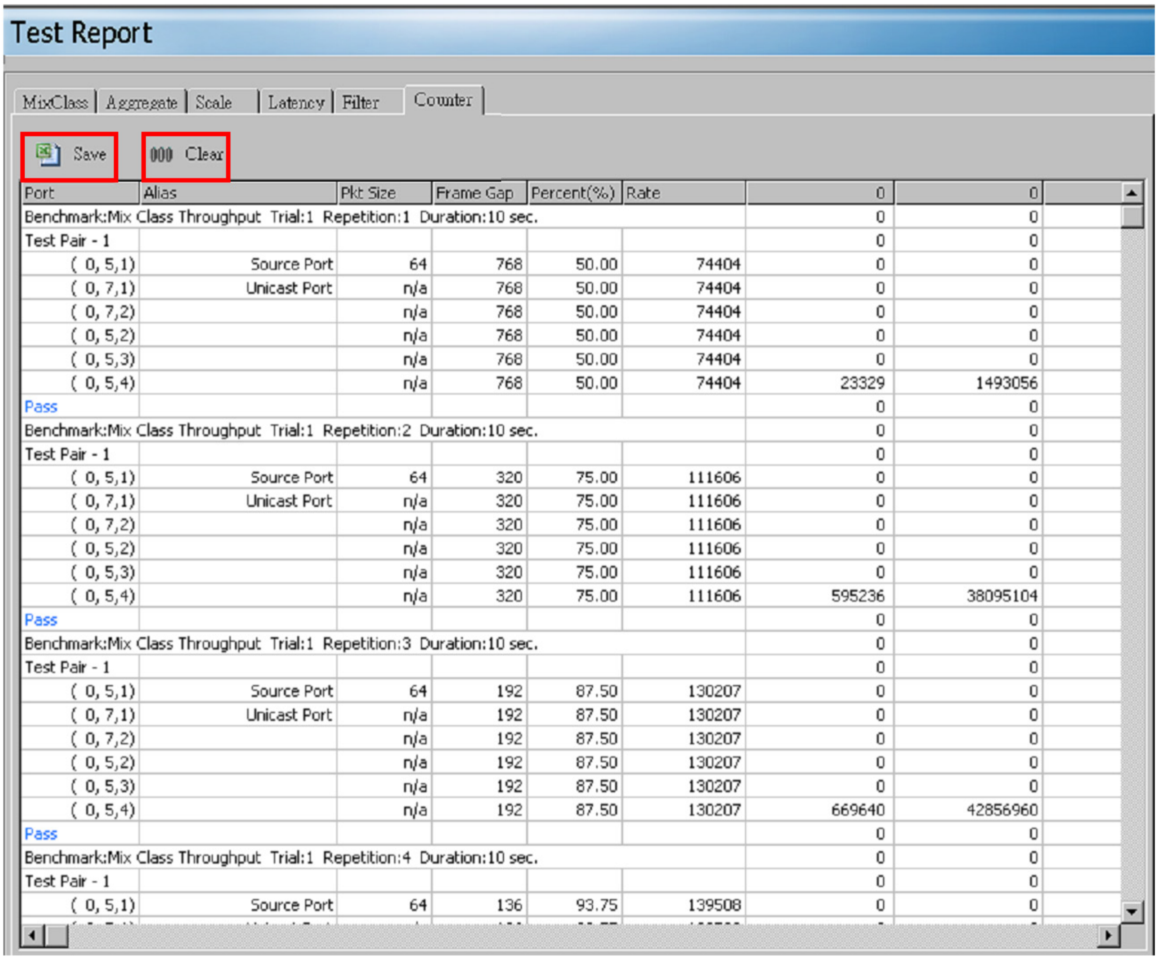


During the test, charts or statics table for results of each test (**Mixed Class Throughput, Aggregated Multicast Throughput, Scaled Group Forwarding, Latency Test, Group Capacity Test, Group Join/Leave Latency Test and IGMP V3 Source Filter Test**) will be displayed on the Main Display Screen.

NuApps-IGMP-RM will switch testing table of each test automatically when finishing the current test and starting the next test. Please note that you can only access the testing table for test you've performed.

6.2. Test Report_Counter

The Counter report will show the detailed result of each test cycle.



Port	Alias	Pkt Size	Frame Gap	Percent(%)	Rate	0	0
Benchmark:Mix Class Throughput Trial:1 Repetition:1 Duration:10 sec.						0	0
Test Pair - 1						0	0
(0, 5,1)	Source Port	64	768	50.00	74404	0	0
(0, 7,1)	Unicast Port	n/a	768	50.00	74404	0	0
(0, 7,2)		n/a	768	50.00	74404	0	0
(0, 5,2)		n/a	768	50.00	74404	0	0
(0, 5,3)		n/a	768	50.00	74404	0	0
(0, 5,4)		n/a	768	50.00	74404	23329	1493056
Pass						0	0
Benchmark:Mix Class Throughput Trial:1 Repetition:2 Duration:10 sec.						0	0
Test Pair - 1						0	0
(0, 5,1)	Source Port	64	320	75.00	111606	0	0
(0, 7,1)	Unicast Port	n/a	320	75.00	111606	0	0
(0, 7,2)		n/a	320	75.00	111606	0	0
(0, 5,2)		n/a	320	75.00	111606	0	0
(0, 5,3)		n/a	320	75.00	111606	0	0
(0, 5,4)		n/a	320	75.00	111606	595236	38095104
Pass						0	0
Benchmark:Mix Class Throughput Trial:1 Repetition:3 Duration:10 sec.						0	0
Test Pair - 1						0	0
(0, 5,1)	Source Port	64	192	87.50	130207	0	0
(0, 7,1)	Unicast Port	n/a	192	87.50	130207	0	0
(0, 7,2)		n/a	192	87.50	130207	0	0
(0, 5,2)		n/a	192	87.50	130207	0	0
(0, 5,3)		n/a	192	87.50	130207	0	0
(0, 5,4)		n/a	192	87.50	130207	669640	42856960
Pass						0	0
Benchmark:Mix Class Throughput Trial:1 Repetition:4 Duration:10 sec.						0	0
Test Pair - 1						0	0
(0, 5,1)	Source Port	64	136	93.75	139508	0	0

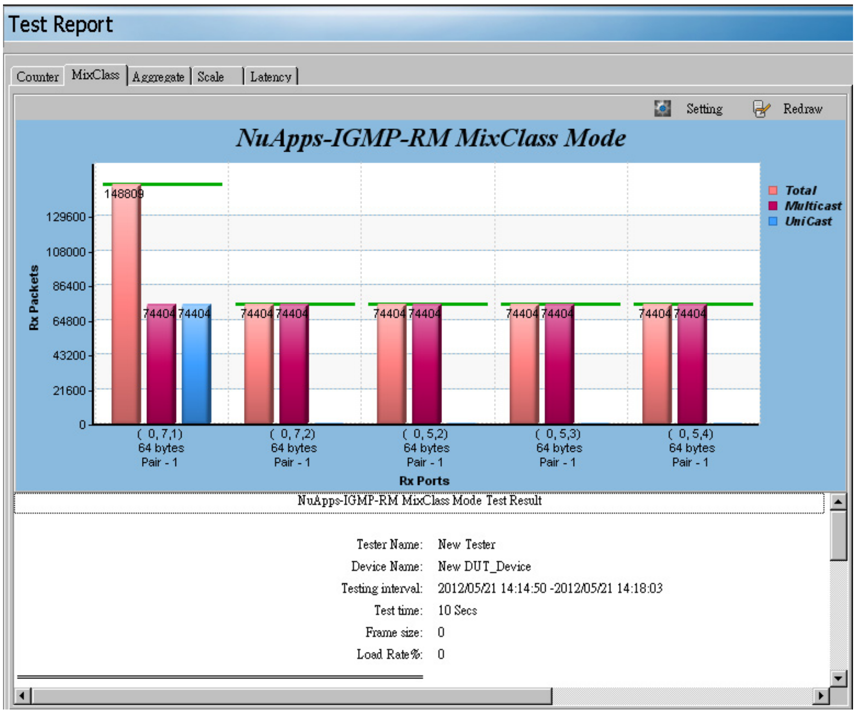
You can save the Counter report on your PC by clicking the 

button. Test results and related statistic are available and can be viewed with the "*.xls" file you saved this way. You need Microsoft Excel® to view "*.xls" file.

Also, you can click the 

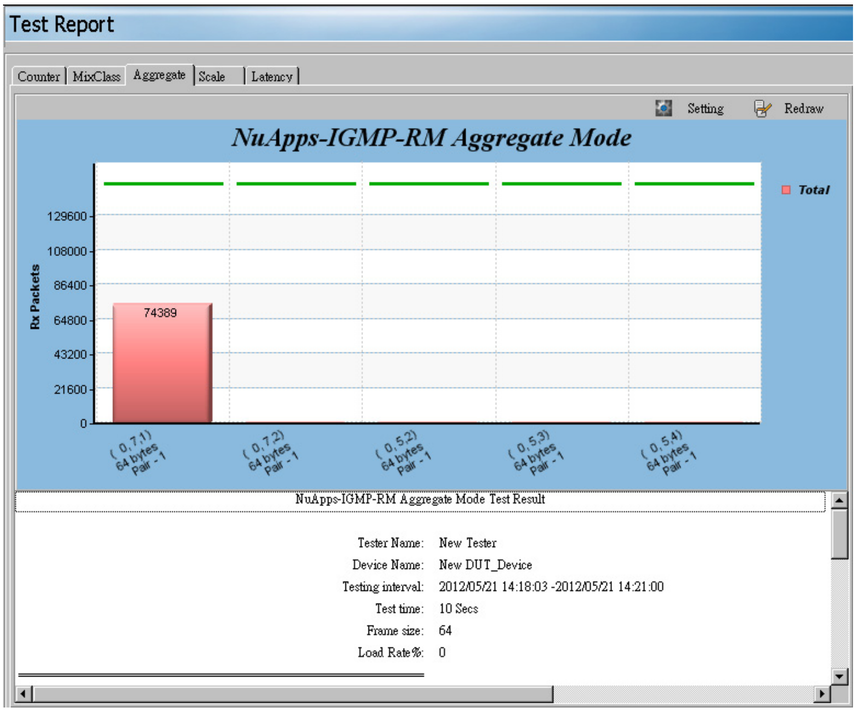
to refresh the counter and run a new task tests.

6.3. Test Report _Mixed Class Throughput



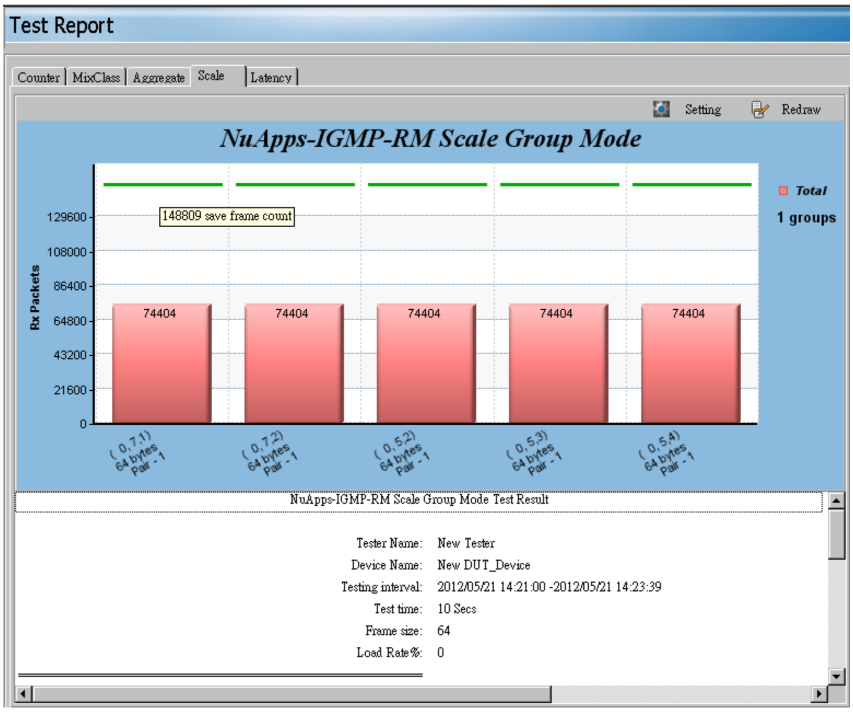
The test result for Mixed Class Throughput will show the table of Rx Packets versus each Rx Ports. It will include the Unicast, Multicast and the Total Rx Packets of each port.

6.4. Test Report _Aggregated Multicast Throughput



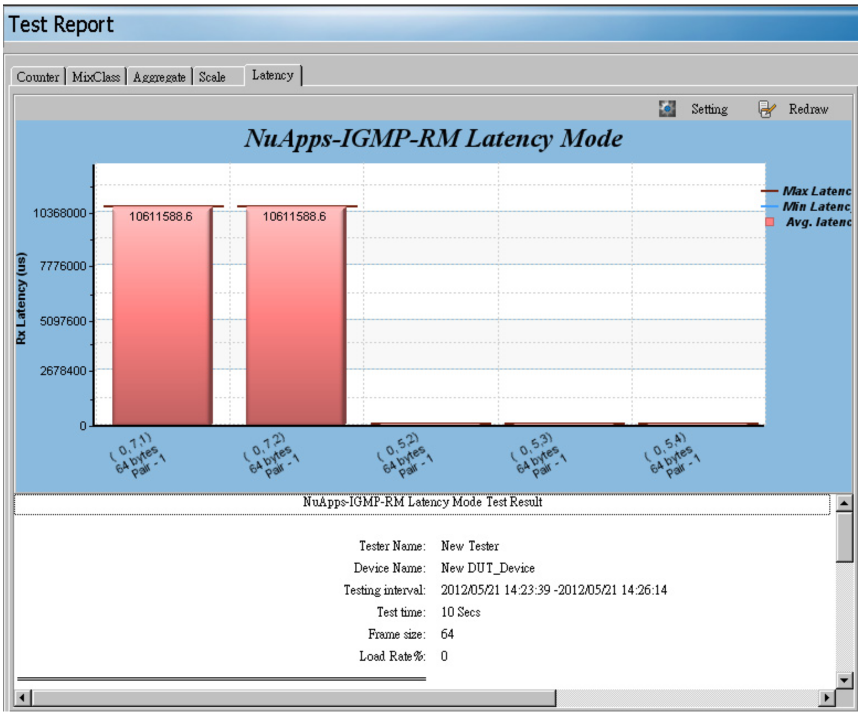
The test result for Aggregated Multicast Throughput will show the table of Rx Packets versus each Rx Ports. It shows the Total Rx Packets of each port.

6.5. Test Report _Scaled Group Forwarding



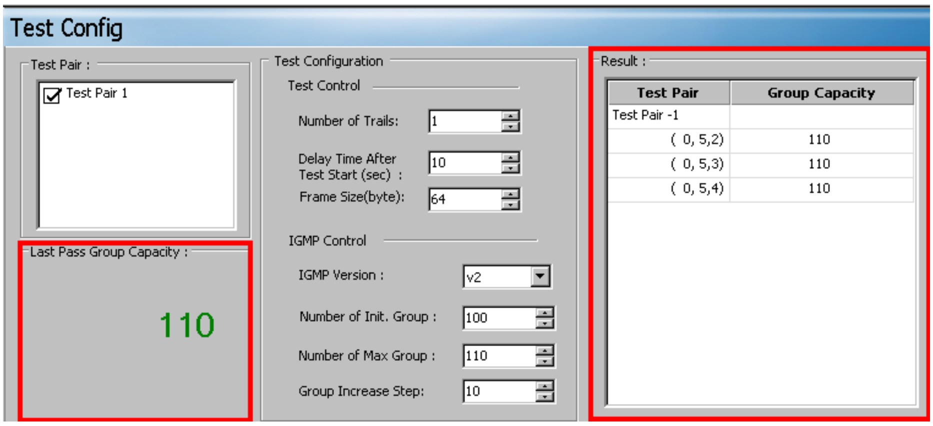
The test result for Scaled Group Forwarding will show the table of Rx Packets versus each Rx Ports. It shows the Total Rx Packets of each port from each group.

6.6. Test Report _Latency Test



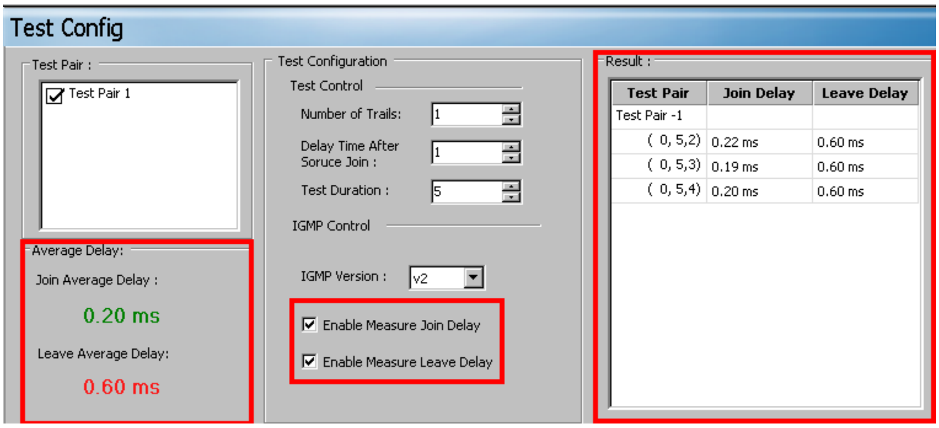
The test result for Latency Test will show the table of Rx Latency in *u*s versus each Rx Ports. It includes the maximum, minimum and the average latency of each port.

6.7. Test Report _Group Capacity Test



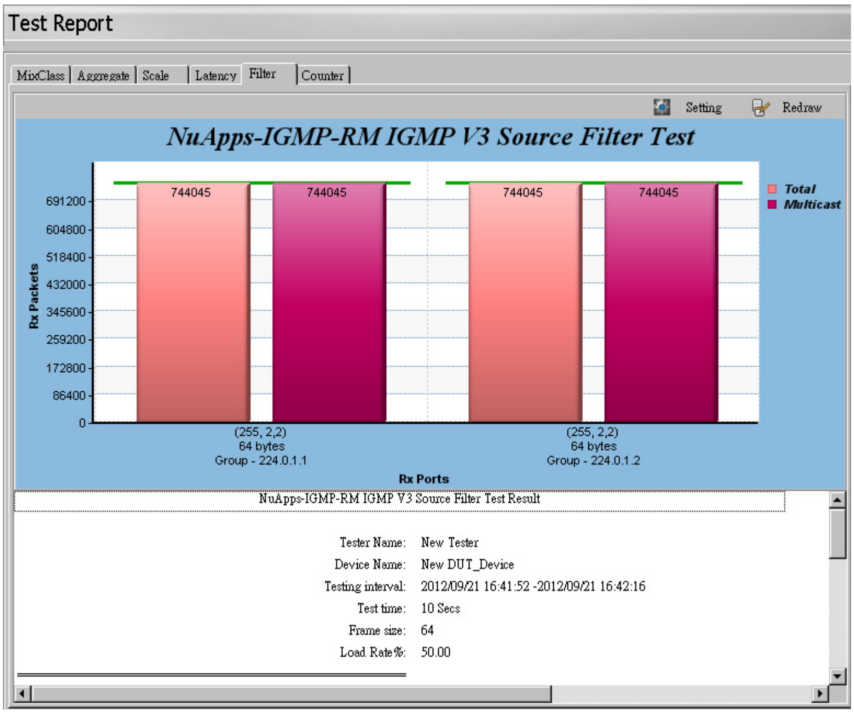
The test result for Group Capacity Test is shown on the Test Config window from the **System Info/Configuration List**. The result of the maximum pass group capacity is shown by the red rectangle for each test pair.

6.8. Test Report _Group Join/Leave Latency Test



The test result for Group Join/Leave Latency Test is shown on the Test Config window from the **System Info/Configuration List**. You must select the **Enable Measure Join Delay** and **Enable Measure Leave Delay** for system to display the average delay time for respectively Join and Leave group. Those result is shown by the red rectangle for each test pair.

6.9. Test Report _IGMP V3 Source Filter Test



The test result for IGMP V3 Source Filter Test will show the table of Rx Packets in *u*s versus each Rx Ports. It includes the Total and Multicast of IGMP V3 Source Filter of each port.

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