N9200-64DC Smoke Test Report

AI Datacenter 64*400G SONiC Switch

NADDOD Pte.Ltd.

content

一、Overview

1.1 Verification scope

This outline is mainly compiled with reference to relevant Chinese standards, RFC standards, relevant recommendations of the International Telecommunication Union ITU-T, as well as the "Guidance on Optimization and Reconstruction of China Telecom's Metropolitan Area Network" and "Technical Specifications for China Telecom's Metropolitan Area Network Equipment".

1.2 Reference Standards

The following standards contain clauses that constitute the clauses of this standard through reference in this standard. When the standard is published, the versions shown are valid. All standards will be revised, and the parties using this standard should explore the possibility of using the latest versions of the following standards.

IEEE802.1d	Media Access Control (MAC) Bridge
IEEE802.1q	Virtual Bridged LAN
IEEE802.1ad	Supplier Bridging
IEEE802.1ag	Ethernet Link Fault Management
IEEE802.1ah	Provider Backbone Bridging
IEEE802.3	LAN protocol standards
IEEE802.3ad	Multi-link segment aggregation
IEEE802.3ah	Ethernet in the First Mile
ITU Y.1731	Ethernet OAM and Performance Management
RFC826	Ethernet Address Resolution Protocol ARP
RFC1213	Management Information Base (MIB-II)
RFC1256	ICMP Router Discovery Messages
RFC1643	Definition of managed objects for Ethernet interface types
RFC1901	SNMPv2
RFC1902	SMI for SNMPv2

RFC1905	SNMPv2 Protocol Operation
RFC1907	MIB for SNMPv2
RFC2233	Using the SMIv2 interface group MIB
RFC2236	Internet Group Management Protocol (IGMP) version 2

1.3 Abbreviations

ACL	Access Control List
ANSI	National Institute of Standards
ARP	Address Resolution Protocol
FCS	Frame Check Sequence
FIB	Forwarding Information Table
GE	Gigabit Ethernet
ICMP	Internet Message Protocol
IGMP	Internet Group Message Protocol
IP	Internet Protocol
IPv4	Internet Protocol – Version 4
LAN	local area network
MIB	Management Information Base
MTU	Maximum Transmission Unit
OA & M	Operation management and maintenance
PDU	Protocol Data Unit
PPP	Point-to-Point Protocol
RADIUS	Remote Authentication Dial-up User Service

SNMP	Simple Network Management Protocol
SVLAN	Stack VLAN
TCP	Transmission Control Protocol
TOS	Service Type
TTL	Survival time
UDP	User Datagram Protocol
VLAN	Virtual Local Area Network
WAN	Wide Area Network

1.4 Introduction to the whole system design

The N9200-64DC is a spine switch for high-performance data centers. The switch provides line-rate L2 and L3 switching across the 64 x QSFP56-DD ports, each supporting 1 x 400G QSFP56-DD, 1 x 100G QSFP28, 1 x 40G QSFP+, or via breakout cables 2 x 200G (2 x 4 lanes 50G PAM4), 4 x 100G (4 x 2 lanes 50G PAM4), 2 x 50G (2 x 2 lanes 25G NRZ), 4 x 25G NRZ, or 4 x 10G NRZ. The N9200-64DC can be deployed as a spine switch supporting 100/400 GbE spine to spine or spine to leaf interconnects. This open network switch is loaded with the Open Network Install Environment (ONIE), which supports the installation of compatible Network Operating System software, including the open source options Open Network Linux, plus commercial NOS offerings.

1.5 Key Features and Benefits

- QSFP56-DD switch ports, each supporting 1 x 400G QSFP56-DD, 1 x 100G QSFP28, 1 x 40G QSFP+, or via breakout cables 2 x 200G (2 x 4 lanes 50G PAM4), 4 x 100G (4 x 2 lanes 50G PAM4), 2 x 50G (2 x 2 lanes 25G NRZ), 4 x 25G NRZ, or 4 x 10G NRZ.
- Incorporates Broadcom Tomahawk 4 switch series silicon.
- 2 RU form factor.
- Supports hot/cold aisles with front-to-back airflow SKU.
- All ports on front; PSUs and fans accessible from rear.
- Hot-swappable, load-sharing, redundant 2400 W AC/HVDC PSUs.
- 3+1 redundant, hot-swappable fan modules.

■ Hardware switch pre-loaded with Open Network Install Environment (ONIE) for automated loading of compatible open source and commerical NOS offerings.

■ Compatible with Open Network Linux (ONL), the open-source, OCP reference NOS.

二、Verification Plan

2.1 Verify the environment

The switch test environment consists of the device under test, instruments, servers, routers and configuration terminals. Most test items are performed between the device under test and the instruments. The server is used to detect the support of the device under test for functions such as RADIUS and SYSLOG. For specific test items, there are also detailed test environments. For the topology diagram, please refer to each test item.

2.2 Verification Tools and Instruments

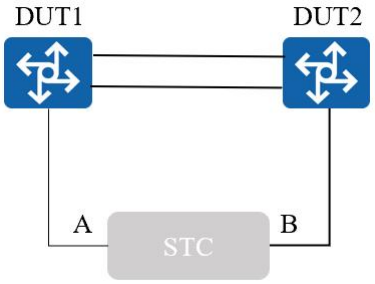
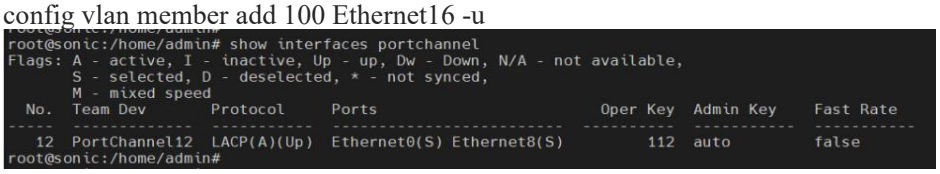
Tester : Spirent TestCenter , supports 100G tester port .

PC : 1, pre-installed with Windows 10 operating system

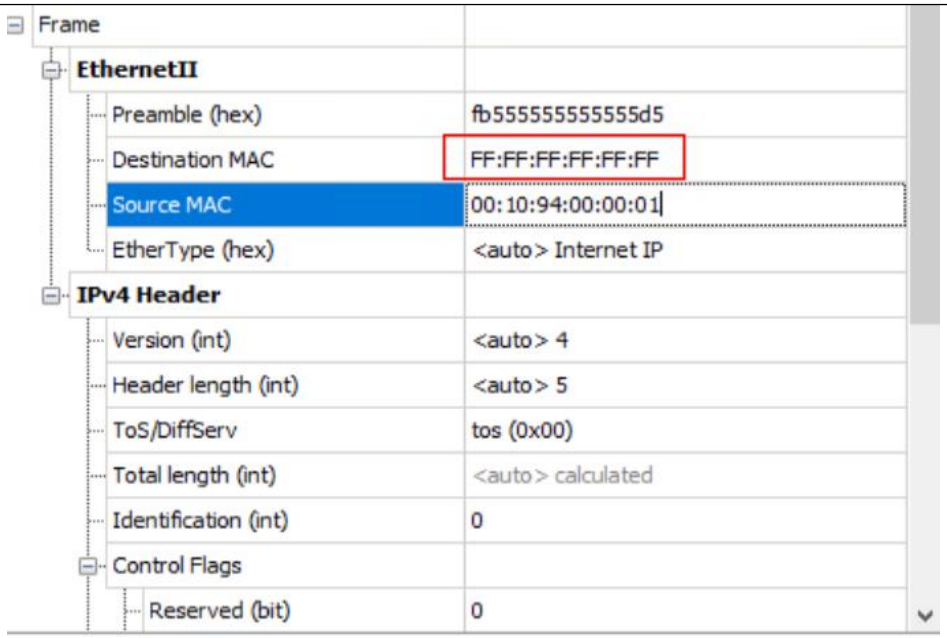
- tacacs software: tacacs .net
- Logging software: tftpd64
- MIB query software: netsnmp

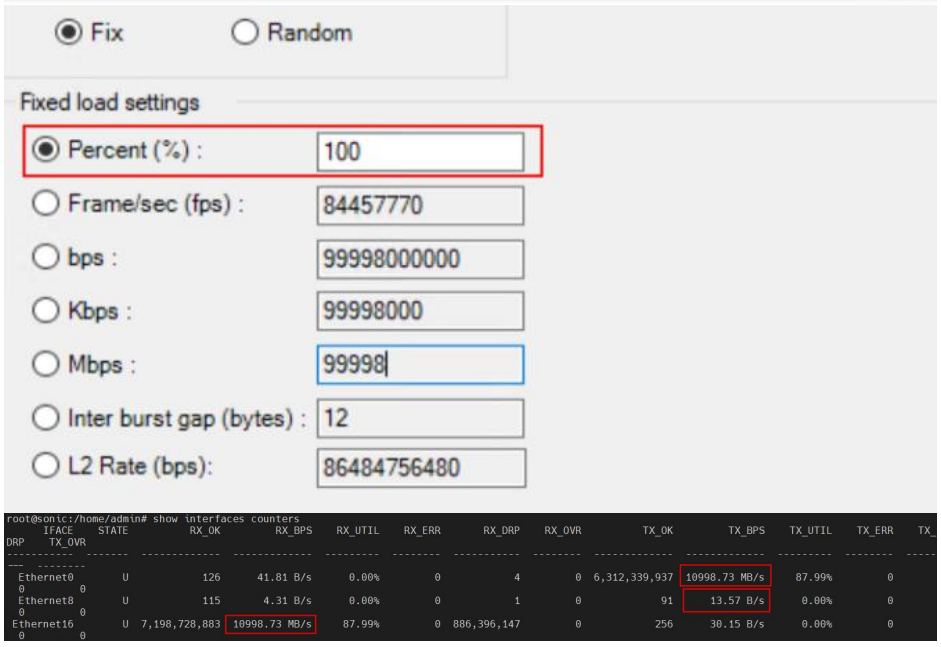
三、L2

3.1 PASS - Link Aggregation 802.3 ad

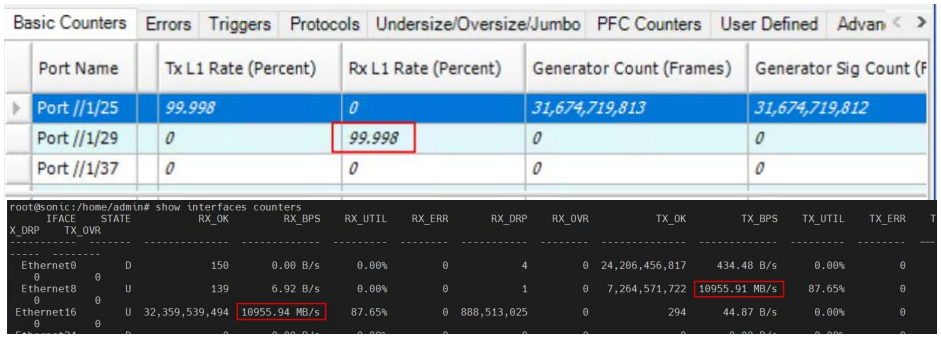
Test items	Link aggregation function test
Test content	Verify that the DUT implements 802.3ad link aggregation functionality
Test topology	
Test steps	1. Connect the equipment according to the test environment; 2. The ports connected between DUT1 and DUT 2 are set to be aggregated in one group; 3. The test instrument port A sends a broadcast to port B (MAC ground is all "F") ; 4. Disconnect one of the links; 5. The test instrument port A sends N unicast streams to port B (N is greater than the number of aggregated links) ; 6. Disconnect one of the links 7. The test instrument port A sends two unicast data streams with the same priority to port B. The flow rate of data stream 1 is greater than the line rate of the aggregation port, and the flow rate of data stream 2 is less than the line rate of the aggregation port.
Expected Results	1. In steps 4 and 6, the test instrument port B should be able to receive the data packet sent by port A 2. In step 7, the test instrument port B should be able to receive the two data streams sent by port A
DUT Configuration	Configuring an Aggregation Interface config portchannel add PortChannel12 config portchannel member add PortChannel12 Ethernet0 config portchannel member add PortChannel12 Ethernet8 config vlan add 100 config vlan member add 100 PortChannel12 -u config vlan member add 100 Ethernet16 -u  Port A sends a broadcast to port B Port A

```
root@sonic:/home/admin# show interfaces portchannel
Flags: A - active, I - inactive, Up - up, Dw - Down, N/A - not available,
       S - selected, D - deselected, * - not synced,
       M - mixed speed
  No.  Team Dev       Protocol     Ports                       Oper Key  Admin Key    Fast Rate
-----  -------------  -----------  ------------------------  ----------  -----------  -----------
   12  PortChannel12  LACP(A)(Up)  Ethernet0(S) Ethernet8(S)         112  auto         false
root@sonic:/home/admin#
```

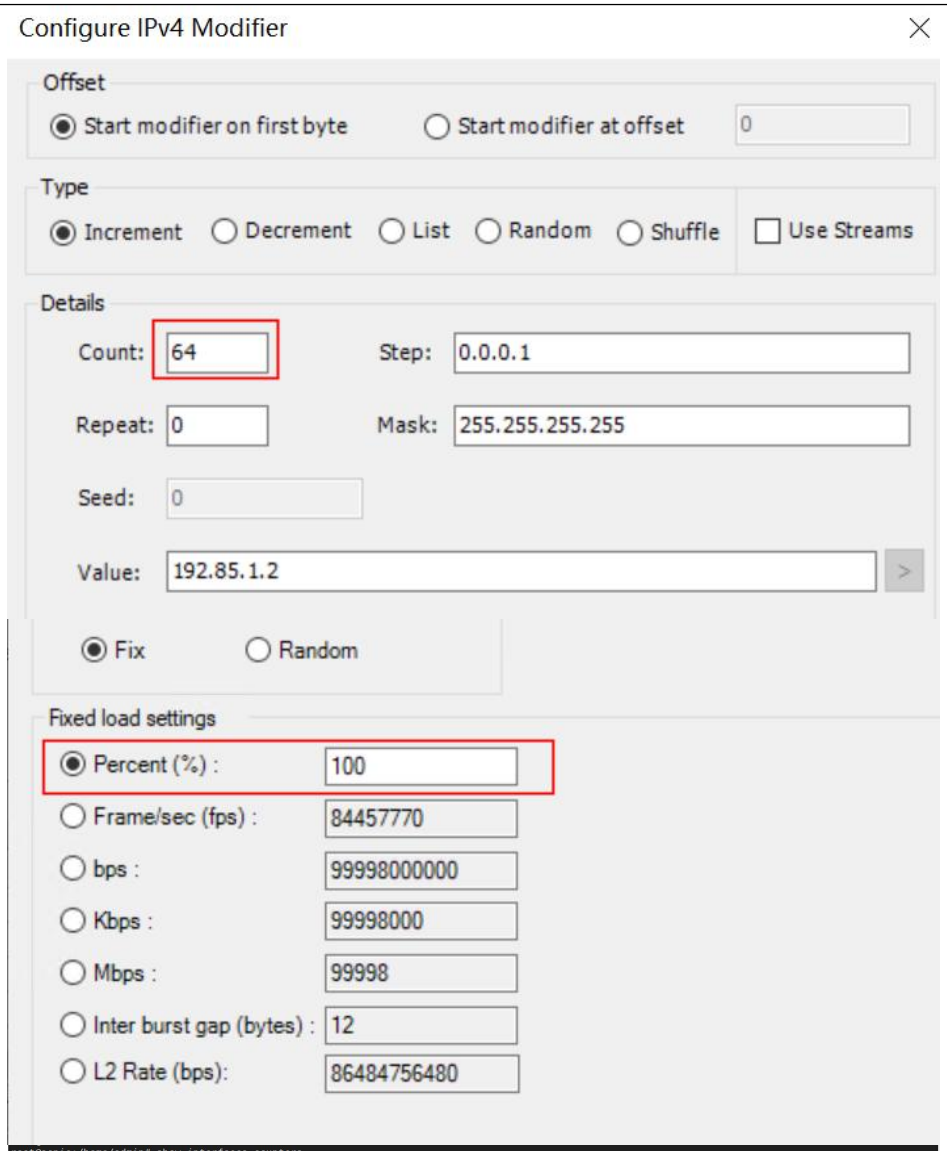


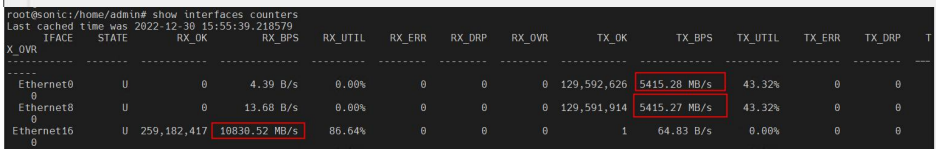


Disconnect a link

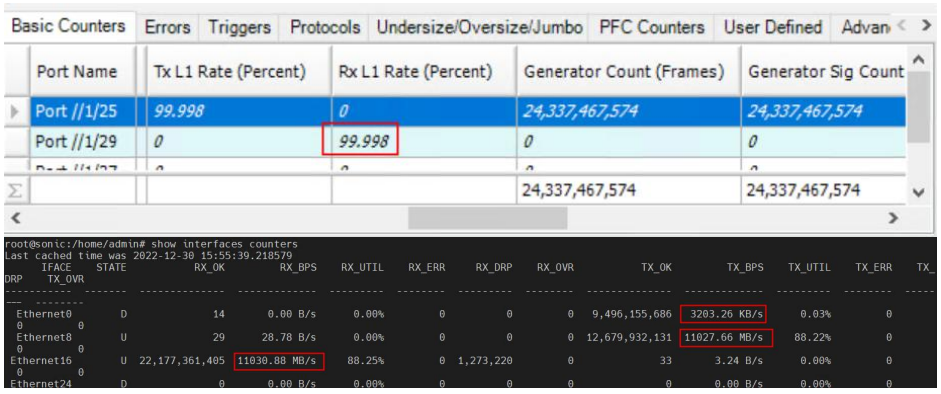


Port A sends source IP incremental unicast stream to port B



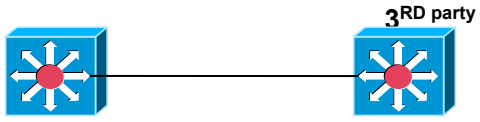


Disconnect a link



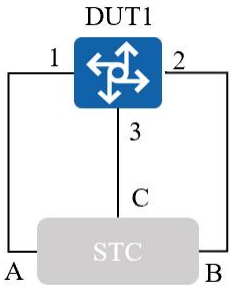
Test Results	**PASS**
Remark	

3.2 PASS -LLDP

Test items	LLDP Test
Test content	The test device can send and receive LLDP and perform analysis normally.
Test topology	
Test steps	1. Set up the test environment according to the diagram. 2. Enable LLDP between the device and third-party devices. 3. Check the LLDP neighbor information of the device 4. Delete related configuration
Expected Results	3 . The device can correctly process LLDP packets from third-party devices and display normal
DUT Configuration	Checking LLDP Information show lldp table show lldp neighbors DUT checks neighbor information root@sonic:/home/admin# show lldp table Capability codes: (R) Router, (B) Bridge, (O) Other LocalPort RemoteDevice RemotePortID Capability RemotePortDescr Ethernet0 00:10:94:00:00:0e eth0 70:72:cf:95:e2:19 B Total entries displayed: 2 root@sonic:/home/admin#

	root@sonic:/home/admin# show lldp neighbors --- LLDP neighbors: --- Interface: eth0, via: LLDP, RID: 1, Time: 0 day, 01:54:50 Chassis: ChassisID: mac 70:72:cf:95:e2:06 Capability: Bridge, on Port: PortID: mac 70:72:cf:95:e2:19 TTL: 120 PMD autoneg: supported: yes, enabled: yes Adv: 10Base-T, HD: yes, FD: yes Adv: 100Base-TX, HD: yes, FD: yes Adv: 1000Base-T, HD: no, FD: yes MAU oper type: 1000BaseTFD - Four-pair Category 5 UTP, full duplex mode LLDP-MED: Device Type: Network Connectivity Device Capability: Capabilities, yes Capability: Policy, yes Capability: Location, yes Capability: Inventory, yes LLDP-MED Location Identification: Type: Civic address Country: TW Extended Power-over-Ethernet: Power Type & Source: PSE Power Source: Primary Power Source Power priority: unknown Power Value: 100 Inventory: Hardware Revision: R01 Firmware Revision: 03.04.00.39 Serial Number: EC1317001072 Manufacturer: Edge-Core Model: ECS4110-28T
Test Results	**PASS**
Remark	

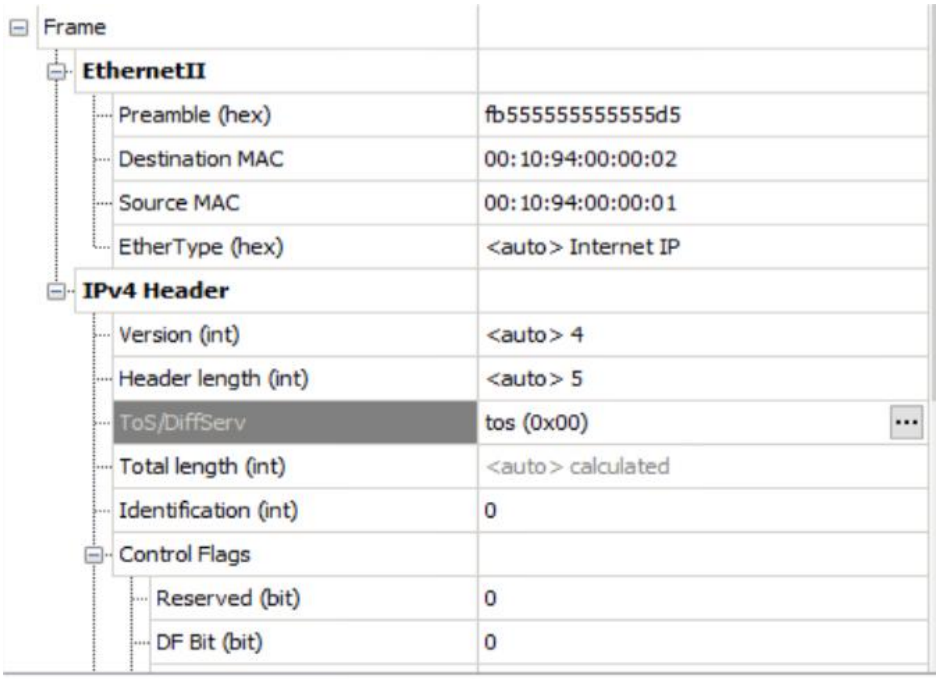
3.3 PASS -VLAN

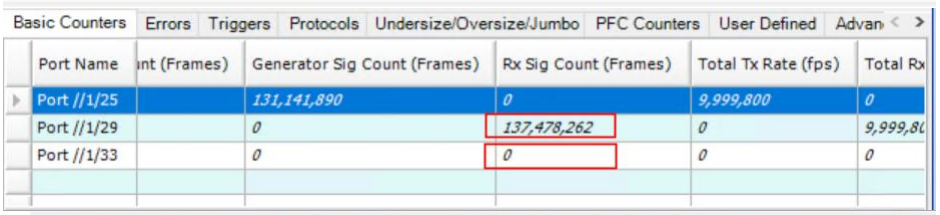
Test items	VLAN Test
Test content	The test equipment can forward according to the set VLAN
Test topology	
Test steps	1. Set up the test environment according to the diagram. 2. Create vlan 2 and vlan 3 3. Configure D UTP1 to join VLAN 2 untagged and VLAN 3 tagged 4. Configure D UTP2 to join vlan 2 untagged 5. Configure D UTP3 to join VLAN 3 tagged 6. TGA sends untagged messages and checks the instrument's packet receiving status 7. TGA sends VLAN 2 tagged packets to check the instrument's packet reception status 8. TGA sends VLAN 3 tagged packets to check the instrument's packet reception status 9. TGA sends VLAN 4 tagged packets to check the instrument's packet reception status 10. Delete related configuration

Expected Results	2, 3 , 4 , 5 Configuration and binding successful 6.7 Only TGB receives the message, and the message is untagged 8. Only TGC receives the message, and the message is VLAN 3 tagged 9. The message is discarded and no port will receive the message
DUT Configuration	V lan configuration config vlan add 2 config vlan add 3 config vlan member add 2 Ethernet0 -u config vlan member add 3 Ethernet0 config vlan member add 2 Ethernet8- u config vlan member add 3 Ethernet16

```
root@sonic:/home/admin# show vlan brief
+-----------+--------------+-----------+----------------+-------------+---------------+---------------+-------------+
|   VLAN ID | IP Address   | Ports     | Port Tagging   | Proxy ARP   | DHCP Helper   | DHCP Source   | DHCP Link   |
|           |              |           |                |             | Address       | Interface     | Selection   |
+===========+==============+===========+================+=============+===============+===============+=============+
|         2 |              | Ethernet0 | untagged       | disabled    |               |               |             |
|           |              | Ethernet8 | untagged       |             |               |               |             |
+-----------+--------------+-----------+----------------+-------------+---------------+---------------+-------------+
|         3 |              | Ethernet0 | tagged         | disabled    |               |               |             |
|           |              | Ethernet16| tagged         |             |               |               |             |
+-----------+--------------+-----------+----------------+-------------+---------------+---------------+-------------+
root@sonic:/home/admin#
```

TGA sends untagged packets
Port A

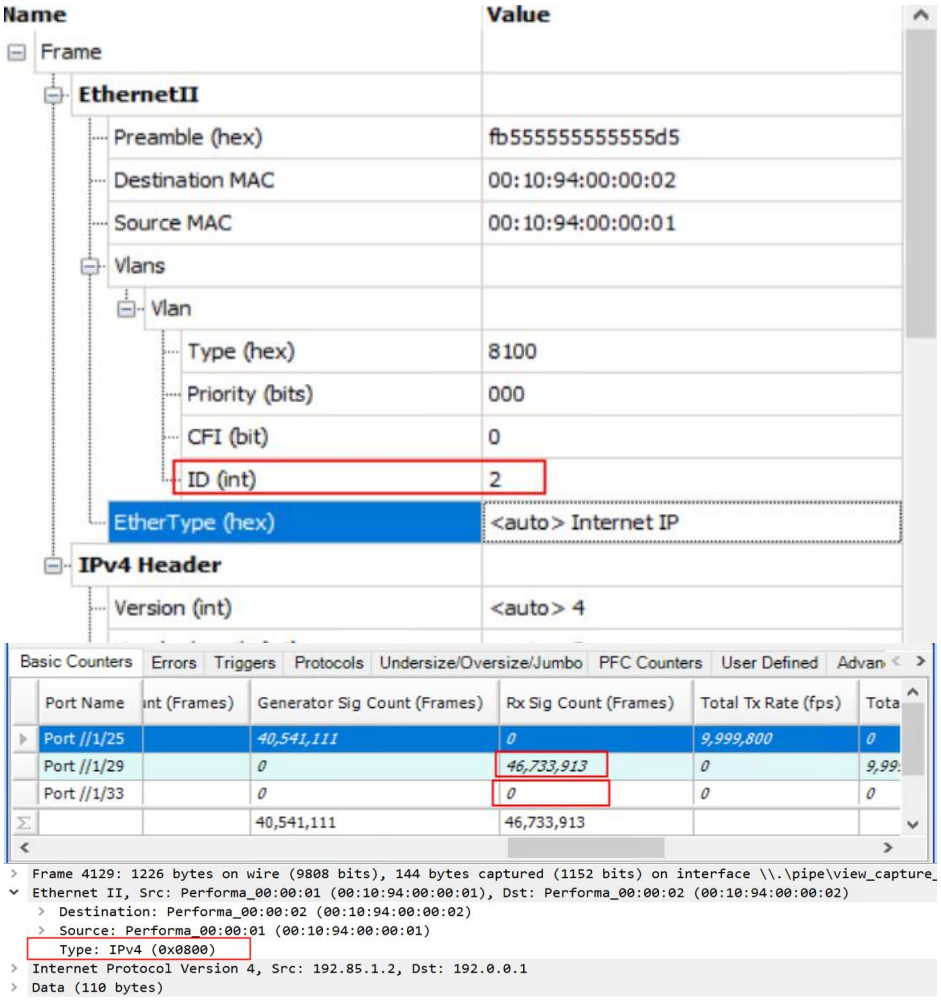




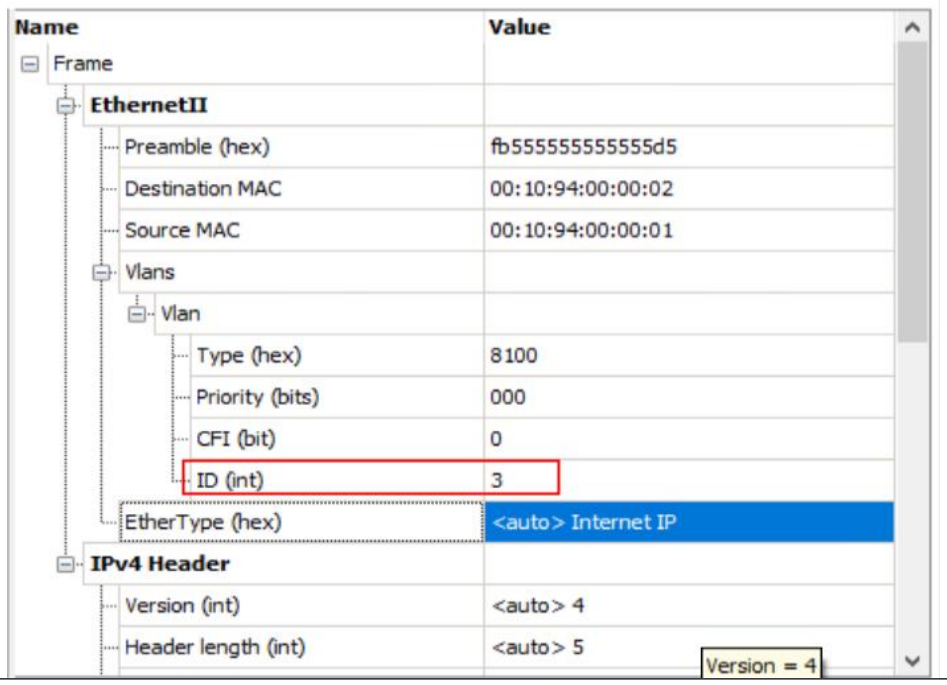

```
Frame 9887: 1230 bytes on wire (9840 bits), 144 bytes captured (1152 bits) on interface \\.\pipe\view_c
Ethernet II, Src: Performa_00:00:01 (00:10:94:00:00:01), Dst: Performa_00:00:02 (00:10:94:00:00:02)
  Destination: Performa_00:00:02 (00:10:94:00:00:02)
  Source: Performa_00:00:01 (00:10:94:00:00:01)
  Type: IPv4 (0x0800)
Internet Protocol Version 4, Src: 192.85.1.2, Dst: 192.0.0.1
Data (110 bytes)
```

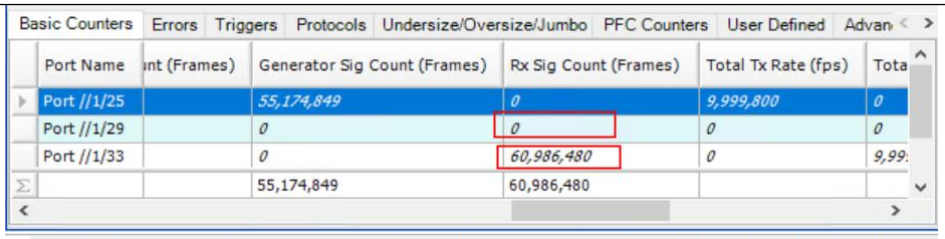
TGA sends VLAN 2 tagged packets

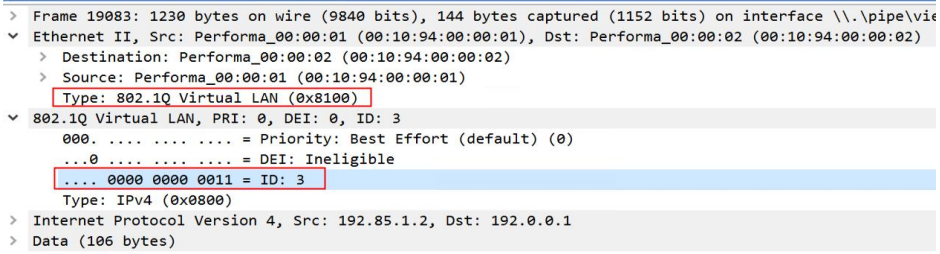
Port A



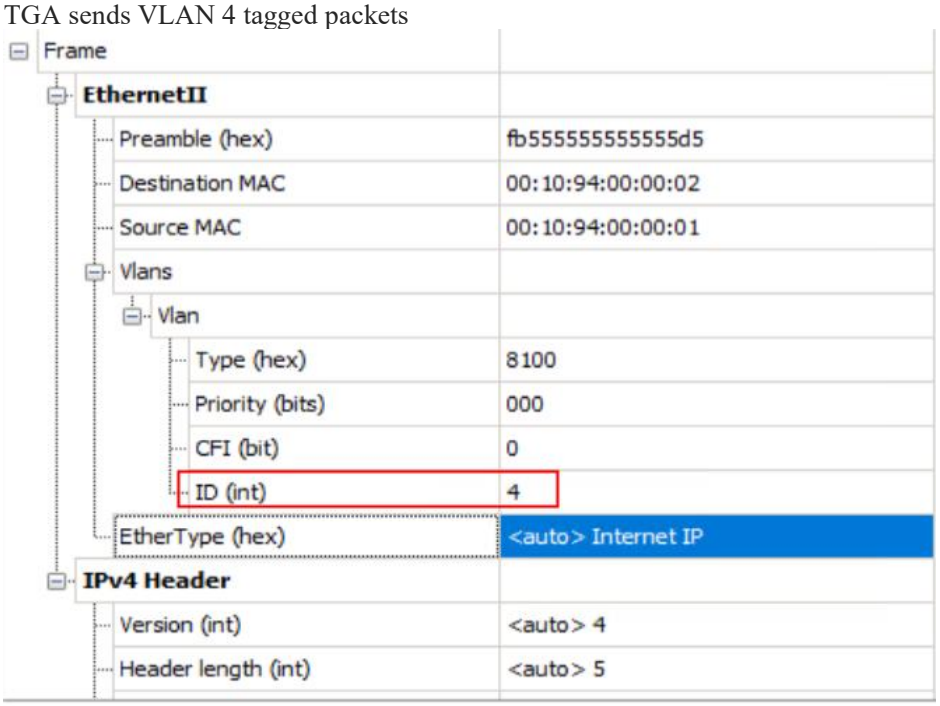
TGA sends VLAN 3 tagged packets

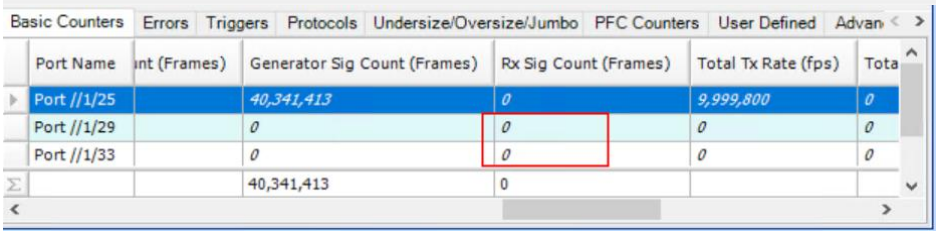






TGA sends VLAN 4 tagged packets

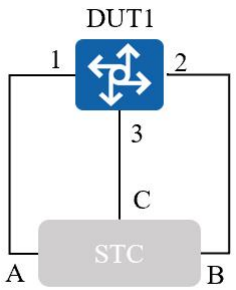


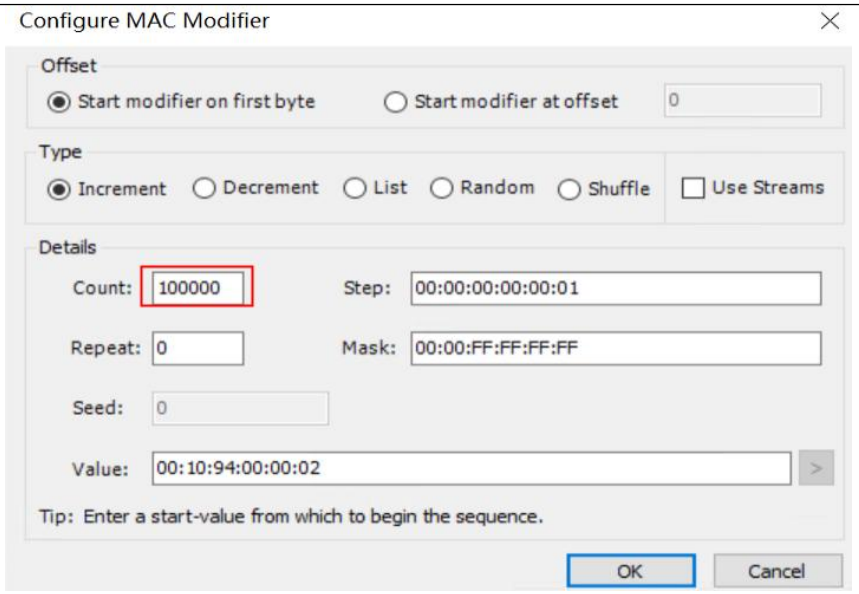


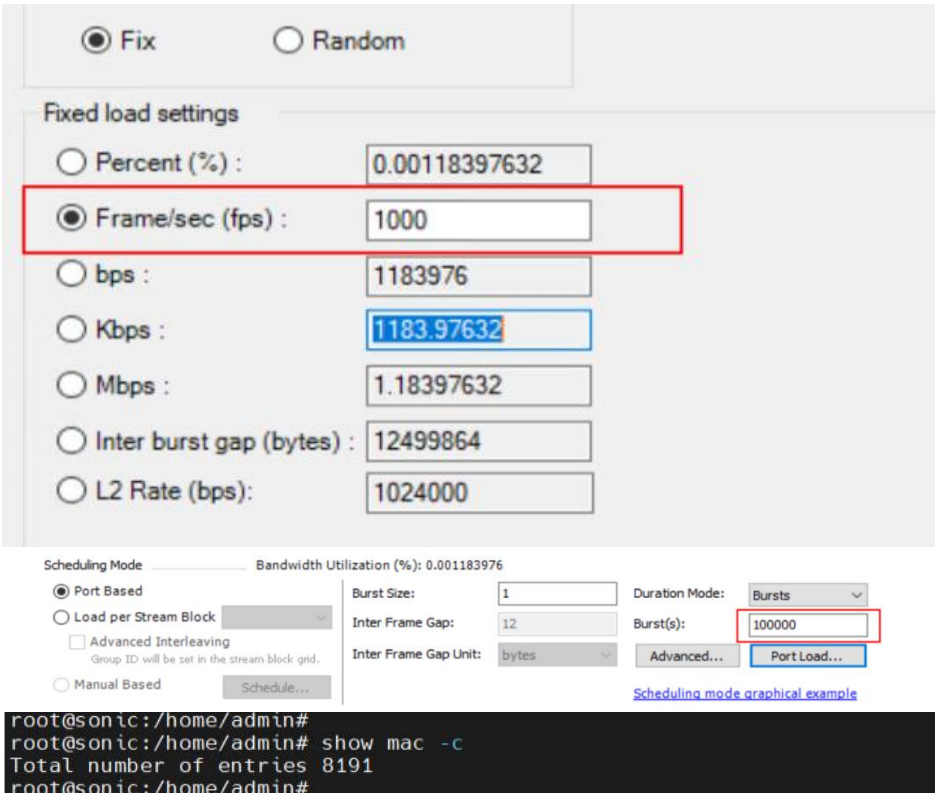
Test Results	**PASS**
Remark	

3.4 PASS - Mac Table Specification Test

Test items	Mac table specification test

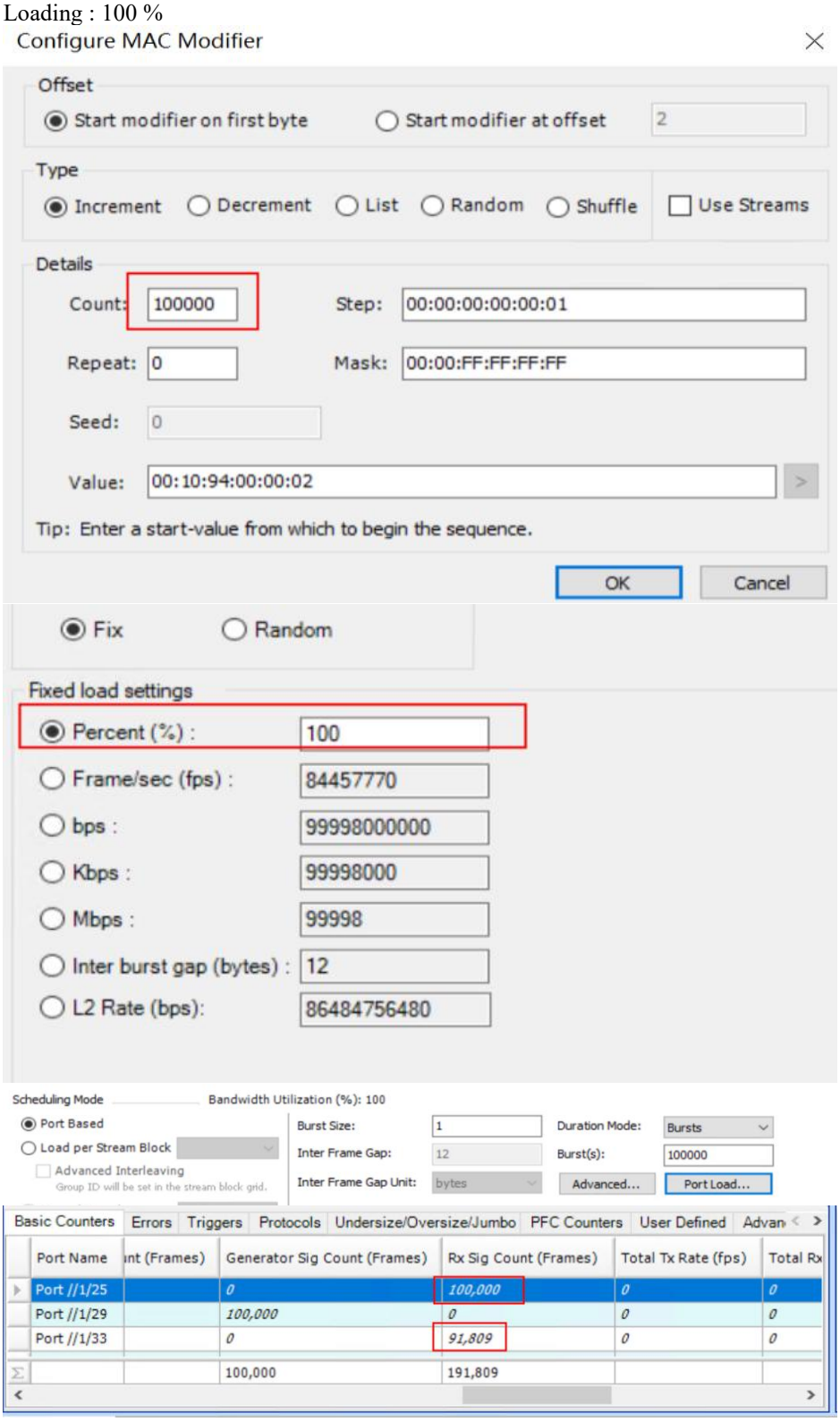
Test content	Verify the device mac address table entry specifications (total specifications including CPU is 8192)
Test topology	
Test steps	1. Set up the test environment according to the diagram. 2. Create VLAN 100 3. Configure DUTP1 -DUTP3 to join VLAN 100 untagged 4. The test instrument TGA sends 100,000 smacs with a flow rate of 100,000 , 1,000 pps 5. Clear instrument packet receiving statistics 6. TGB enters 100,000 dmacs for TGA smac traffic 7. Deleting a Configuration
Expected Results	6. The message received by TGA minus the message received by TGC equals the MAC address learned by DUT
DUT Configuration	V lan configuration config vlan add 100 config vlan member add 100 Ethernet0 -u config vlan member add 100 Ethernet8 -u config vlan member add 100 Ethernet16 -u 100,000 messages were entered into the test instrument TGA TGA message settings : DST MAC: 00:00:02:00:00:01 SRC MAC: 00:10:94:00:00:02 – Incremental (100000 MACs) Loading : 1 000 pps



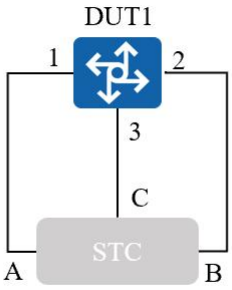


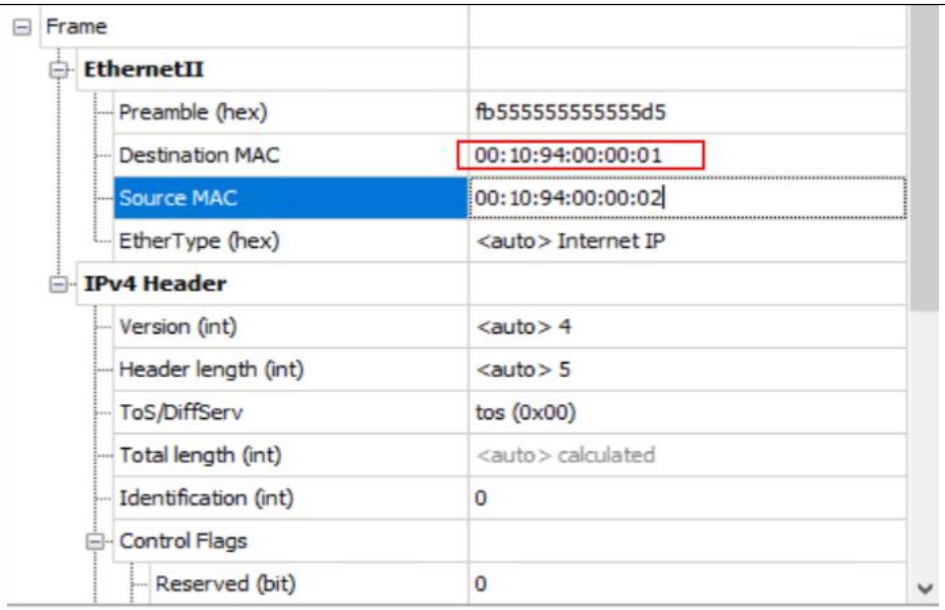
The test instrument TGB inputs 100,000 messages

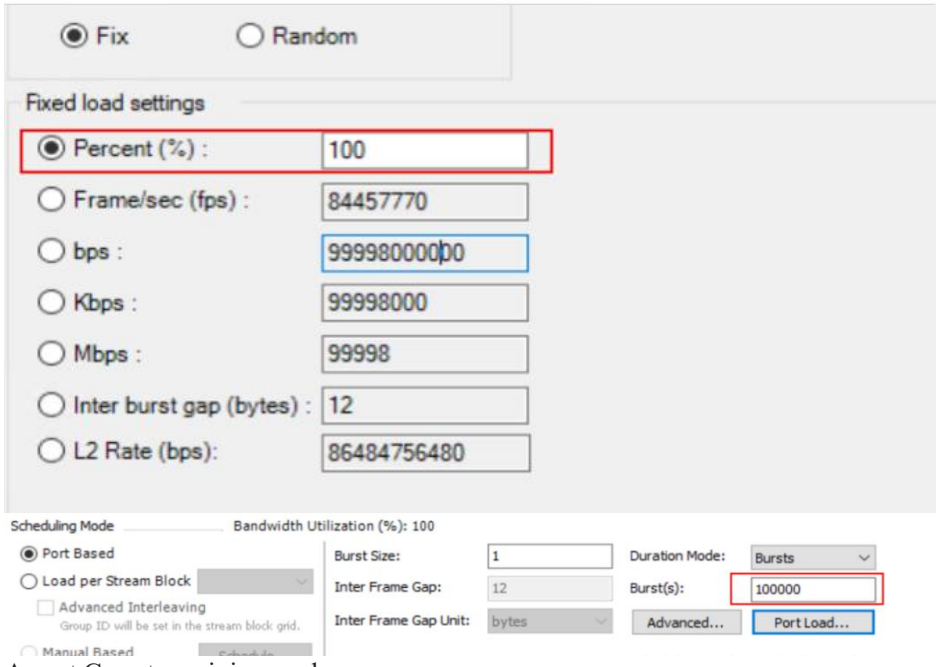
TGB message settings :
Dst MAC: 00:10:94:00:00:02 – Incremental (100000 MACs)
SRC MAC: 00:00:02:00:00:01

	Loading : 100 %  1 00000-91908= 8191
Test Results	**PASS**
Remark	of the MAC hash , a number greater than the number of MAC address table entries needs to be entered.

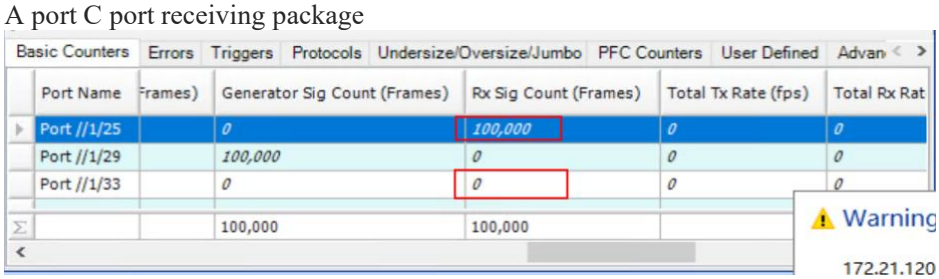
3.5 PASS -Static FDB

Test items	Static FDB Test
Test content	Verify that the device Static FDB is working properly
Test topology	
Test steps	1. Set up the test environment according to the diagram. 2. Create VLAN 100 3. Configure DUTP1 -DUTP3 to join VLAN 100 untagged 4. Configure DUTP 1 vlan 100 static mac address 5. TGB enters 100,000 dmacs for the traffic of vlan 100 configured in DUTP 1 6. Deleting a Configuration
Expected Results	5. TGA Received 100,000 messages from TGB , but TGC did not receive any messages
DUT Configuration	Configuring VLANs config vlan add 100 config vlan member add 100 Ethernet0 -u config vlan member add 100 Ethernet8 -u config vlan member add 100 Ethernet16 -u Configuring Static FDB config static-mac add 00:10:94:00:00:01 100 Ethernet0 root@sonic:/home/admin# show mac No. Vlan MacAddress Port Type 1 100 00:10:94:00:00:01 Ethernet0 Static 2 100 00:10:94:00:00:02 Ethernet8 Dynamic Total number of entries 2 root@sonic:/home/admin# B port



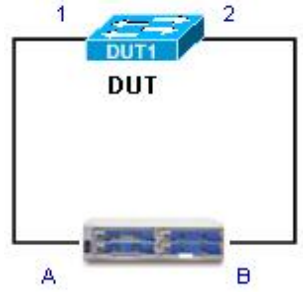
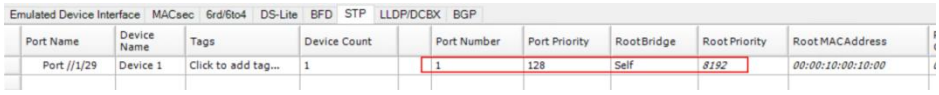
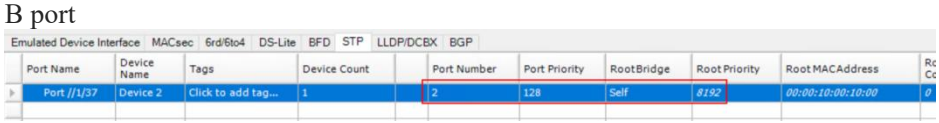


A port C port receiving package



Test Results	**PASS**
Remark	

3.6 PASS - STP

Test items	STP
Purpose of the test	Test equipment STP can work normally
Test environment	
Test steps	1. Set up the test environment according to the diagram. 2. Configuring VLANs 3. Configuring stp 4. TGA and TGB simulate two ports of the same device to enable STP (root priority 8 192) 5. show stp port status 6. TGA sends data stream to confirm whether there is a loop 7. The device port self-loops, check the STP port status
Expected Results	5.7 . No loop 6. TGB did not receive the package from TGA
DUT Configuration	Configuration config spanning-tree enable stp config vlan add 100 config vlan member add 100 Ethernet0 -u config vlan member add 100 Ethernet8 -u Port A  B port  Check the status of the STP port

Emulated Device Interface | MACsec | 6rd/6to4 | DS-Lite | BFD | STP | LLDP/DCBX | BGP

Port Name	Device Name	Tags	Device Count	Port Number	Port Priority	RootBridge	Root Priority	Root MACAddress
Port //1/29	Device 1	Click to add tag...	1	1	128	Self	8192	00:00:10:00:10:00

Emulated Device Interface | MACsec | 6rd/6to4 | DS-Lite | BFD | STP | LLDP/DCBX | BGP

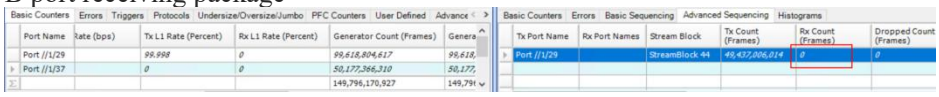
Port Name	Device Name	Tags	Device Count	Port Number	Port Priority	RootBridge	Root Priority	Root MACAddress
Port //1/37	Device 2	Click to add tag...	1	2	128	Self	8192	00:00:10:00:10:00

```
root@sonic:/home/admin# show spanning-tree
Spanning Tree Information
------------------------------------------------------------------
 Spanning Tree Mode              : STP
 Spanning Tree Enabled/Disabled  : Enabled
 Instance                        : 0
 VLANs Configured                : 1-4094
 Priority                        : 32768
 Bridge Hello Time (sec.)        : 2
 Bridge Max. Age (sec.)          : 20
 Bridge Forward Delay (sec.)     : 15
 Root Hello Time (sec.)          : 2
 Root Max. Age (sec.)            : 20
 Root Forward Delay (sec.)       : 15
 Max. Hops                       : 20
 Remaining Hops                  : 20
 Designated Root                 : 8192.000010001000
 Current Root Port(Eth)          : 1
 Current Root Cost               : 100
 Number of Topology Changes      : 1
 Last Topology Change Time (sec.): 207
 Transmission Limit              : 3
 Path Cost Method                : Long
------------------------------------------------------------------

Ethernet0 Information
------------------------------------------------------------------
 Spanning-Tree Status                : Enabled
 Link Oper Status                    : Up
 Role                                : Root
 State                               : Forwarding
 Admin Path Cost                     : 0
 Oper Path Cost                      : 100
 Priority                            : 128
 Designated Cost                     : 0
 Designated Port                     : 128.1
 Designated Root                     : 8192.000010001000
 Designated Bridge                   : 8192.000010001000
 Forward Transitions                 : 1
 Admin Edge Port                     : Auto
 Oper Edge Port                      : Disabled
 Admin Link Type                     : Auto
 Oper Link Type                      : Point-to-point
 Loopback Detection Status           : Disabled
 Loopback Detection Release Mode     : Auto
 Loopback Detection Action           : Block
 Root Guard Status                   : Disabled
 BPDU Guard Status                   : Disabled
 BPDU Guard Auto Recovery            : Disabled
 BPDU Guard Auto Recovery Interval   : 300
 BPDU Filter Status                  : Disabled
 TC Propagate Stop                   : Disabled
```

```
Ethernet8 Information
------------------------------------------------------------------------
 Spanning-Tree Status                : Enabled
 Link Oper Status                    : Up
 Role                                : Alternate
 State                               : Discarding
 Admin Path Cost                     : 0
 Oper Path Cost                      : 100
 Priority                            : 128
 Designated Cost                     : 0
 Designated Port                     : 128.2
 Designated Root                     : 8192.000010001000
 Designated Bridge                   : 8192.000010001000
 Forward Transitions                 : 1
 Admin Edge Port                     : Auto
 Oper Edge Port                      : Disabled
 Admin Link Type                     : Auto
 Oper Link Type                      : Point-to-point
 Loopback Detection Status           : Disabled
 Loopback Detection Release Mode     : Auto
 Loopback Detection Action           : Block
 Root Guard Status                   : Disabled
 BPDU Guard Status                   : Disabled
 BPDU Guard Auto Recovery            : Disabled
 BPDU Guard Auto Recovery Interval   : 300
 BPDU Filter Status                  : Disabled
 TC Propagate Stop                   : Disabled
root@sonic:/home/admin#
```

A port packaging

B port receiving package

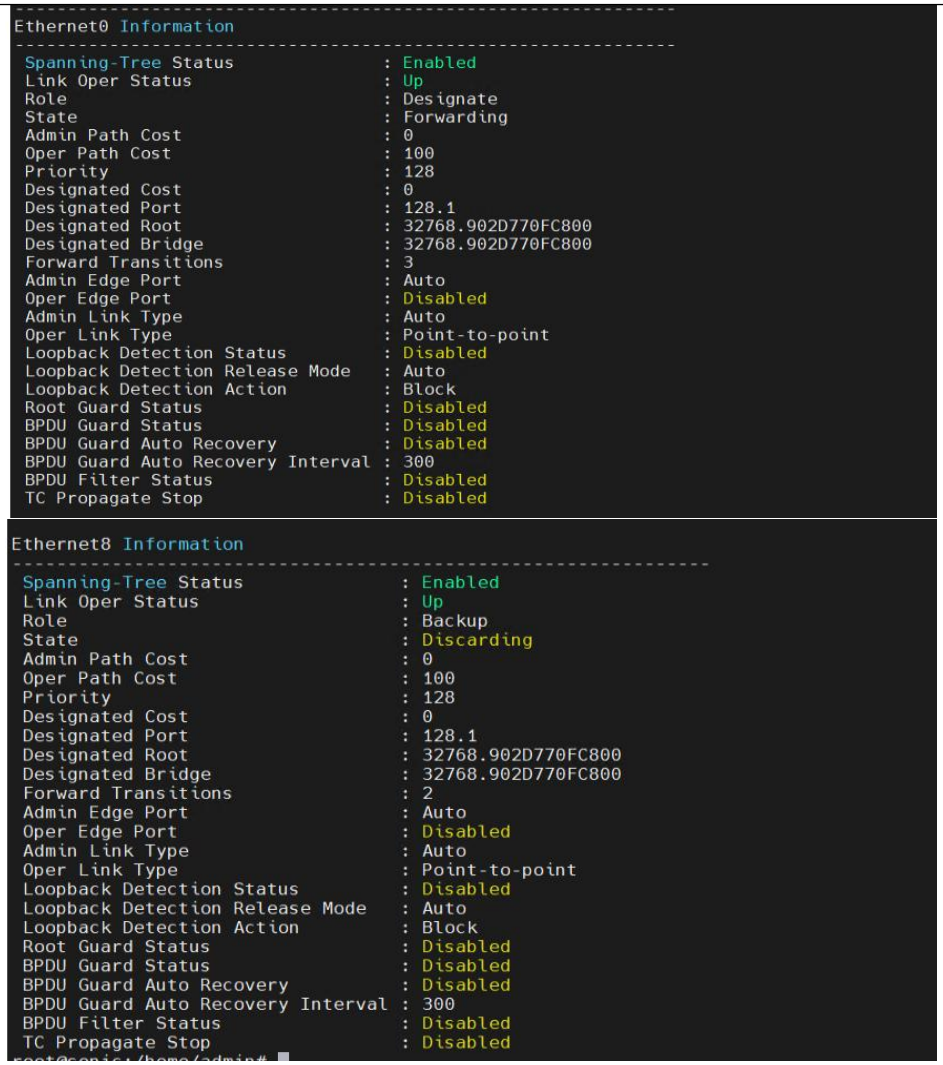


Switch the stp mode to rstp and check the stp port status

Same result as above, no loop

Port 1 and 2 self-loop

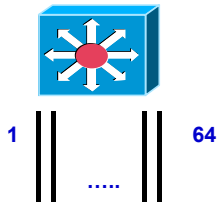
```
root@sonic:/home/admin# show spanning-tree
Spanning Tree Information
------------------------------------------------------------
 Spanning Tree Mode              : RSTP
 Spanning Tree Enabled/Disabled  : Enabled
 Instance                        : 0
 VLANs Configured                : 1-4094
 Priority                        : 32768
 Bridge Hello Time (sec.)        : 2
 Bridge Max. Age (sec.)          : 20
 Bridge Forward Delay (sec.)     : 15
 Root Hello Time (sec.)          : 2
 Root Max. Age (sec.)            : 20
 Root Forward Delay (sec.)       : 15
 Max. Hops                       : 20
 Remaining Hops                  : 20
 Designated Root                 : 32768.902D770FC800
 Current Root Port               : 0
 Current Root Cost               : 0
 Number of Topology Changes      : 4
 Last Topology Change Time (sec.): 136
 Transmission Limit              : 3
 Path Cost Method                : Long
------------------------------------------------------------
```



Test Results	**PASS**
Remark	

3.8 PASS -RFC-2544

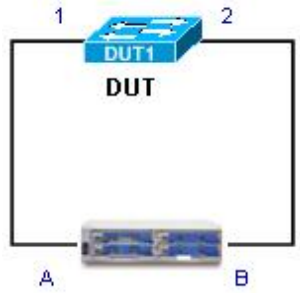
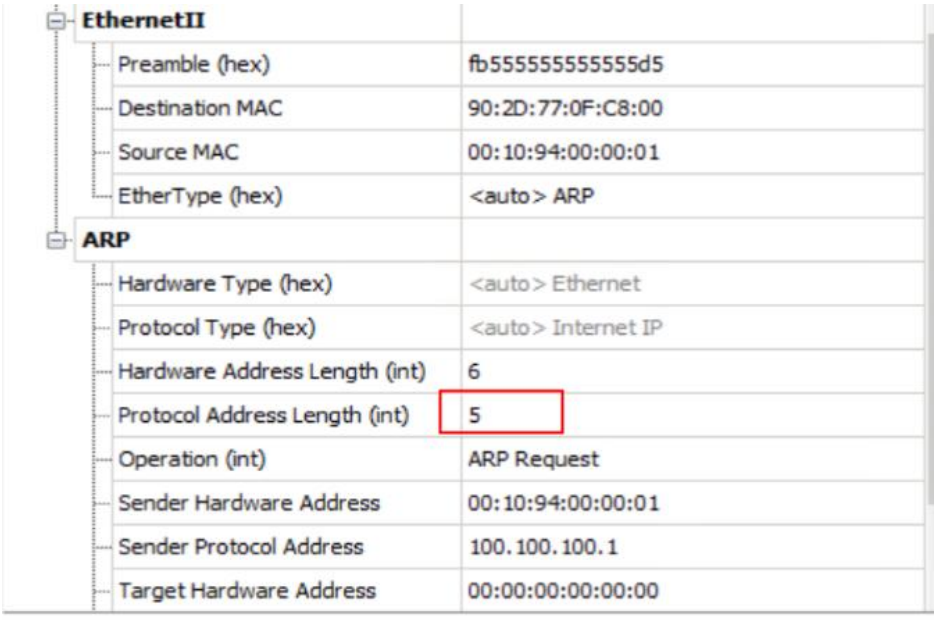
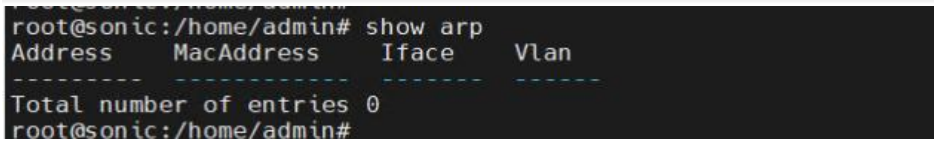
Test items	RFC 2544 Testing
Purpose of the test	Device connection instrumentation for RFC 2544

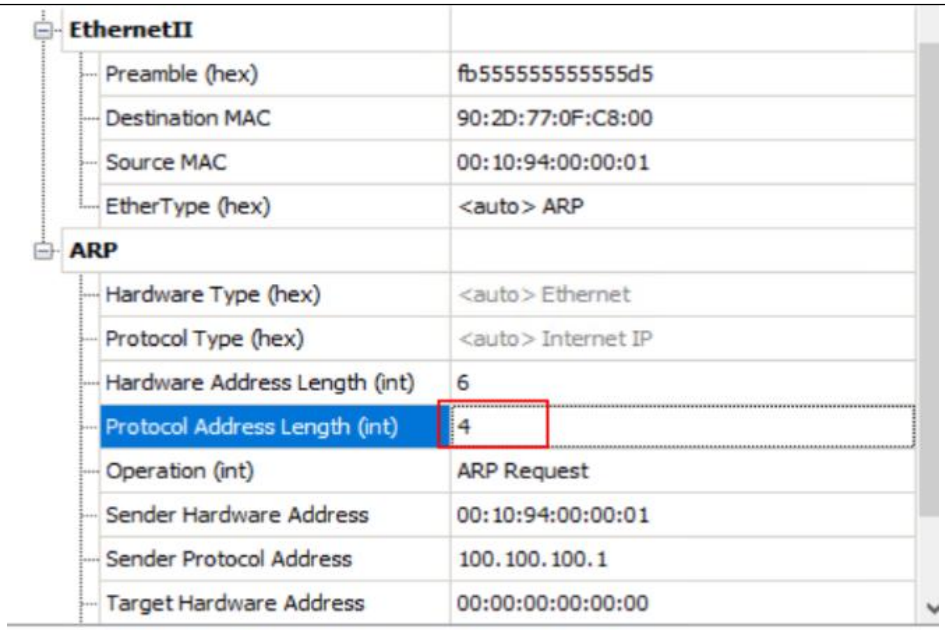
Test topology	 Test Center
Test steps	1. Set up the test environment according to the diagram. 2. Configuring VLANs 3. 2544 Testing with an Instrument 4. Delete related configuration
Expected Results	3 : RFC 2544 results are as expected
DUT Configuration	Configuring VLANs config vlan add 100 config vlan member add 100 Ethernet0 -u config vlan member add 100 Ethernet8 -u Configuring mtu config interface mtu Ethernet0 9216 config interface mtu Ethernet8 9216 Disable lldp systemctl stop lldp.service Throughput Report: N9200-64D_400 Gx2_L2_Throughp
Test Results	**PASS**
Remark	

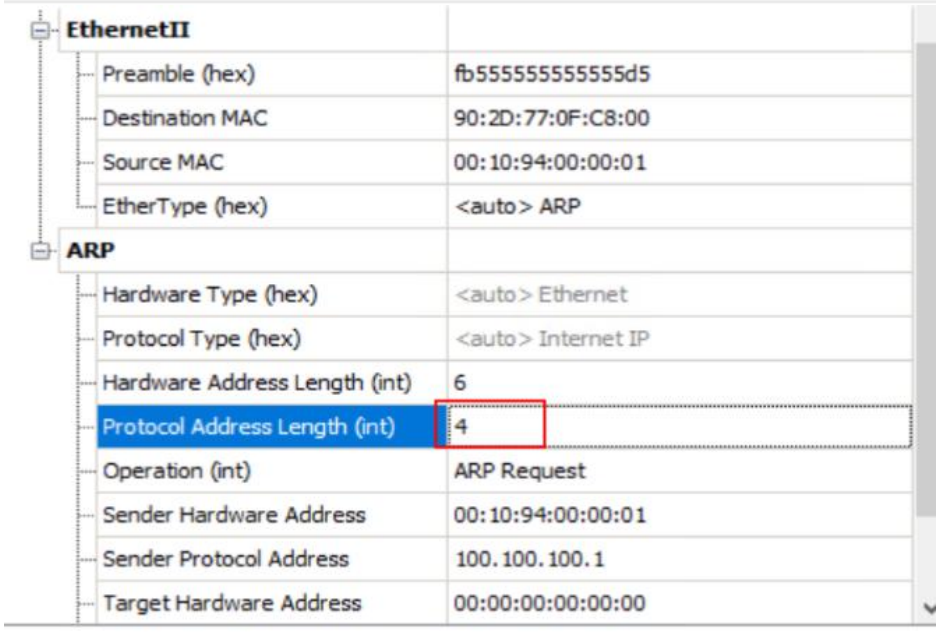
四、L 3

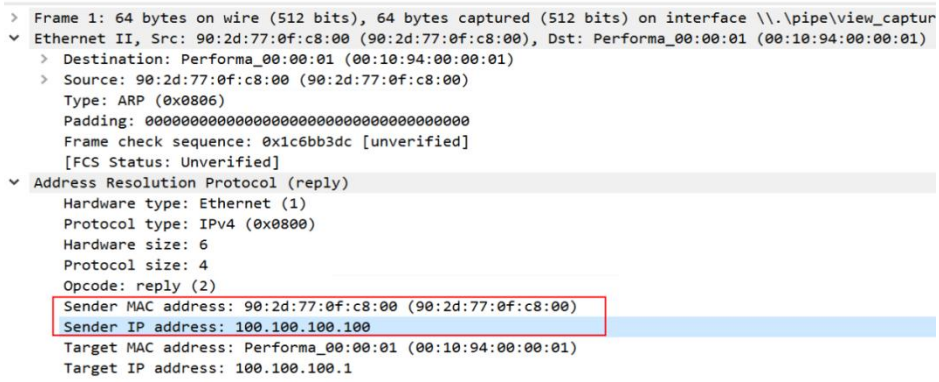
4.1 PASS - ARP protocol test

Test items	ARP protocol test

Test content	The test device can process ARP packets correctly.
Test topology	
Test steps	1. Set up the test environment according to the diagram. 2. Configure DUTP 1 IP to 1 00 . 100 . 100 . 100 / 24 3. TGA sends wrong ARP using 100.100.100.1 as source mac request to 1 00.100.100.100 4. TGA sends the correct ARP using 100.100.100.1 as the source mac request to 100.100.100.100 5. Delete related configuration
Expected Results	3. DUT did not learn 100 . 100 . 100 . 1 4. DUT learns to 100 . 100 . 100 . 1
DUT Configuration	Configure device P1 IP to 1 00 . 100 . 100 . 100 / 24 config interface ip add Ethernet0 100.100.100.100/24 Port A   Port A

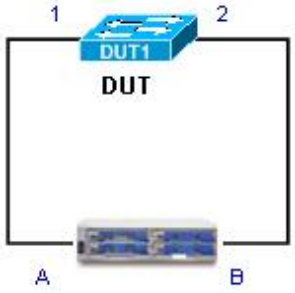
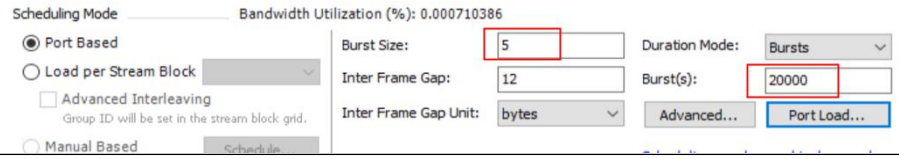

EthernetII
Preamble (hex) fb555555555555d5
Destination MAC 90:2D:77:0F:C8:00
Source MAC 00:10:94:00:00:01
EtherType (hex) <auto> ARP
ARP
Hardware Type (hex) <auto> Ethernet
Protocol Type (hex) <auto> Internet IP
Hardware Address Length (int) 6
Protocol Address Length (int) 4
Operation (int) ARP Request
Sender Hardware Address 00:10:94:00:00:01
Sender Protocol Address 100.100.100.1
Target Hardware Address 00:00:00:00:00:00

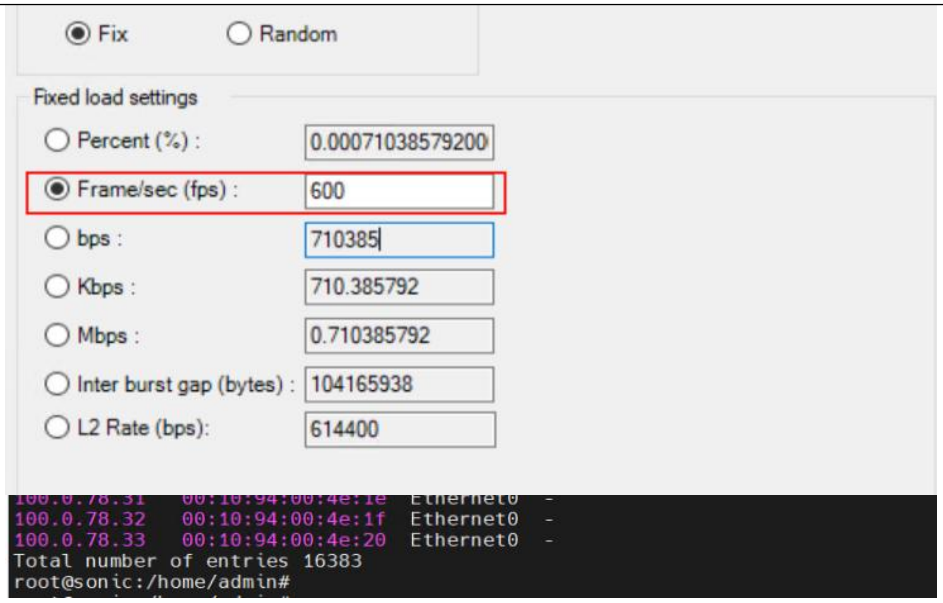

EthernetII
Preamble (hex) fb555555555555d5
Destination MAC 90:2D:77:0F:C8:00
Source MAC 00:10:94:00:00:01
EtherType (hex) <auto> ARP
ARP
Hardware Type (hex) <auto> Ethernet
Protocol Type (hex) <auto> Internet IP
Hardware Address Length (int) 6
Protocol Address Length (int) 4
Operation (int) ARP Request
Sender Hardware Address 00:10:94:00:00:01
Sender Protocol Address 100.100.100.1
Target Hardware Address 00:00:00:00:00:00


Frame 1: 64 bytes on wire (512 bits), 64 bytes captured (512 bits) on interface \\.\pipe\view_captur
Ethernet II, Src: 90:2d:77:0f:c8:00 (90:2d:77:0f:c8:00), Dst: Performa_00:00:01 (00:10:94:00:00:01)
Destination: Performa_00:00:01 (00:10:94:00:00:01)
Source: 90:2d:77:0f:c8:00 (90:2d:77:0f:c8:00)
Type: ARP (0x0806)
Padding: 000000000000000000000000000000000000
Frame check sequence: 0x1c6bb3dc [unverified]
[FCS Status: Unverified]
Address Resolution Protocol (reply)
Hardware type: Ethernet (1)
Protocol type: IPv4 (0x0800)
Hardware size: 6
Protocol size: 4
Opcode: reply (2)
Sender MAC address: 90:2d:77:0f:c8:00 (90:2d:77:0f:c8:00)
Sender IP address: 100.100.100.100
Target MAC address: Performa_00:00:01 (00:10:94:00:00:01)
Target IP address: 100.100.100.1

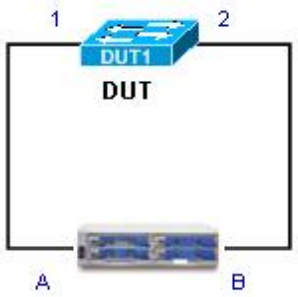
	root@sonic:/home/admin# show arp Address MacAddress Iface Vlan 100.100.100.1 00:10:94:00:00:01 Ethernet0 - Total number of entries 1 root@sonic:/home/admin#
Test Results	**PASS**
Remark	

4.2 PASS - ARP Specification Test

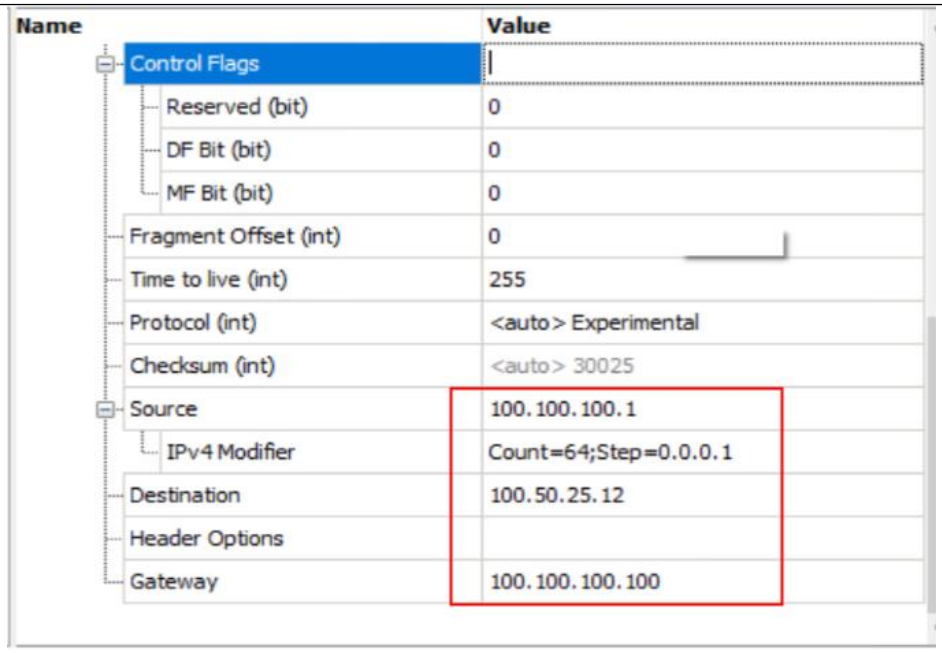
Test items	ARP Specification Test
Test content	Test device ARP specifications.
Test topology	
Test steps	1. Set up the test environment according to the diagram. 2. Configure DUTP 1 IP to 100.0.0.1/8 3. TGA starts sending incremental ARP using 100.0.0.2 request to 1 00.0 . 0 . 1 4. Delete related configuration
Expected Results	3. DUT learns that the A RP meets the specification
DUT Configuration	Configure device P1 IP to 100.0.0.1/8 config interface ip add Ethernet0 100.0.0.1/8 ARP Learning Table Port A 

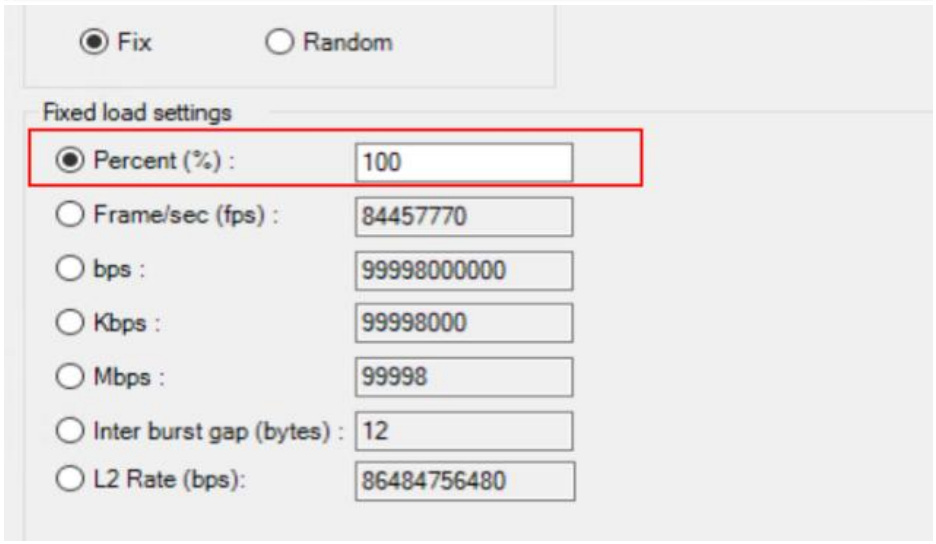
	
Test Results	**PASS**
Remark	Show arp shows that 16383 messages have been learned

4.3 PASS -ECMP

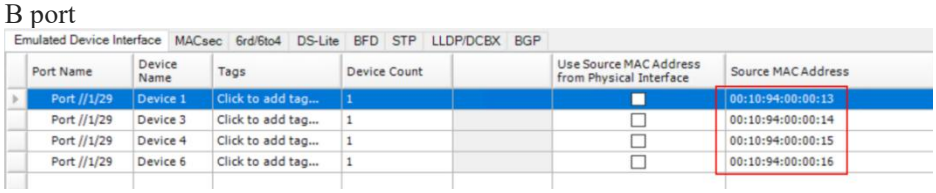
Test items	ECMP functional test
Purpose of the test	The test equipment can learn routes and forward messages through BGP.
Test environment	
Test steps	1. Set up the test environment according to the diagram. 2. Configure the interface IP address 3. Tester TGA creates an IP interface and performs ARP interaction with device P1 4. Tester TG B creates a multi-IP interface and performs arp interaction with device P 2 5. Configuring Equal-Cost Static Routes 6. TG A sends L3 message to the destination IP specified by the equal-cost route 7. Delete related configuration

Expected Results	2. IP address configuration is successful 5. Configuration successful 6. Message forwarding is normal, there is no packet loss, and there is load sharing through ECMP
DUT Configuration	2. Configure the interface IP address config interface ip add Ethernet 0 100.100.100.100/24 config interface ip add Ethernet 8 200.200.200.200/24 3. Tester TG A creates interface 100.100.100.1 and performs ARP interaction with device IP 100.100.100.100 4. Tester TG B creates interface 200.200.200.1-200.200.200.4 and performs ARP interaction with device IP 200.200.200.200 5. Configuring equal-cost static routes Vtysh configure terminal ip route 100.50.25.12/32 200.200.200. 1 ip route 100.50.25.12/32 200.200.200.2 ip route 100.50.25.12/32 200.200.200.3 ip route 100.50.25.12/32 200.200.200.4 root@sonic:/home/admin# show ip route Codes: K - kernel route, C - connected, S - static, R - RIP, O - OSPF, I - IS-IS, B - BGP, E - EIGRP, N - NHRP, T - Table, v - VNC, V - VNC-Direct, A - Babel, D - SHARP, F - PBR, f - OpenFabric, > - selected route, * - FIB route, q - queued route, r - rejected route K>*0.0.0.0/0 [0/0] via 172.21.120.254, eth0, 00:17:36 S>*100.50.25.12/32 [1/0] via 200.200.200.1, Ethernet8, 00:13:53 * via 200.200.200.2, Ethernet8, 00:13:53 * via 200.200.200.3, Ethernet8, 00:13:53 * via 200.200.200.4, Ethernet8, 00:13:53 C>*100.100.100.0/24 is directly connected, Ethernet0, 00:15:38 K>*100.100.100.100/32 [0/0] is directly connected, Ethernet0, 00:15:38 C>*172.21.120.0/24 is directly connected, eth0, 00:17:36 C>*200.200.200.0/24 is directly connected, Ethernet8, 00:15:38 K>*200.200.200.200/32 [0/0] is directly connected, Ethernet8, 00:15:38 root@sonic:/home/admin# 6. Tester TG A continuously sends increasing source IP 10 0 .10 0 .10 0 .1-10 0 .10 0 .10 0 .64, and the destination IP is 100.50.25.12; Port A

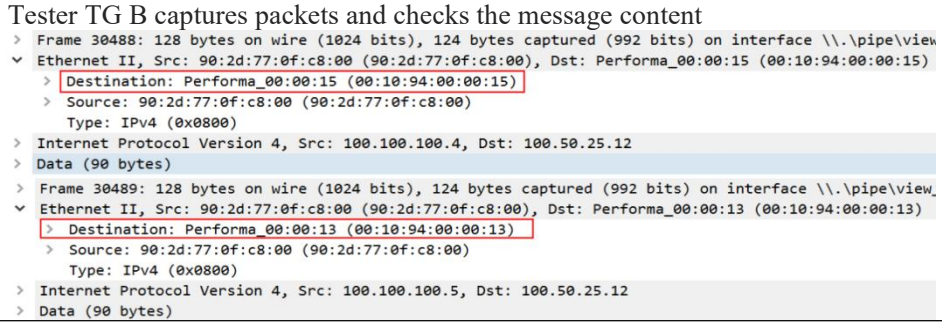


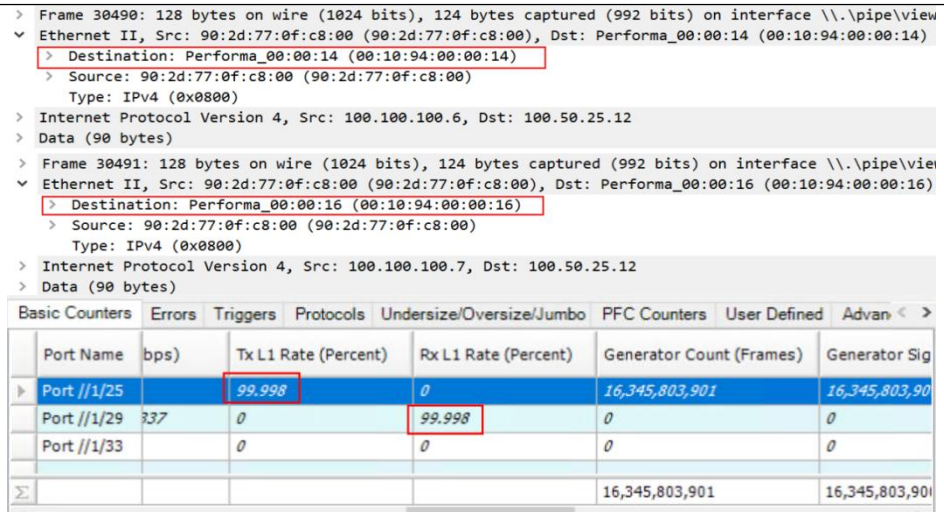


B port

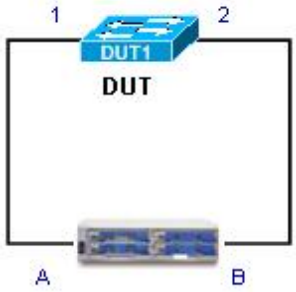


Tester TG B captures packets and checks the message content

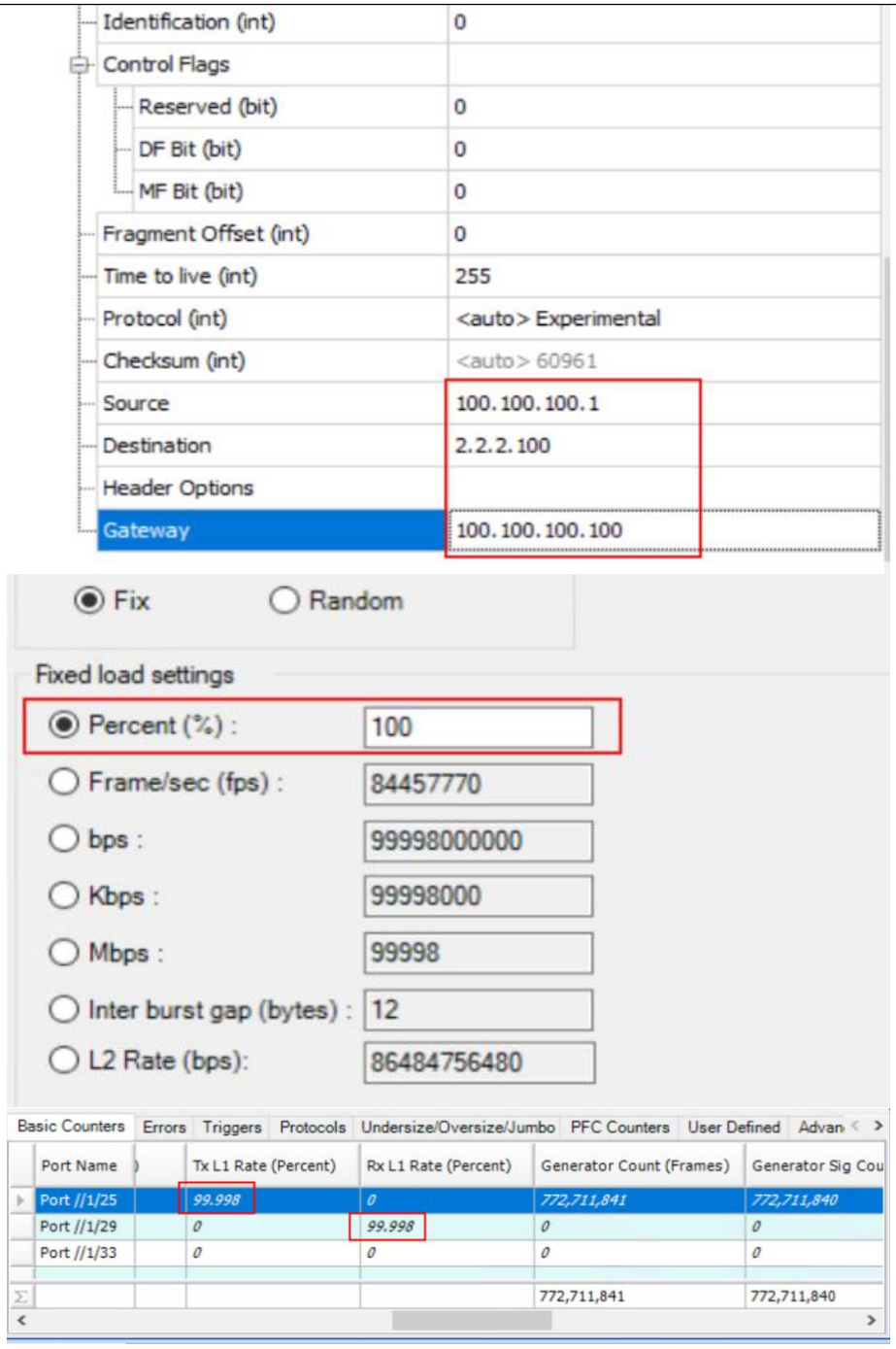


	
Test Results	**PASS**
Remark	

4.4 PASS -BGP

Test items	BGP Function Test
Purpose of the test	The test equipment can learn routes and forward messages through BGP.
Test environment	
Test steps	1. Set up the test environment according to the diagram. 2. Configure the DUT P1 IP is 100 . 100 . 100 . 100 / 24, P2 IP is 200 . 200 . 200 . 200 / 24 3. Configure the DUT BGP AS 100 ; network 1 00 . 100 . 100 . 100 / 24 and 2 00 . 200 . 200 . 200 / 2 4 ; the neighbor is 200.200.200.1 (AS 200) 4. TGA 100.100.100.1/24 performs ARP interaction with the device 5. TG 200.200.200.1/24 establishes an eBGP neighbor relationship with the device and advertises route 2.2.2.0/24 6. TGA sends DA to DUT MAC, SIP 100.100.100.1 , DIP 2.2.2.100 7. Delete related configuration
Expected Results	2. IP address configuration is successful 3. Configuration successful 5. Neighborhood establishment is successful , and DUT learns route 2.2.2.0/24 6. Message forwarding is normal, no packet loss

DUT Configuration	2. Configure the device P1 IP to 100.100.100.100/24 and P2 IP to 200.200.200.200/24
	config interface ip add Ethernet 0 100.100.100.100/24
	config interface ip add Ethernet 8 200.200.200.200/24
	
	3. Configure DUT BGP
	vtysh
	configure terminal
	router bgp 100
	network 100.100.100.0/24
	network 200.200.200.0/24
	neighbor 200.200.200.1 remote-as 200
	no bgp ebgp -requires-policy
	
	5. Neighbor status and routing
	`root@sonic:/home/admin# show ip bgp neighbors`
	`BGP neighbor is 200.200.200.1, remote AS 200, local AS 100, external link`
	`BGP version 4, remote router ID 200.200.200.1, local router ID 200.200.200.200`
	`BGP state = Established, up for 00:01:10`
	`Last read 00:00:10, Last write 00:00:10`
	`Hold time is 90, keepalive interval is 30 seconds`
	`Neighbor capabilities:`
	`4 Byte AS: advertised and received`
	`Extended Message: advertised`
	`AddPath:`
	`IPv4 Unicast: RX advertised`
	`Route refresh: advertised`
	`Enhanced Route Refresh: advertised`
	`Address Family IPv4 Unicast: advertised and received`
	`Hostname Capability: advertised (name: sonic,domain name: n/a) not received`
	`Graceful Restart Capability: advertised`
	`Graceful restart information:`
	`Local GR Mode: Helper*`
	`Remote GR Mode: Disable`
	`R bit: False`
	`Timers:`
	`Configured Restart Time(sec): 120`
	`Received Restart Time(sec): 0`
	`Message statistics:`
	`Inq depth is 0`
	`Outq depth is 0`
	`Sent Rcvd`
	`Opens: 24 22`
	`Notifications: 42 0`
	`Updates: 2 22`
	`Keepalives: 24 25`
	`Route Refresh: 0 0`
	`Capability: 0 0`
	`Total: 92 69`
	`root@sonic:/home/admin# show ip route`
	`Codes: K - kernel route, C - connected, S - static, R - RIP,`
	`O - OSPF, I - IS-IS, B - BGP, E - EIGRP, N - NHRP,`
	`T - Table, v - VNC, V - VNC-Direct, A - Babel, D - SHARP,`
	`F - PBR, f - OpenFabric,`
	`> - selected route, * - FIB route, q - queued route, r - rejected route`
	`K>*0.0.0.0/0 [0/0] via 172.21.120.254, eth0, 00:22:49`
	`B>*2.2.2.0/24 [20/0] via 200.200.200.1, Ethernet8, 00:05:51`
	`C>*100.100.100.0/24 is directly connected, Ethernet0, 00:14:09`
	`K>*100.100.100.100/32 [0/0] is directly connected, Ethernet0, 00:14:09`
	`C>*172.21.120.0/24 is directly connected, eth0, 00:22:49`
	`C>*200.200.200.0/24 is directly connected, Ethernet8, 00:14:09`
	`K>*200.200.200.200/32 [0/0] is directly connected, Ethernet8, 00:14:09`
	`root@sonic:/home/admin#`
	6. Message forwarding results

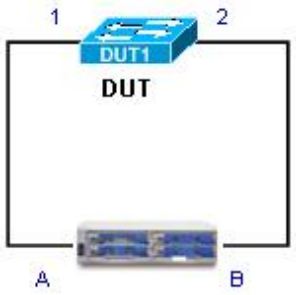


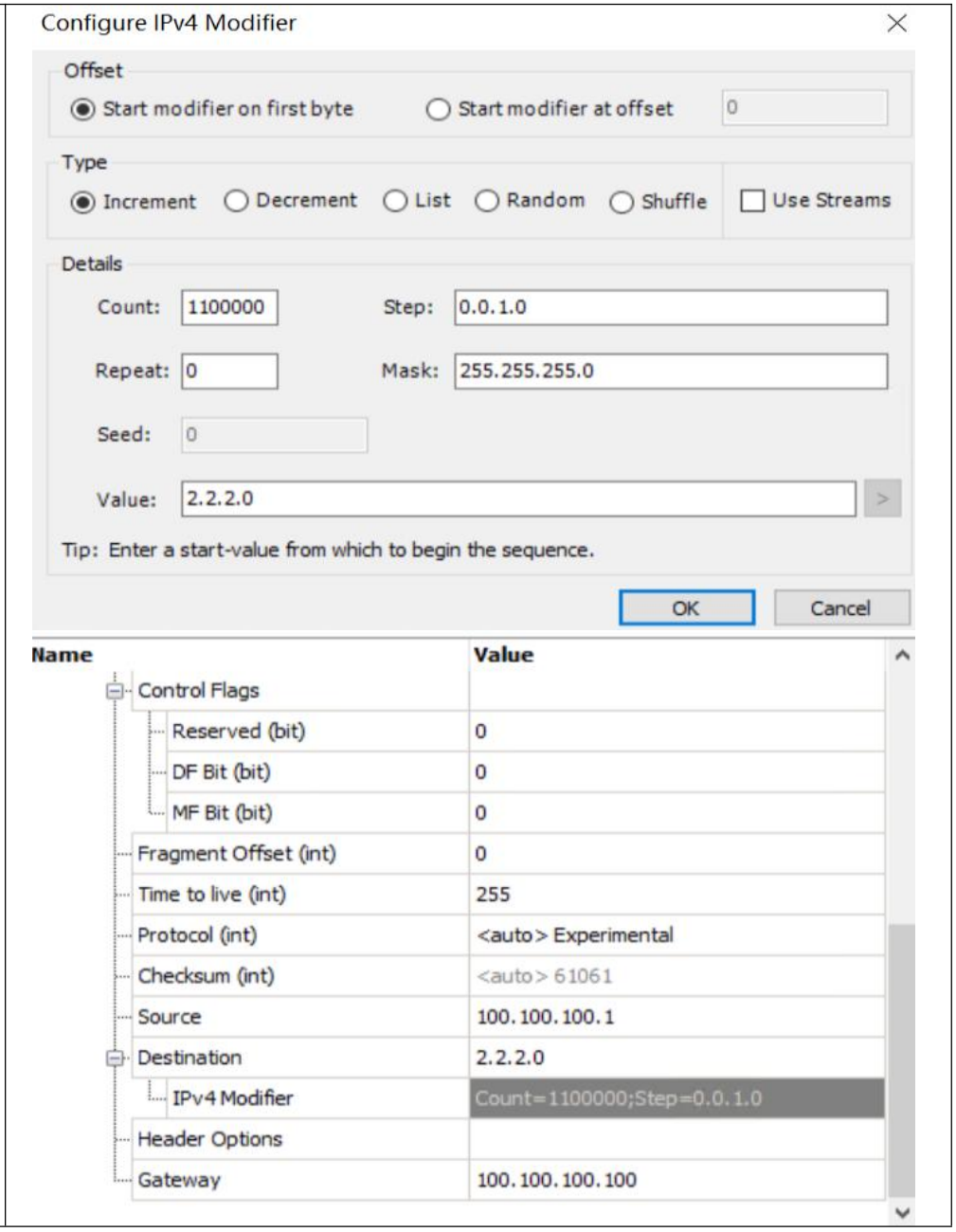
7. Remove configuration
config reload -f

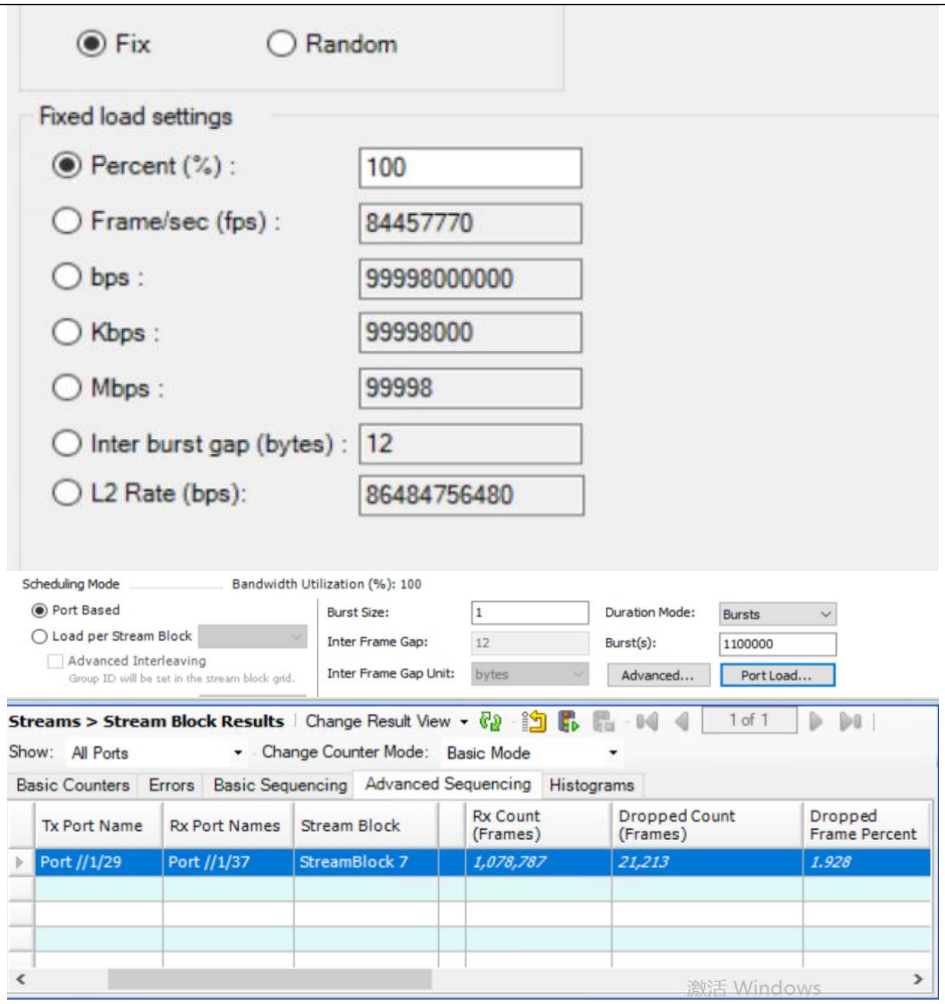
Test Results	**PASS**
Remark	

4.5 PASS - IPv4 routing table specifications

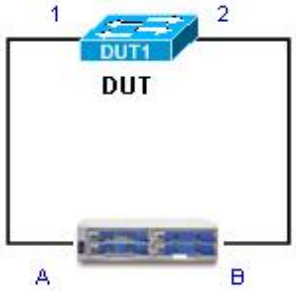
Test items	IPv4 routing table specifications
Purpose of the test	IPv4 routing table specification test

Test environment	
Test steps	1. Set up the test environment according to the diagram. 2. Configure the DUT P1 IP is 1 00 . 100 . 100 . 100 / 24, P2 IP is 2 00 . 200 . 200 . 200 / 2 4 3. Configure the DUT BGP AS 100 ; network 1 00 . 100 . 100 . 100 / 24 and 2 00 . 200 . 200 . 200 / 2 4 ; the neighbor is 200.200.200.1 (AS 200) 4. TG 200.200.200.1/24 establishes an eBGP neighbor relationship with the device and advertises route 1100000 Delete related configuration
Expected Results	4 Check the maximum route that BGP can learn
DUT Configuration	Configure the device P1 IP to 100.100.100.100/24 and P2 IP to 200.200.200.200/24 config interface ip add Ethernet 0 100.100.100.100/24 config interface ip add Ethernet 8 200.200.200.200/24 Configuring DUT BGP Vtysh configure terminal router bgp 100 network 100.100.100.0/24 network 200.200.200.0/24 neighbor 200.200.200.1 remote-as 200 no bgp ebgp -requires-policy BGP route learning number Passed the Burst 1100000 packets test

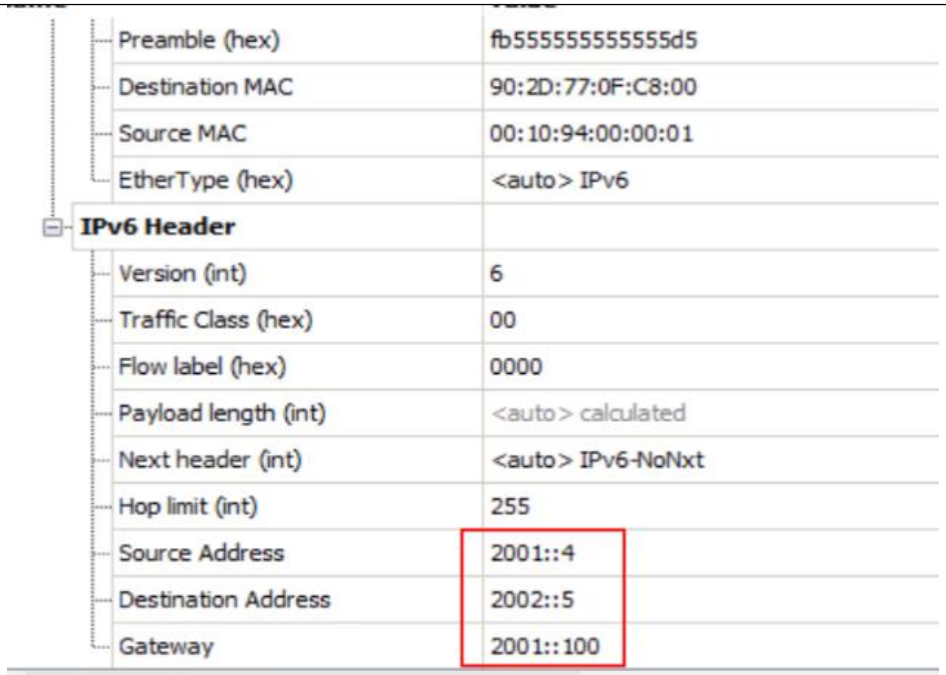
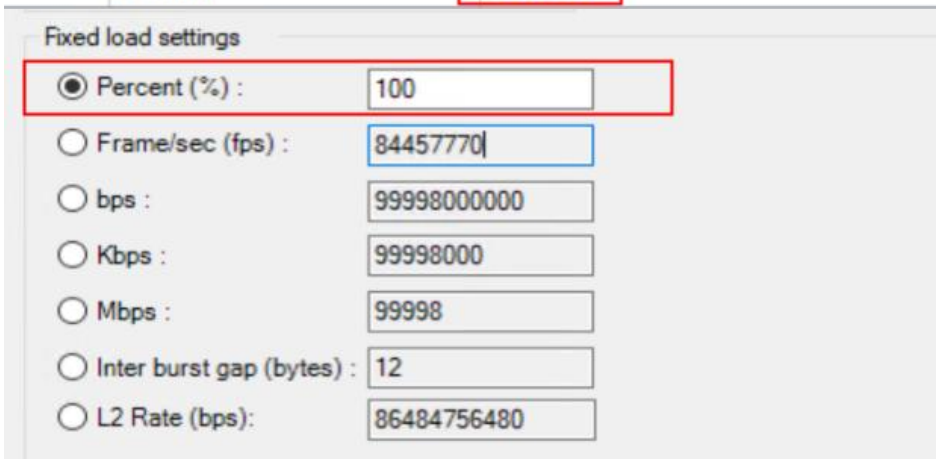
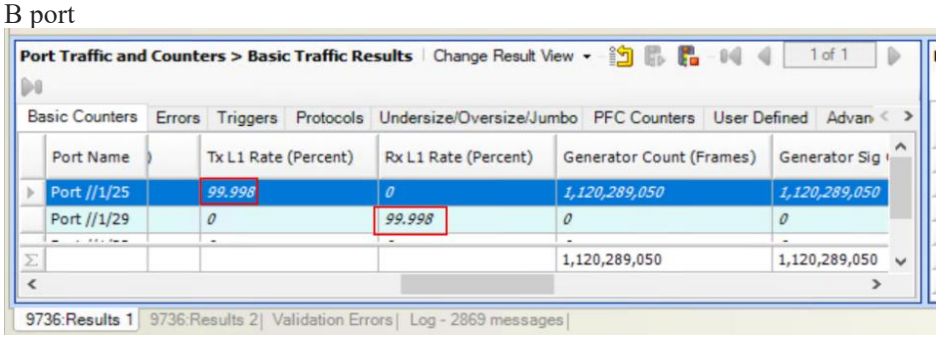

Configure IPv4 Modifier
Offset
Start modifier on first byte
Start modifier at offset
0
Type
Increment
Decrement
List
Random
Shuffle
Use Streams
Details
Count: 1100000
Step: 0.0.1.0
Repeat: 0
Mask: 255.255.255.0
Seed: 0
Value: 2.2.2.0
Tip: Enter a start-value from which to begin the sequence.
OK
Cancel
Name
Value
Control Flags
Reserved (bit) 0
DF Bit (bit) 0
MF Bit (bit) 0
Fragment Offset (int) 0
Time to live (int) 255
Protocol (int) <auto> Experimental
Checksum (int) <auto> 61061
Source 100.100.100.1
Destination 2.2.2.0
IPv4 Modifier Count=1100000;Step=0.0.1.0
Header Options
Gateway 100.100.100.100

	
Test Results	**PASS**
Remark	actual number of packets that passed the test was 1,078,787 .

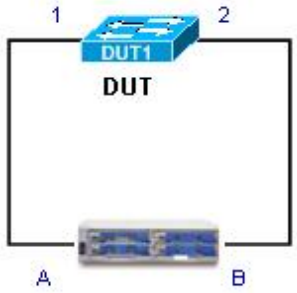
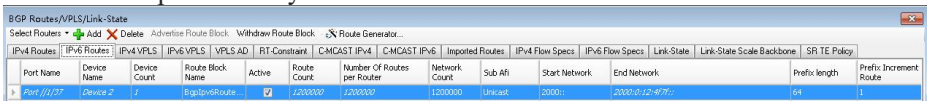
4.6 PASS - IPv6

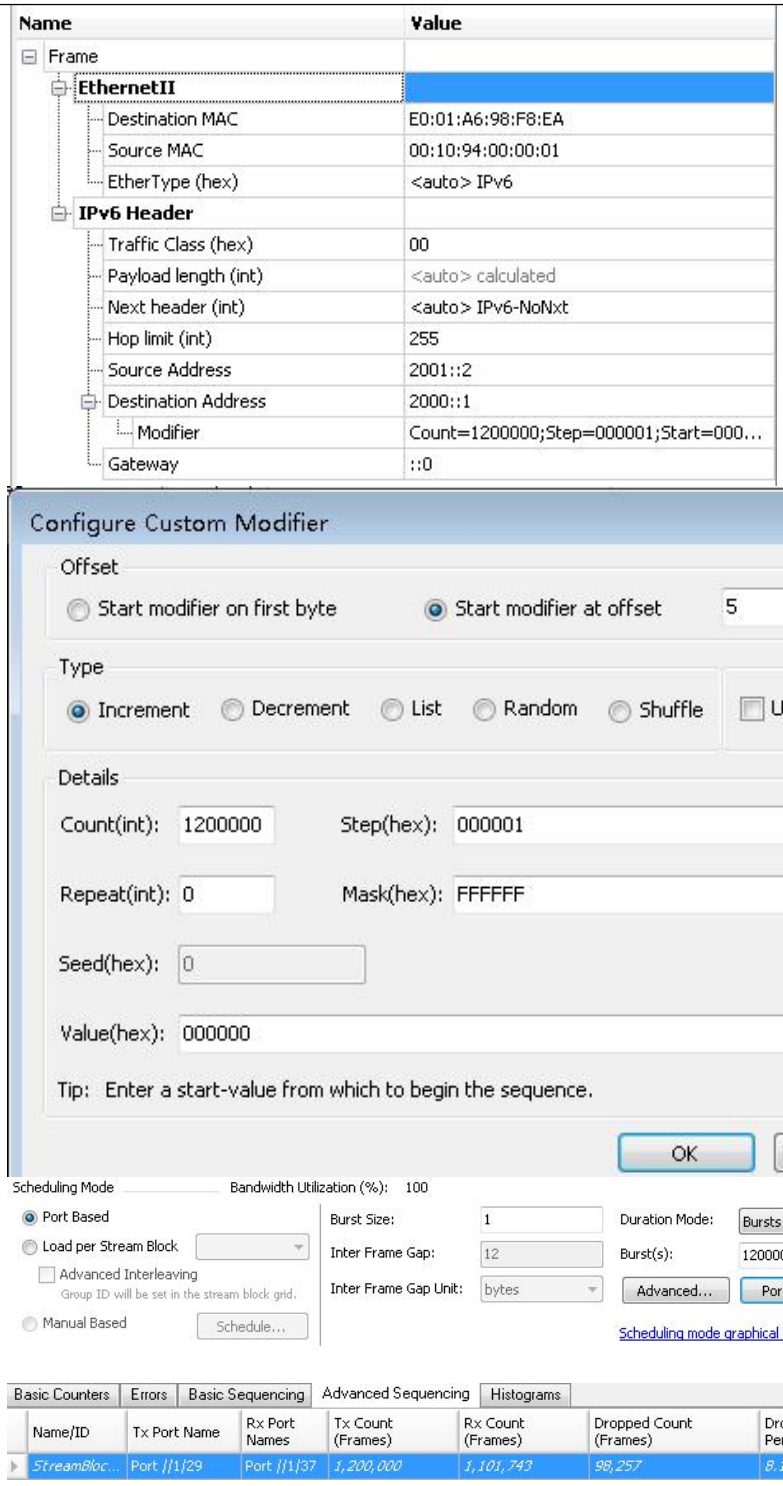
Test items	IPv6 Testing
Test content	The test equipment can support IPv6 .
Test topology	

Test steps	1. Set up the test environment according to the diagram. 2. Configure the interface ip v6 address 3. Tester TGA creates an IP v6 interface and interacts with device P1 4. Tester TG B creates an IP v6 interface and interacts with device P 2 5. TG A sends L3 IPv6 message to TGB 6. Delete related configuration
Expected Results	2. Query ipv6 information 5. Correct data forwarding
DUT Configuration	Configuring IPv6 Addresses config interface ip add Ethernet 0 2001::100/64 config interface ip add Ethernet 8 2002::100/64 Query ipv6 interface information show ipv6 interface root@sonic:/home/admin# root@sonic:/home/admin# show ipv6 interface Interface Master IPv6 address/mask Admin/Oper BGP Neighbor Neighbor IP Bridge fe80::b41e:5eff:fea5:2f8d%Bridge/64 up/down N/A N/A Ethernet0 2001::100/64 up/up N/A N/A fe80::922d:77ff:fe0f:c800%Ethernet0/64 N/A N/A Ethernet8 2002::100/64 up/up N/A N/A fe80::922d:77ff:fe0f:c800%Ethernet8/64 N/A N/A Ethernet16 fe80::922d:77ff:fe0f:c800%Ethernet16/64 up/up N/A N/A bcm0 fe80::2bc:ff:fe00:0%bcm0/64 up/up N/A N/A bcm0_0 fe80::201:ff:fe00:0%bcm0_0/64 up/up N/A N/A docker0 fd00::1/80 up/down N/A N/A fe80::1%docker0/64 N/A N/A eth0 fe80::922d:77ff:fe0f:c800%eth0/64 up/up N/A N/A lo ::1/128 up/up N/A N/A root@sonic:/home/admin# Query ipv6 neighbor information ip -6 neigh root@sonic:/home/admin# root@sonic:/home/admin# ip -6 neigh 2002::5 dev Ethernet8 lladdr 00:10:94:00:00:10 REACHABLE 2001::4 dev Ethernet0 lladdr 00:10:94:00:00:0f REACHABLE fe80::1 dev Ethernet0 lladdr 00:10:94:00:00:0f REACHABLE fe80::1 dev Ethernet8 lladdr 00:10:94:00:00:10 REACHABLE root@sonic:/home/admin# Port A

	  B port 
Test Results	**PASS**
Remark	

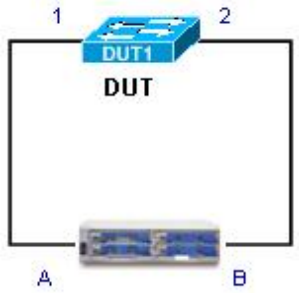
4.7 PASS-IPv6 routing table specifications

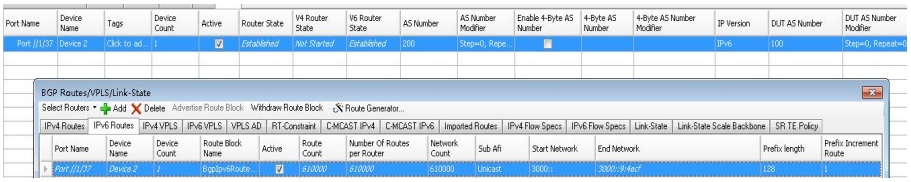
Test items	IPv6 routing table specifications
Purpose of the test	IPv6 routing table specification test
Test environment	
Test steps	1. Set up the test environment according to the diagram. 2. Configure the DUT P1 IP is 2001 :: 100/64 , P2 IP is 2002 :: 100/64 3. Configure the DUT BGP AS 100 ; 2002:: 1/64 (AS 200) 4. TG B 2002::1/64 establishes an eBGP neighbor relationship with the device and advertises route 610000 Delete related configuration
Expected Results	4 Check the maximum route that BGP can learn
DUT Configuration	Configuring IP Address config interface ip add Ethernet 0 2001 : :100/64 config interface ip add Ethernet 8 2002 : :200/64 Configure to accept IPv6 link local address as neighbor config interface ipv6 enable use-link-local-only Ethernet8 config interface ipv6 enable use-link-local-only Ethernet16 Configuring DUT BGP vtysh configure terminal router bgp 100 neighbor 2002::1 remote-as 200 no bgp ebgp -requires-policy address-family ipv6 unicast neighbor 2002::1 activate network 2002::200/64 EBGP routes published by the instrument  BGP route learning number (ip - 6 routes show | wc -l)  Send data traffic to the learned routing table entry Instrument configuration



Test Results	**Pass**
Remark	actual number of packets that passed the test was 1101743

4.8 PASS-IPv6 Routing Table Specifications-Global

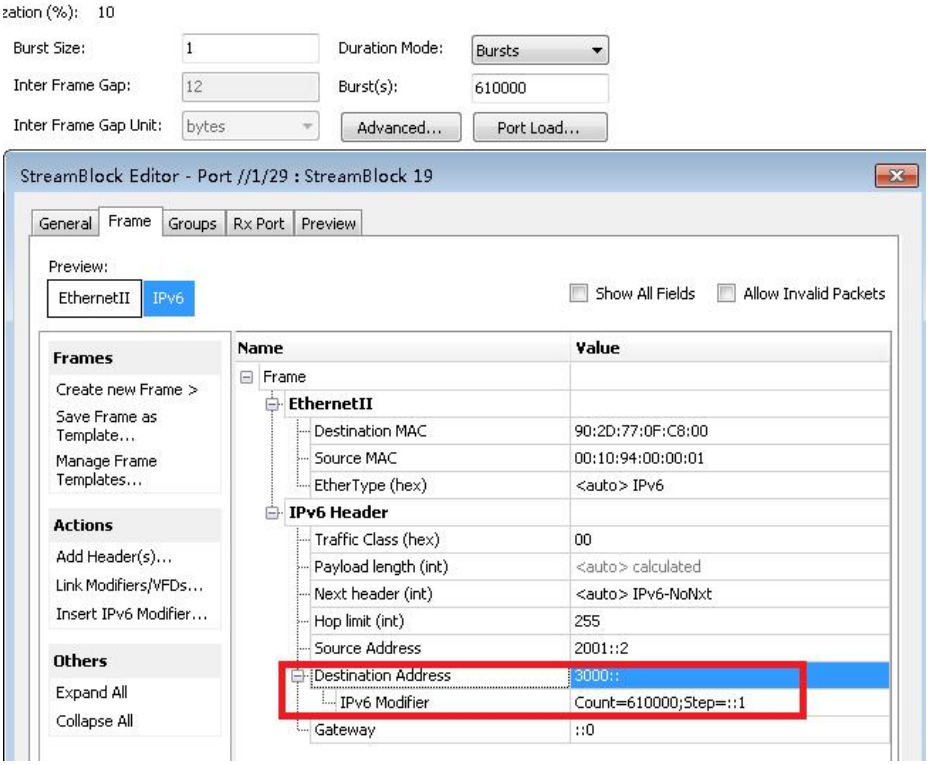
Test items	IPv6 routing table specifications
Purpose of the test	IPv6 routing table specification test
Test environment	
Test steps	1. Set up the test environment according to the diagram. 2. Configure the DUT P1 IP is 2001 :: 100/64 , P2 IP is 2002 :: 100/64 3. Configuring routes map 4. Configure the DUT BGP AS 100 ; network 2002:: 1/64 (AS 200), bound to routemap 5. TG B 2002::1/64 establishes an eBGP neighbor relationship with the device and advertises route 610000 Delete related configuration
Expected Results	5. Check the maximum number of routes that BGP can learn
DUT Configuration	Configuring IP Address config interface ip add Ethernet0 2001::100/64 config interface ip add Ethernet8 2002::200/64 Configure Route map vtysh configure terminal route-map FROM_BGP_PEER_V6 permit 1 on-match next set ipv6 next-hop prefer-global Configure BGP Vtysh configure terminal router bgp 100 neighbor 2002::1 remote-as 200 no bgp ebgp-requires-policy no bgp default ipv4-unicast address-family ipv6 unicast neighbor 2002::1 activate neighbor 2002::1 soft-reconfiguration inbound neighbor 2002::1 route-map FROM_BGP_PEER_V6 in network 2002::200/64



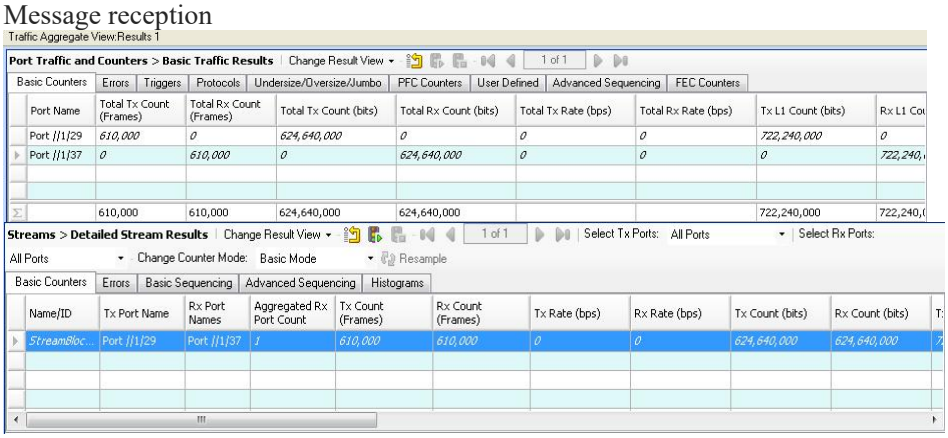
BGP Route Learning Count

```
root@sonic:/home/admin# ip -6 route show|wc -l
610014
root@sonic:/home/admin#
```

TGA sends IPv6 Layer 3 data packets are sent to the ebgp route announced by TGB . There are 6 10,000 packets with destination ipv6d addresses ranging from 3000 :: 1 to 3000:0:: 9 :4ecf.



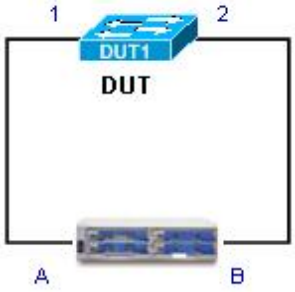
Message reception



Test Results	**PASS**
Remark	ip -6 route Show shows that 610014 items have been learned, and the flow can be connected

五、QoS

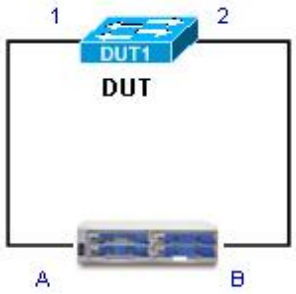
5.1 PASS-Classification-COS

Test items	Classification COS Test
Test content	The test device can be bound to the ingress port according to the set Classfication COS .
Test topology	
Test steps	1. Set up the test environment according to the diagram. 2. Create dot1p-tc and map dot1p to TC 3. Bind the created dot1p-tc to the port 4. View the relevant created dot1p-tc and its binding Delete related configuration
Expected Results	2.3 Configuration Success 4. Display content is consistent with creation
DUT Configuration	Configure dot1p-tc and bind config qos dot1p-tc add dot1p_tc --dot1p 0 -- tc 0 config interface qos dot1p-tc bind Ethernet 0 dot1p_tc View related configuration show qos dot1p-tc show interface qos Deleting a Configuration

```
root@sonic:/home/admin# config qos dot1p-tc add dot1p_tc --dot1p 0 --tc 0
root@sonic:/home/admin# config interface qos dot1p-tc bind Ethernet0 dot1p_tc
root@sonic:/home/admin#
root@sonic:/home/admin#
root@sonic:/home/admin# show qos dot1p-tc
dot1p-tc policy: dot1p_tc
  Dot1p     TC
-------  ----
      0      0

root@sonic:/home/admin# show interface qos
Ethernet0:
  Dot1p to TC: dot1p_tc

root@sonic:/home/admin#
```

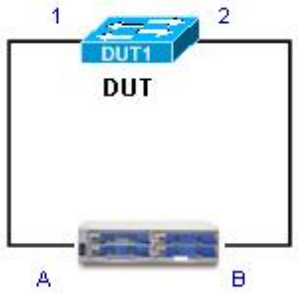
Test Results	**PASS**
Remark	

5.2 PASS -Classification-DSCP

Test items	Classfication DSCP test
Test content	The test device can be bound to the ingress port according to the set Classfication DSCP .
Test topology	
Test steps	1. Set up the test environment according to the diagram. 2. Create dscp-tc and map DSCP to TC 3. Bind the created dscp-tc to the port 4. View the relevant created dscp-tc and its binding 5. Delete related configuration
Expected Results	2.3 Configuration Success 4. Display content is consistent with creation
DUT Configuration	Configure dscp-tc and bind config qos dscp-tc add dscp_to_tc_profile -- dscp 0 -- tc 1 config interface qos dscp-tc bind Ethernet 0 dscp_to_tc_profile View related configuration show qos dscp-tc show interface qos root@sonic:/home/admin# show qos dscp-tc dscp-tc policy: dscp_to_tc_profile DSCP TC 0 1 root@sonic:/home/admin# show interface qos Ethernet0: Dot1p to TC: dot1p_tc DSCP to TC: dscp_to_tc_profile root@sonic:/home/admin# Deleting a Configuration

Test Results	**PASS**
Remark	

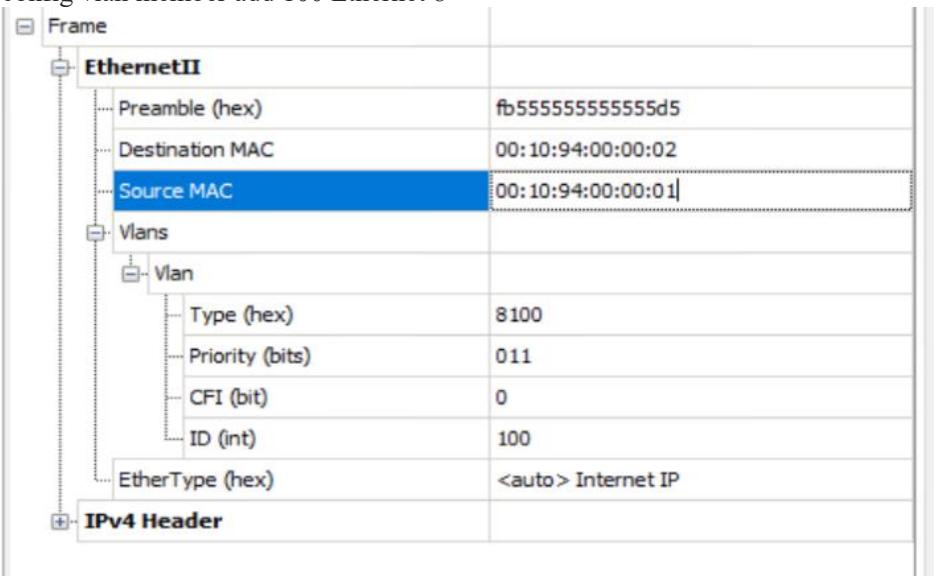
5.3 PASS- Marking-COS

Test items	Marking COS test
Test content	The test equipment can be set according to the entry Classification COS and the exit Marking COS
Test topology	
Test steps	1. Set up the test environment according to the diagram. 2. Create dot1p-tc and map dot1p 3 to TC 1 3. Bind the created dot1p-tc to port DUTP1 4. Create a remark, set TC1 remark dot1p to 1 5. Remark the binding created is bound to port DUTP2 6. View the created qos rules and their bindings 7. Create VLAN 100 and add DUTP1 and DUTP2 to VLAN 100 as tagged members. 8. TGA sends a VLAN priority 3 message, and TGB captures the packet to view the VLAN priority value of the message 9. Delete related configuration
Expected Results	2,3,4,5 Configuration and binding successful 6. The displayed qos configuration is the same as the setting VLAN priority value in the message received by TGB is changed to 1
DUT Configuration	Configure dscp-tc and remark and bind config qos dot1p-tc add dot1p_tc --dot1p 3 -- tc 1 config interface qos dot1p-tc bind Ethernet 0 dot1p_tc config qos remark dot1p add remark_pcp --tc 1 --dot1p 1 config interface qos remark dot1p bind Ethernet8 remark_pcp View qos configuration show qos dot1p-tc show qos remark dot1p show interface qos

```
root@sonic:/home/admin# show qos remark dot1p
dot1p policy: remark_pcp
  TC    Dot1p
----  -------
   1        1

root@sonic:/home/admin# show interface qos
Ethernet0:
  Dot1p to TC: dot1p_tc

Ethernet8:
  Dot1p remark: remark_pcp

root@sonic:/home/admin#
```

```
root@sonic:/home/admin# show qos dot1p-tc
dot1p-tc policy: dot1p_tc
  Dot1p    TC
-------  ----
      3     1

root@sonic:/home/admin#
```

Configuring VLANs
config vlan add 100
config vlan member add 100 Ethernet 0
config vlan member add 100 Ethernet 8



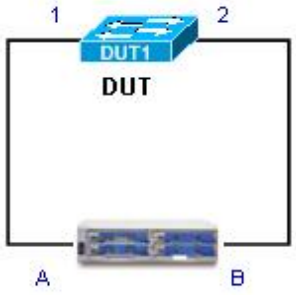
Results of the package

```
> Frame 4743: 128 bytes on wire (1024 bits), 124 bytes captured (992
> Ethernet II, Src: Performa_00:00:01 (00:10:94:00:00:01), Dst: Perf
v 802.1Q Virtual LAN, PRI: 1, DEI: 0, ID: 100
      001. .... .... .... = Priority: Background (1)
      ...0 .... .... .... = DEI: Ineligible
      .... 0000 0110 0100 = ID: 100
      Type: IPv4 (0x0800)
> Internet Protocol Version 4, Src: 192.85.1.2, Dst: 192.0.0.1
> Data (86 bytes)
```

Test Results	**PASS**

Remark	

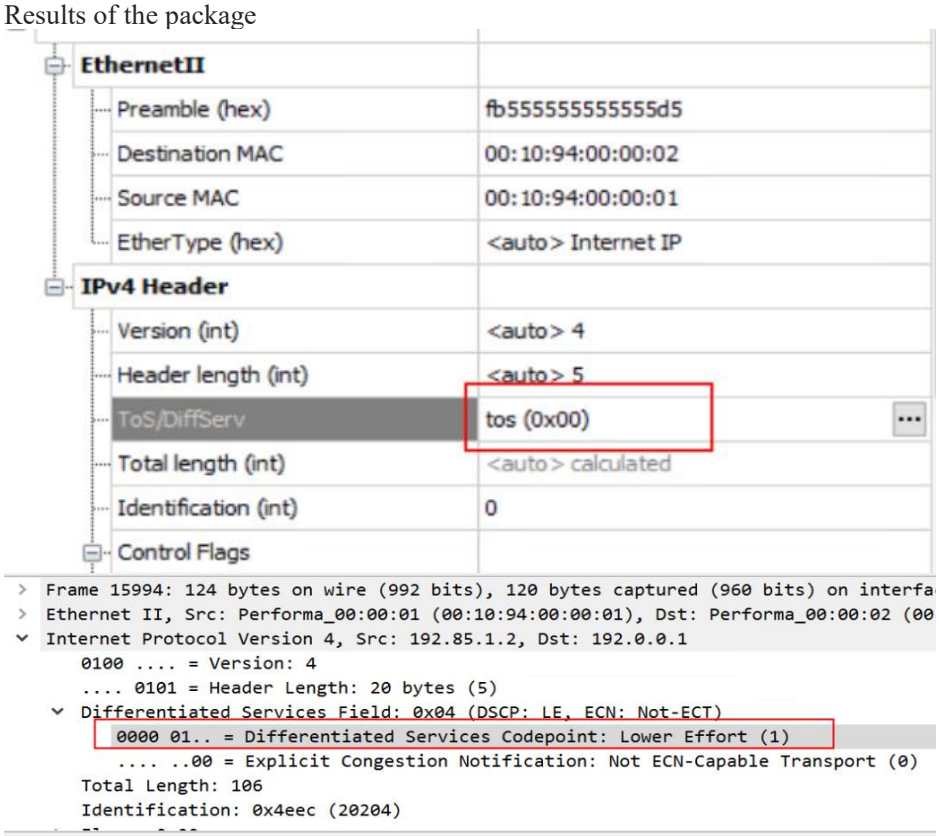
5.4 PASS- Marking-DSCP

Test items	Marking DSCP Test
Test content	The test equipment can set the inlet Classification DSCP and the outlet Marking DSCP
Test topology	
Test steps	1. Set up the test environment according to the diagram. 2. Create dscp-tc and map DSCP 0 to TC 3 3. Bind the created dscp-tc to port DUTP1 4. Create a remark and set TC3 remark DSCP to 1 5. Remark the binding created is bound to port DUTP2 6. View the created qos rules and their bindings 7. Create VLAN 100 and add DUTP1 and DUTP2 to VLAN 100 as untagged members. 8. TGA sends an IPv4 packet with DSCP0, and TGB captures the packet to view the DSCP value of the packet 9. TGA sends an IPv6 packet of traffic class 0, and TGB captures the packet to view the traffic class value. 10. Delete related configuration
Expected Results	2,3,4,5 Configuration and binding successful 6. The displayed qos configuration is the same as the setting The dscp and traffic class values in IPv4 and IPv6 packets received by TGB are changed to 0x04
DUT Configuration	Configure dscp-tc and remark and bind config qos dscp-tc add dscp_to_tc_profile -- dscp 0 -- tc 3 config interface qos dscp-tc bind Ethernet 0 dscp_to_tc_profile config qos remark dscp add remark_dscp --tc 3 --dscp 1 config interface qos remark dscp bind Ethernet8 remark_dscp View qos configuration show qos dscp-tc show qos remark dscp show interface qos

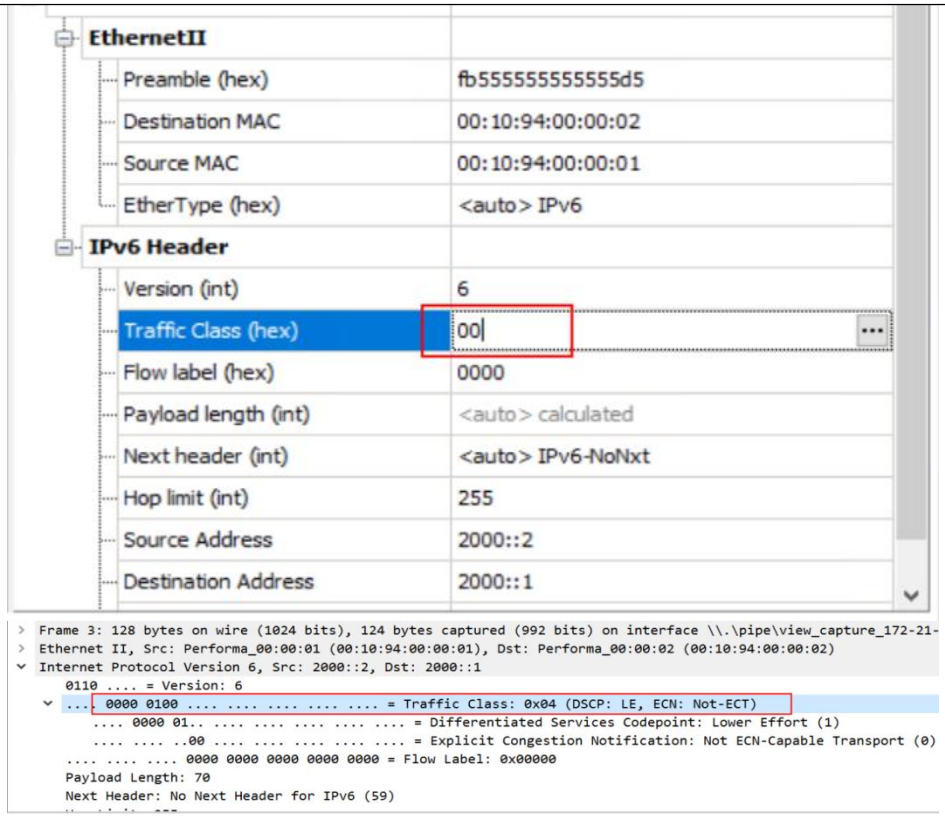
```
root@sonic:/home/admin# show qos dscp-tc
dscp-tc policy: dscp_to_tc_profile
  DSCP    TC
------  ----
     0     3

root@sonic:/home/admin# show qos remark dscp
dscp policy: remark_dscp
  TC    DSCP
----  ------
   3       1

root@sonic:/home/admin# show interface qos
Ethernet0:
  DSCP to TC: dscp_to_tc_profile

Ethernet8:
  IP DSCP remark: remark_dscp

root@sonic:/home/admin#
```

Configuring VLANs
config vlan add 100
config vlan member add 100 Ethernet 0 -u
config vlan member add 100 Ethernet 8 -u

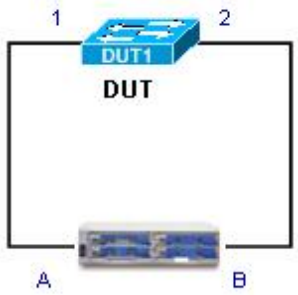
Results of the package



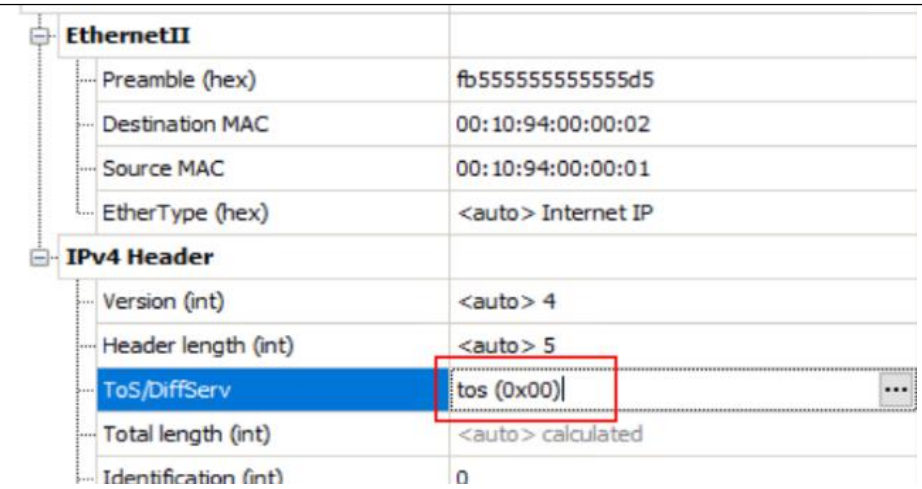
V6

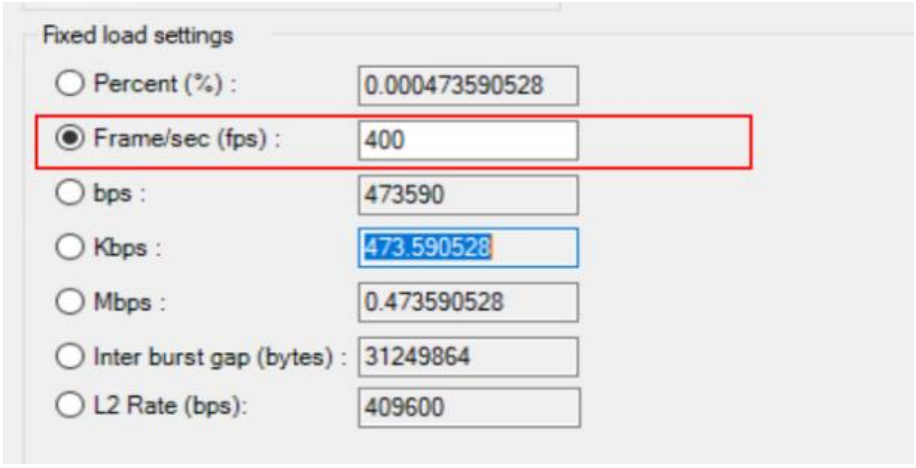
	
Test Results	**PASS**
Remark	

5.5 PASS- DiffServ

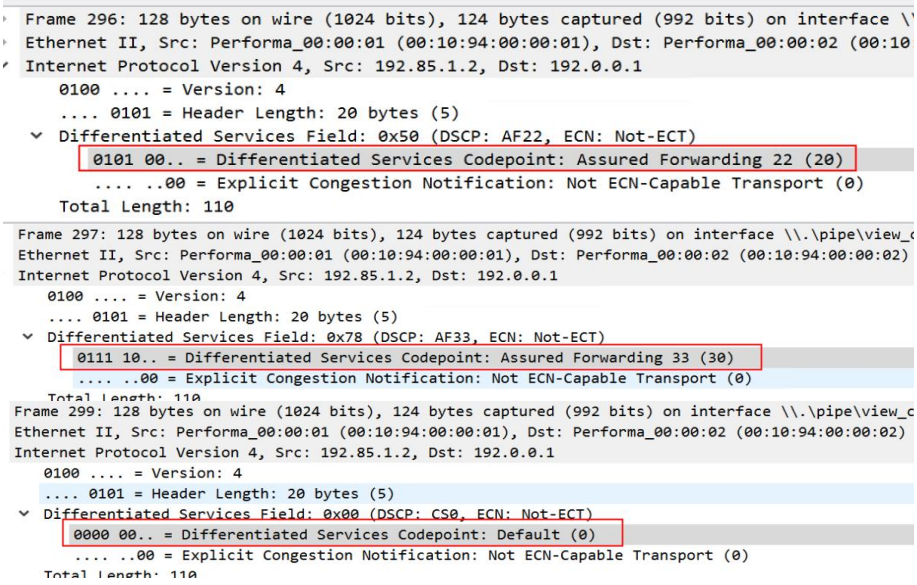
Test items	Diffserv Function Test
Purpose of the test	The test equipment can forward messages according to Diffserv settings
Test environment	
Test steps	1. Set up the test environment according to the diagram. 2. Create VLAN 100 and add DUT P1 and DUTP2 to VLAN 100 as untagged members. 3. Create an ACL of type diffserv -type to match DSCP and use the policer action 4. Create an acl and use the previous diffserv -type to bind to the TGA port inbound direction 5. Create a policer rule and modify the DSCP value of packets of different colors

	6. Add policer rules to acl 7. TGA sends DSCP matching packets at a rate exceeding the PIR rate 8. dscp settings in the message 9. Delete related configuration
Expected Results	2-6 Configuration successful 7. The message is forwarded successfully, and the DSCP is modified according to the diffserv settings.
DUT Configuration	2. Configuring VLANs config vlan add 100 config vlan member add 100 Ethernet 0 -u config vlan member add 100 Ethernet 8 -u 3. Create an ACL of type diffserv -type to match DSCP and use the policer action config acl add table-type diffserv -type --match- dscp --action-set-policer show acl table-type root@sonic:/home/admin# show acl table-type Name Bind Point Match Policer diffserv-type PORT DSCP Yes IP type root@sonic:/home/admin# 4. Bind ACL and view config acl add table diffserv -table diffserv -type -s ingress -p Ethernet 0 show acl table root@sonic:/home/admin# show acl table Name Type Binding Description Stage Policer diffserv-table diffserv-type Ethernet0 diffserv-table ingress Yes root@sonic:/home/admin# root@sonic:/home/admin# 5. Create policer rules config policer add pol tr_tcm packets blind -- cir 100 -- cbs 200 --pir 300 --pbs 400 -- green_set_dscp 0 -- yellow_set_dscp 20 -- red_set_dscp 30 6. Add policer rules to acl config acl add rule diffserv -table permit --priority 10000 -- dscp 0 --policer pol show policer root@sonic:/home/admin# show policer Name Type Mode Color Source CIR CBS PIR PBS Green Packet Action Yellow Packet Action Red Packet Action pol packets tr_tcm blind 100 200 300 400 DSCP: 0 DSCP: 20 DSCP: 30 root@sonic:/home/admin# 7. TGA sends DSCP 0 packets, 400 packets per second



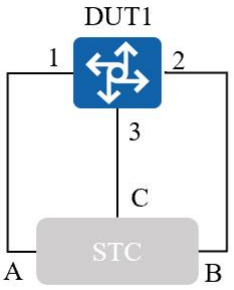


dscp setting in the message . Green is dscp 0, yellow is dscp 20, and red is dscp 30.



Test Results	PASS
Remark	

5.6 PASS - PFC (Priority Flow Control)

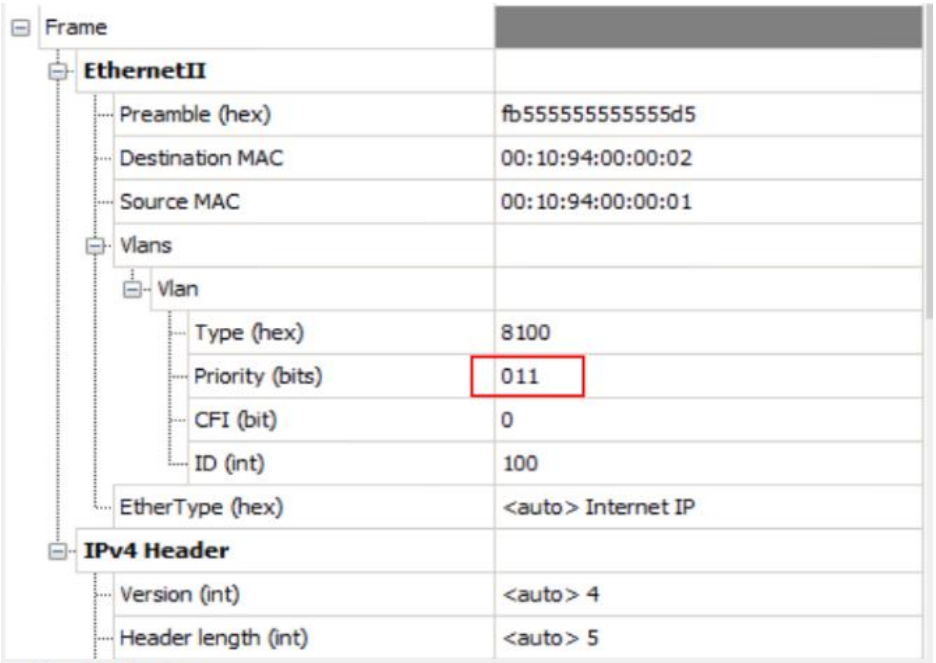
Test items	PFC Function Test
Test content	Test device PFC can trigger PFC messages and stop according to PFC priority
Test topology	
Test steps	1. Set up the test environment according to the diagram. 2. Configure dot1p priority 3 to map to tc3 and pg3 3. Bind qos mapping to port 4. Enable PFC priority 3 on DUTP1 and DUTP2 5. Create VLAN 100 and add DUT P1-P3 to VLAN 100 as tagged members 6. TGB and TGC send bidirectional VLAN tagged data streams, and the packet sending rate of TGC is 100% to TGB 7. TGA sends VLAN 100 , priority 3 data packets to TGB at line speed 8. TGA capture shows the PFC priority 3 packets sent by the device. 9. Stop all outbound packets 10. Create pfc -priority-queue and set pfc priority 3 to correspond to queue3 11. Bind the created pfc -priority-queue to TGB 12. TGA sends VLAN 100 , priority 3 data packets to TGB at line speed 13. TGB sends PFC priority 3 messages 14. Delete related configuration
Expected Results	2-6 Configuration successful 8. PFC priority 3 message sent by the device 100 priority 3 packets from TGA
DUT CONFIGURATION	Configuring QOS config qos dot1p-tc add dot1p_to_tc_profile --dot1p 3 --tc 3 config interface qos dot1p-tc bind Ethernet0 dot1p_to_tc_profile config interface qos dot1p-tc bind Ethernet8 dot1p_to_tc_profile config interface qos dot1p-tc bind Ethernet16 dot1p_to_tc_profile config qos tc-pg add tc-pg-prof --tc 3 --pg 3 config interface qos tc-pg bind Ethernet0 tc-pg-prof config interface qos tc-pg bind Ethernet8 tc-pg-prof config interface qos tc-pg bind Ethernet16 tc-pg-prof config qos tc-queue add tc-queue-prof --tc 3 --queue 3 config interface qos tc-queue bind Ethernet0 tc-queue-prof config interface qos tc-queue bind Ethernet8 tc-queue-prof config interface qos tc -queue bind Ethernet 16 tc -queue-prof

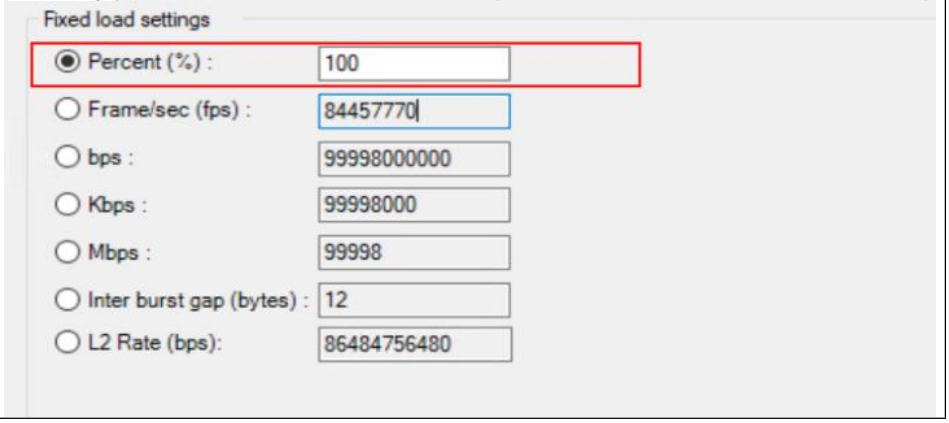
Enable PFC priority 3 on the port
config interface pfc priority Ethernet 0 3 on
config interface pfc priority Ethernet 8 3 on

```
root@sonic:/home/admin# config interface pfc priority Ethernet0 3 on

Interface      Lossless priorities
-----------  ---------------------
Ethernet0                        3
root@sonic:/home/admin# config interface pfc priority Ethernet8 3 on

Interface      Lossless priorities
-----------  ---------------------
Ethernet8                        3
root@sonic:/home/admin#
```

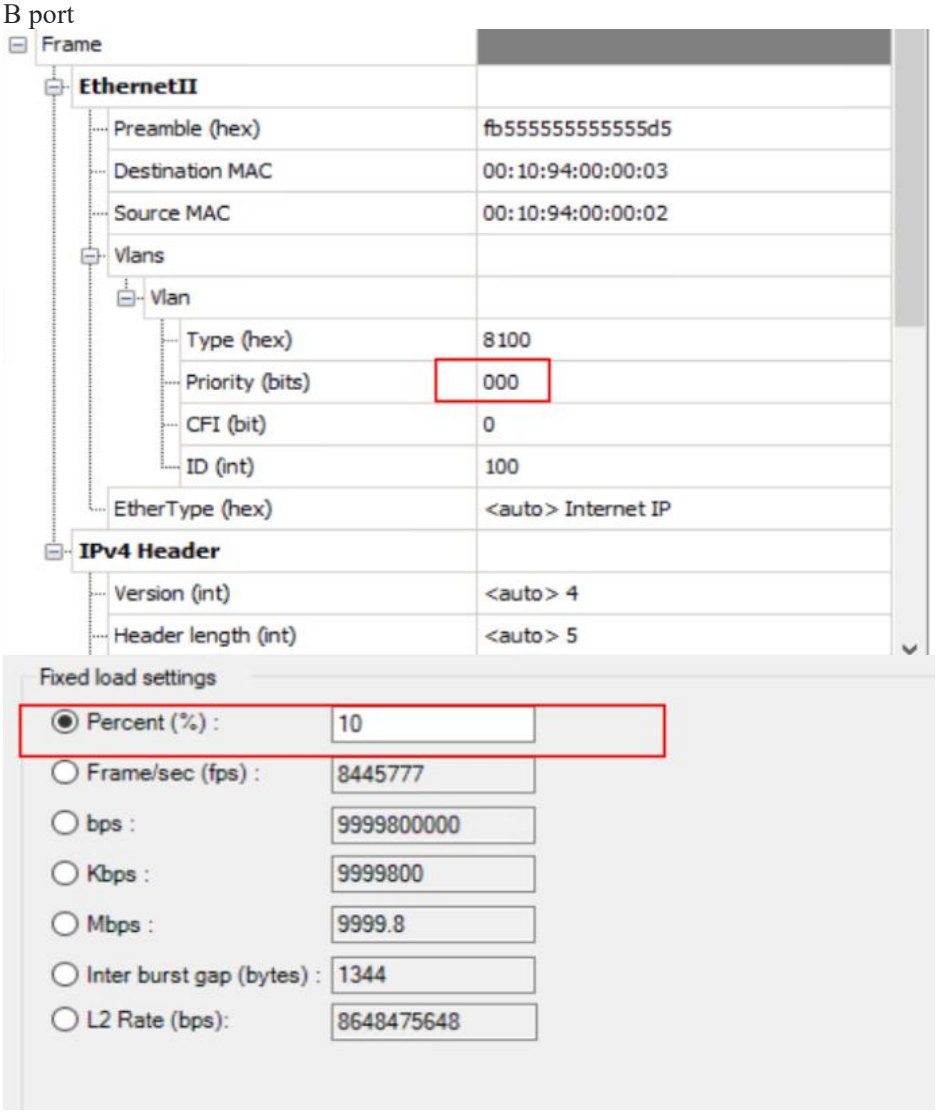
Configuring VLANs
config vlan add 100
config vlan member add 100 Ethernet 0
config vlan member add 100 Ethernet 8
config vlan member add 100 Ethernet 16

TGB and TGC send bidirectional VLAN tagged data streams, and the packet sending rate of TGC is 100% to TGB
TGA sends VLAN 100 , priority 3 data packets to TGB at line speed
TGA capture shows the PFC priority 3 packets sent by the device.
Port A

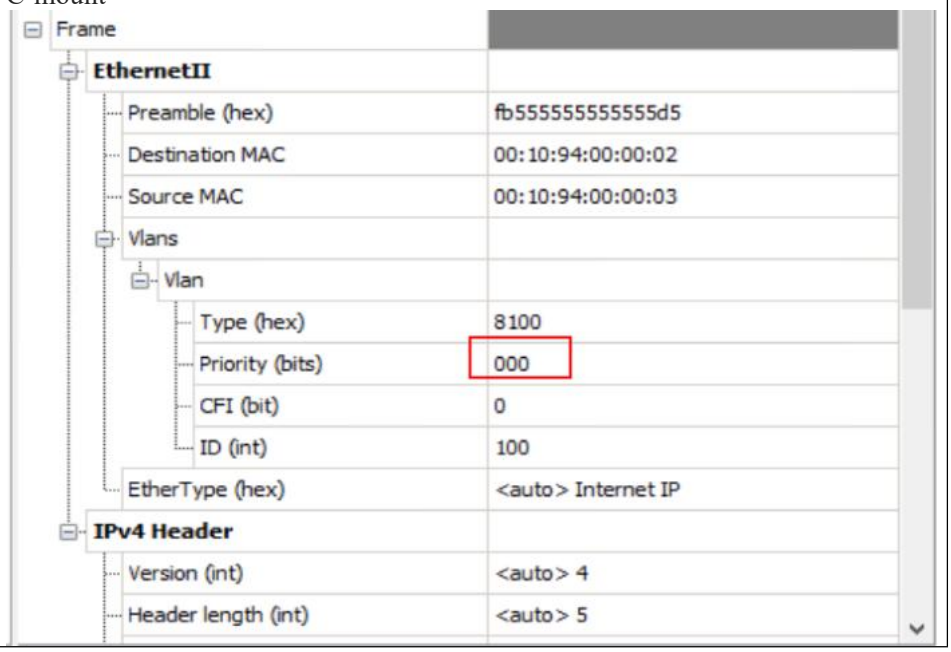


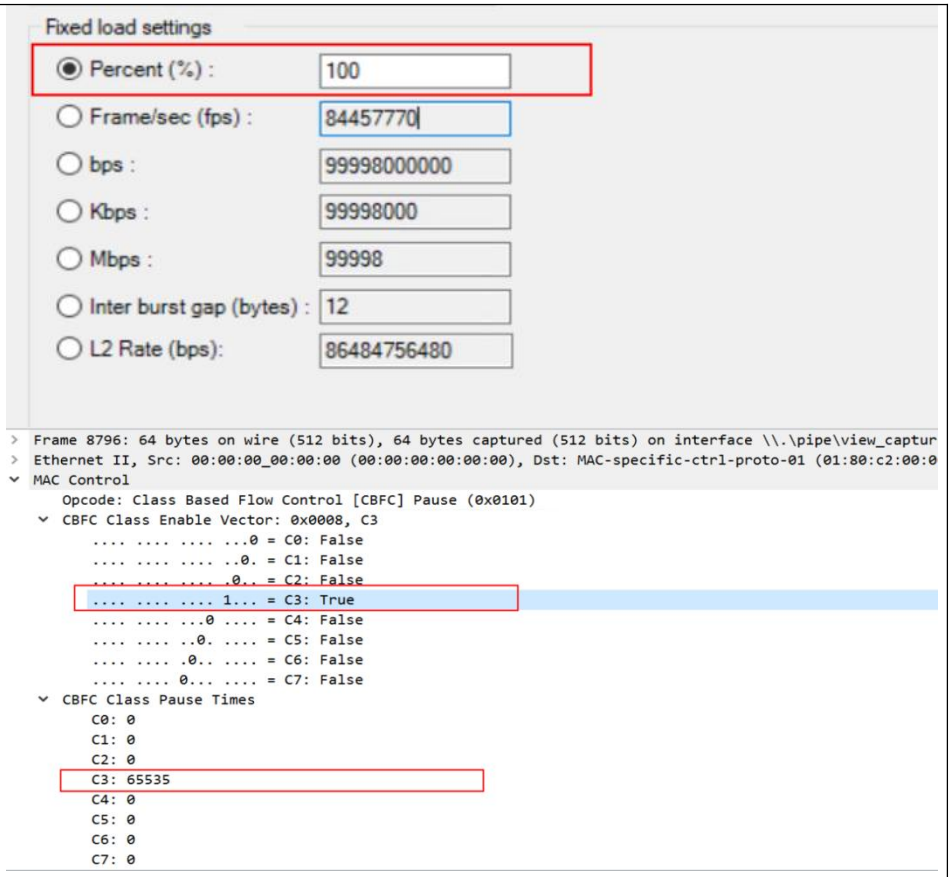


B port



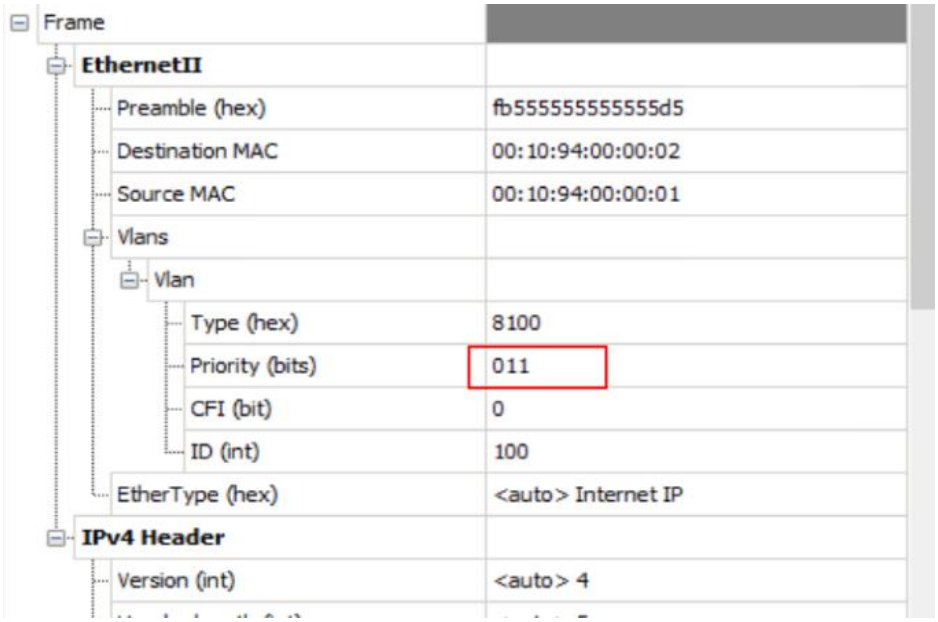
C-mount



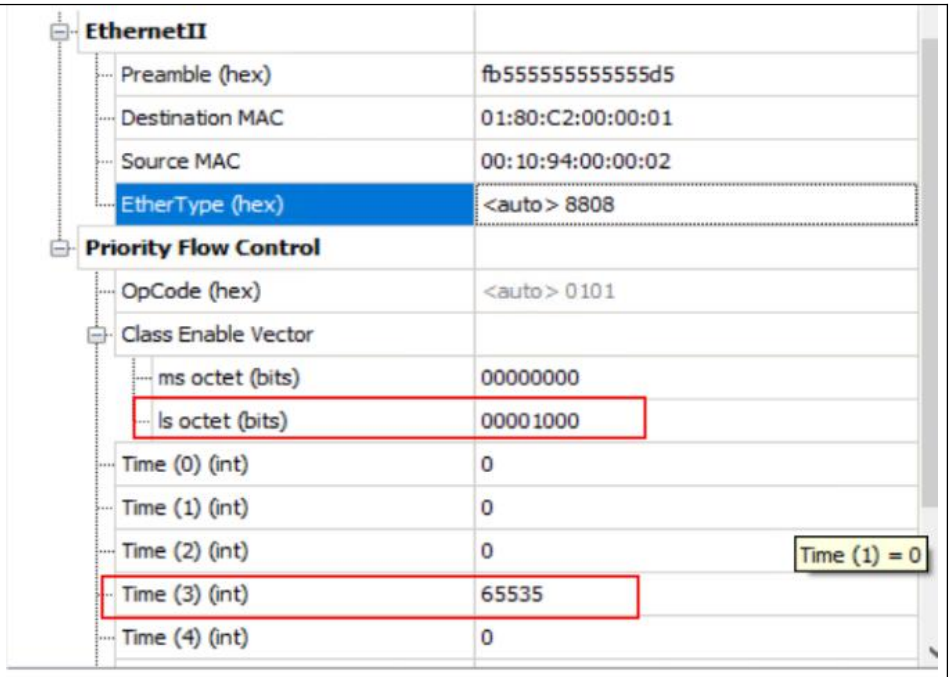
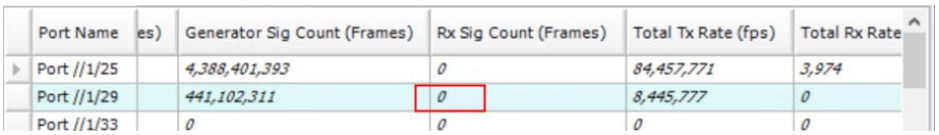
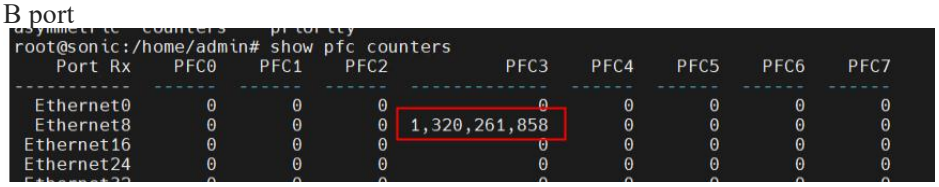
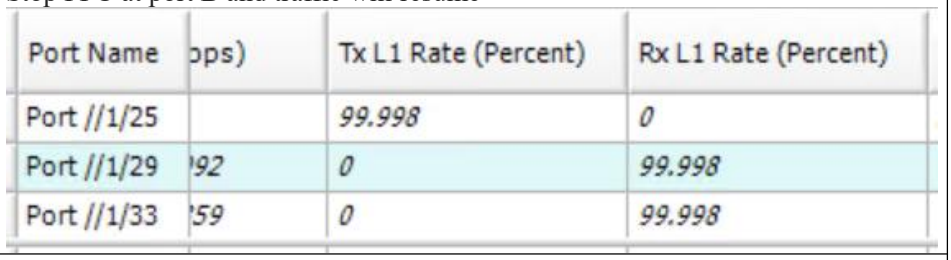


Configuring pfc -priority-queue
config qos pfc -priority-queue add pfc_queue_profile -- pfc -priority 3 --queue 3
config interface qos pfc -priority-queue bind Ethernet 8 pfc_queue_profile

Stop sending packets on all ports
TGA sends VLAN 100 , priority 3 data packets to TGB at line speed
TGB sends the destination learning packet and the PFC priority 3 message
Port A

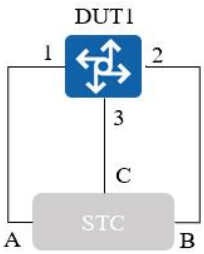


B port

	  B port  Stop PFC at port B and traffic will resume 
Test Results	**PASS**
Remark	

5.7 PASS - Asym PFC

Test items	Asym PFC Function Test
Test content	The test device Asym PFC can correctly trigger the PFC message and stop according to the PFC priority.

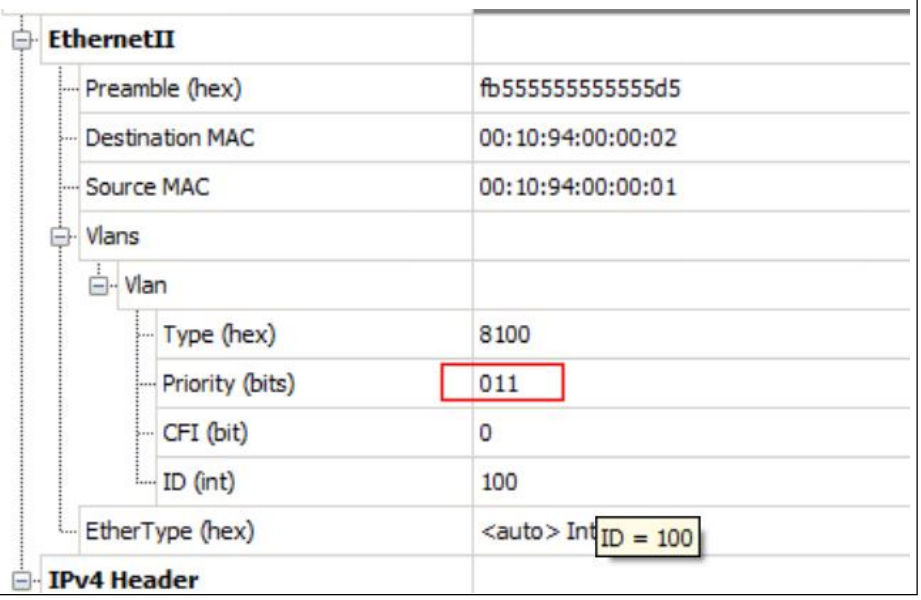
Test topology	
Test steps	1. Set up the test environment according to the diagram. 2. Configure dot1p priority 3 to map to tc3 and pg3 3. Bind qos mapping to port 4. Enable PFC priority 3 and Asym FPC on DUTP1 and DUTP2 5. Create VLAN 100 and add DUT P1-P3 to VLAN 100 as tagged members 6. TGB and TGC send bidirectional VLAN tagged data streams, and the packet sending rate of TGC is 100% to TGB 7. TGA sends VLAN 100 , priority 3 data packets to TGB at line speed 8. TGA capture shows the PFC priority 3 packets sent by the device. 9. Stop all outbound packets 10. Create pfc -priority-queue and set pfc priority 3 to correspond to queue3 11. Bind the created pfc -priority-queue to TGB 12. TGA sends VLAN 100 , priority 3 data packets to TGB at line speed 13. TGB sends PFC priority 3 messages 14. Delete related configuration
Expected Results	2-7 Configuration successful 8. PFC priority 3 message sent by the device 100 priority 3 packets from TGA
DUT Configuration	Configuring QOS config qos dot1p-tc add dot1p_to_tc_profile --dot1p 3 -- tc 3 config interface qos dot1p-tc bind Ethernet 0 dot1p_to_tc_profile config interface qos dot1p-tc bind Ethernet 8 dot1p_to_tc_profile config interface qos dot1p-tc bind Ethernet16 dot1p_to_tc_profile config qos tc-pg add tc-pg-prof --tc 3 --pg 3 config interface qos tc-pg bind Ethernet0 tc-pg-prof config interface qos tc-pg bind Ethernet8 tc-pg-prof config interface qos tc-pg bind Ethernet16 tc-pg-prof config qos tc-queue add tc-queue-prof --tc 3 --queue 3 config interface qos tc-queue bind Ethernet0 tc-queue-prof config interface qos tc-queue bind Ethernet8 tc-queue-prof config interface qos tc-queue bind Ethernet16 tc-queue-prof Enable PFC and asym on the port config interface pfc priority Ethernet0 3 on config interface pfc priority Ethernet8 3 on config interface pfc asymmetric Ethernet0 on config interface pfc asymmetric Ethernet8 on

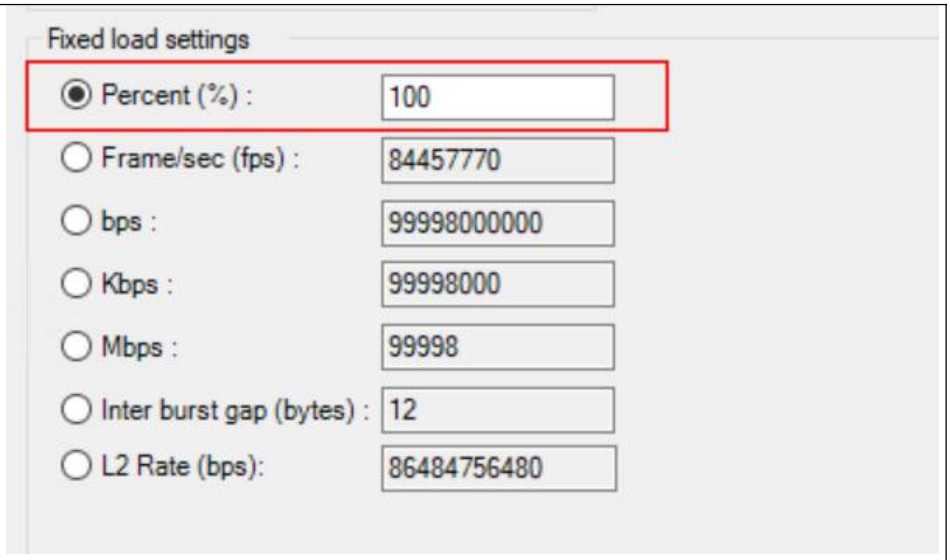
```
root@sonic:/home/admin# config interface pfc priority Ethernet0 3 on
ic Ethernet8 on

Interface      Lossless priorities
-----------  ---------------------
Ethernet0                        3
root@sonic:/home/admin# config interface pfc priority Ethernet8 3 on

Interface      Lossless priorities
-----------  ---------------------
Ethernet8                        3
```

Configuring VLANs
config vlan add 100
config vlan member add 100 Ethernet0
config vlan member add 100 Ethernet8
config vlan member add 100 Ethernet16

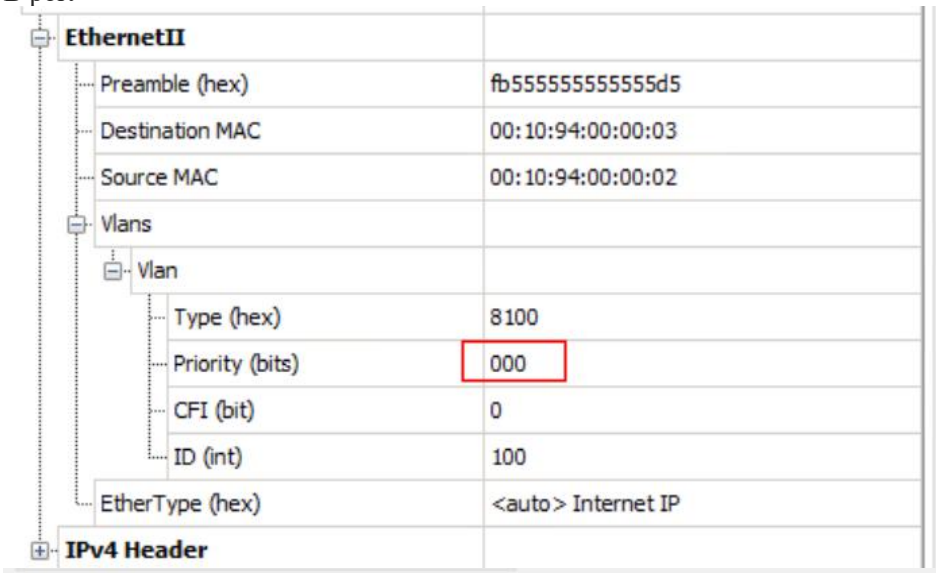
TGB and TGC send bidirectional VLAN tagged data streams, and the packet sending rate of TGC is 100% to TGB
TGA sends VLAN 100 , priority 3 data packets to TGB at line speed
TGA capture shows the PFC priority 3 packets sent by the device.

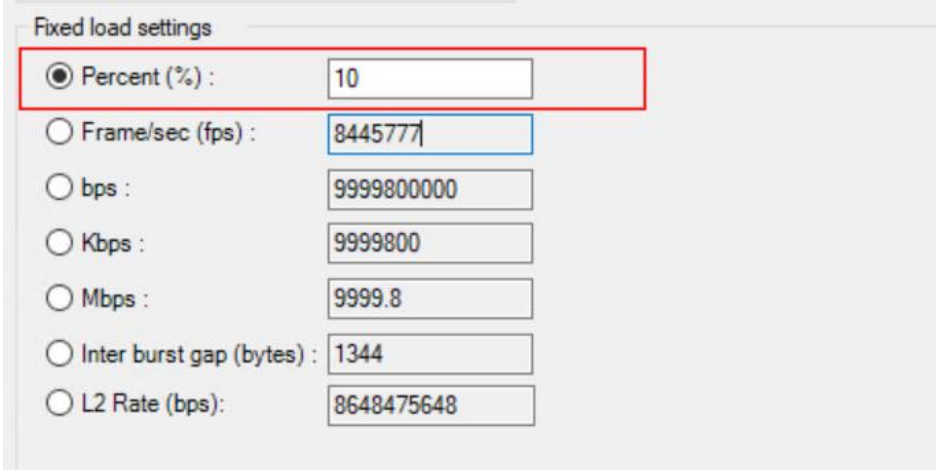
Port
A



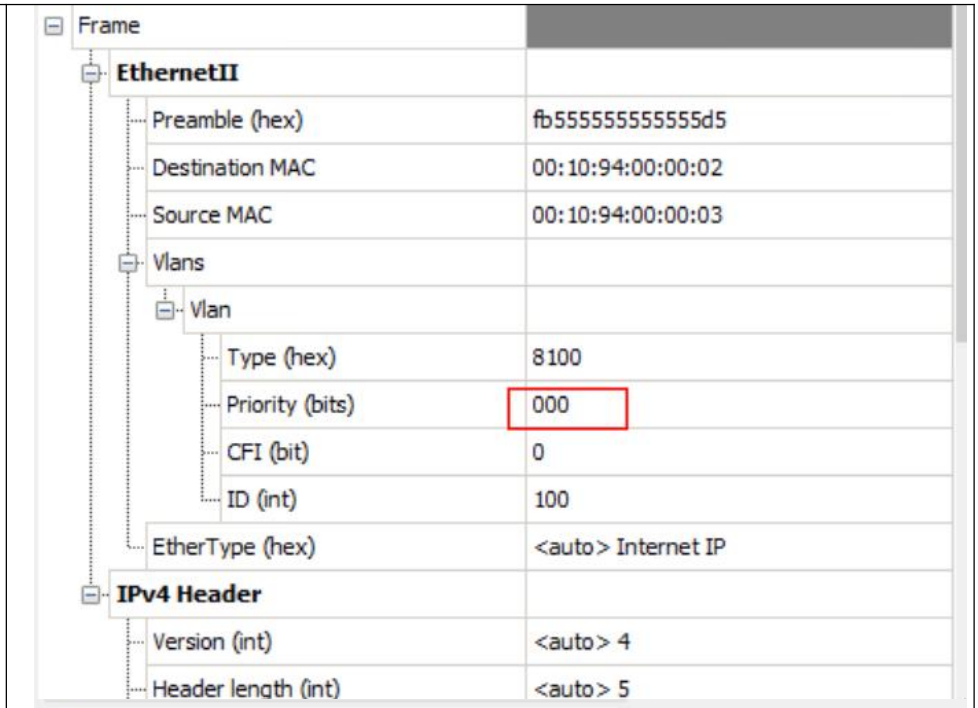


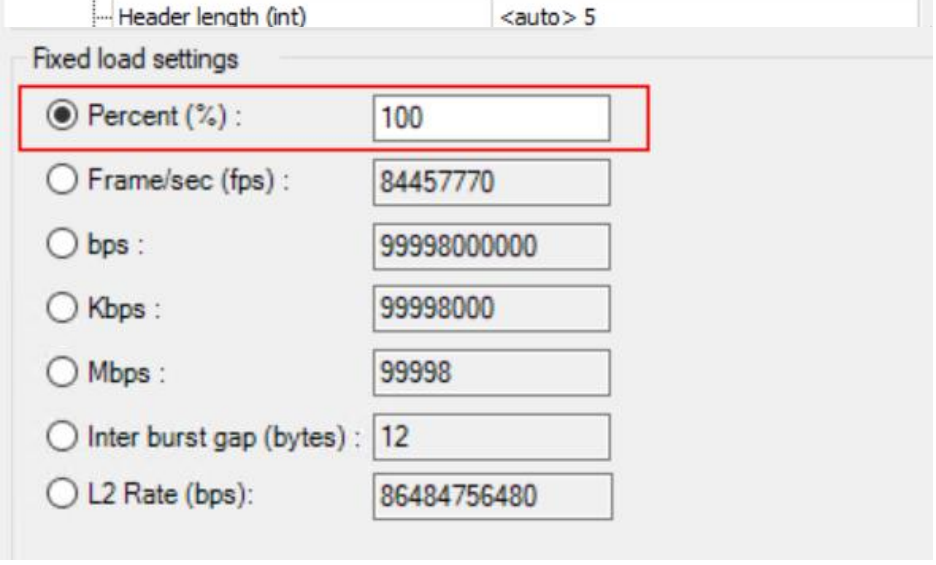
B port

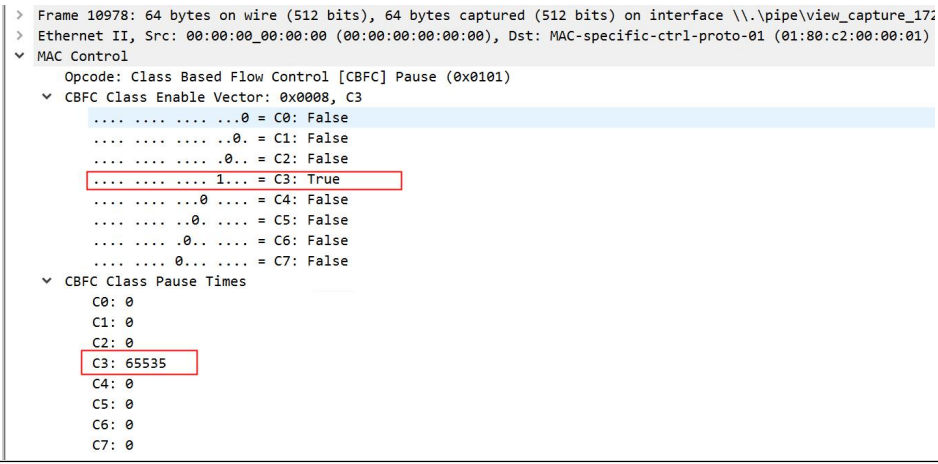




C-mount


Frame
EthernetII
Preamble (hex) fb555555555555d5
Destination MAC 00:10:94:00:00:02
Source MAC 00:10:94:00:00:03
Vlans
Vlan
Type (hex) 8100
Priority (bits) 000
CFI (bit) 0
ID (int) 100
EtherType (hex) <auto> Internet IP
IPv4 Header
Version (int) <auto> 4
Header length (int) <auto> 5


Fixed load settings
Percent (%) : 100
Frame/sec (fps) : 84457770
bps : 99998000000
Kbps : 99998000
Mbps : 99998
Inter burst gap (bytes) : 12
L2 Rate (bps): 86484756480


Frame 10978: 64 bytes on wire (512 bits), 64 bytes captured (512 bits) on interface \\.\pipe\view_capture_172
Ethernet II, Src: 00:00:00_00:00:00 (00:00:00:00:00:00), Dst: MAC-specific-ctrl-proto-01 (01:80:c2:00:00:01)
MAC Control
Opcode: Class Based Flow Control [CBFC] Pause (0x0101)
CBFC Class Enable Vector: 0x0008, C3
....0 = C0: False
....0. = C1: False
.... .0.. = C2: False
.... 1... = C3: True
....0 .... = C4: False
....0. .... = C5: False
.... .0.. .... = C6: False
.... 0... .... = C7: False
CBFC Class Pause Times
C0: 0
C1: 0
C2: 0
C3: 65535
C4: 0
C5: 0
C6: 0
C7: 0

```
> Frame 10979: 64 bytes on wire (512 bits), 64 bytes captured (512 bits) on interface \\.\pipe\view_capture_172
> Ethernet II, Src: 00:00:00_00:00:00 (00:00:00:00:00:00), Dst: MAC-specific-ctrl-proto-01 (01:80:c2:00:00:01)
v MAC Control
    Opcode: Class Based Flow Control [CBFC] Pause (0x0101)
  v CBFC Class Enable Vector: 0x0008, C3
      .... .... .... ...0 = C0: False
      .... .... .... ..0. = C1: False
      .... .... .... .0.. = C2: False
      .... .... .... 1... = C3: True
      .... .... ...0 .... = C4: False
      .... .... ..0. .... = C5: False
      .... .... .0.. .... = C6: False
      .... .... 0... .... = C7: False
  v CBFC Class Pause Times
      C0: 0
      C1: 0
      C2: 0
      C3: 0
      C4: 0
      C5: 0
      C6: 0
      C7: 0
```

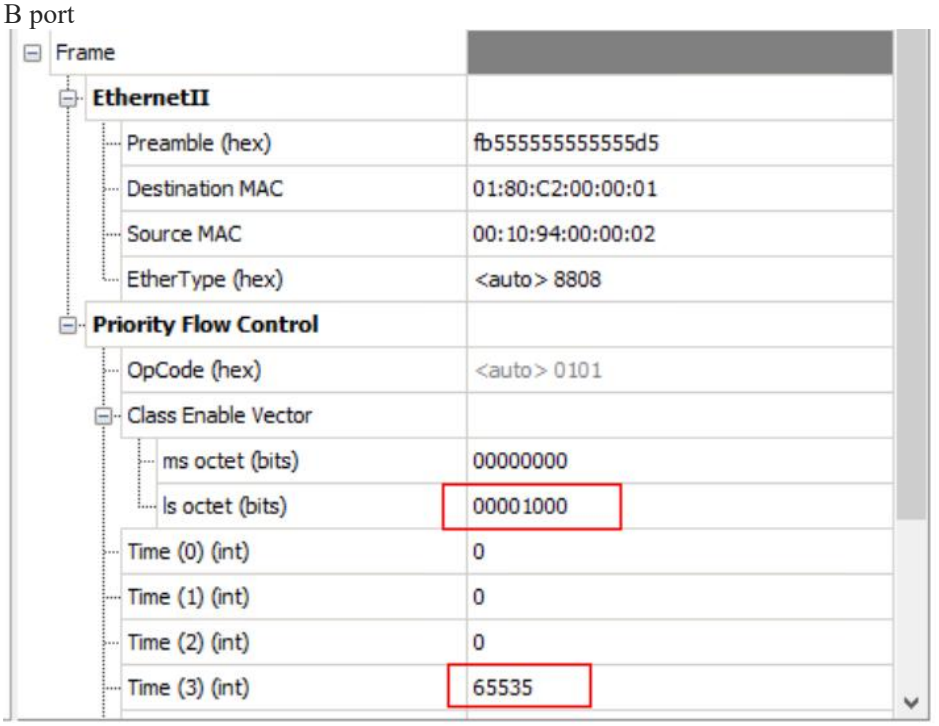
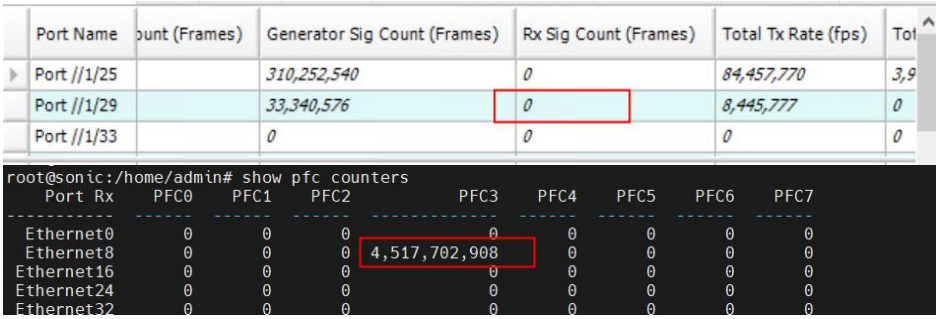
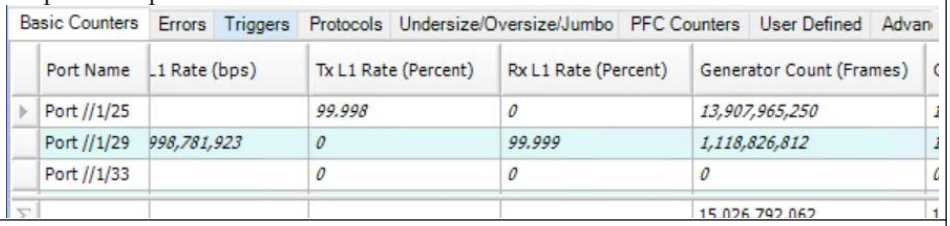
Configuring pfc -priority-queue
config qos pfc -priority-queue add pfc_queue_profile -- pfc -priority 3 --queue 3
config interface qos pfc -priority-queue bind Ethernet 8 pfc_queue_profile

Stop sending packets on all ports
TGA sends VLAN 100 , priority 3 data packets to TGB at line speed
TGB sends the destination learning packet and the PFC priority 3 message
Port A

EthernetII	
Preamble (hex)	fb555555555555d5
Destination MAC	00:10:94:00:00:02
Source MAC	00:10:94:00:00:01
Vlans	
Vlan	
Type (hex)	8100
Priority (bits)	011
CFI (bit)	0
ID (int)	100
EtherType (hex)	<auto> Internet IP
IPv4 Header	
Version (int)	<auto> 4

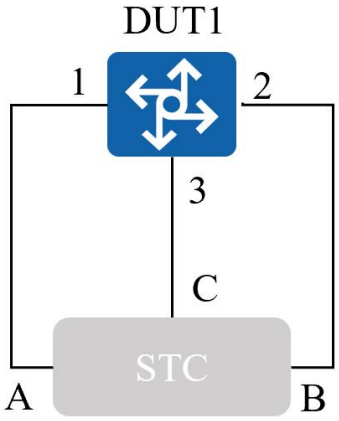
Fixed load settings

(•) Percent (%) :	100
( ) Frame/sec (fps) :	84457770
( ) bps :	99998000000
( ) Kbps :	99998000
( ) Mbps :	99998
( ) Inter burst gap (bytes) :	12
( ) L2 Rate (bps):	86484756480

	B port   Stop PFC at port B and traffic will resume 
Test Results	**PASS**
Remark	

5.8 PASS - PFC Watchdog (WD)

Test items	PFC Watchdog function test
Test content	Test equipment PFC watchdog can work

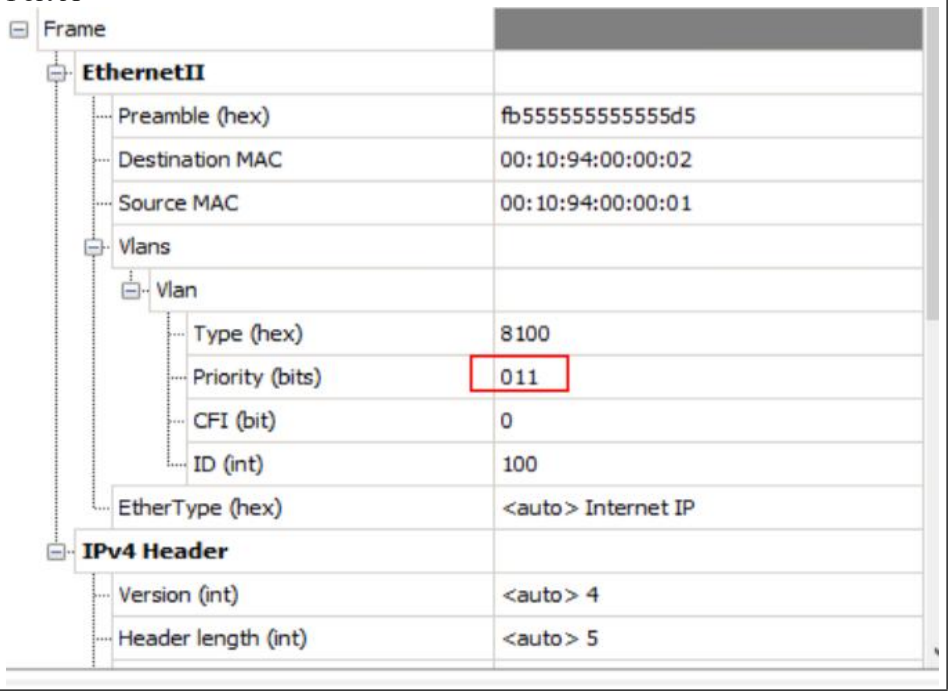
Test topology	
Test steps	1. Set up the test environment according to the diagram. 2. Configure dot1p priority 3 to map to tc3 and pg3 3. Bind qos mapping to port 4. Enable PFC priority 3 on DUTP1 and DUTP2 5. Create VLAN 100 and add DUT P1-P3 to VLAN 100 as tagged members 6. Create pfc -priority-queue and set pfc priority 3 to correspond to queue3 7. Bind the created pfc -priority-queue to TGB 8. TGA sends VLAN 100 , priority 3 data packets to TGB at line speed 9. TGB sends a message with PFC priority 3. 10. Port Enable PFCWD Delete related configuration
Expected Results	8. TGB stops receiving TGA data messages 9. TGB starts to receive some TGA data messages
DUT Configuration	Configuring QOS config qos dot1p-tc add dot1p_to_tc_profile --dot1p 3 -- tc 3 config interface qos dot1p-tc bind Ethernet 0 dot1p_to_tc_profile config interface qos dot1p-tc bind Ethernet 8 dot1p_to_tc_profile config interface qos dot1p-tc bind Ethernet16 dot1p_to_tc_profile config qos tc-pg add tc-pg-prof --tc 3 --pg 3 config interface qos tc-pg bind Ethernet0 tc-pg-prof config interface qos tc-pg bind Ethernet8 tc-pg-prof config interface qos tc-pg bind Ethernet16 tc-pg-prof config qos tc-queue add tc-queue-prof --tc 3 --queue 3 config interface qos tc-queue bind Ethernet0 tc-queue-prof config interface qos tc-queue bind Ethernet8 tc-queue-prof config interface qos tc-queue bind Ethernet16 tc-queue-prof PFC priority 3 is enabled on the port config interface pfc priority Ethernet0 3 on config interface pfc priority Ethernet8 3 on

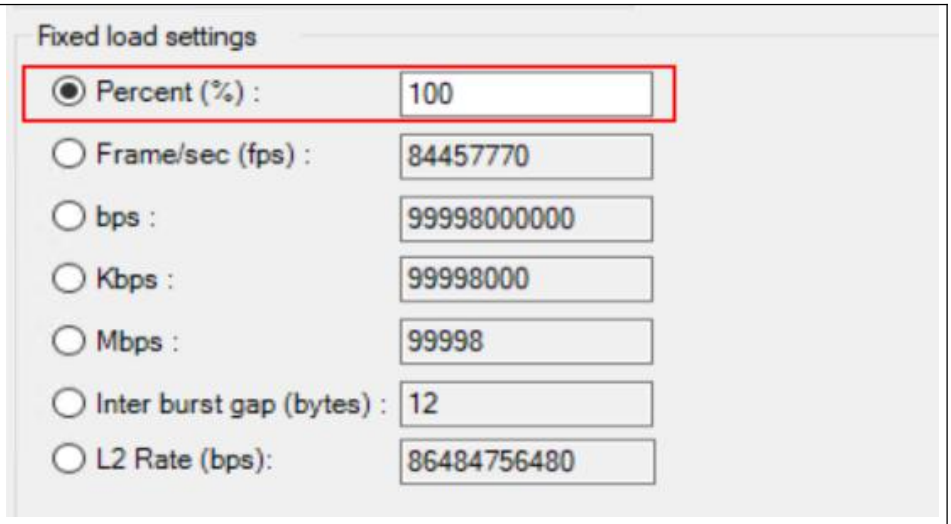
```
root@sonic:/home/admin# config interface pfc priority Ethernet0 3 on

Interface      Lossless priorities
-----------  ---------------------
Ethernet0                        3
root@sonic:/home/admin# config interface pfc priority Ethernet8 3 on

Interface      Lossless priorities
-----------  ---------------------
Ethernet8                        3
root@sonic:/home/admin#
```

Configuring VLANs
config vlan add 100
config vlan member add 100 Ethernet0
config vlan member add 100 Ethernet8
config vlan member add 100 Ethernet16

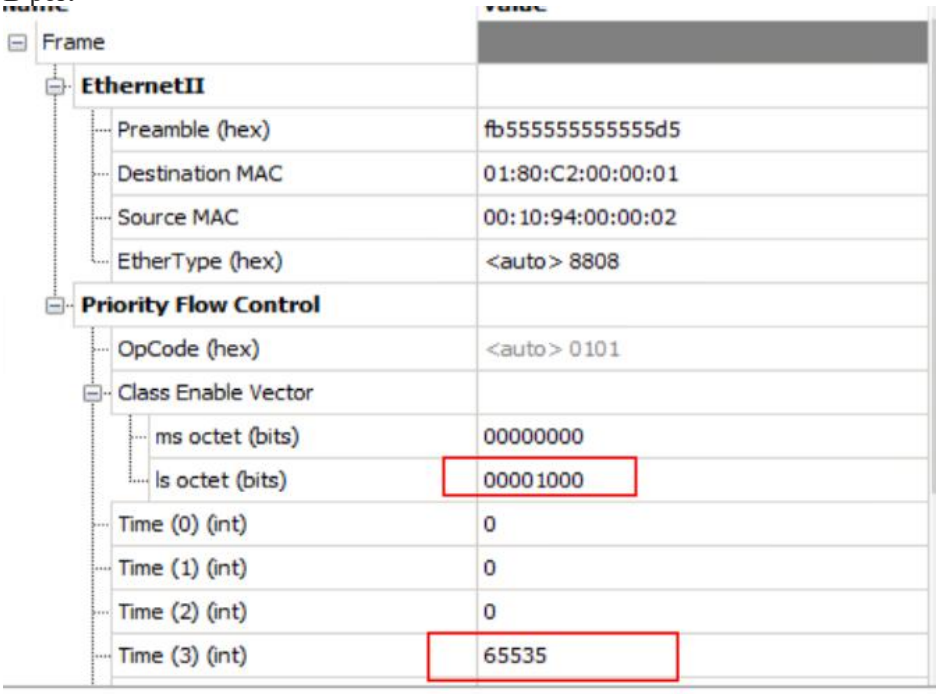
Configuring pfc-priority-queue
config qos pfc -priority-queue add pfc_queue_profile -- pfc -priority 3 --queue 3
config interface qos pfc -priority-queue bind Ethernet 8 pfc_queue_profile

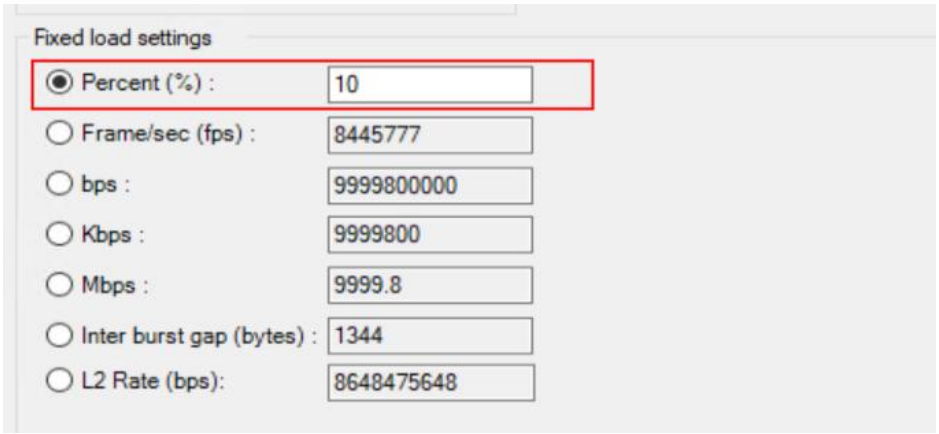
TGA sends VLAN 100 , priority 3 data packets to TGB at line speed
TGB sends the destination learning packet and the PFC priority 3 message
Port A



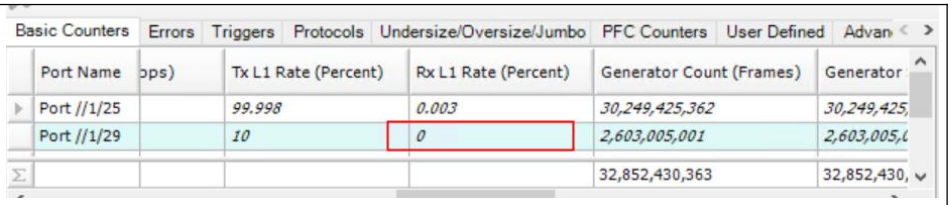
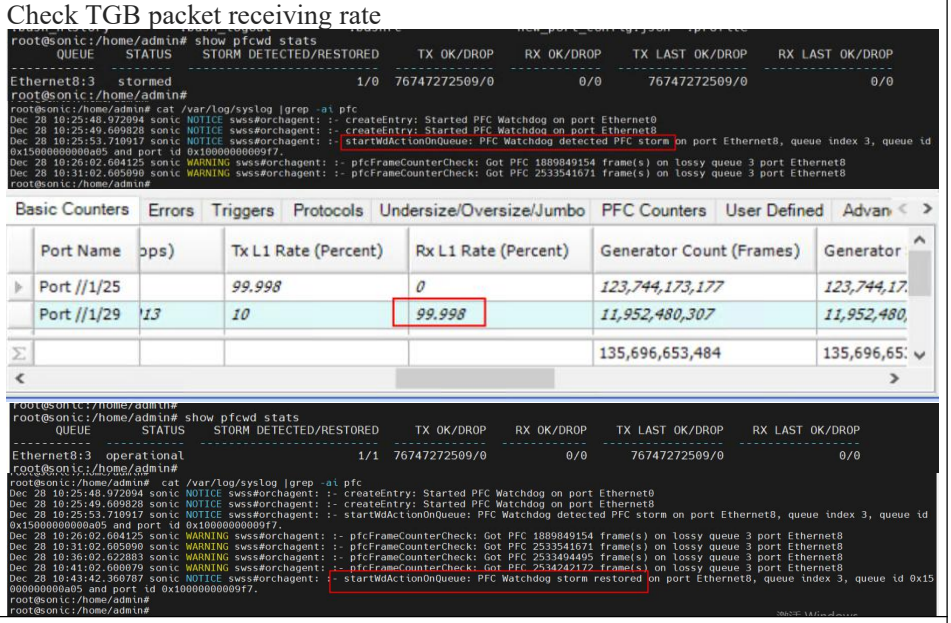


B port

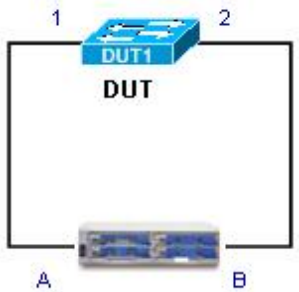




Check TGB packet receiving rate

	 Setting PFCWD config pfcwd start --action forward --restoration-time 4000 ports Ethernet0 detection-time 4000 config pfcwd start --action forward --restoration-time 4000 ports Ethernet8 detection-time 4000 Check TGB packet receiving rate 
Test Results	**PASS**
Remark	

5.9 PASS- PFC Watermark (WM)

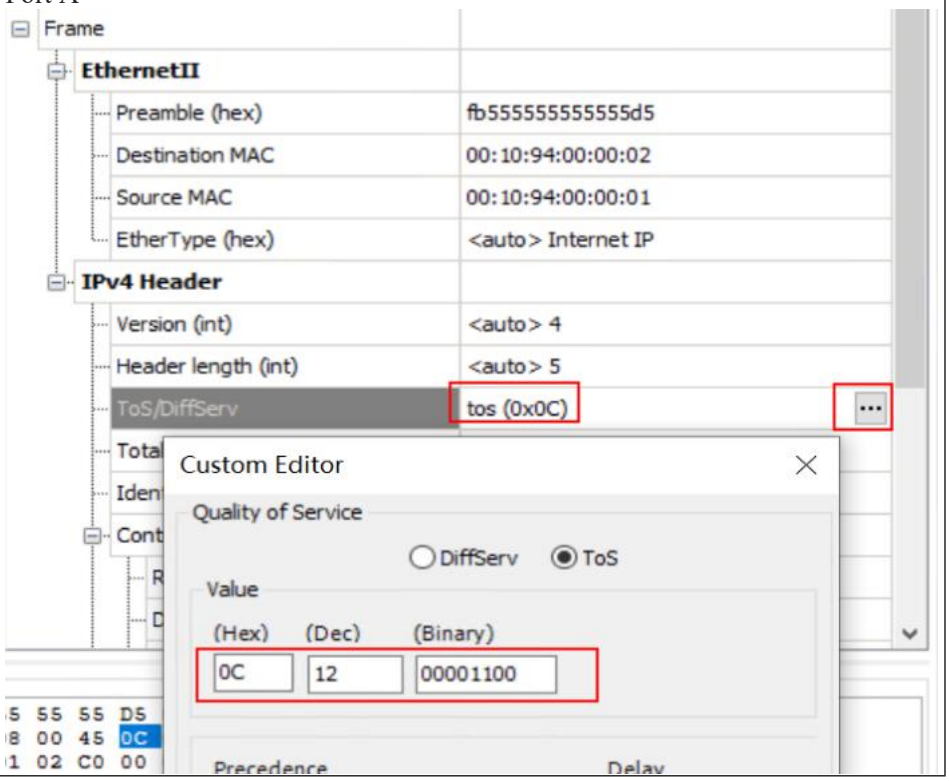
Test items	PFC Watetmark Functional Test
Test content	Test equipment PFC Watermarks can be displayed as statistics.
Test topology	

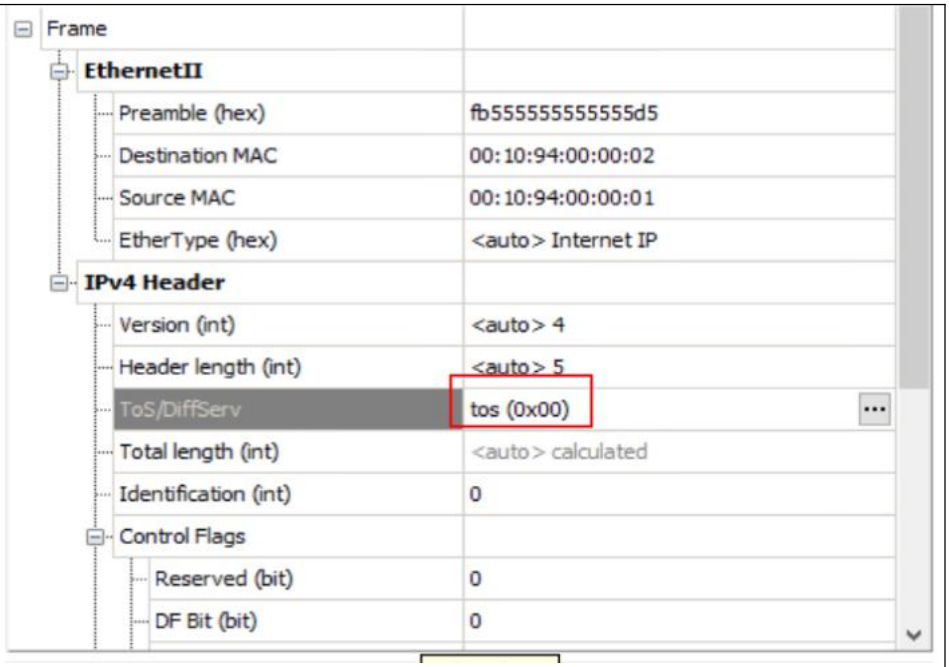
Test steps	1. Set up the test environment according to the diagram. 2. Load qos configuration file 3. Configure buffer parameters and bind to the port 4. Configure dscp3 to map to tc 3 , mapped to pg 3 ; dscp 0 to map to tc 0 , mapped to pg 0 5. Bind qos mapping to port 6. Create pfc -priority-queue to set pfc priority 3 to queue 3 and pfc priority 0 to queue 0 7. Bind the created pfc -priority-queue to the port 8. Enable PFC priority 3,0 on the port 9. Create VLAN 100 and add ports to VLAN 100 10. 1 230 length data packets of dscp 3 and dscp 0 to TGB at line speed 11. View watermark statistics 12. TG B egress speed limit 1 0 G 13. View watermark statistics 14. Delete related configuration
Expected Results	2 - 9 Configuration successful 11.1 3. View statistics
DUT Configuration	Configuring QOS sudo config qos reload config interface buffer bind priority-group Ethernet0 0 ingress_lossless_profile config interface buffer bind priority-group Ethernet8 0 ingress_lossless_profile config interface buffer bind queue Ethernet0 0 egress_lossless_profile config interface buffer bind queue Ethernet8 0 egress_lossless_profile config interface buffer bind priority-group Ethernet0 3 ingress_lossless_profile config interface buffer bind priority-group Ethernet8 3 ingress_lossless_profile config interface buffer bind queue Ethernet0 3 egress_lossless_profile config interface buffer bind queue Ethernet8 3 egress_lossless_profile config qos dscp-tc add dscp_to_tc_profile --dscp 3 --tc 3 config qos dscp-tc update dscp_to_tc_profile --dscp 0 --tc 0 config interface qos dscp-tc bind Ethernet0 dscp_to_tc_profile config interface qos dscp-tc bind Ethernet8 dscp_to_tc_profile config qos tc-pg add tc-pg-prof --tc 3 --pg 3 config qos tc-pg update tc-pg-prof --tc 0 --pg 0 config interface qos tc-pg bind Ethernet0 tc-pg-prof config interface qos tc-pg bind Ethernet8 tc-pg-prof config qos tc-queue add tc-queue-prof --tc 3 --queue 3 config qos tc-queue update tc-queue-prof --tc 0 --queue 0 config interface qos tc-queue bind Ethernet0 tc-queue-prof config interface qos tc-queue bind Ethernet8 tc-queue-prof Configuring pfc-priority-queue config qos pfc-priority-queue add pfc_queue_profile --pfc-priority 3 --queue 3 config qos pfc-priority-queue update pfc_queue_profile --pfc-priority 0 --queue 0 config interface qos pfc-priority-queue bind Ethernet0 pfc_queue_profile config interface qos pfc-priority-queue bind Ethernet8 pfc_queue_profile Enable PFC priority 3 on the port config interface pfc priority Ethernet0 3 on config interface pfc priority Ethernet0 0 on config interface pfc priority Ethernet8 3 on config interface pfc priority Ethernet8 0 on

```
root@sonic:/home/admin# config interface pfc priority Ethernet0 3 on

Interface      Lossless priorities
-----------  ---------------------
Ethernet0                        3
root@sonic:/home/admin# config interface pfc priority Ethernet0 0 on

Interface    Lossless priorities
-----------  ---------------------
Ethernet0    0,3
root@sonic:/home/admin# config interface pfc priority Ethernet8 3 on

Interface      Lossless priorities
-----------  ---------------------
Ethernet8                        3
root@sonic:/home/admin# config interface pfc priority Ethernet8 0 on

Interface    Lossless priorities
-----------  ---------------------
Ethernet8    0,3
root@sonic:/home/admin#
```

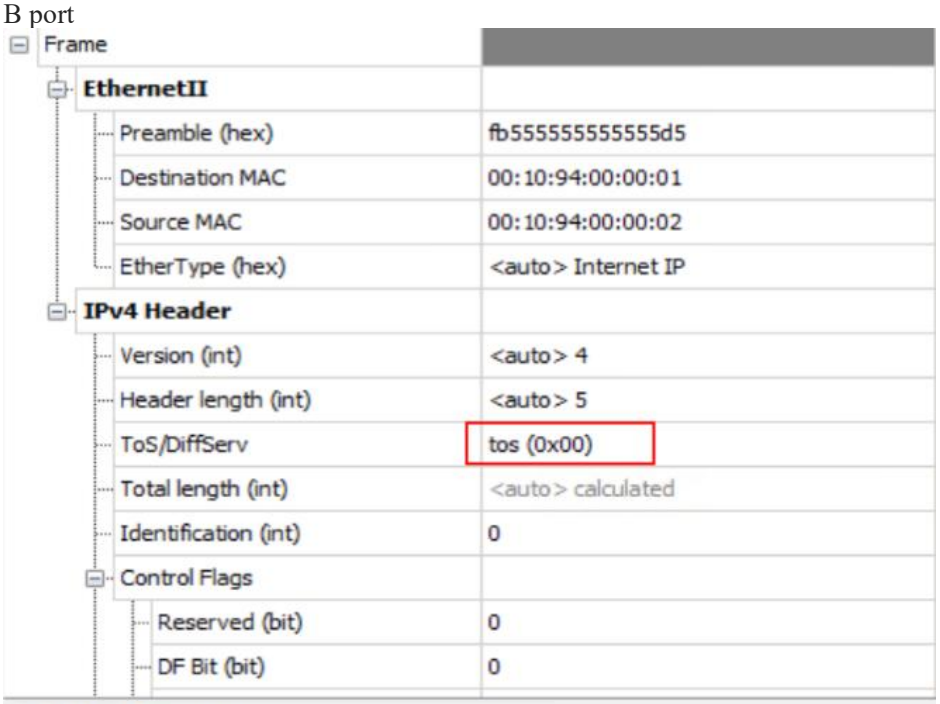
Configuring VLANs
config vlan add 100
config vlan member add 100 Ethernet0 -u
config vlan member add 100 Ethernet8 -u

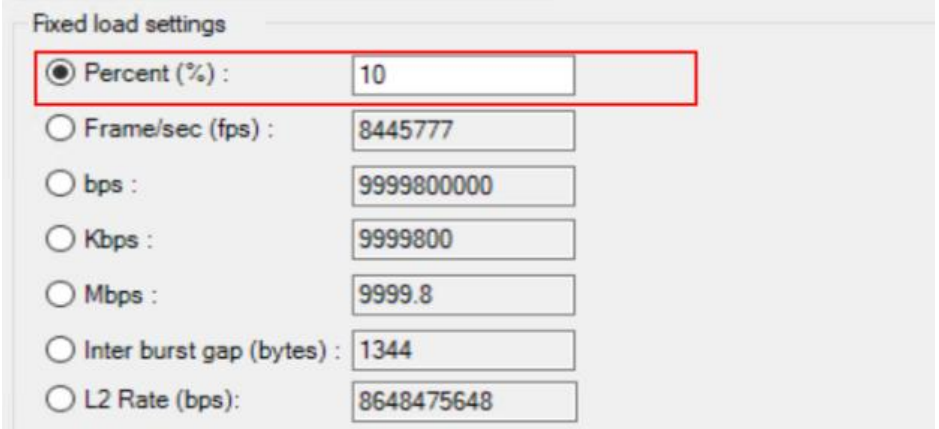
TGB sends learning mac, TGA sends DSCP 3 and DSCP 0 line speed packets
Port A




Frame
EthernetII
Preamble (hex)
fb555555555555d5
Destination MAC
00:10:94:00:00:02
Source MAC
00:10:94:00:00:01
EtherType (hex)
<auto> Internet IP
IPv4 Header
Version (int)
<auto> 4
Header length (int)
<auto> 5
ToS/DiffServ
tos (0x00)
Total length (int)
<auto> calculated
Identification (int)
0
Control Flags
Reserved (bit)
0
DF Bit (bit)
0

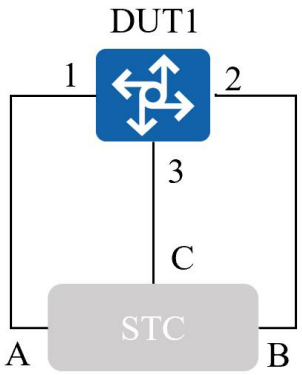
B port


Frame
EthernetII
Preamble (hex)
fb555555555555d5
Destination MAC
00:10:94:00:00:01
Source MAC
00:10:94:00:00:02
EtherType (hex)
<auto> Internet IP
IPv4 Header
Version (int)
<auto> 4
Header length (int)
<auto> 5
ToS/DiffServ
tos (0x00)
Total length (int)
<auto> calculated
Identification (int)
0
Control Flags
Reserved (bit)
0
DF Bit (bit)
0

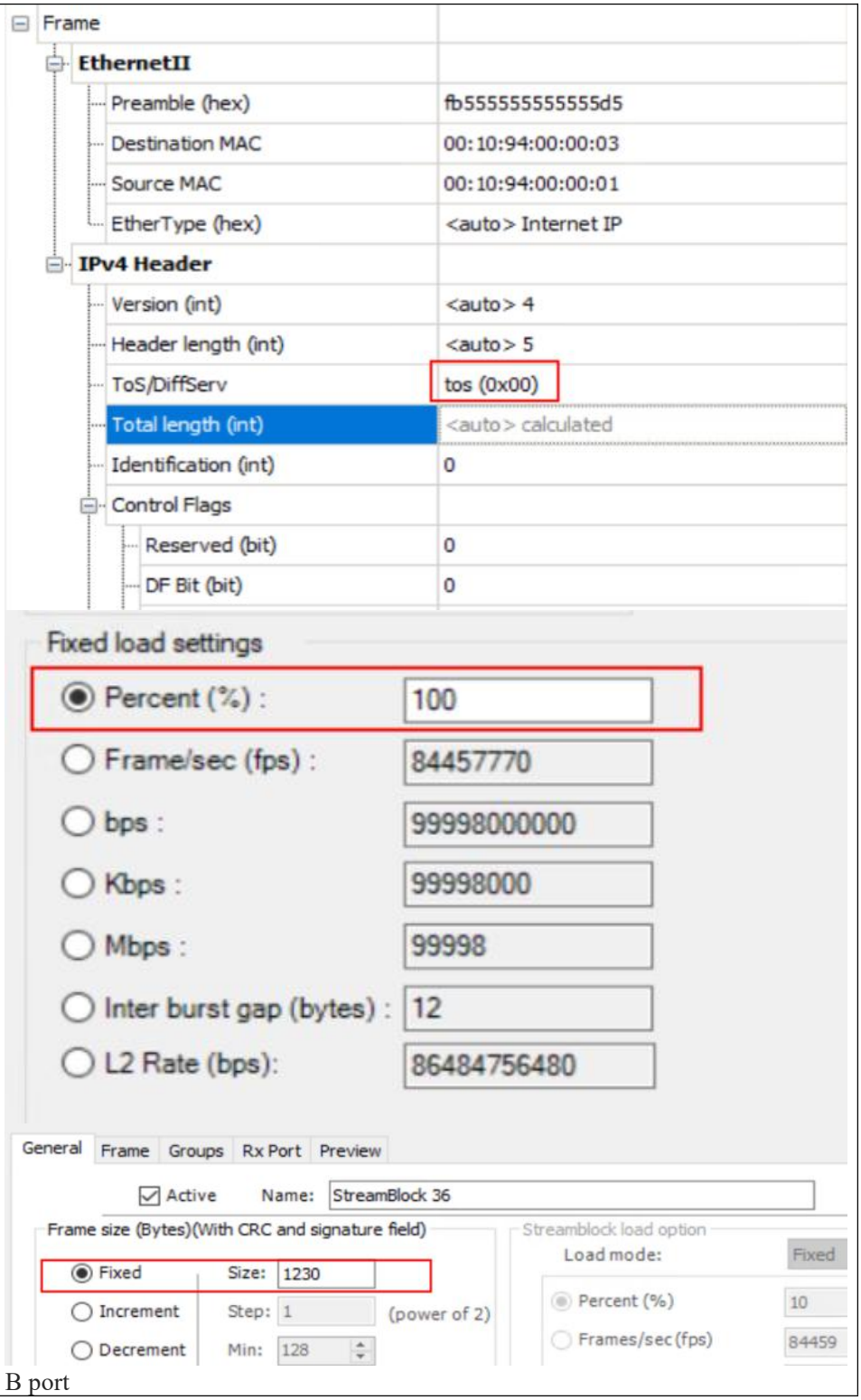

Fixed load settings
Percent (%) :
10
Frame/sec (fps) :
8445777
bps :
9999800000
Kbps :
9999800
Mbps :
9999.8
Inter burst gap (bytes) :
1344
L2 Rate (bps):
8648475648

	Clean up and view watermark statistics sonic-clear priority-group watermark headroom show priority-group watermark headroom root@sonic:/home/admin# show priority-group watermark headroom Ingress headroom per PG: Port PG0 PG1 PG2 PG3 PG4 PG5 PG6 PG7 Ethernet0 0 0 0 0 0 0 0 0 Ethernet8 0 0 0 0 0 0 0 0 Ethernet16 0 0 0 0 0 0 0 0 Ethernet24 0 0 0 0 0 0 0 0 Ethernet32 0 0 0 0 0 0 0 0 Ethernet40 0 0 0 0 0 0 0 0 Ethernet48 0 0 0 0 0 0 0 0 Ethernet56 0 0 0 0 0 0 0 0 Ethernet64 0 0 0 0 0 0 0 0 B port egress speed limit 10G config scheduler add profile-1 -- shaper_type =bytes --bandwidth=10g config interface scheduler bind port Ethernet8 profile-1 Clean up and view watermark statistics root@sonic:/home/admin# show priority-group watermark headroom Ingress headroom per PG: Port PG0 PG1 PG2 PG3 PG4 PG5 PG6 PG7 Ethernet0 971296 0 0 971296 0 0 0 0 Ethernet8 0 0 0 0 0 0 0 0 Ethernet16 0 0 0 0 0 0 0 0 Ethernet24 0 0 0 0 0 0 0 0 Ethernet32 0 0 0 0 0 0 0 0 Ethernet40 0 0 0 0 0 0 0 0 Ethernet48 0 0 0 0 0 0 0 0 Ethernet56 0 0 0 0 0 0 0 0
Test Results	**PASS**
Remark	

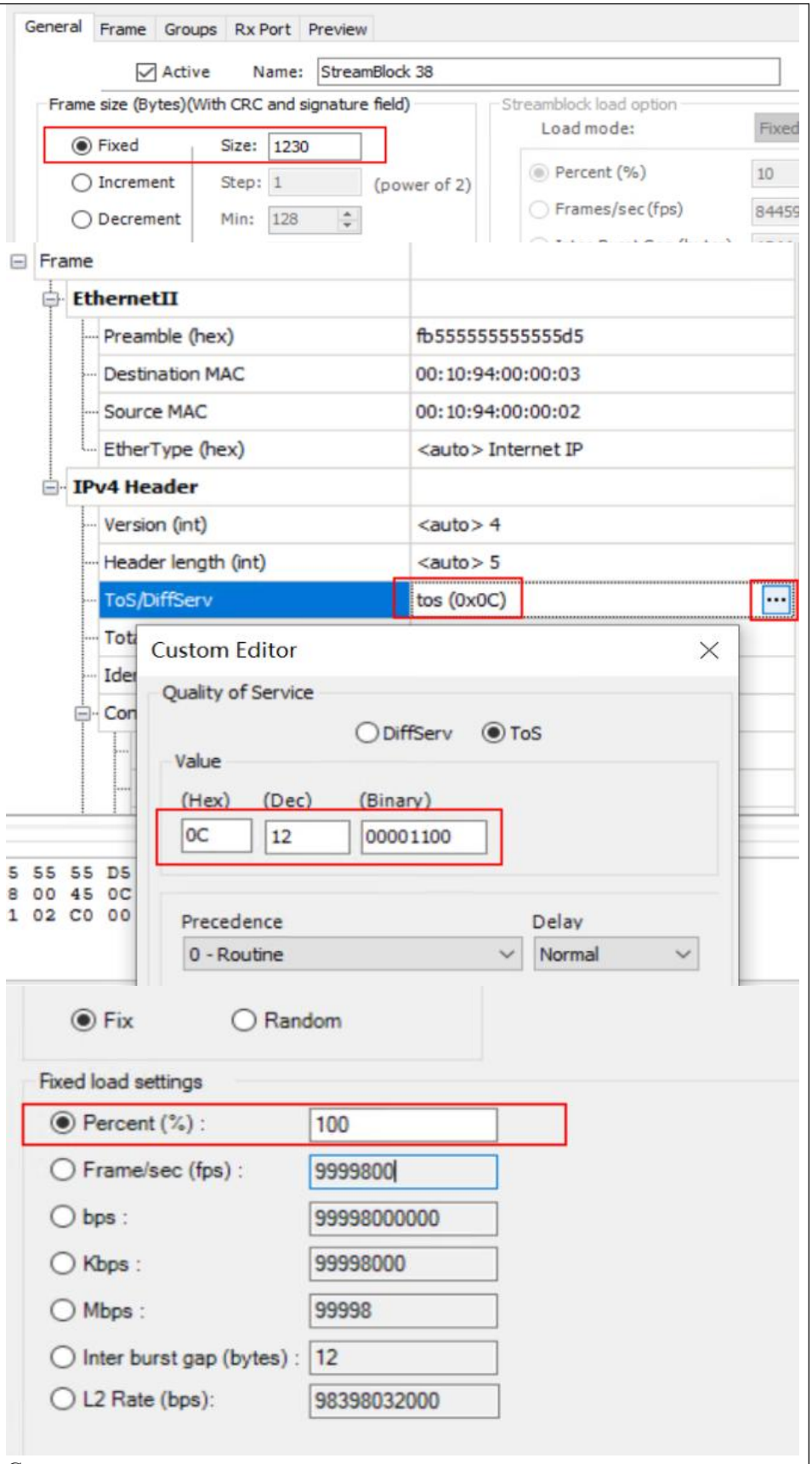
5.10 PASS -Scheduling

Test items	Scheduling Functional Test
Test content	Test equipment according to qos Scheduling forwarding messages
Test topology	
Test steps	1. Set up the test environment according to the diagram. 2. Configure dscp3 to map to tc 3 , mapped to pg 3 , dscp 0 to map to tc 0 , mapped to pg 0 3. Bind qos mapping to port 4. Setting the scheduler wrr 60 and wrr 40 and bound to queue 0 and queue 3 of DUTP 3

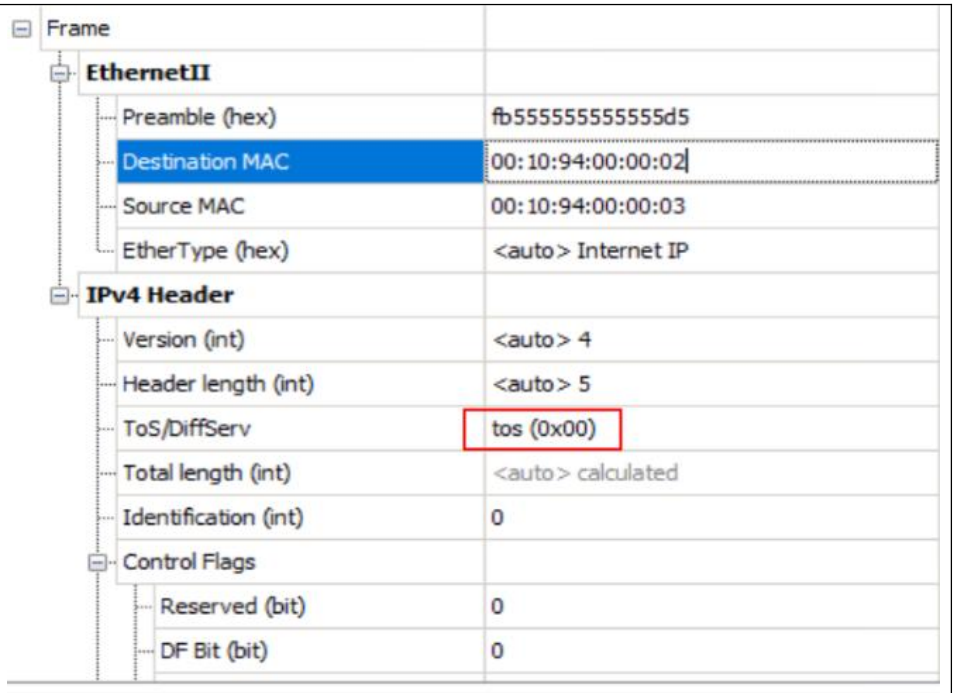
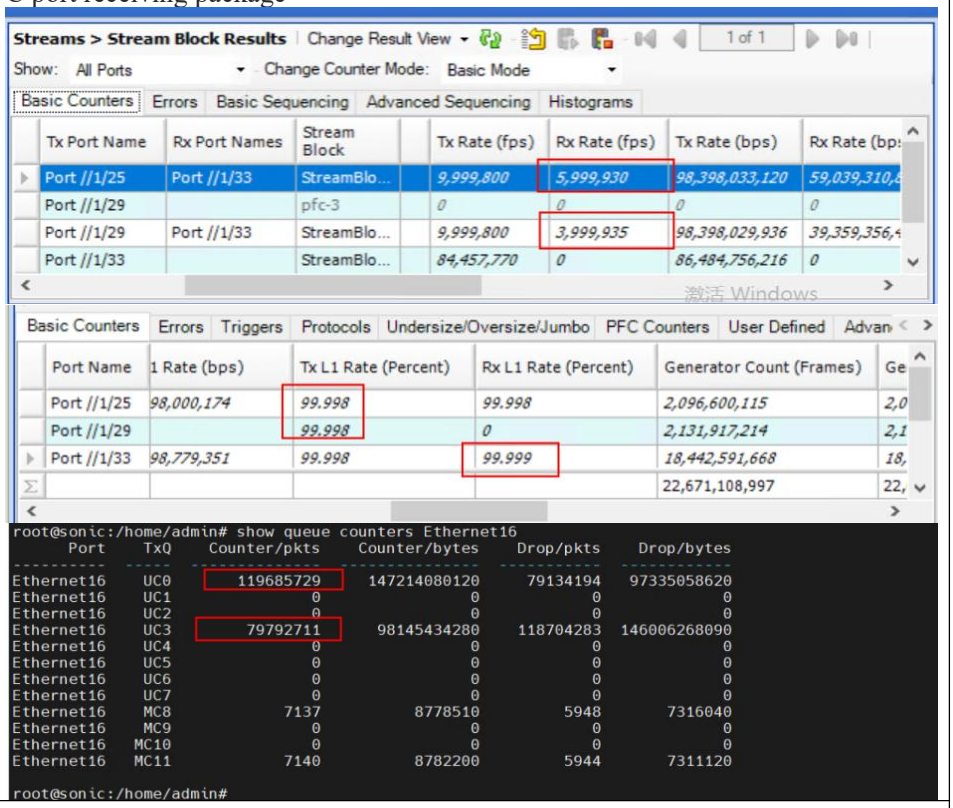
	5. Create VLAN 100 and add DUT P1 -P3 to VLAN 100 as tagged members 6. TGC sends a learning message 7. TGA sets the line speed to send DSCP 0 packet length 1 230 packets to TGC ; TG B sets the line speed to send DSCP 3 packet length 1 230 packets to TGC 8. TGA and TGB are sent at the same time, and the ratio of TGA and TGB messages received by TGC is checked. 9. Stop all outbound packets 10. Delete related configuration
Expected Results	2- 5. Configuration successful 8. The dscp messages from TGA and TGB received by TGC meet the wrr ratio
DUT Configuration	Configuring QOS config qos dscp-tc add dscp_to_tc_profile --dscp 3 --tc 3 config qos dscp-tc update dscp_to_tc_profile --dscp 0 --tc 0 config interface qos dscp-tc bind Ethernet0 dscp_to_tc_profile config interface qos dscp-tc bind Ethernet8 dscp_to_tc_profile config interface qos dscp-tc bind Ethernet16 dscp_to_tc_profile config qos tc-pg add tc-pg-prof --tc 3 --pg 3 config qos tc-pg update tc-pg-prof --tc 0 --pg 0 config interface qos tc-pg bind Ethernet0 tc-pg-prof config interface qos tc-pg bind Ethernet8 tc-pg-prof config interface qos tc-pg bind Ethernet16 tc-pg-prof config qos tc-queue add tc-queue-prof --tc 3 --queue 3 config qos tc-queue update tc-queue-prof --tc 0 --queue 0 config interface qos tc-queue bind Ethernet0 tc-queue-prof config interface qos tc-queue bind Ethernet8 tc-queue-prof config interface qos tc-queue bind Ethernet16 tc-queue-prof Setting the scheduler config scheduler add sched-prof-wrr60 --sched_type WRR --weight 60 config scheduler add sched-prof-wrr40 --sched_type WRR --weight 40 config interface scheduler bind queue Ethernet16 0 sched-prof-wrr60 config interface scheduler bind queue Ethernet16 3 sched-prof-wrr40 Add VLAN config vlan add 100 config vlan member add 100 Ethernet0 -u config vlan member add 100 Ethernet8 -u config vlan member add 100 Ethernet16 -u TGC sends learning package The packet receiving rate of TGA and TGB with both DSCP 0 and DSCP 3 to TGC Port A


Frame
EthernetII
Preamble (hex)
fb555555555555d5
Destination MAC
00:10:94:00:00:03
Source MAC
00:10:94:00:00:01
EtherType (hex)
<auto> Internet IP
IPv4 Header
Version (int)
<auto> 4
Header length (int)
<auto> 5
ToS/DiffServ
tos (0x00)
Total length (int)
<auto> calculated
Identification (int)
0
Control Flags
Reserved (bit)
0
DF Bit (bit)
0
Fixed load settings
Percent (%) :
100
Frame/sec (fps) :
84457770
bps :
99998000000
Kbps :
99998000
Mbps :
99998
Inter burst gap (bytes) :
12
L2 Rate (bps):
86484756480
General
Frame
Groups
Rx Port
Preview
Active
Name:
StreamBlock 36
Frame size (Bytes)(With CRC and signature field)
Fixed
Size:
1230
Increment
Step:
1
(power of 2)
Decrement
Min:
128
Streamblock load option
Load mode:
Fixed
Percent (%)
10
Frames/sec (fps)
84459

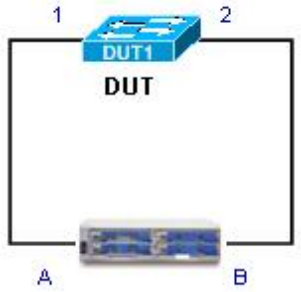
B port


General
Frame
Groups
Rx Port
Preview
Active
Name: StreamBlock 38
Frame size (Bytes)(With CRC and signature field)
Fixed
Size: 1230
Increment
Step: 1
(power of 2)
Decrement
Min: 128
Streamblock load option
Load mode:
Fixed
Percent (%)
10
Frames/sec (fps)
Frame
EthernetII
Preamble (hex)
fb555555555555d5
Destination MAC
00:10:94:00:00:03
Source MAC
00:10:94:00:00:02
EtherType (hex)
<auto> Internet IP
IPv4 Header
Version (int)
<auto> 4
Header length (int)
<auto> 5
ToS/DiffServ
tos (0x0C)
Custom Editor
Quality of Service
DiffServ
ToS
Value
(Hex)
(Dec)
(Binary)
0C
12
00001100
Precedence
0 - Routine
Delay
Normal
Fix
Random
Fixed load settings
Percent (%) :
100
Frame/sec (fps) :
9999800
bps :
99998000000
Kbps :
99998000
Mbps :
99998
Inter burst gap (bytes) :
12
L2 Rate (bps):
98398032000

C-mount

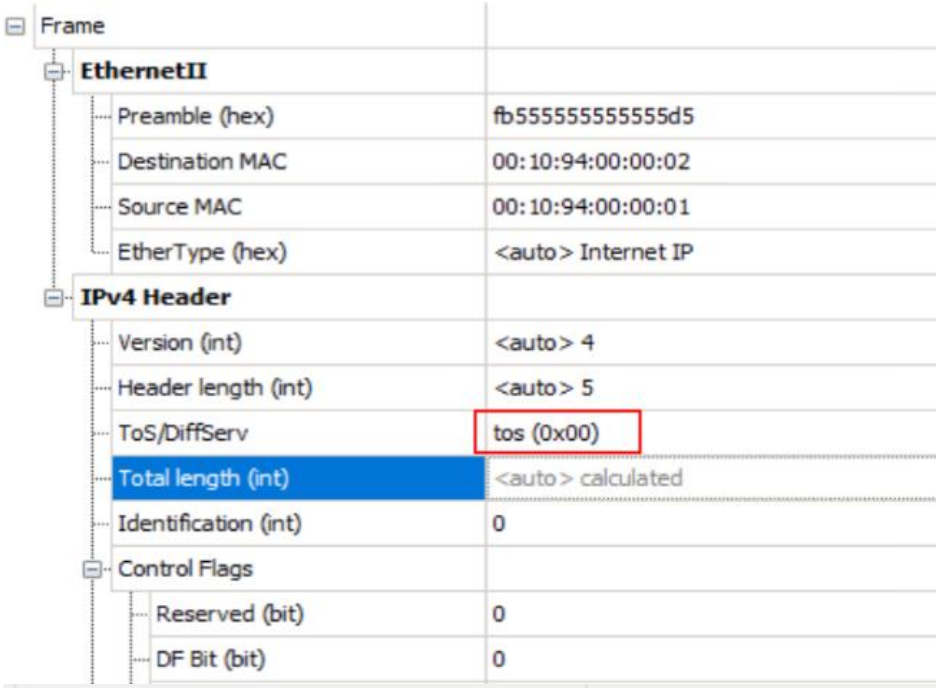
	 C port receiving package 
Test Results	**PASS**
Remark	

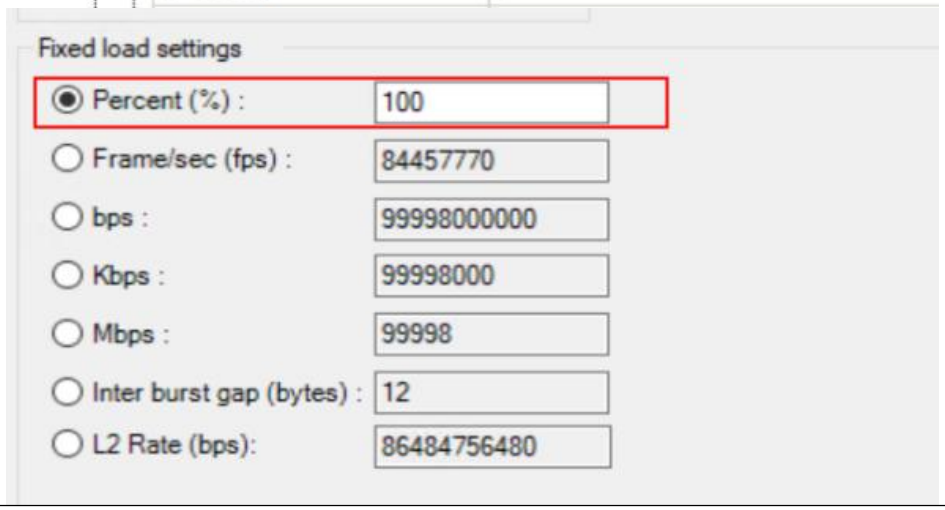
5.11 PASS -Egress Shaping (Port, Queue)

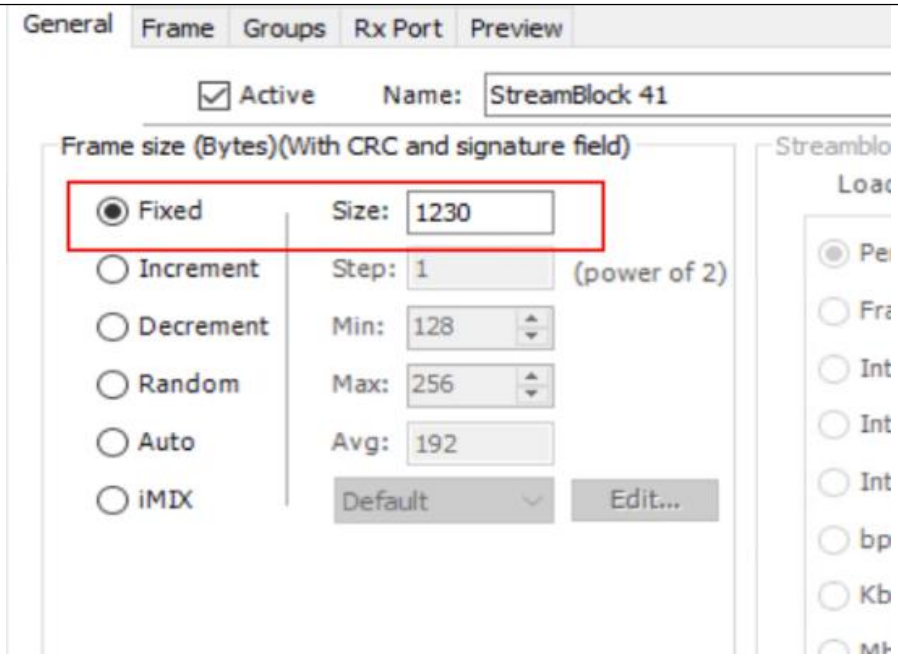
Test items	Egress Shaping Functional Test
Test content	Test the device according to the set Egress Shaping value forwarding message
Test topology	
Test steps	1. Set up the test environment according to the diagram. 2. Configure dscp3 to map to tc 3 , mapped to pg 3 , dscp 0 to map to tc 0 , mapped to pg 0 3. Bind qos mapping to port 4. Set DUTP 2 port bandwidth to 10G , queue 0 bandwidth to 1G 5. Create VLAN 2 and add DUT P1 -P2 to VLAN 2 as a tagged member 6. TGB sends learning message 7. TGA sets the line speed to send DSCP 0 packet length 1 230 packets to TGB, and checks the packet receiving rate 8. TGA sets the line speed to send DSCP 3 packets with a length of 1 230 to TGB, and checks the packet receiving rate. 9. Stop all outbound packets 10. Delete related configuration
Expected Results	2- 5. Configuration successful 7 0 message rate received by TG B is 1G 8 3 message rate received by TGB is 10 G
DUT Configuration	Configure QoS config qos dscp-tc add dscp_to_tc_profile --dscp 3 --tc 3 config qos dscp-tc update dscp_to_tc_profile --dscp 0 --tc 0 config interface qos dscp-tc bind Ethernet0 dscp_to_tc_profile config interface qos dscp-tc bind Ethernet8 dscp_to_tc_profile config qos tc-pg add tc-pg-prof --tc 3 --pg 3 config qos tc-pg update tc-pg-prof --tc 0 --pg 0 config interface qos tc-pg bind Ethernet0 tc-pg-prof config interface qos tc-pg bind Ethernet8 tc-pg-prof config qos tc-queue add tc-queue-prof --tc 3 --queue 3 config qos tc-queue update tc-queue-prof --tc 0 --queue 0 config interface qos tc-queue bind Ethernet0 tc-queue-prof config interface qos tc-queue bind Ethernet8 tc-queue-prof Configure port bandwidth and queue0 bandwidth config scheduler add profile-1 --shaper_type=bytes --bandwidth=10g config scheduler add profile-2 --shaper_type=bytes --bandwidth=1g config interface scheduler bind port Ethernet8 profile-1 config interface scheduler bind queue Ethernet8 0 profile-2 Add VLAN config vlan add 100

config vlan member add 100 Ethernet0 -u
config vlan member add 100 Ethernet8 -u

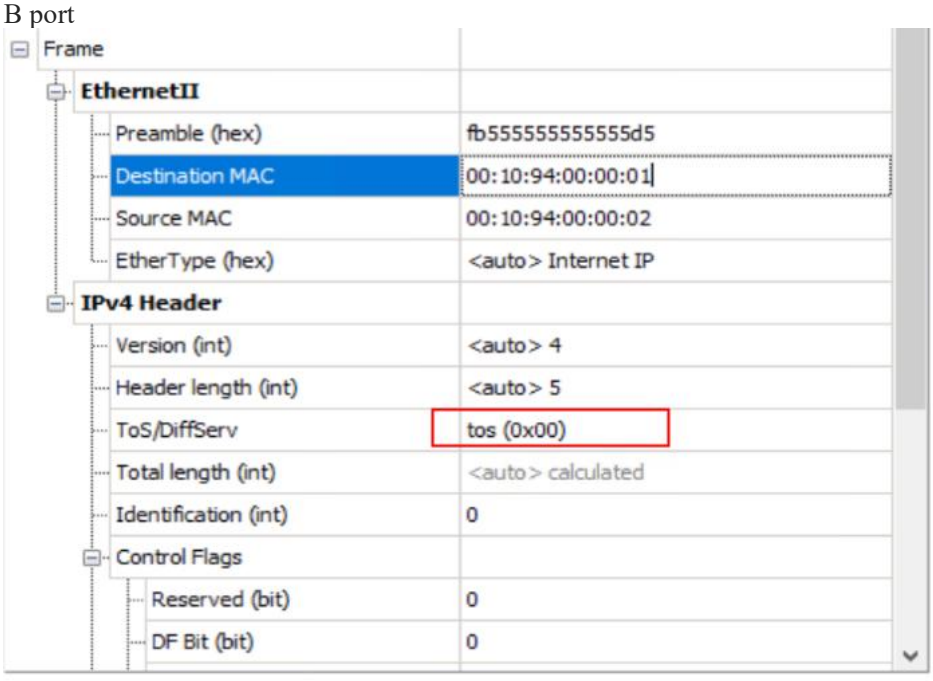
TGB sends learning message
TGA sets the line speed to send DSCP0 packet length 1230 packets to TGB and check the packet receiving rate
Port A



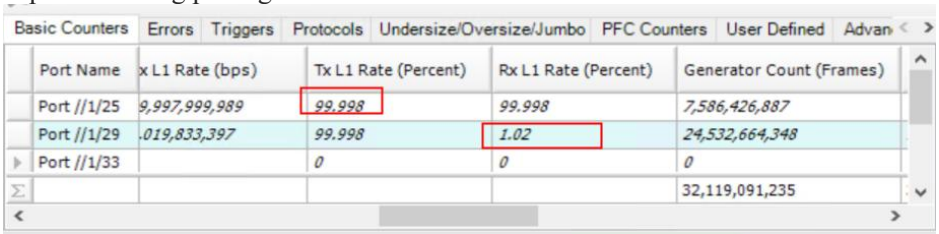




B port

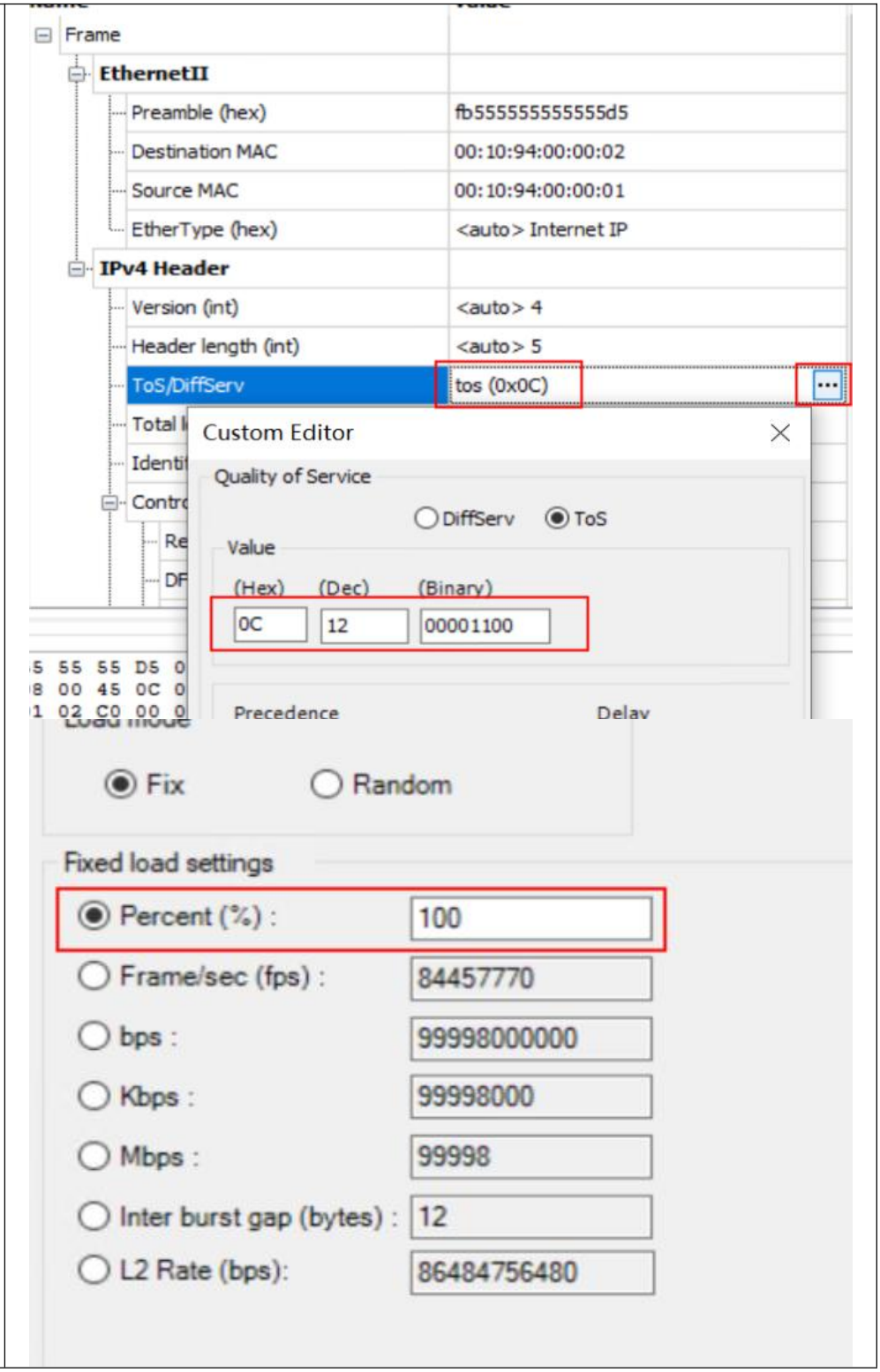


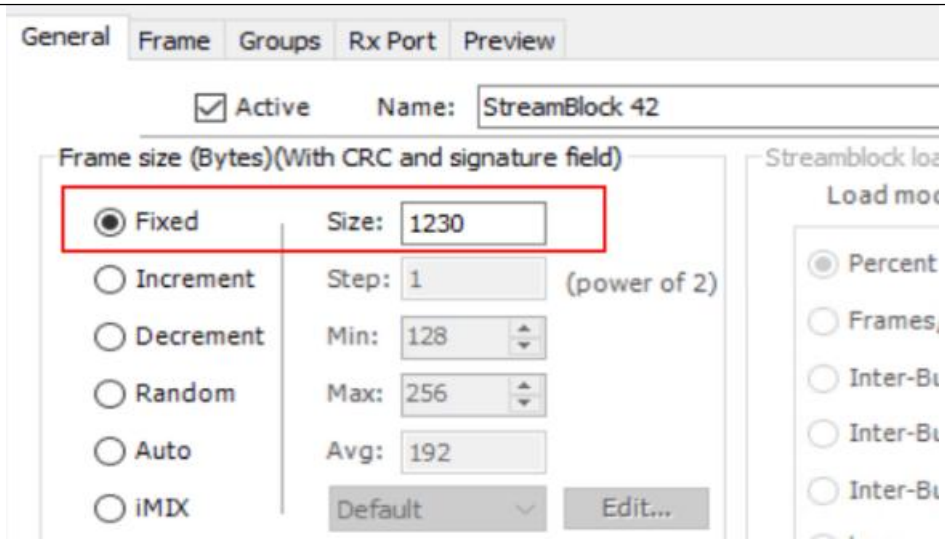
B port receiving package



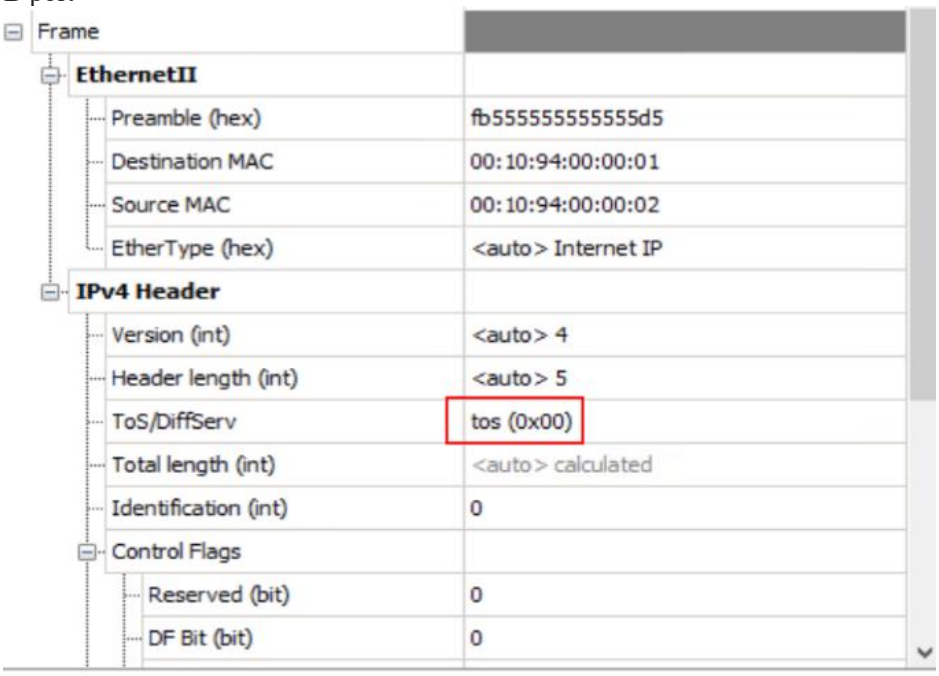
TGA sets the line speed to send DSCP3 packets with a length of 1230 to TGB, and checks the packet receiving rate.

Port A

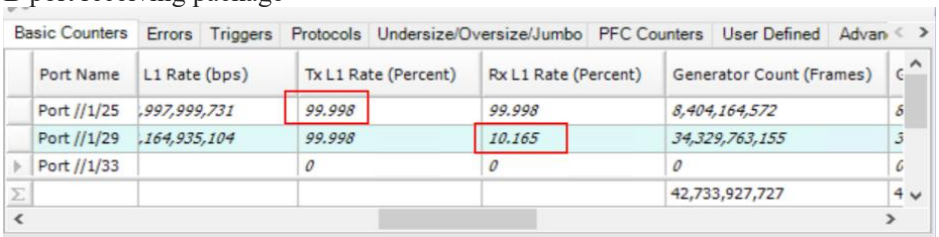

Frame
EthernetII
Preamble (hex)
fb555555555555d5
Destination MAC
00:10:94:00:00:02
Source MAC
00:10:94:00:00:01
EtherType (hex)
<auto> Internet IP
IPv4 Header
Version (int)
<auto> 4
Header length (int)
<auto> 5
ToS/DiffServ
tos (0x0C)
Custom Editor
Quality of Service
DiffServ
ToS
Value
(Hex)
(Dec)
(Binary)
0C
12
00001100
Precedence
Delay
Fix
Random
Fixed load settings
Percent (%) :
100
Frame/sec (fps) :
84457770
bps :
99998000000
Kbps :
99998000
Mbps :
99998
Inter burst gap (bytes) :
12
L2 Rate (bps):
86484756480



B port

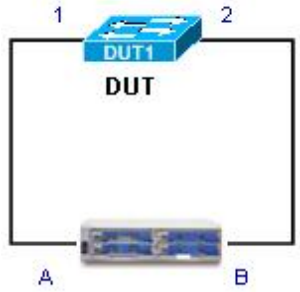


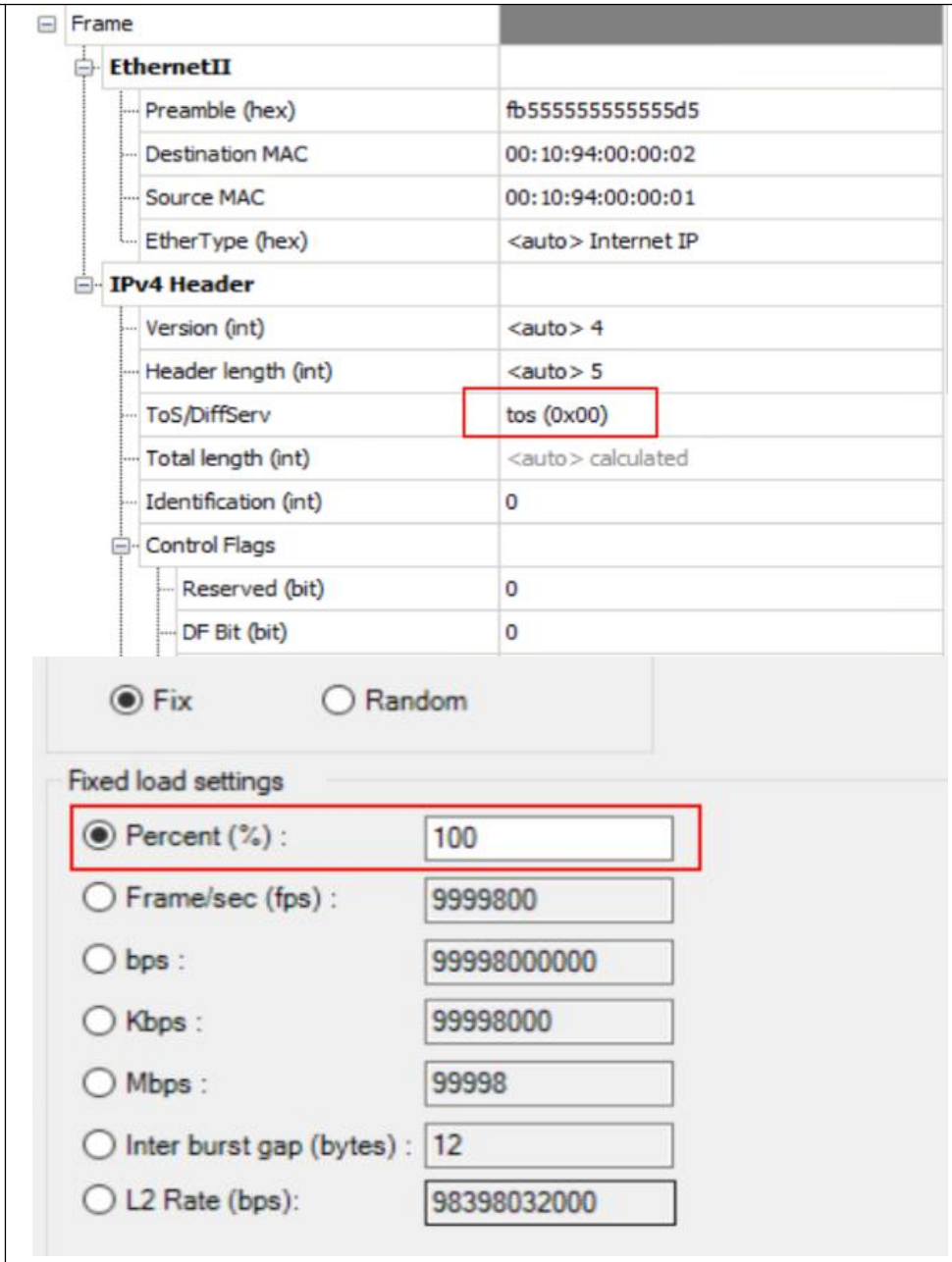
B port receiving package



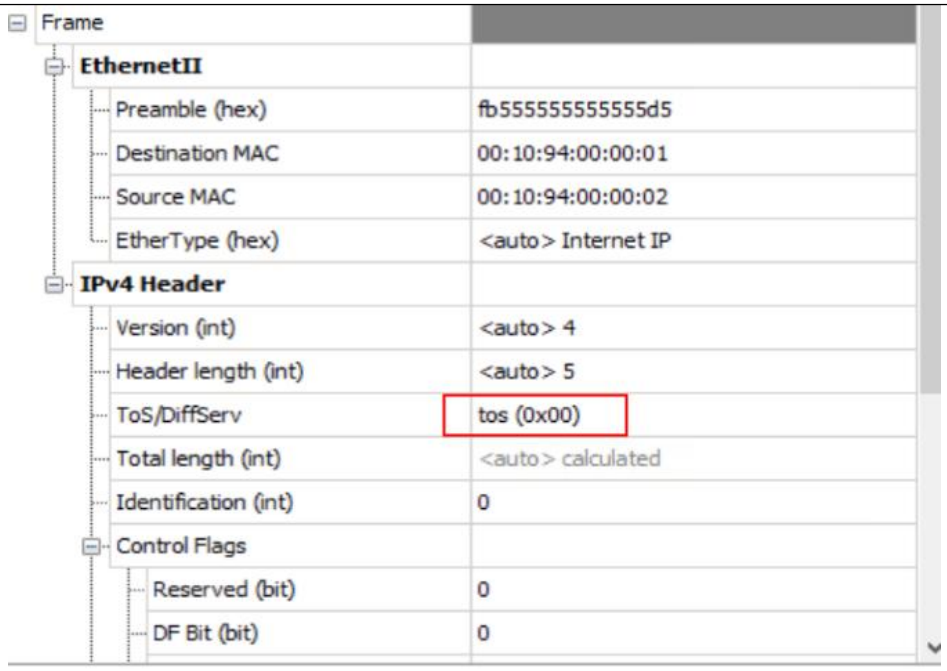
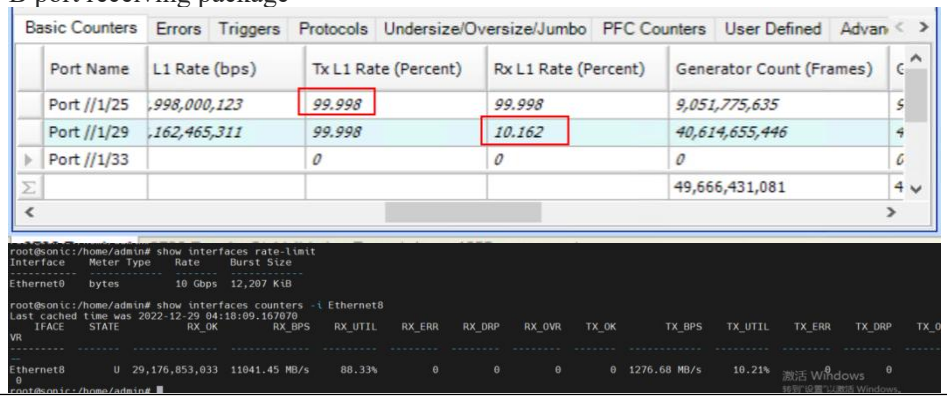
Test Results	**PASS**
Remark	

5.12 PASS -Ingress Port Rate Limit

Test items	Egress Shaping Functional Test
Test content	Test the device according to the set Egress Shaping value forwarding message
Test topology	 —
Test steps	1. Set up the test environment according to the diagram. 2. Configure DUTP 1 ingress rate limit 1 0 G 3. Create VLAN 100 and add DUT P1 -P2 to vlan1 00 as untagged members 4. TGB sends a learning packet, TGA sets the line speed to send a packet length of 1 230 to TGB, and checks the packet receiving rate 5. Stop all outbound packets Delete related configuration
Expected Results	2- 3. Configuration successful 3. The message rate received by TGB is 10 G
DUT Configuration	Configuring rate limit config interface rate-limit add Ethernet0 --meter-type bytes --rate 10g Add VLAN config vlan add 100 config vlan member add 100 Ethernet0 -u config vlan member add 100 Ethernet8 -u TGB sends a learning packet, TGA sets the line speed to send a packet length of 1 230 to TGB, and checks the packet receiving rate Port A

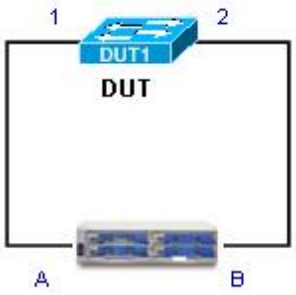

Frame
EthernetII
Preamble (hex)
fb555555555555d5
Destination MAC
00:10:94:00:00:02
Source MAC
00:10:94:00:00:01
EtherType (hex)
<auto> Internet IP
IPv4 Header
Version (int)
<auto> 4
Header length (int)
<auto> 5
ToS/DiffServ
tos (0x00)
Total length (int)
<auto> calculated
Identification (int)
0
Control Flags
Reserved (bit)
0
DF Bit (bit)
0
Fix
Random
Fixed load settings
Percent (%) :
100
Frame/sec (fps) :
9999800
bps :
99998000000
Kbps :
99998000
Mbps :
99998
Inter burst gap (bytes) :
12
L2 Rate (bps):
98398032000

B port

	 B port receiving package 
Test Results	**PASS**
Remark	

5.13 PASS -WRED

Test items	WRED Function Test
Purpose of the test	The test equipment can forward messages according to the wred settings.

Test environment	 _
Test steps	1. Set up the test environment according to the diagram. 2. Configuring Two WRED Profiles 3. Bind the WRED profile to the outbound ports Queue 0 and Queue 3 respectively. 4. Configure the QOS profile and bind it to the port, set DSCP 0 to Queue 0 and DSCP 3 to Queue 3 5. Configure the egress rate limit to 10G 6. Create VLAN 100 and add DUT P1 and DUTP2 to VLAN 100 as untagged members. 7. TGB continues to send mac learning packages 8. TGA sends messages to TGB at line speed Continue for 10 seconds to check the packet loss ratio received by TGB 9. Delete the wred configuration and repeat step 8 to view the packets received by TGB.
Expected Results	8. wred works as configured 9. No wred behavior
DUT Configuration	Configuring QOS sudo config qos reload config interface buffer bind priority-group Ethernet0 0 ingress_lossless_profile config interface buffer bind priority-group Ethernet8 0 ingress_lossless_profile config interface buffer bind queue Ethernet0 0 egress_lossless_profile config interface buffer bind queue Ethernet8 0 egress_lossless_profile config interface buffer bind priority-group Ethernet0 3 ingress_lossless_profile config interface buffer bind priority-group Ethernet8 3 ingress_lossless_profile config interface buffer bind queue Ethernet0 3 egress_lossless_profile config interface buffer bind queue Ethernet8 3 egress_lossless_profile config qos dscp-tc add dscp_to_tc_profile --dscp 0 --tc 0 config qos dscp-tc update dscp_to_tc_profile --dscp 3 --tc 3 config interface qos dscp-tc bind Ethernet0 dscp_to_tc_profile config interface qos dscp-tc bind Ethernet8 dscp_to_tc_profile config qos tc-pg add tc_to_pg_profile --tc 0 --pg 0 config qos tc-pg update tc_to_pg_profile --tc 3 --pg 3 config interface qos tc-pg bind Ethernet0 tc_to_pg_profile config interface qos tc-pg bind Ethernet8 tc_to_pg_profile config qos tc-queue add tc_to_queue_profile --tc 0 --queue 0 config qos tc-queue update tc_to_queue_profile --tc 3 --queue 3 config interface qos tc-queue bind Ethernet0 tc_to_queue_profile

config interface qos tc-queue bind Ethernet8 tc_to_queue_profile

Configure a WRED profile and bind it
config wred add wred-prof-high --mode wred --gmin 0 --gmax 133168898 --gdrop 100

config wred add wred-prof --mode wred --gmin 0 --gmax 133168898 --gdrop 10

config interface wred bind queue Ethernet8 0 wred-prof-high
config interface wred bind queue Ethernet 8 3 wred -prof

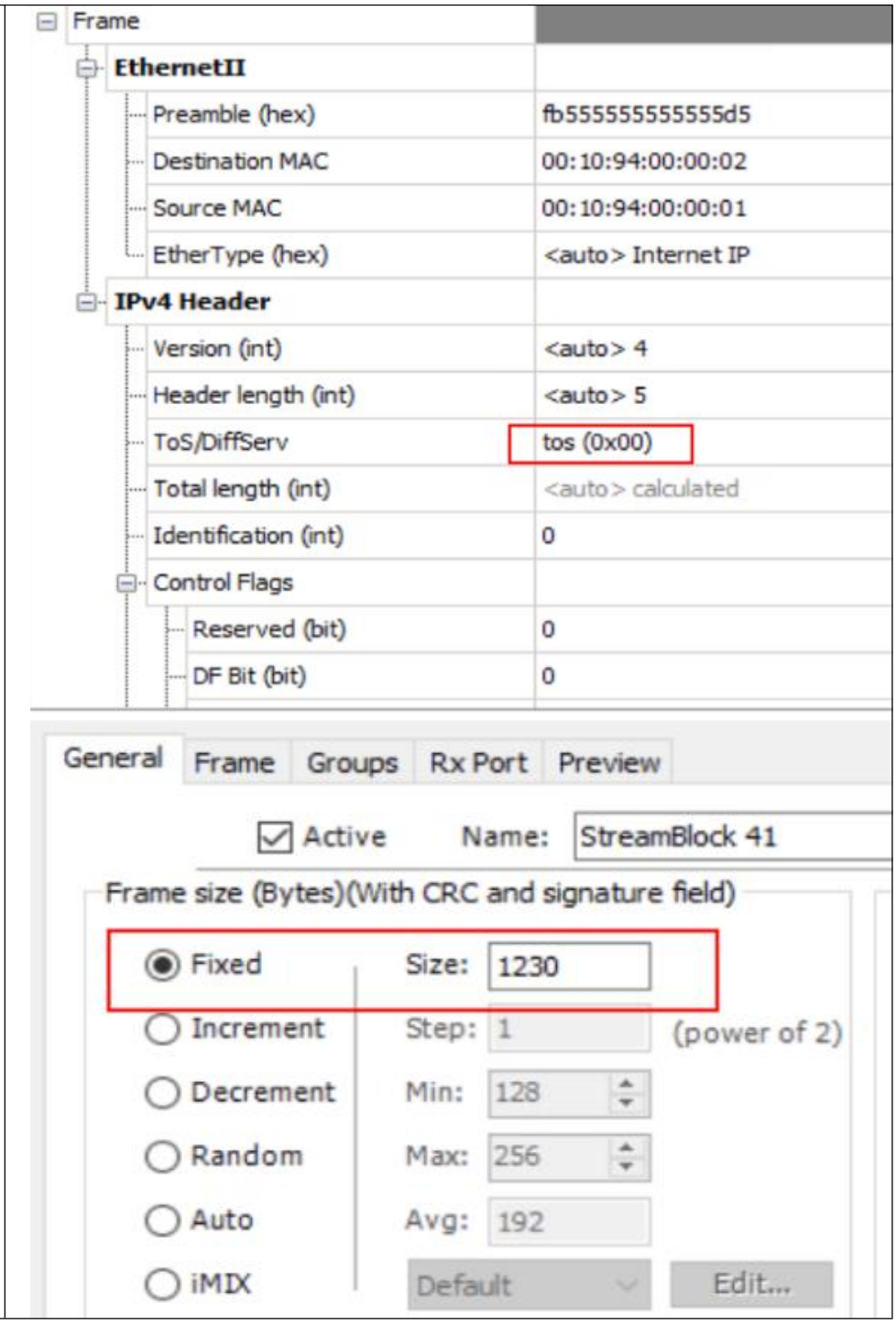
Check the WRED profile of the bound port
show written
show interfaces wred

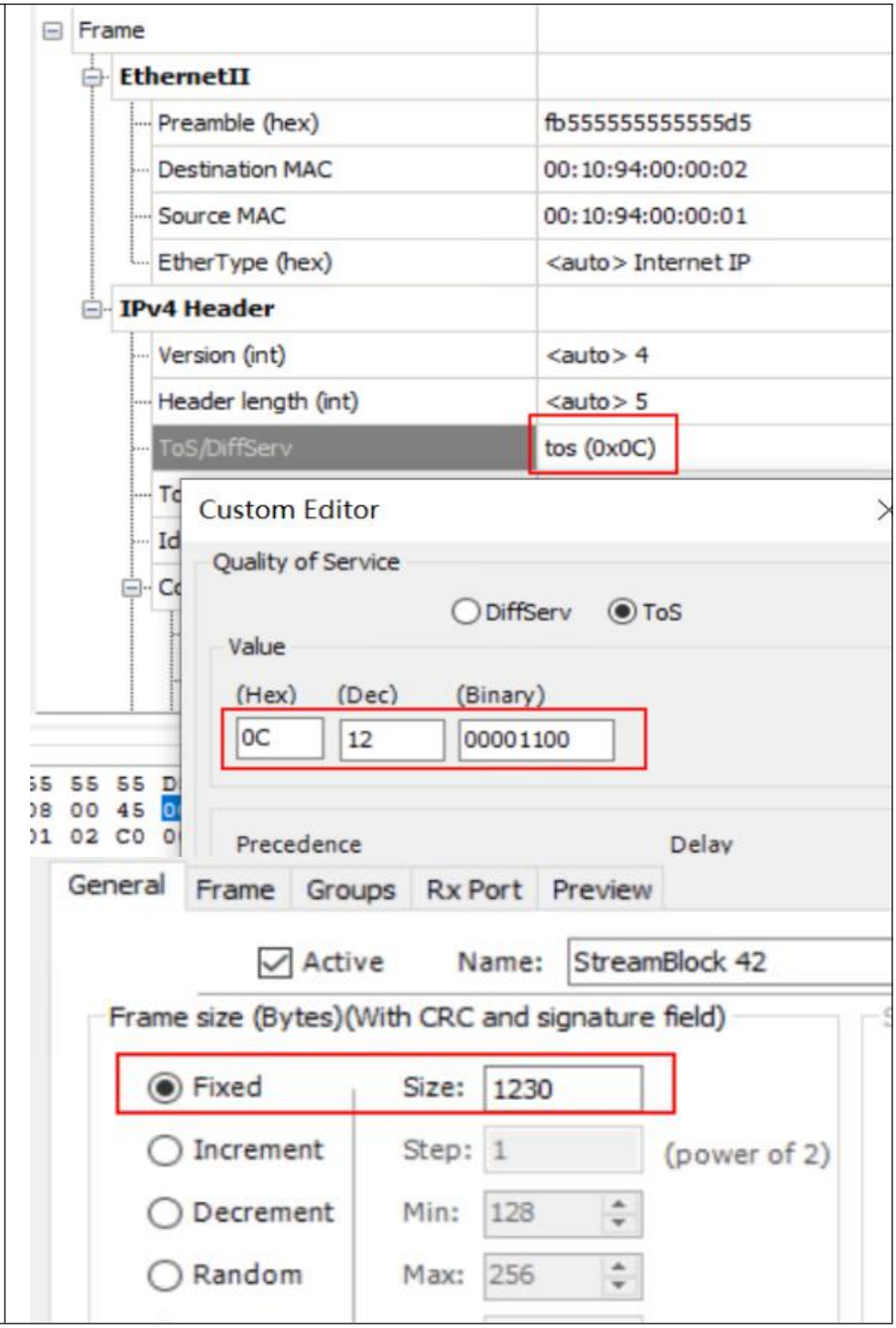
```
root@sonic:/home/admin# show wred
Profile: wred-prof
Color     Mode      Min Threshold    Max Threshold    Drop Probability
-------   ------  ---------------  ---------------  ------------------
Green     WRED                 0        133168898                 100
Yellow
Red

Profile: wred-prof-high
Color     Mode      Min Threshold    Max Threshold    Drop Probability
-------   ------  ---------------  ---------------  ------------------
Green     WRED                 0        133168898                  10
Yellow
Red

root@sonic:/home/admin#
root@sonic:/home/admin# show interfaces wred
Ethernet8
Queue: 0
ECN/WRED: wred-prof
Color     Mode      Min Threshold    Max Threshold    Drop Probability
-------   ------  ---------------  ---------------  ------------------
Green     WRED                 0        133168898                 100
Yellow
Red

Ethernet8
Queue: 3
ECN/WRED: wred-prof-high
Color     Mode      Min Threshold    Max Threshold    Drop Probability
-------   ------  ---------------  ---------------  ------------------
Green     WRED                 0        133168898                  10
Yellow
Red

root@sonic:/home/admin#
```

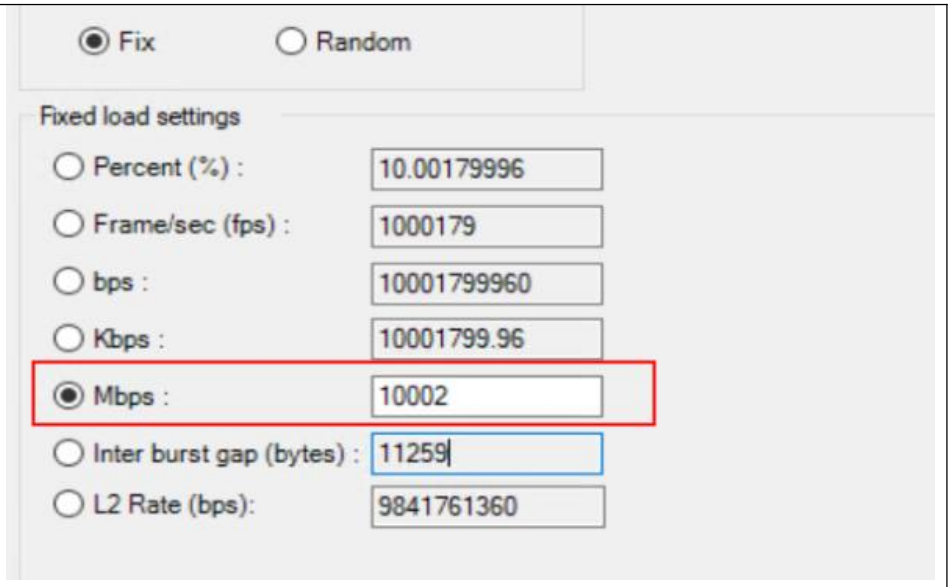
Configure the egress rate limit to 10G
config scheduler add profile-1 -- shaper_type =bytes --bandwidth=10g
config interface scheduler bind port Ethernet8 profile-1

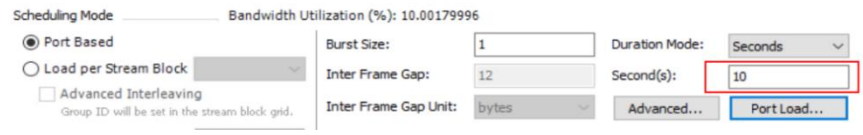
Configuring VLANs
config vlan add 100
config vlan member add 100 Ethernet 0 -u
config vlan member add 100 Ethernet 8 -u

TGB continues to send mac learning packets, TGA 1 0.002 Gb sends messages to TGB
Port A

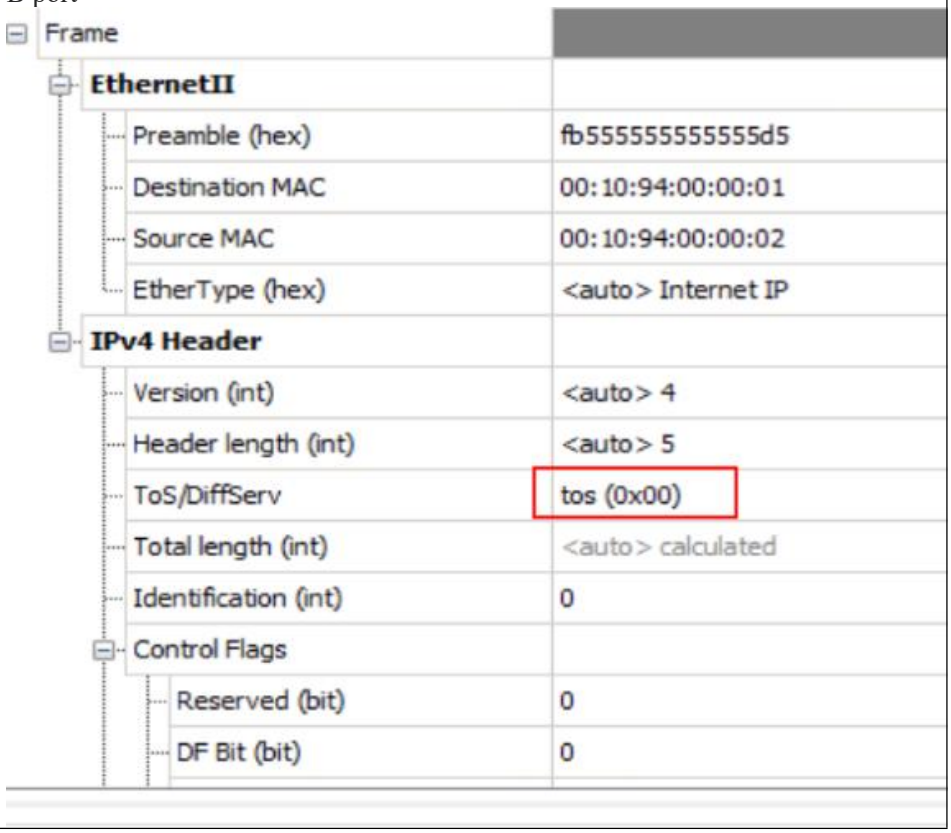

Frame
EthernetII
Preamble (hex)
fb555555555555d5
Destination MAC
00:10:94:00:00:02
Source MAC
00:10:94:00:00:01
EtherType (hex)
<auto> Internet IP
IPv4 Header
Version (int)
<auto> 4
Header length (int)
<auto> 5
ToS/DiffServ
tos (0x00)
Total length (int)
<auto> calculated
Identification (int)
0
Control Flags
Reserved (bit)
0
DF Bit (bit)
0
General
Frame
Groups
Rx Port
Preview
Active
Name:
StreamBlock 41
Frame size (Bytes)(With CRC and signature field)
Fixed
Size:
1230
Increment
Step:
1
(power of 2)
Decrement
Min:
128
Random
Max:
256
Auto
Avg:
192
iMIX
Default
Edit...

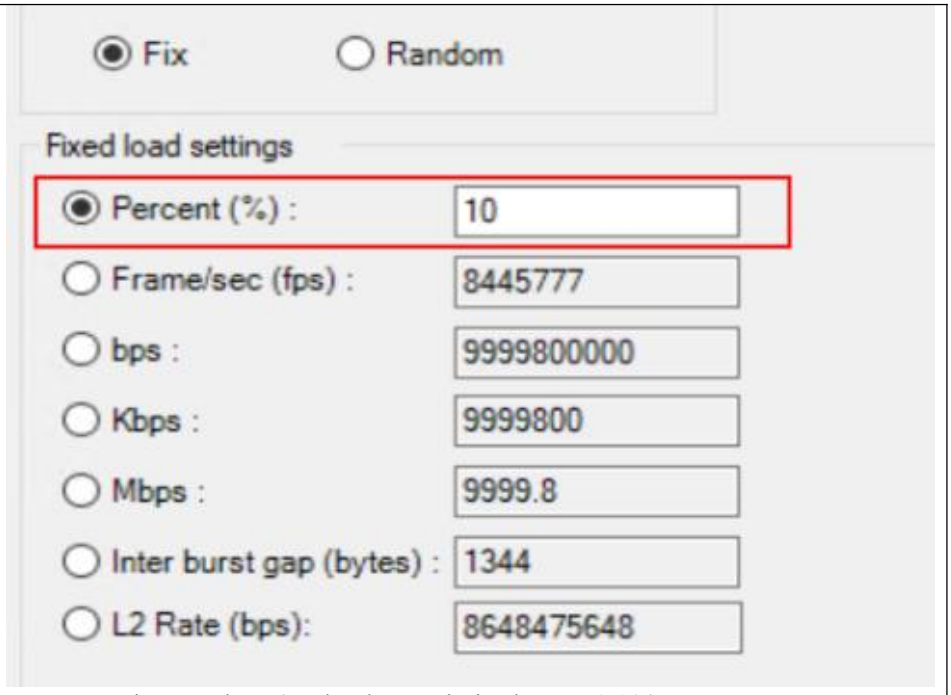

Frame
EthernetII
Preamble (hex)
fb555555555555d5
Destination MAC
00:10:94:00:00:02
Source MAC
00:10:94:00:00:01
EtherType (hex)
<auto> Internet IP
IPv4 Header
Version (int)
<auto> 4
Header length (int)
<auto> 5
ToS/DiffServ
tos (0x0C)
Custom Editor
Quality of Service
DiffServ
ToS
Value
(Hex)
(Dec)
(Binary)
0C
12
00001100
Precedence
Delay
General
Frame
Groups
Rx Port
Preview
Active
Name:
StreamBlock 42
Frame size (Bytes)(With CRC and signature field)
Fixed
Size:
1230
Increment
Step:
1
(power of 2)
Decrement
Min:
128
Random
Max:
256

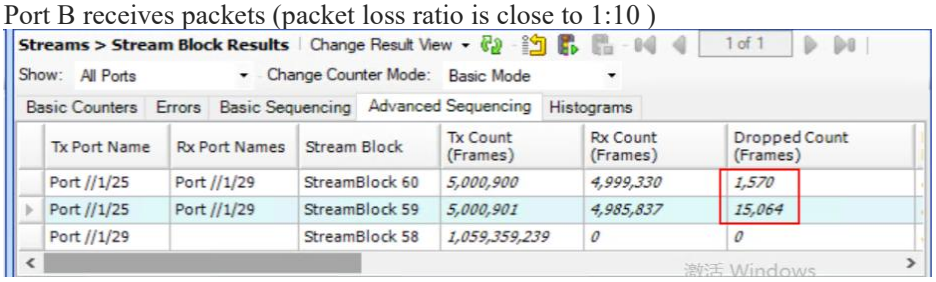

Fix
Random
Fixed load settings
Percent (%) :
10.00179996
Frame/sec (fps) :
1000179
bps :
10001799960
Kbps :
10001799.96
Mbps :
10002
Inter burst gap (bytes) :
11259
L2 Rate (bps):
9841761360

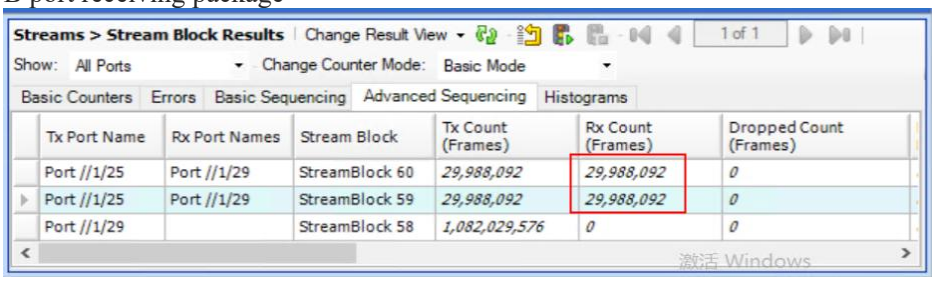

Scheduling Mode
Bandwidth Utilization (%): 10.00179996
Port Based
Load per Stream Block
Advanced Interleaving
Group ID will be set in the stream block grid.
Burst Size:
1
Inter Frame Gap:
12
Inter Frame Gap Unit:
bytes
Duration Mode:
Seconds
Second(s):
10
Advanced...
Port Load...

B port


Frame
EthernetII
Preamble (hex)
fb555555555555d5
Destination MAC
00:10:94:00:00:01
Source MAC
00:10:94:00:00:02
EtherType (hex)
<auto> Internet IP
IPv4 Header
Version (int)
<auto> 4
Header length (int)
<auto> 5
ToS/DiffServ
tos (0x00)
Total length (int)
<auto> calculated
Identification (int)
0
Control Flags
Reserved (bit)
0
DF Bit (bit)
0

<table>
<tr><td></td><td>


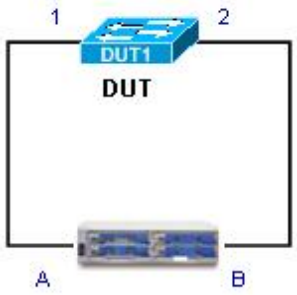
Port B receives packets (packet loss ratio is close to 1:10)


Remove wred binding
Instrument configuration has not changed
B port receiving package


</td></tr>
<tr><td>Test Results</td><td>PASS</td></tr>
<tr><td>Remark</td><td></td></tr>
</table>

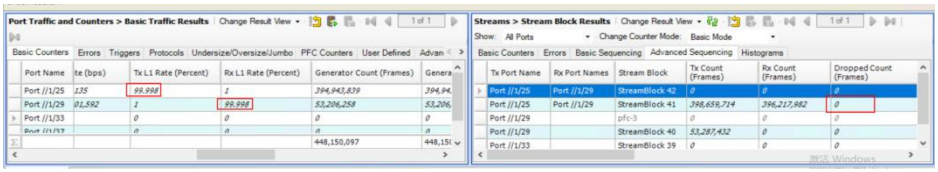
5.14 PASS -ECN

Test items	ECN functional test
Test content	The test equipment can forward messages according to the ECN settings.

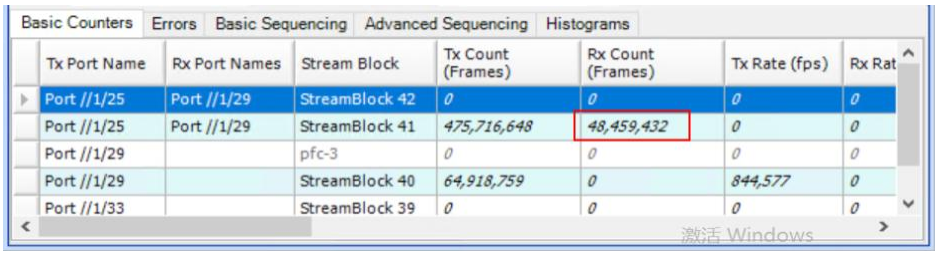
Test environment	
Test steps	1. Set up the test environment according to the diagram. 2. Create VLAN 100 and add DUT P1 and DUTP2 to VLAN 100 as untagged members. 3. Configure a WRED profile and bind the port 4. View ECN Configuration 5. Configure QOS profile and bind it to the port, set DSCP 0 to Queue 0 6. Set the egress speed limit to 10G 7. TGB continues to send MAC learning packets 8. TGA sends ECN 0x01 v 4 messages at line speed 9. TGB packet capture view 10. TGA sends ECN 0x02 v 4 messages at line speed 11. TGB packet capture view 12. TGA sends ECN 0x01 v6 messages at line speed 13. TGB packet capture view 14. TGA sends ECN 0x02 v6 messages at line speed 15. TGB packet capture view
Expected Results	2.3 Configuration Success 5. Message forwarding without packet loss 6. Drop packets according to wred settings 9. TGB packet capture ECN is 3 11. TGB packet capture ECN is 3
DUT Configuration	Configuring VLANs config vlan add 100 config vlan member add 100 Ethernet0 -u config vlan member add 100 Ethernet8 -u Configure a WRED profile and bind it config wred add wred-prof --mode ecn --gmin 100000 --gmax 800000 --gdrop 100 config interface wred bind queue Ethernet0 0 wred-prof config interface wred bind queue Ethernet 8 0 wred -prof View ECN

show ecn

Configure QOS profile and bind it to the port, set DSCP 0 to Queue 0
config qos dscp-tc add dscp_to_tc_profile -- dscp 0 -- tc 0
config interface qos dscp-tc bind Ethernet 0 dscp_to_tc_profile
config interface qos dscp-tc bind Ethernet8 dscp_to_tc_profile
config qos tc-pg add tc_to_pg_profile --tc 0 --pg 0
config interface qos tc-pg bind Ethernet0 tc_to_pg_profile
config interface qos tc-pg bind Ethernet8 tc_to_pg_profile
config qos tc -queue add tc_to_queue_profile -- tc 0 --queue 0
config interface qos tc -queue bind Ethernet 0 tc_to_queue_profile
config interface qos tc -queue bind Ethernet 8 tc_to_queue_profile
No packet loss before speed limit

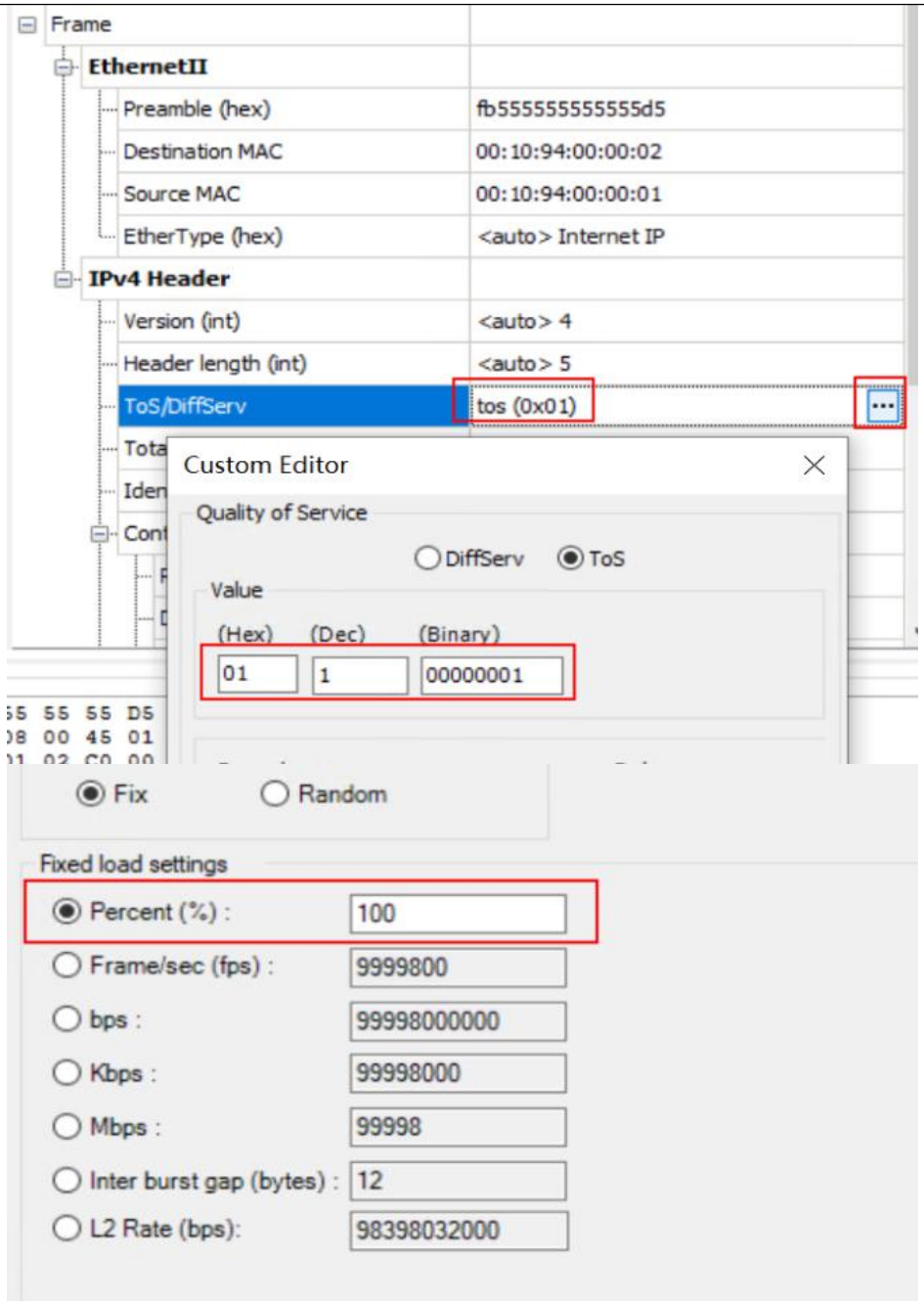


Configuring egress rate limit
config scheduler add profile-1 -- shaper_type =bytes --bandwidth=10g
config interface scheduler bind port Ethernet8 profile-1

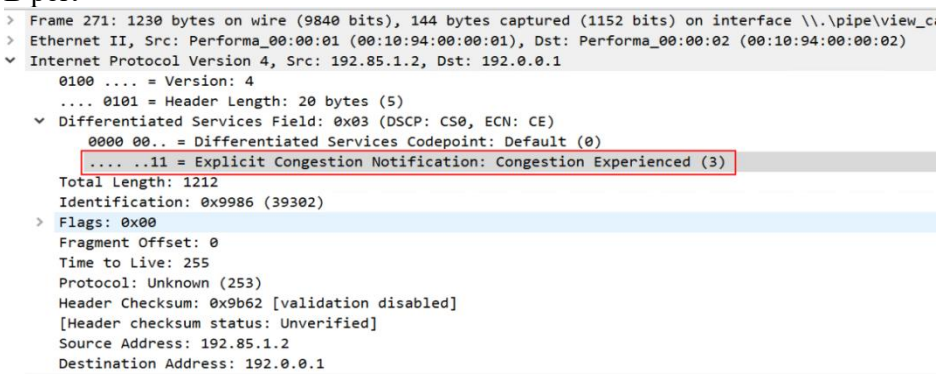


Tx Port Name	Rx Port Names	Stream Block	Tx Count (Frames)	Rx Count (Frames)	Tx Rate (fps)	Rx Rat
Port //1/25	Port //1/29	StreamBlock 42	0	0	0	0
Port //1/25	Port //1/29	StreamBlock 41	475,716,648	48,459,432	0	0
Port //1/29		pfc-3	0	0	0	0
Port //1/29		StreamBlock 40	64,918,759	0	844,577	0
Port //1/33		StreamBlock 39	0	0	0	0

TGA sends dscp0 packets with ECN 1 at line speed, and TGB captures packets with ECN 3
Port A

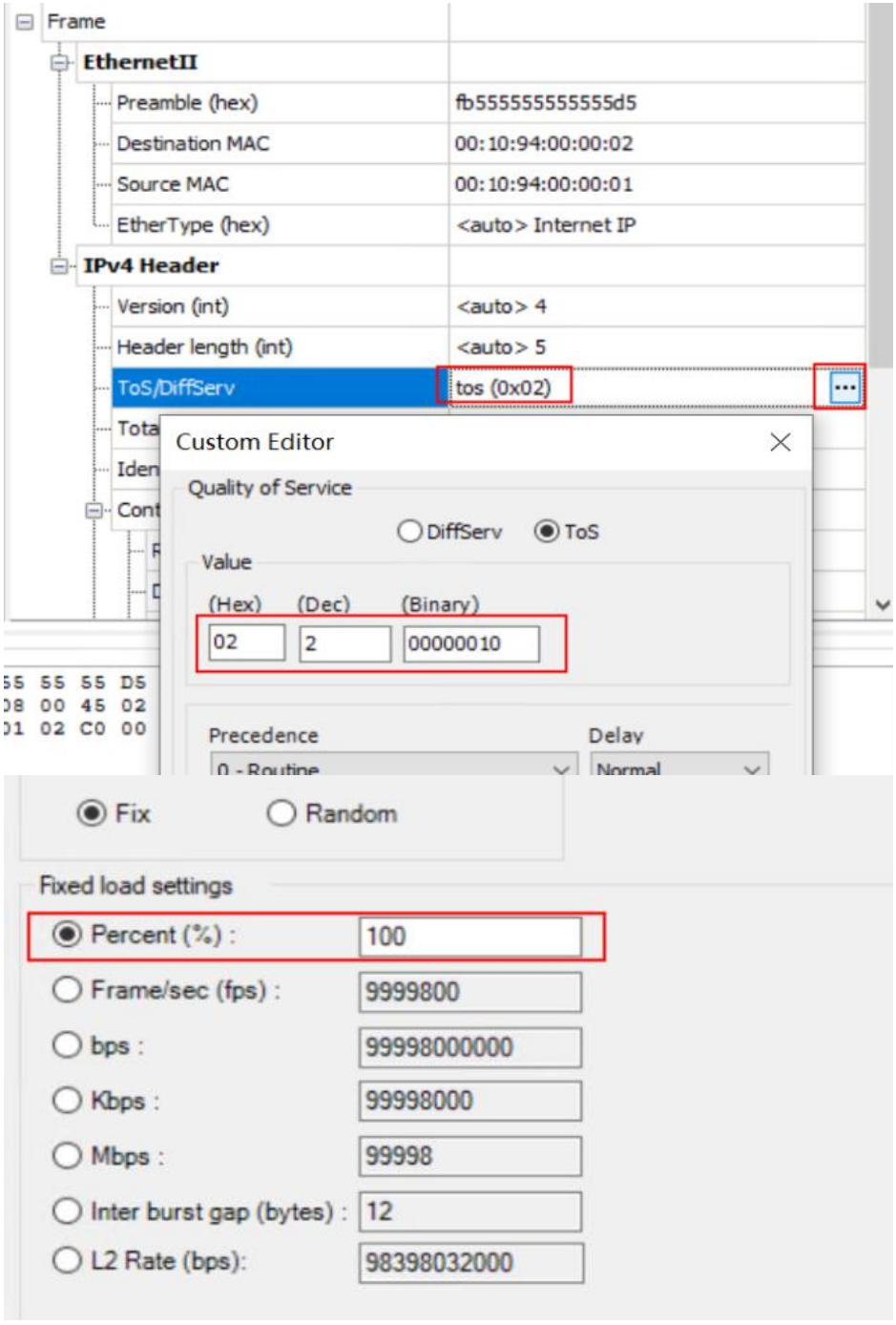


B port

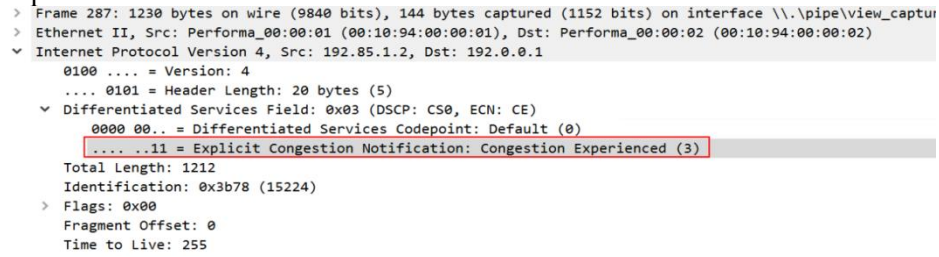


TGA sends dscp0 packets with ECN 2 at line speed, and TGB captures packets

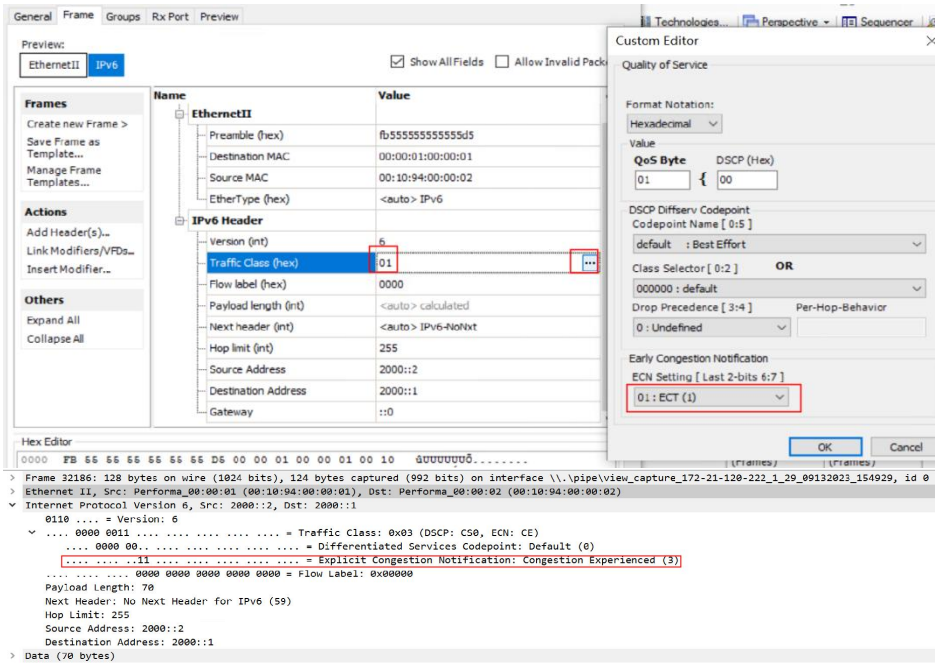
with ECN 3



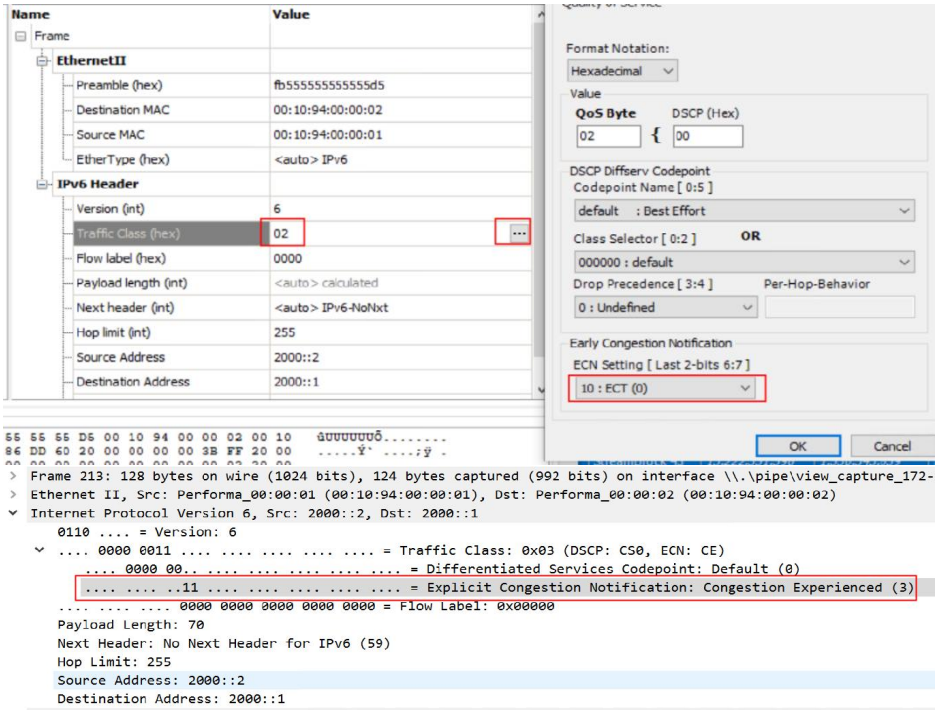
B port



TGA line speed sends dscp0 with ECN 1 IPv6 packets , TGB captures packets with ECN of 3



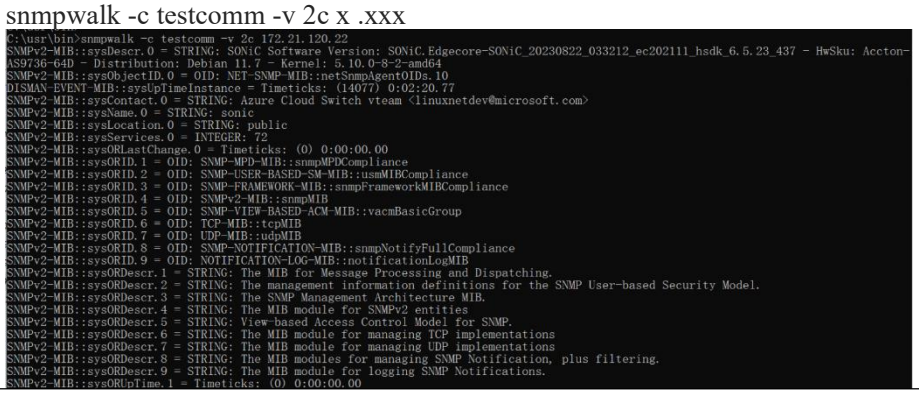
TGA line speed sends dscp0 with ECN 2 IPv6 packets , TGB captures packets with ECN of 3



Test Results	PASS
Remark	

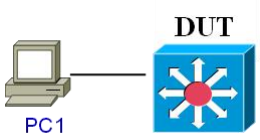
六、System/Management

6.1 PASS -DRAFT(NAL) SNMP

Test items	SNMP support test
Purpose of the test	Test switch supports SNMP protocol
Test environment	
Test steps	1. Connect the host with the MIB calling software installed to the switch. 2. Set the community and agent of the switch 3. Use the snmpwalk tool to query mib information
Expected Results	3. You can get mib information
DUT Configuration	Step 2: config snmp community add testcomm 1 config snmpagentaddress add x .xxx Step 3: snmpwalk -c testcomm -v 2c x .xxx 
Test Results	**PASS**
Remark	

```
C:\usr\bin>snmpwalk -c testcomm -v 2c 172.21.120.22
SNMPv2-MIB::sysDescr.0 = STRING: SONiC Software Version: SONiC.Edgecore-SONiC_20230822_033212_ec202111_hsdk_6.5.23_437 - HwSku: Accton-
AS9736-64D - Distribution: Debian 11.7 - Kernel: 5.10.0-8-2-amd64
SNMPv2-MIB::sysObjectID.0 = OID: NET-SNMP-MIB::netSnmpAgentOIDs.10
DISMAN-EVENT-MIB::sysUpTimeInstance = Timeticks: (14077) 0:02:20.77
SNMPv2-MIB::sysContact.0 = STRING: Azure Cloud Switch vteam <linuxnetdev@microsoft.com>
SNMPv2-MIB::sysName.0 = STRING: sonic
SNMPv2-MIB::sysLocation.0 = STRING: public
SNMPv2-MIB::sysServices.0 = INTEGER: 72
SNMPv2-MIB::sysORLastChange.0 = Timeticks: (0) 0:00:00.00
SNMPv2-MIB::sysORID.1 = OID: SNMP-MPD-MIB::snmpMPDCompliance
SNMPv2-MIB::sysORID.2 = OID: SNMP-USER-BASED-SM-MIB::usmMIBCompliance
SNMPv2-MIB::sysORID.3 = OID: SNMP-FRAMEWORK-MIB::snmpFrameworkMIBCompliance
SNMPv2-MIB::sysORID.4 = OID: SNMPv2-MIB::snmpMIB
SNMPv2-MIB::sysORID.5 = OID: SNMP-VIEW-BASED-ACM-MIB::vacmBasicGroup
SNMPv2-MIB::sysORID.6 = OID: TCP-MIB::tcpMIB
SNMPv2-MIB::sysORID.7 = OID: UDP-MIB::udpMIB
SNMPv2-MIB::sysORID.8 = OID: SNMP-NOTIFICATION-MIB::snmpNotifyFullCompliance
SNMPv2-MIB::sysORID.9 = OID: NOTIFICATION-LOG-MIB::notificationLogMIB
SNMPv2-MIB::sysORDescr.1 = STRING: The MIB for Message Processing and Dispatching.
SNMPv2-MIB::sysORDescr.2 = STRING: The management information definitions for the SNMP User-based Security Model.
SNMPv2-MIB::sysORDescr.3 = STRING: The SNMP Management Architecture MIB.
SNMPv2-MIB::sysORDescr.4 = STRING: The MIB module for SNMPv2 entities
SNMPv2-MIB::sysORDescr.5 = STRING: View-based Access Control Model for SNMP.
SNMPv2-MIB::sysORDescr.6 = STRING: The MIB module for managing TCP implementations
SNMPv2-MIB::sysORDescr.7 = STRING: The MIB module for managing UDP implementations
SNMPv2-MIB::sysORDescr.8 = STRING: The MIB modules for managing SNMP Notification, plus filtering.
SNMPv2-MIB::sysORDescr.9 = STRING: The MIB module for logging SNMP Notifications.
SNMPv2-MIB::sysORUpTime.1 = Timeticks: (0) 0:00:00.00
```

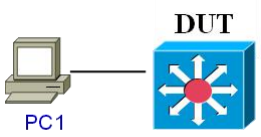
6.2 PASS - SNMP Trap

Test items	SNMP trap
Purpose of the test	The test equipment will follow the snmp Trap configuration sends trap
Test topology	

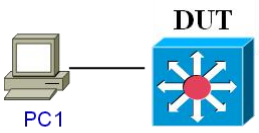
Test steps	1. Set up the test environment according to the diagram. 2. Configure the device to send snmptrap to the PC and enable snmp on the PC Trap Server 3. View related logs on PC
Expected Results	2. Configuration successful 3.SNMP The trap server contains relevant trap information sent by the device
DUT Configuration	Configure snmp trap server config snmptrap modify 2 -c public xxxx View snmp Trap Configuration show snmptrap root@sonic:/home/admin# root@sonic:/home/admin# show snmptrap Version TrapReceiverIP Port VRF Community 2 172.21.120.31 162 None public root@sonic:/home/admin# Shutdown port root@sonic:/home/admin# config interface shutdown Ethernet0 root@sonic:/home/admin# View trapserver receiving packets Received 95 byte packet from UDP: [172.21.120.22]:42741→[172.21.120.31]:162 0000: 30 5D 02 01 01 04 06 70 75 62 6C 69 63 A7 50 02 0].....public.P. 0016: 04 16 53 07 B6 02 01 00 02 01 00 30 42 30 0D 06 ..S.....0B0.. 0032: 08 2B 06 01 02 01 01 03 00 43 01 03 30 17 06 0A .+.....C..0... 0048: 2B 06 01 06 03 01 01 04 01 00 06 09 2B 06 01 06 +.....+... 0064: 03 01 01 05 01 30 18 06 0A 2B 06 01 06 03 01 01 .....0...+..... 0080: 04 03 00 06 0A 2B 06 01 04 01 BF 08 03 02 0A .....+..... No access configuration - dropping trap. Received 70 byte packet from UDP: [172.21.120.22]:42741→[172.21.120.31]:162 0000: 30 44 02 01 01 04 06 70 75 62 6C 69 63 A7 37 02 0D.....public.7. 0016: 04 16 53 07 B7 02 01 00 02 01 00 30 29 30 0E 06 ..S.....0)0.. 0032: 08 2B 06 01 02 01 01 03 00 43 02 38 B8 30 17 06 .+.....C.8.0.. 0048: 0A 2B 06 01 06 03 01 01 04 01 00 06 09 2B 06 01 .+.....+.. 0064: 02 01 2F 02 00 01 ../... No access configuration - dropping trap. Received 149 byte packet from UDP: [172.21.120.22]:42741→[172.21.120.31]:162 0000: 30 81 92 02 01 01 04 06 70 75 62 6C 69 63 A7 81 0.....public.. 0016: 84 02 04 16 53 07 B8 02 01 00 02 01 00 30 76 30 ....S.....0v0 0032: 0E 06 08 2B 06 01 02 01 01 03 00 43 02 38 C5 30 ...+.....C.8.0 0048: 17 06 0A 2B 06 01 06 03 01 01 04 01 00 06 09 2B ...+.....+ 0064: 06 01 06 03 01 01 05 03 30 0F 06 0A 2B 06 01 02 .....0...+... 0080: 01 02 02 01 01 01 02 01 01 30 0F 06 0A 2B 06 01 .....0...+.. 0096: 02 01 02 02 01 07 01 02 01 02 30 0F 06 0A 2B 06 .....0...+. 0112: 01 02 01 02 02 01 08 01 02 01 02 30 18 06 0A 2B .....0...+ 0128: 06 01 06 03 01 01 04 03 00 06 0A 2B 06 01 04 01 .....+.... 0144: BF 08 03 02 0A ..... No access configuration - dropping trap.
Test Results	**PASS**
Remark	

6.3 PASS - Rsyslog

Test items	Rsyslog
Purpose of the test	The test device will send device log information according to the rsyslog configuration

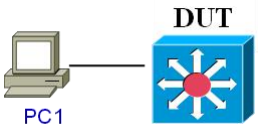
Test topology	
Test steps	1. Set up the test environment according to the diagram. 2. Configure the device to send syslog to PC 1 and enable the log server on the PC 3. View related logs on PC
Expected Results	2. Configuration successful 3. There are relevant logs sent by the device on the log server
DUT Configuration	Configuring remote syslog server config syslog add xxxx View syslog show syslog Feb 26 11:13:56.959142 sonic NOTICE swss#orchagent: :- doPortTask: Set port Ethernet16 admin status to down Log server received 172.21.110.110 Syslog 170 USER.NOTICE: Feb 26 11:13:56.963095 sonic NOTICE swss#orchagent: :- updatePortOperStatus: Port Ethernet16 oper state set from up to down\n
Test Results	**PASS**
Remark	

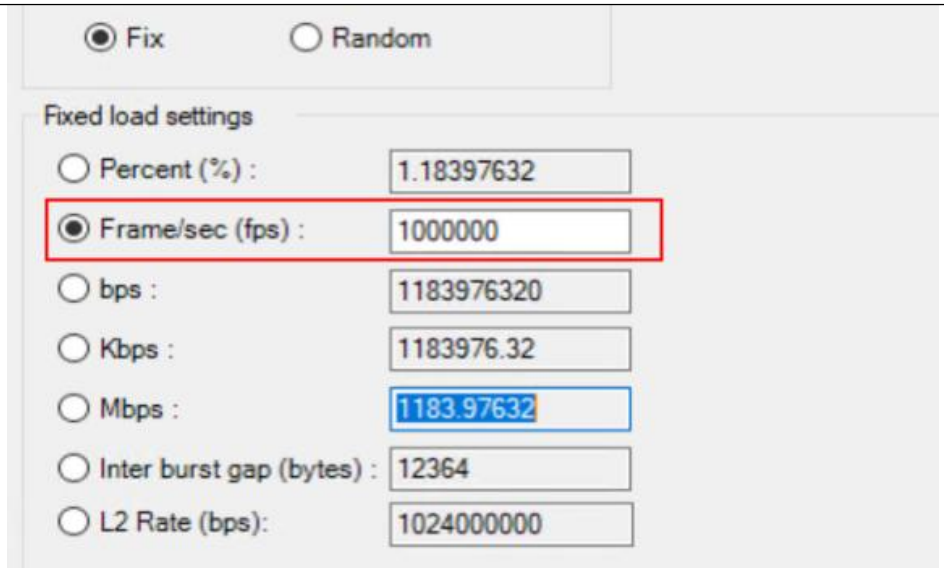
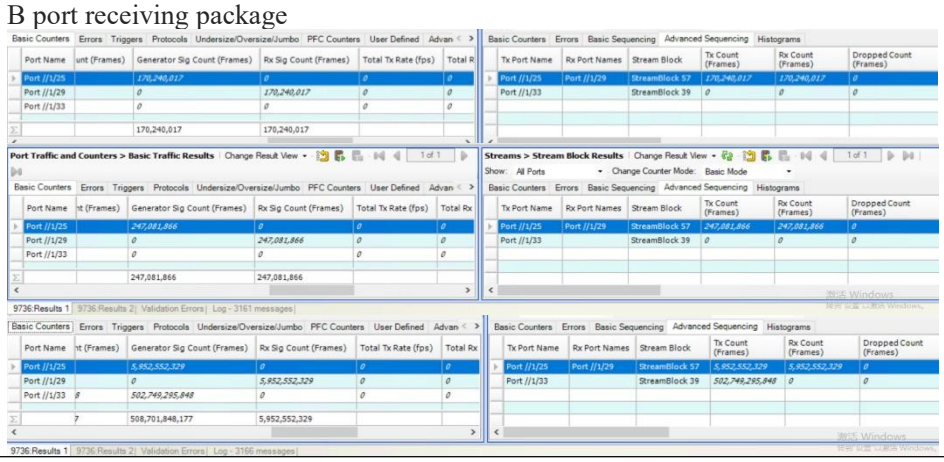
6.4 PASS-Fast Reload

Test items	fast- reboot
Test content	Test the impact of hot restart on the data plane
Test topology	
Test steps	fast- reboot 1. PORT1 to interface IP , config save 2. The instrument sends a ping packet 3. Run fast- reboot -v Observe the number of packet losses after fast- reboot is completed and calculate the impact time
Expected Results	Ping packets are for the control plane, and the impact of fast- reboot is less than 90 seconds.
DUT Configuration	Configuring the Interface config interface ip add Ethernet 0 100.100.100.100/24 config save Packet loss statistics

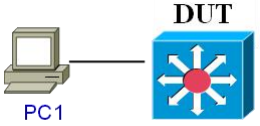
	--- ping statistics --- 100 packets transmitted, 69 packets received, 31.0% packet loss rtt min/avg/max/stddev = 0.266/0.387/0.646/0.055 ms --- ping statistics --- 100 packets transmitted, 57 packets received, 43.0% packet loss rtt min/avg/max/stddev = 0.233/0.430/1.445/0.202 ms 100 packets transmitted, 61 packets received, 39.0% packet loss rtt min/avg/max/stddev = 0.281/0.402/0.754/0.064 ms Average 3 7 seconds
Test Results	**PASS**
Remark	https://github.com/sonic-net/SONiC/wiki/Fast-Reboot

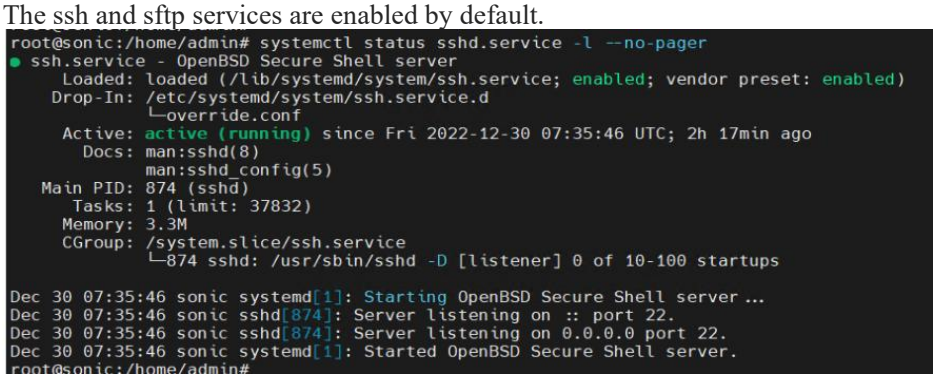
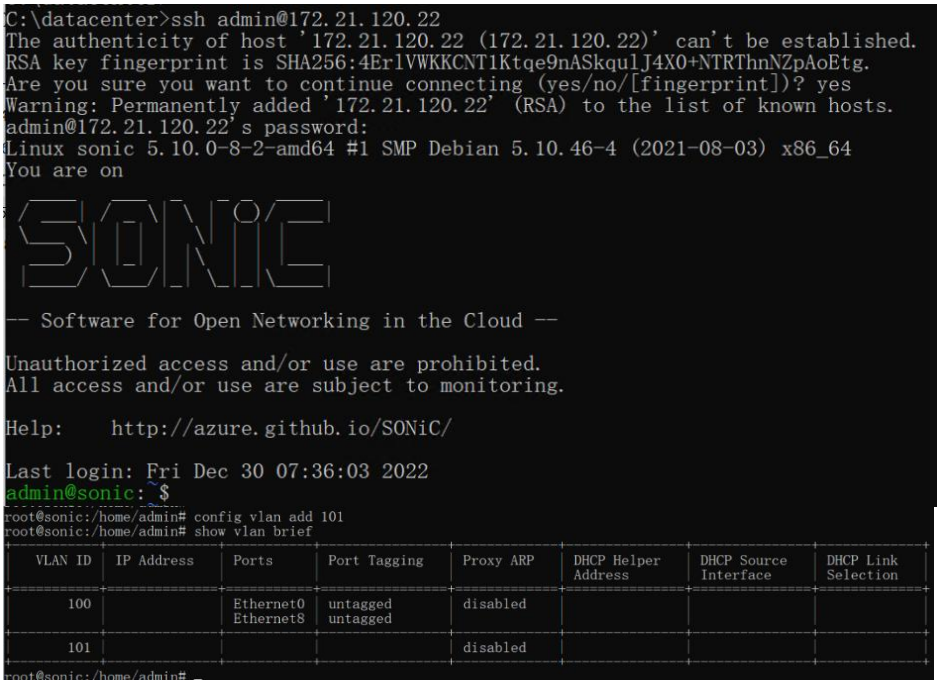
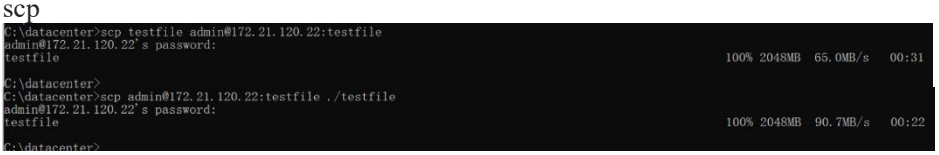
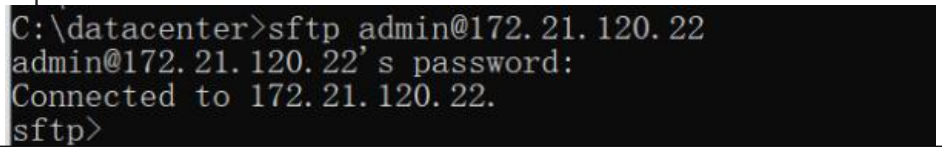
6.5 PASS - Warm Reboot

Test items	Warm Reboot
Test content	Test the impact of hot restart on the data plane
Test topology	
Test steps	w arm-reboot -v 1. Add PORT1 and PORT2 to VLAN 100 , config save 2. Instrument setting 1 000000/ pps 3. Execute w arm-reboot -v 4. Observe the number of packet losses after warm -reboot is completed and calculate the impact time
Expected Results	Record impact time
DUT Configuration	V lan configuration config vlan add 100 config vlan member add 100 Ethernet 0 -u config vlan member add 100 Ethernet 8 -u config save Port A

	 B port receiving package 
Test Results	**PASS**
Remark	https://github.com/sonic-net/SONiC/blob/master/doc/warm-reboot/SONiC_Warmboot.md

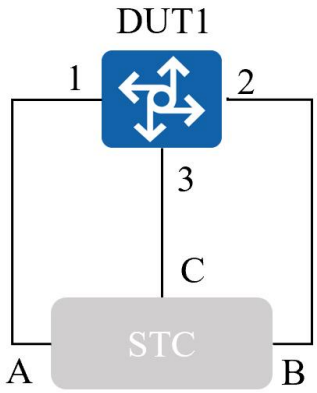
6.6 PASS - Open SSH/SCP/SFTP

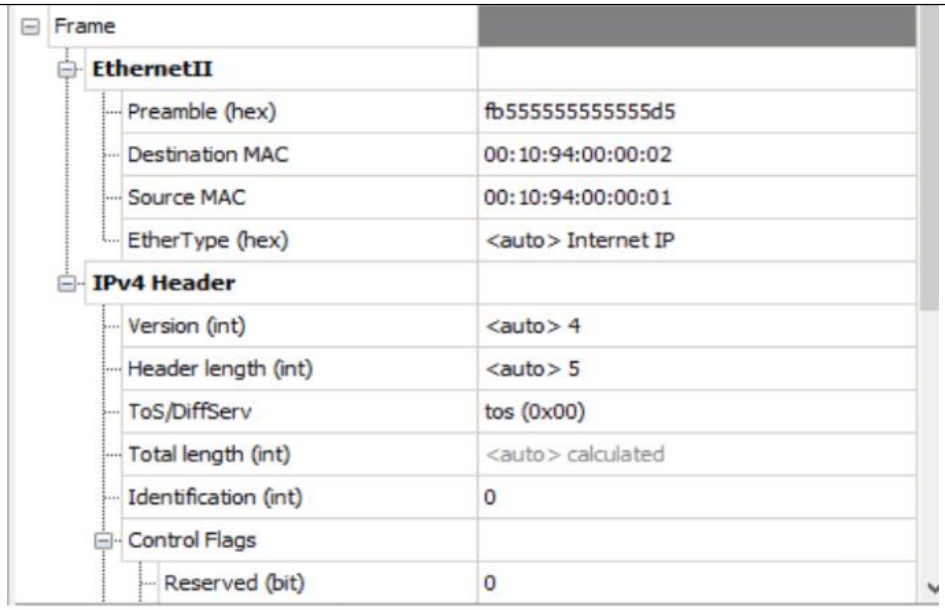
Test items	Open SSH/SCP/SFTP
Purpose of the test	Test switch support for Open SSH/SCP/SFTP
Test topology	
Test steps	admin@DUTIP on PC1 to log in remotely according to the prompts 2. After successful login, use the config command and show command to configure scp on PC1 testfile admin@DUTIP:testfile transfer file scp on PC1 admin@DUTIP : testfile ./testfile transfer file admin@DUTIP on PC1 to log in remotely according to the prompts testfile to transfer files in the interactive interface

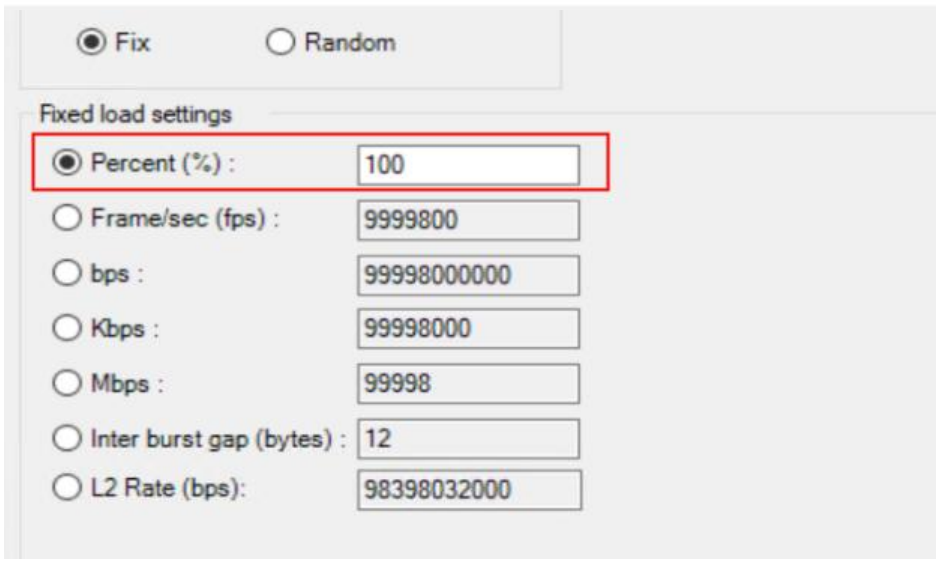
	testfile to transfer files in the interactive interface
Expected Results	1. Login successful 2. The order takes effect 3.4. File transfer successful 5. Login successful 6.7. File transfer successful
DUT Configuration	The ssh and sftp services are enabled by default.  ssh  scp  sftp 

	sftp> put testfile Uploading testfile to /home/admin/testfile testfile 100% 2048MB 56.6MB/s 00:36 sftp> sftp> get testfile Fetching /home/admin/testfile to testfile /home/admin/testfile 100% 2048MB 76.6MB/s 00:26 sftp>
Test Results	**PASS**
Remark	

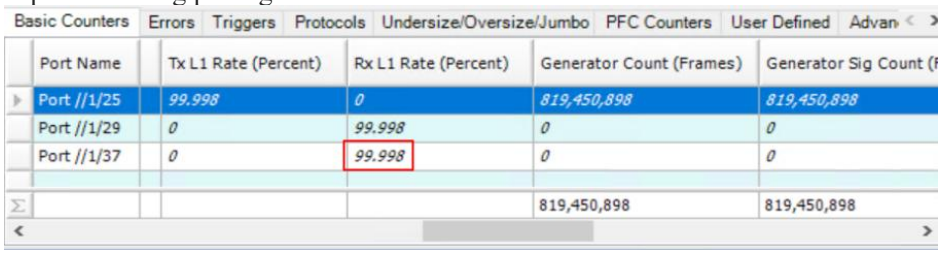
6.7 PASS - Mirroring

Test items	Mirroring
Purpose of the test	Verify whether the device under test supports Mirroring
Test topology	
Test steps	1. Link devices according to test environment 2. Configure port mirroring on the DUT, with the mirroring source port as interface 1 and the destination port as interface 3. 3. Send data packets from test instrument port A to test instrument port B 4. Configure port mirroring on the DUT, with the mirroring source ports being interface 1 and interface 2, and the destination port being interface 3. Send data packets to each other from test instrument ports A and B.
Expected Results	3. The test traffic from port A can also be observed from DUT interface 3. 4. Test traffic from port A and port B can be observed from DUT interface 3.
DUT Configuration	V lan configuration config vlan add 100 config vlan member add 100 Ethernet0 -u config vlan member add 100 Ethernet8 -u Step 3 , configuration: config mirror_session span add port0 Ethernet16 Ethernet0 TGA sends a contract to TGB Port A

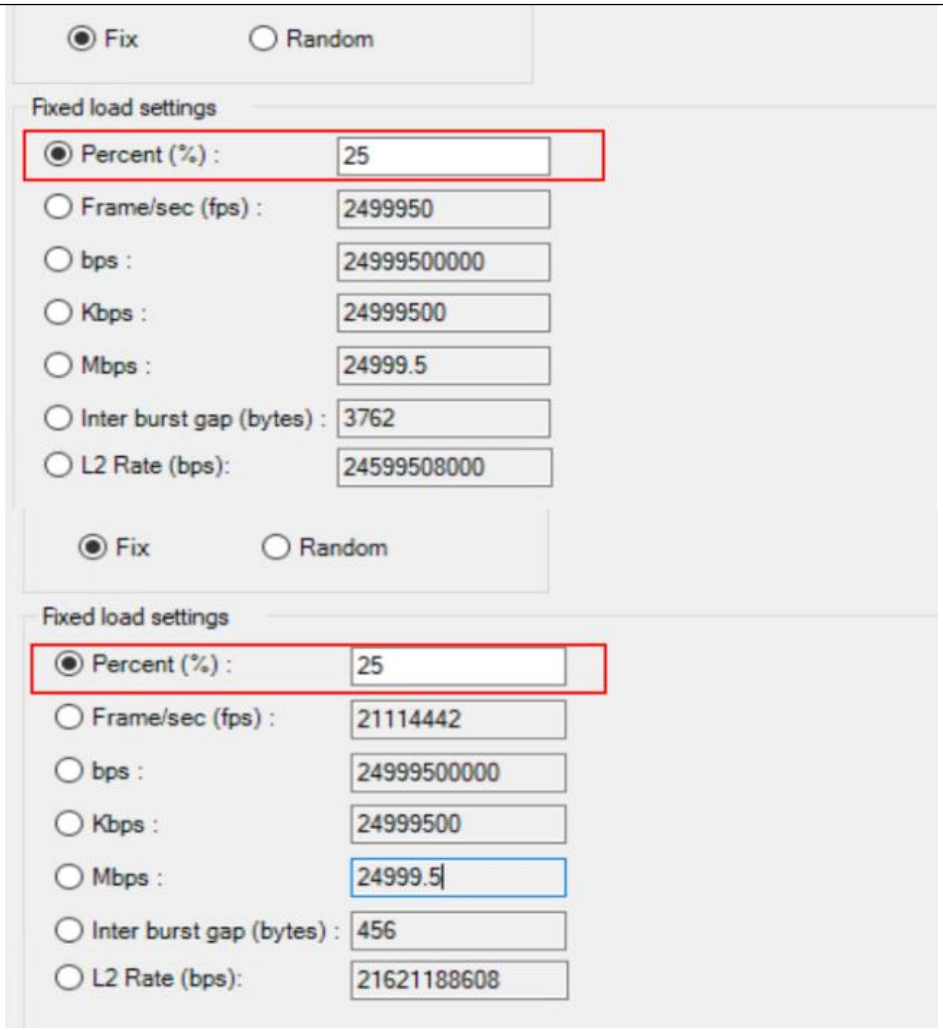




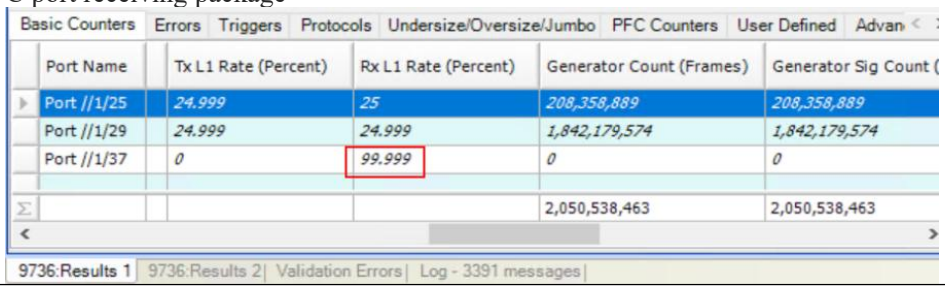
C port receiving package



Step 4 , configuration:
config mirror_session remove port0
config mirror_session span add port0 Ethernet16 Ethernet 0,Ethernet 8
Port A



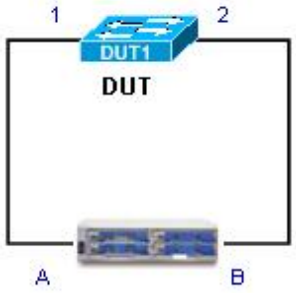
C port receiving package



Test Results	**PASS**
Remark	

6.8 PASS - Port Speed Setting

Test items	Port speed Setting function test
Purpose of the test	The test equipment port can be set to the speed as required

Test environment	
Test steps	1. Set up the test environment according to the diagram. 2. Configure DUT P1 and P2 to 100g 3. Enable device ports P1 and P2
Expected Results	2. Set the port speed successfully 3 ports can link normally
DUT Configuration	2. Configure the DUT port to default to 400G  3. Configure the DUT port 400G to split into two 200G config interface breakout Ethernet472 2x200G config interface breakout Ethernet480 2x200G config interface breakout Ethernet488 2x200G config interface startup Ethernet4 72 config interface startup Ethernet4 76 config interface startup Ethernet4 80 config interface startup Ethernet4 88 
Test Results	PASS
Remark	

6.9 PASS - COPP

Test items	COPP
Purpose of the test	The test equipment can resist attacks by turning on COPP

Test environment	
Test steps	1. Set up the test environment according to the diagram. 2. Configure the DUT P1 IP is 1 00 . 100 . 100 . 100 / 24, P2 IP is 2 00 . 200 . 200 . 200 / 2 4 3. Check the CPU load of the device 4. Send messages to the device CPU at TGA line speed to view the device CPU load 5. Test arpmiss , wait 5 minutes, and check the device CPU load
Expected Results	4.5 . Device CPU utilization is within normal range
DUT Configuration	Configure the device P1 IP to 100.100.100.100/24 and P2 IP to 200.200.200.200/24 config interface ip add Ethernet 0 100.100.100.100/24 config interface ip add Ethernet 8 200.200.200.200/24 Check the device CPU responsible top root@sonic:/home/admin# root@sonic:/home/admin# top top - 09:26:05 up 18:23, 1 user, load average: 1.88, 1.69, 1.67 Tasks: 455 total, 1 running, 451 sleeping, 0 stopped, 3 zombie %Cpu(s): 2.5 us, 0.6 sy, 0.0 ni, 96.9 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st MiB Mem : 31560.9 total, 25400.1 free, 3388.3 used, 2772.4 buff/cache MiB Swap: 0.0 total, 0.0 free, 0.0 used. 27576.4 avail Mem PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND 1920803 root 20 0 3272724 742688 228408 S 28.1 2.3 0:48.55 syncd 1589 root 20 0 911608 399268 6840 S 9.9 1.2 167:51.89 redis-server 1917680 root 20 0 38912 26632 12084 S 3.6 0.1 0:07.06 python3 1921560 root 20 0 198900 36548 13224 S 2.6 0.1 0:09.50 python3 **1924714 root 20 0 11092 4200 3184 R 1.3 0.0 0:00.43 top** 1921071 root 20 0 2423628 187148 20880 S 0.7 0.6 0:03.55 telemetry 1258 root 20 0 30228 23672 8812 S 0.3 0.1 0:21.82 supervisord 2382 root 20 0 18944 11804 5740 S 0.3 0.0 1:23.80 python 1916811 root 20 0 0 0 0 I 0.3 0.0 0:00.02 kworker/8:0-events 1916983 root 20 0 30384 24080 9012 S 0.3 0.1 0:00.68 supervisord 1917678 root 20 0 264096 34108 12616 S 0.3 0.1 0:04.11 python3 1919821 root 20 0 30240 23616 8840 S 0.3 0.1 0:00.41 supervisord 1921222 root 20 0 2419664 188796 18416 S 0.3 0.6 0:03.65 dialout_client_ 1921822 root 20 0 105264 21268 11520 S 0.3 0.1 0:00.27 python3 1 root 20 0 167900 13192 7652 S 0.0 0.0 2:23.04 systemd 2 root 20 0 0 0 0 S 0.0 0.0 0:00.02 kthreadd 3 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 rcu_gp ip 2 me TGA line speed sending destination mac is device CPU mac, destination IP is 1 00 . 100.100.100 Observe for 5 minutes and take the average value

```
top - 09:33:51 up 18:31,  1 user,  load average: 2.03, 1.73, 1.66
Tasks: 387 total,   3 running, 381 sleeping,   0 stopped,   3 zombie
%Cpu(s):  5.0 us,  1.5 sy,  0.0 ni, 92.9 id,  0.1 wa,  0.0 hi,  0.5 si,  0.0 st
MiB Mem :  31560.9 total,  25267.3 free,   3523.0 used,   2770.6 buff/cache
MiB Swap:      0.0 total,      0.0 free,      0.0 used.  27442.4 avail Mem

    PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM     TIME+ COMMAND
1920661 root      20   0  384952   8944   8104 S  18.9   0.0   0:48.80 p4rt

1920803 root      20   0 3338484 742916 228408 S  15.2   2.3   2:24.42 syncd

1933208 root      20   0   56808  35208  16680 R   6.6   0.1   0:00.20 sonic-cfggen

   1589 root      20   0  911608 399188   6840 S   6.3   1.2 168:41.99 redis-server

1933192 root      20   0   29296  22560   8728 R   6.3   0.1   0:00.19 supervisorctl

   2385 root      20   0   52916  37772  14352 S   3.6   0.1   2:16.00 healthd

1921560 root      20   0  199188  36548  13224 S   3.6   0.1   0:40.52 python3

    982 root      20   0 3384364 149932  52200 S   3.3   0.5  28:13.48 dockerd

1916473 root      20   0   42504  26524  13372 S   3.0   0.1   0:35.74 procdockerstats

1917680 root      20   0   38912  26632  12084 D   2.6   0.1   0:21.72 python3

   2379 root      20   0   19636  12388   5852 S   1.7   0.0  10:56.09 python

1933149 root      20   0 1273608  60948  31216 S   1.7   0.2   0:00.05 docker

    836 root      20   0 2467508  67324  32728 S   1.3   0.2  26:46.20 containerd

1919912 root      20   0  720776   9976   6532 S   0.7   0.0   0:00.92 containerd-shim

1920187 root      20   0  721032   9520   6468 S   0.7   0.0   0:00.94 containerd-shim

1920210 root      20   0   29968  23504   8916 S   0.7   0.1   0:00.54 supervisord

1921071 root      20   0 2424012 187400  20880 S   0.7   0.6   0:07.83 telemetry
```

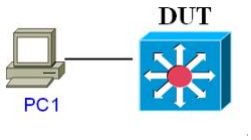
arpmiss
TGA line speed sending destination mac is device CPU mac , destination IP is 200.200.200.200

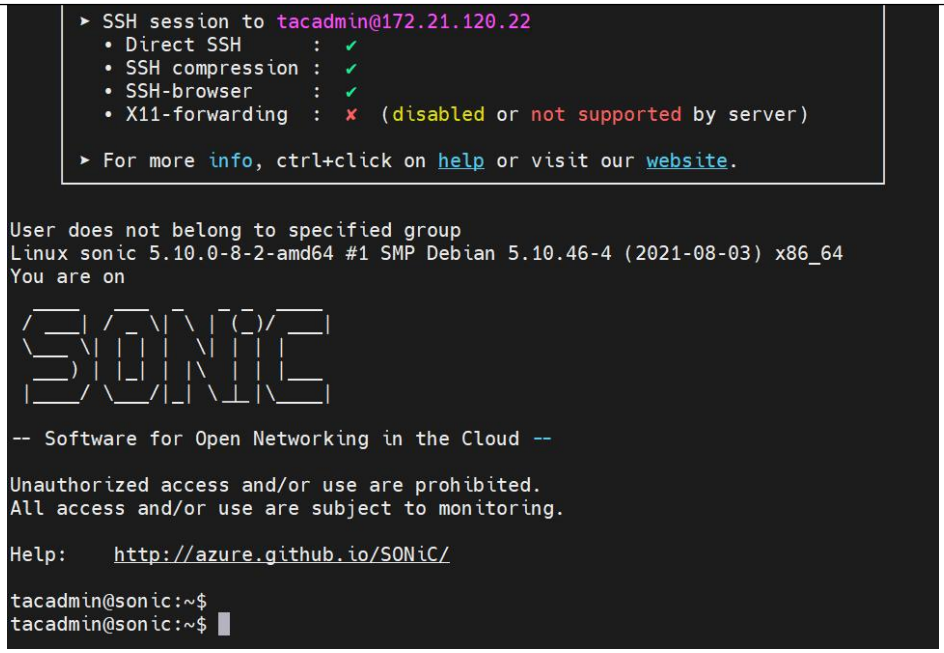
Wait for 5 minutes
Check the CPU load of the device
top

```
root@sonic:/home/admin# top
top - 09:51:08 up 18:48,  2 users,  load average: 2.03, 1.48, 1.50
Tasks: 391 total,   1 running, 387 sleeping,   0 stopped,   3 zombie
%Cpu(s):  3.8 us,  1.2 sy,  0.0 ni, 92.8 id,  0.0 wa,  0.0 hi,  2.2 si,  0.0 st
MiB Mem :  31560.9 total,  25258.0 free,   3526.3 used,   2776.6 buff/cache
MiB Swap:      0.0 total,      0.0 free,      0.0 used.  27438.9 avail Mem

    PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM     TIME+ COMMAND
1920661 root      20   0  384952   8944   8104 S  18.8   0.0   3:49.07 p4rt
1920803 root      20   0 3338484 763168 228408 S  16.2   2.4   5:50.09 syncd
1916473 root      20   0   42504  26524  13372 S  15.2   0.1   1:27.40 procdockerstats
   1589 root      20   0  911608 399352   6840 S  13.2   1.2 170:32.66 redis-server
1921560 root      20   0  199188  36812  13224 S   6.9   0.1   1:51.17 python3
    836 root      20   0 2467508  66420  32728 S   6.6   0.2  27:12.01 containerd
    982 root      20   0 3384364 149932  52200 S   6.3   0.5  28:40.29 dockerd
1917680 root      20   0   38912  26632  12084 S   3.3   0.1   0:54.78 python3
1950761 root      20   0   10988   3836   3092 R   1.0   0.0   0:00.31 top
     13 root      20   0       0      0      0 I   0.7   0.0   2:33.62 rcu_sched
1920187 root      20   0  721032  16892   6532 S   0.7   0.1   0:02.40 containerd-shim
1921071 root      20   0 2424012 187456  20880 S   0.7   0.6   0:17.58 telemetry
1921222 root      20   0 2419792 188796  18416 S   0.7   0.6   0:18.67 dialout_client_
   1258 root      20   0   30228  23672   8812 S   0.3   0.1   0:22.33 supervisord
   2382 root      20   0   18944  11804   5740 S   0.3   0.0   1:25.69 python
1896868 root      20   0       0      0      0 I   0.3   0.0   0:00.14 kworker/11:1-events
1915938 root      20   0       0      0      0 I   0.3   0.0   0:00.22 kworker/0:12-events
1916863 root      20   0   30684  24040   8780 S   0.3   0.1   0:01.53 supervisord
1916961 root      20   0  720520  16412   6408 S   0.3   0.1   0:02.46 containerd-shim
1918187 root      20   0  720520  15208   6160 S   0.3   0.0   0:02.44 containerd-shim
1918512 root      20   0  720776  17296   6468 S   0.3   0.1   0:02.40 containerd-shim
1918906 root      20   0  720776  16988   6348 S   0.3   0.1   0:02.43 containerd-shim
1919487 root      20   0  720520  15312   6408 S   0.3   0.0   0:02.41 containerd-shim
1919619 root      20   0   30236  23680   8824 S   0.3   0.1   0:00.94 supervisord
1919632 root      20   0  720776  17272   6532 S   0.3   0.1   0:02.36 containerd-shim
```

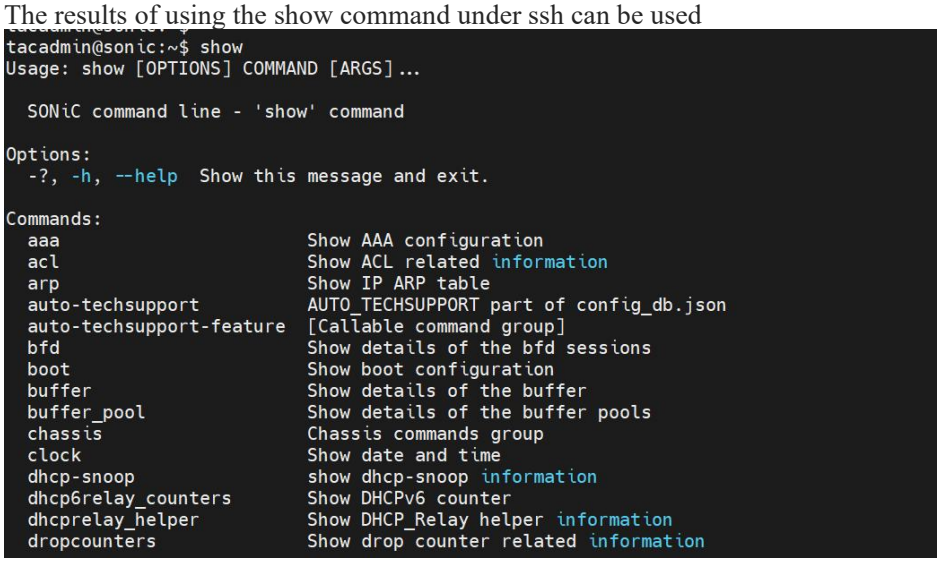
Test Results	**PASS**
Remark	

6.10 PASS - AAA

Test items	AAA
Purpose of the test	The test equipment can be operated normally
Test topology	
Test steps	1. Set up the test environment according to the diagram. 2. Configure the device tacacs Server to PC 3. Configure AAA authentication tacacs 4. After connecting to the device using ssh, user tacadmin can operate the device 5. Configure the authorization method to tacacs , and the tacadmin user's operations are restricted
Expected Results	2. 3. Configuration successful 4 . aaa works fine
DUT Configuration	Configure tacacs config tacacs add 172.21.110.110 -k accton Configure aaa authentication to tacacs config aaa authentication login tacacs + local Use ssh to connect to the device management interface, username tacadmin Password: tacadmin



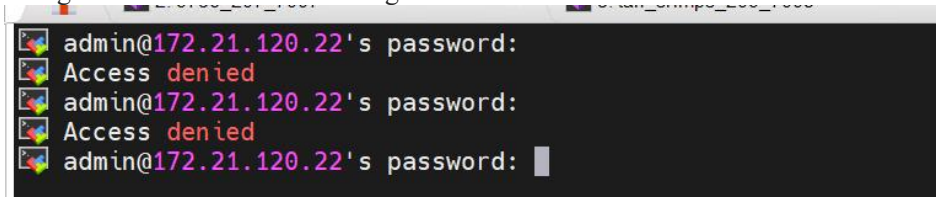
The results of using the show command under ssh can be used



Serial port configuration aaa authorization is tacacs +
config aaa authorization tacacs +

The show command is rejected under ssh

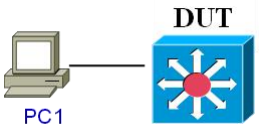
Using non- tacacs to allow user login is denied

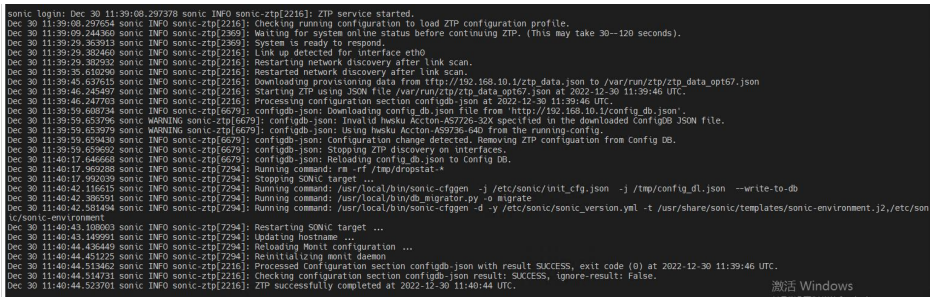


Test Results	**PASS**

Remark	

6.11 PASS - ZTP

Test items	ZTP
Purpose of the test	Test switch support for ZTP
Test topology	
Test steps	1. Export the current configdb file (the exported one can be ignored), delete the current configdb file 2. PC1 opens dhcp server configuration option67, opens tftp server including ztp configuration file, opens http server including configdb 3. Restart the DUT and check whether the ztp configuration and configdb are obtained
Expected Results	2. You can get the ztp configuration and configdb files

DUT Configuration	Default configuration: Enabled
	root@sonic :/home/admin# cat /host/ ztp / ztp_cfg.json
	{
	" admin -mode": true,
	" ztp - json - local " : " /mnt/usb/ztp.json "
	}
	
	Delete the configdb file
	rm/ etc /sonic/ config_db.json
	Device restart
	 
	View the downloaded configdb file
	 

Test Results	**PASS**
Remark	