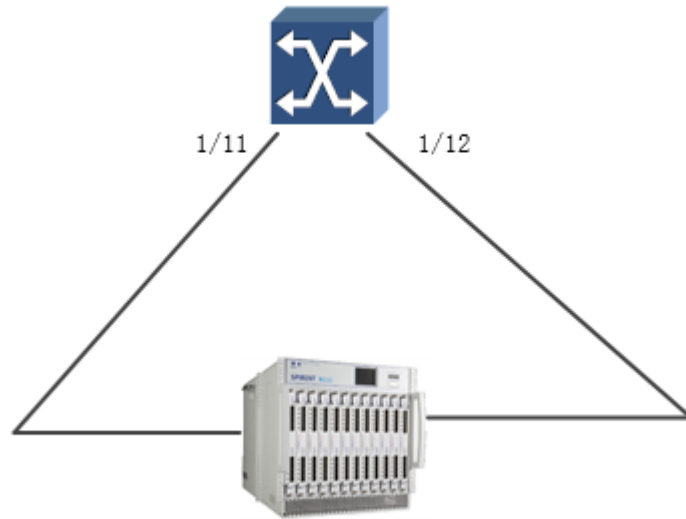


印度项目接口下QOS功能测试报告

一、测试拓扑



二、测试设备配置

```
switch# sh run
```

```
Building configuration...
```

```
hostname switch
```

```
username admin privilege 15 password algorithm sha256 encrypted  
ef6f6affcfa8f12f9bfe48662ea5c086628fd633c60425cc9d3662900bbfadde6e2441c462e5a256a5f96  
f56a343d94174fb605bf5fa8e2f35f821f4e74f9cf3
```

```
!
```

```
vlan 1,2
```

```
!
```

```
!
```

```
!
```

```
!
```

```
spanning-tree mst name 00-11-22-33-44-55 revision 0
```

```
!
```

```
voice vlan oui 00-01-E3 description Siemens AG phones
```

```
voice vlan oui 00-03-6B description Cisco phones
```

voice vlan oui 00-0F-E2 description H3C phones

voice vlan oui 00-60-B9 description Philips and NEC AG phones

voice vlan oui 00-D0-1E description Pingtel phones

voice vlan oui 00-E0-75 description Polycom phones

voice vlan oui 00-E0-BB description 3Com phones

!

interface GigabitEthernet 1/1

!

interface GigabitEthernet 1/2

!

interface GigabitEthernet 1/3

!

interface GigabitEthernet 1/4

!

interface GigabitEthernet 1/5

!

interface GigabitEthernet 1/6

!

interface GigabitEthernet 1/7

!

interface GigabitEthernet 1/8

!

interface GigabitEthernet 1/9

!

interface GigabitEthernet 1/10

!

interface GigabitEthernet 1/11

switchport access vlan 2

qos storm unicast 90 mbps

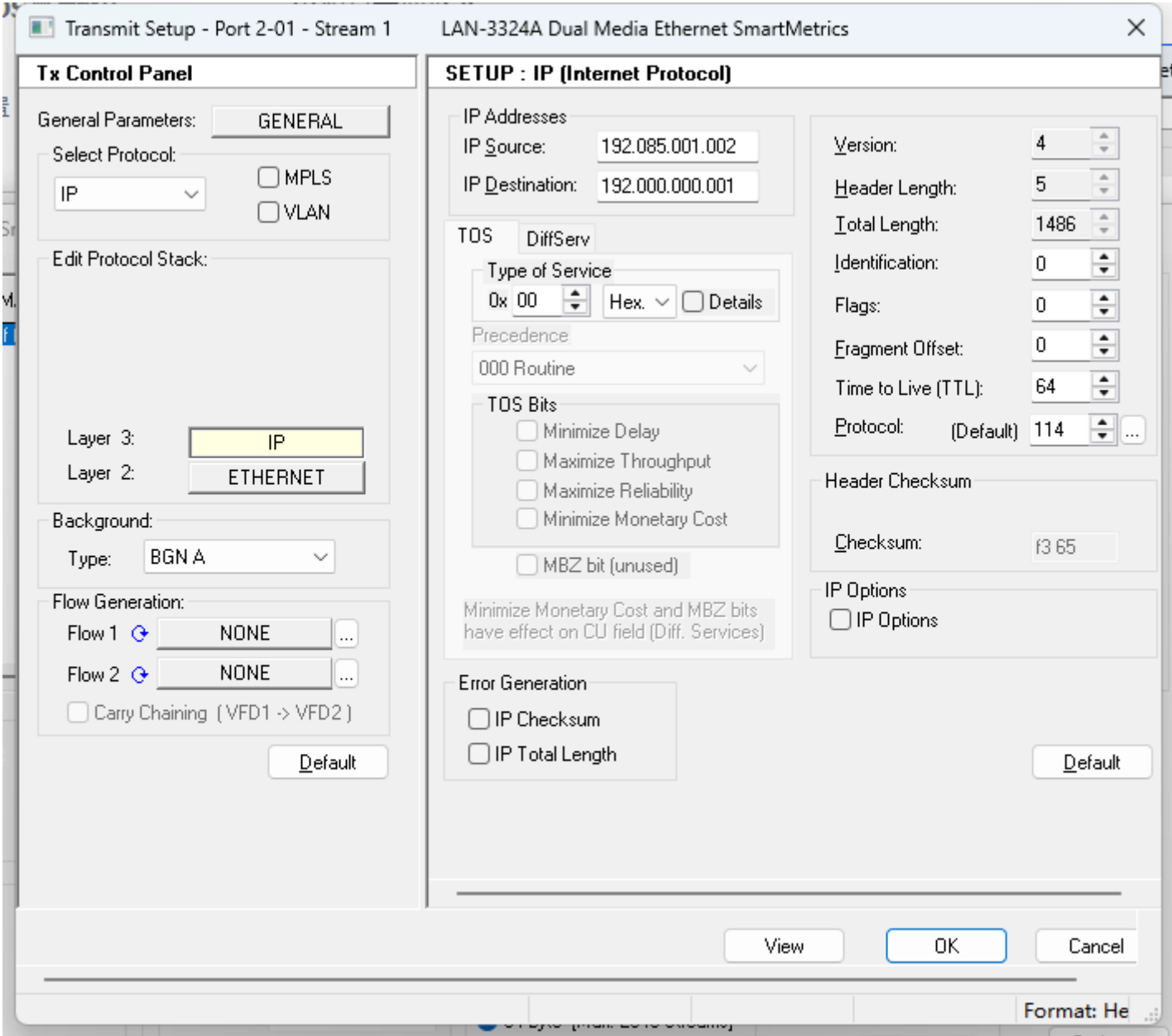
qos storm broadcast 70 mbps

qos storm multicast 80 mbps

!
interface GigabitEthernet 1/12 switchport access vlan 2
!
interface GigabitEthernet 1/13
!
interface 10GigabitEthernet 1/1
!
interface 10GigabitEthernet 1/2
!
interface 10GigabitEthernet 1/3
!
interface 10GigabitEthernet 1/4
!
interface 10GigabitEthernet 1/5
!
interface 10GigabitEthernet 1/6
!
interface 10GigabitEthernet 1/7
!
interface 10GigabitEthernet 1/8
!
interface vlan 1
ip address 192.168.2.139 255.255.255.0
!
spanning-tree aggregation
spanning-tree link-type point-to-point
!
!
!
hostname switch
!

三、测试记录

未知名单播报文



Transmit Setup - Port 2-01 - Stream 1

LAN-3324A Dual Media Ethernet SmartMetrics

✕

Tx Control Panel

General Parameters:

GENERAL

Select Protocol:

IP

☐ MPLS

☐ VLAN

Edit Protocol Stack:

Layer 3:

IP

Layer 2:

ETHERNET

Background:

Type: BGN A

Flow Generation:

Flow 1

⌛

NONE

...

Flow 2

⌛

NONE

...

☐ Carry Chaining (VFD1 -> VFD2)

Default

SETUP : Ethernet Protocol

MAC Source:

AA AA 11 11 11 00

MAC Destination:

00 00 01 00 00 01

Type:

0x 08 00

IP

Default

View

OK

Cancel

Format: He

组播报文

Transmit Setup - Port 2-01 - Stream 2

LAN-3324A Dual Media Ethernet SmartMetrics

✕

Tx Control Panel

General Parameters: GENERAL

Select Protocol:

IP

☐ MPLS☐ VLAN

Edit Protocol Stack:

Layer 3: IP

Layer 2: ETHERNET

Background:

Type: BGN A

Flow Generation:

Flow 1 NONE

Flow 2 NONE

☐ Carry Chaining (VFD1 -> VFD2)

Default

SETUP : IP (Internet Protocol)

IP Addresses

IP Source: 192.085.001.002

IP Destination: 225.000.000.001

TOS

DiffServ

Type of Service

0x 00Hex. ☐ Details

Precedence

000 Routine

TOS Bits

☐ Minimize Delay☐ Maximize Throughput☐ Maximize Reliability☐ Minimize Monetary Cost☐ MBZ bit (unused)

Minimize Monetary Cost and MBZ bits have effect on CU field (Diff. Services)

Error Generation

☐ IP Checksum☐ IP Total Length

Version: 4

Header Length: 5

Total Length: 1486

Identification: 0

Flags: 0

Fragment Offset: 0

Time to Live (TTL): 64

Protocol: (Default) 114

Header Checksum

Checksum: d2 65

IP Options

☐ IP Options

Default

View

OK

Cancel

Def: 0Format: He

Transmit Setup - Port 2-01 - Stream 2

LAN-3324A Dual Media Ethernet SmartMetrics

Tx Control Panel

General Parameters: GENERAL

Select Protocol:

IP

☐ MPLS☐ VLAN

Edit Protocol Stack:

Layer 3: IP

Layer 2: ETHERNET

Background:

Type: BGN A

Flow Generation:

Flow 1

↻

 NONE

...

Flow 2

↻

 NONE

...

☐ Carry Chaining (VFD1 -> VFD2)

Default

SETUP : Ethernet Protocol

MAC Source: 00 10 94 00 00 04

MAC Destination: 01 00 5E 02 01 01

Type: 0x 08 00 IP

Default

View

OK

Cancel

Format: He

广播报文

Transmit Setup - Port 2-01 - Stream 3

LAN-3324A Dual Media Ethernet SmartMetrics

✕

Tx Control Panel

General Parameters: GENERAL

Select Protocol:

IP

☐ MPLS☐ VLAN

Edit Protocol Stack:

Layer 3: IP

Layer 2: ETHERNET

Background:

Type: BGN A

Flow Generation:

Flow 1 NONE

Flow 2 NONE

☐ Carry Chaining (VFD1 -> VFD2)

Default

SETUP : IP (Internet Protocol)

IP Addresses

IP Source: 192.085.001.002

IP Destination: 255.255.255.000

TOS DiffServ

Type of Service

0x 00 Hex. ☐ Details

Precedence

000 Routine

TOS Bits

☐ Minimize Delay☐ Maximize Throughput☐ Maximize Reliability☐ Minimize Monetary Cost☐ MBZ bit (unused)

Minimize Monetary Cost and MBZ bits have effect on CU field (Diff. Services)

Error Generation

☐ IP Checksum☐ IP Total Length

Version: 4

Header Length: 5

Total Length: 1486

Identification: 0

Flags: 0

Fragment Offset: 0

Time to Live (TTL): 64

Protocol: (Default) 114

Header Checksum

Checksum: b4 66

IP Options

☐ IP Options

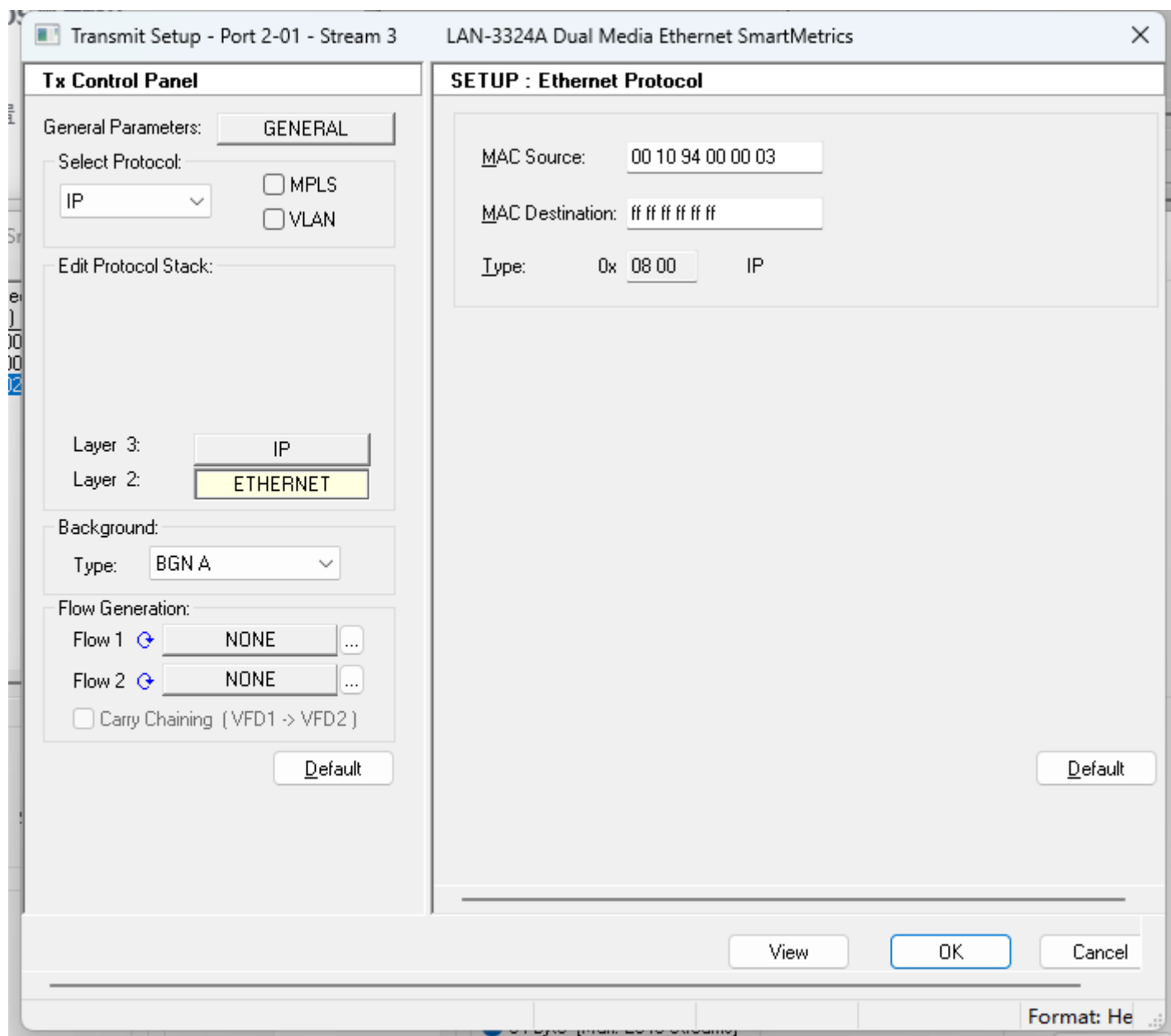
View

OK

Cancel

Destination MAC address

Format: He



分别对三类报文打100M的数据流

1. 仅未知名单播报文

Streams Setup - SmartWindow Port 2-01

#	Len	Requested Rate(fps)	Calculated Rate(fps)	Requested Utilization(%)	Calculated Utilization(%)	Errors	MAC Dst	MAC Src	VLAN	pri	cfi	vid	Type
<input checked="" type="checkbox"/> 1	1500	10000	10000	12.192000	12.192000		00 00 01 00 00 01	aa aa 11 11 11 00	<input type="checkbox"/>				IP
<input type="checkbox"/> 2	1500	10000		12.192000			01 00 5e 02 01 01	00 10 94 00 00 04	<input type="checkbox"/>				IP
<input type="checkbox"/> 3	1500	10000		12.192000			ff ff ff ff ff ff	00 10 94 00 00 03	<input type="checkbox"/>				IP

Calculated Values

Utilization (selected): 0.00 %

Total Utilization: 12.19 %

Total Bit Rate: 120.32 Mbps

Total Frame Rate: 10000 fps

Bandwidth

Line Rate: 1000 Mbps

Payload Capacity: 1000 Mbps

Global Settings

Schedule Mode

☐ IFG

Time: 0.000096

Units: mSec

☐ Random IFG

Min: 96 ns

Max: 1073741816 ns

Units: nSec

☐ Frame Rate

☒ Advanced Scheduler

Mode

Tx Mode: Continuous

Stream Header Length

☒ 64-byte [Max. 2048 Streams]

☐ 128-byte [Max. 2048 Streams]

Background

A: All Zeros

B: All Ones

Random Frame Length

Min: 60

Max: 124

Random Seed: 0

Default

Options...

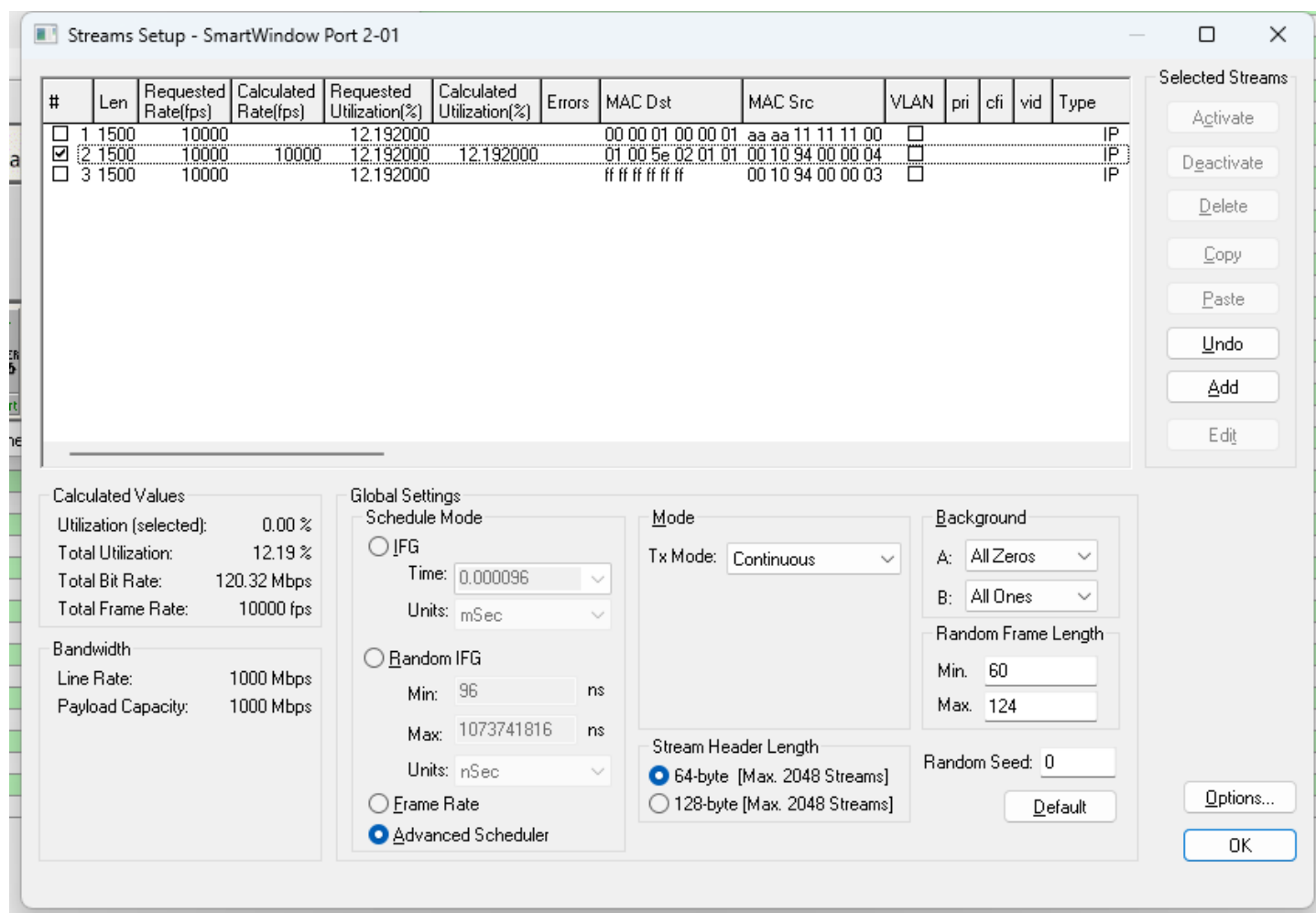
OK

Port Counters		Events		Rates	
		Port 2-01 LAN-3324A		Port 2-01 LAN-3324A	
Tx Frames		52,363,125			10,000
Rx Frames		96,518			0
Rx Bytes		43,729,632,275			15,040,758
Rx Bytes		6,280,591			0
Tx Triggers		0			0
Rx Triggers		0			0
CRC Errors		0			0
OverSize		0			0
Frag/UnderSize		0			0
Tx From Stack		0			0

Port Counters		Events		Rates	
		Port 2-02 LAN-3324A		Port 2-02 LAN-3324A	
Tx Frames		12,019,782			0
Rx Frames		39,684,807			7,397
Tx Bytes		18,077,752,128			0
Rx Bytes		59,666,433,274			11,124,556
Tx Triggers		0			0

发送为120M (15*8)，接收约为90M (11.1*8)，符合限速预期。

2. 仅组播报文

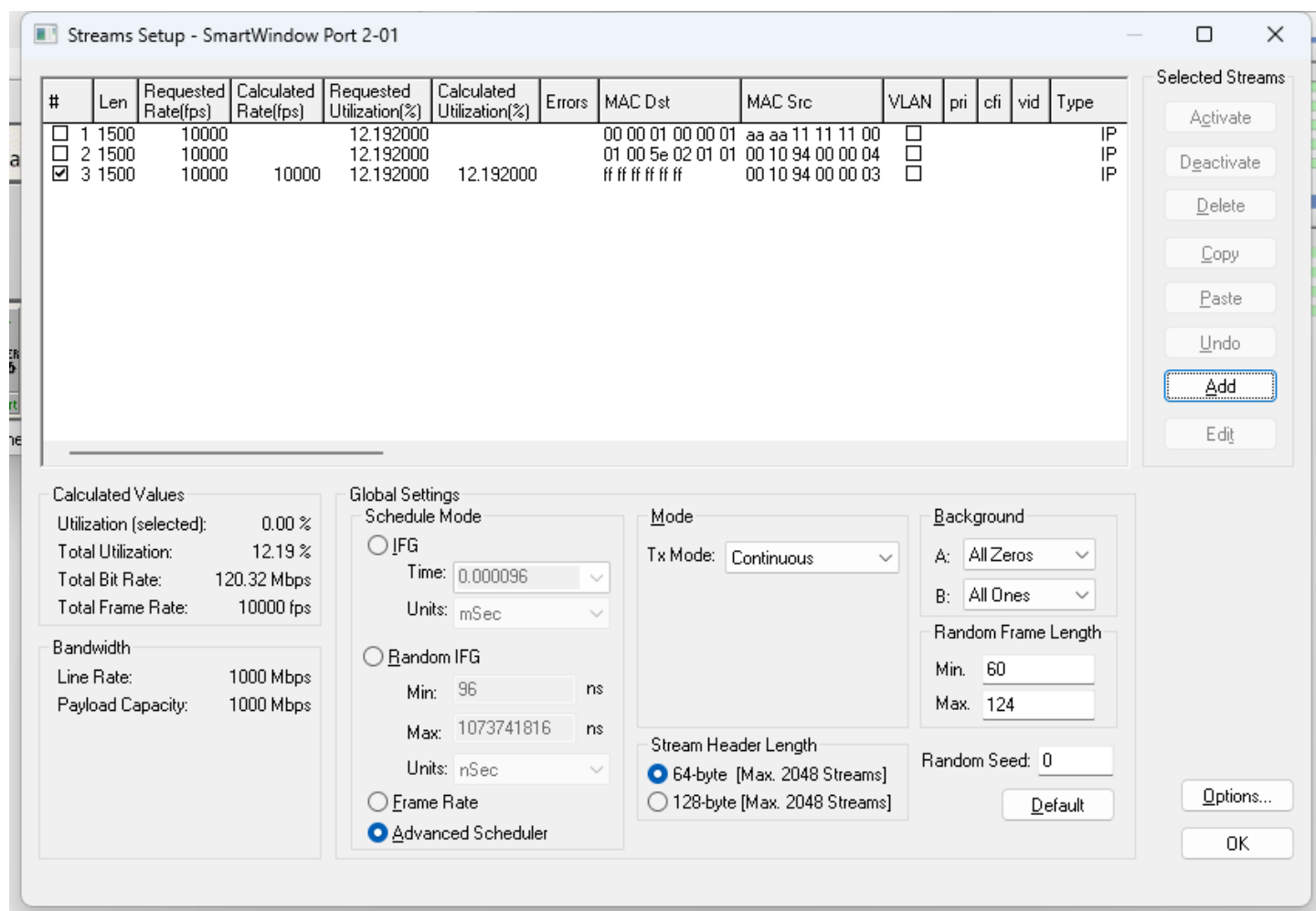


Port Counters		Events	Rates
		Port 2-01 LAN-3324A	Port 2-01 LAN-3324A
Tx Frames	54,040,327		10,000
Rx Frames	96,729		0
Tx Bytes	46,317,811,584		15,039,937
Rx Bytes	6,319,436		0
Tx Triggers	0		0
Rx Triggers	0		0
CRC Errors	0		0
OverSize	0		0

Port Counters		Events	Rates
		Port 2-02 LAN-3324A	Port 2-02 LAN-3324A
Tx Frames	12,019,782		0
Rx Frames	39,450,060		6,576
Tx Bytes	18,077,752,128		0
Rx Bytes	59,313,405,553		9,888,813
Tx Triggers	0		0
Rx Triggers	0		0

发送为120M (15*8)，接收约为80M (9.88*8)，符合限速预期。

3. 仅广播报文



Port Counters		Events	Rates
		Port 2-01 LAN-3324A	Port 2-01 LAN-3324A
Tx Frames	55,358,835		10,000
Rx Frames	96,809		15,039,373
Tx Bytes	48,299,345,216		0
Rx Bytes	6,329,266		0
Tx Triggers	0		0
Rx Triggers	0		0
CRC Errors	0		0
OverSize	0		0
Frame/Interface	0		0

Port Counters		Events	Rates
		Port 2-02 LAN-3324A	Port 2-02 LAN-3324A
Tx Frames		12,019,782	0
Rx Frames		39,955,814	5,753
Tx Bytes		18,077,752,128	0
Rx Bytes		60,073,982,225	8,653,215
Tx Triggers		0	0
Rx Triggers		0	0

发送为120M (15*8) ，接收约为70M (8.65*8) ，符合限速预期。

4. 未知名单播报文+组播报文

Streams Setup - SmartWindow Port 2-01

#	Len	Requested Rate(fps)	Calculated Rate(fps)	Requested Utilization(%)	Calculated Utilization(%)	Errors	MAC Dst	MAC Src	VLAN	pri	cfi	vid	Type
<input checked="" type="checkbox"/> 1	1500	10000	10000	12.192000	12.192000		00 00 01 00 00 01	aa aa 11 11 11 00	<input type="checkbox"/>				IP
<input checked="" type="checkbox"/> 2	1500	10000	10000	12.192000	12.192000		01 00 5e 02 01 01	00 10 94 00 00 04	<input type="checkbox"/>				IP
<input type="checkbox"/> 3	1500	10000		12.192000			ff ff ff ff ff ff	00 10 94 00 00 03	<input type="checkbox"/>				IP

Calculated Values

Utilization (selected): 0.00 %

Total Utilization: 24.38 %

Total Bit Rate: 240.64 Mbps

Total Frame Rate: 20000 fps

Bandwidth

Line Rate: 1000 Mbps

Payload Capacity: 1000 Mbps

Global Settings

Schedule Mode

☐ IFG

Time: 0.000096

Units: mSec

☐ Random IFG

Min: 96 ns

Max: 1073741816 ns

Units: nSec

☐ Frame Rate

☒ Advanced Scheduler

Mode

Tx Mode: Continuous

Stream Header Length

☒ 64-byte [Max. 2048 Streams]
 ☐ 128-byte [Max. 2048 Streams]

Background

A: All Zeros

B: All Ones

Random Frame Length

Min: 60

Max: 124

Random Seed: 0

Options...

OK

Port Counters		
	Events	Rates
	Port 2-01 LAN-3324A	Port 2-01 LAN-3324A
Tx Frames	56,416,573	20,000
Rx Frames	36,876	128
Tx Bytes	49,890,783,168	30,080,583
Rx Bytes	6,337,499	0
Tx Triggers	0	0
Rx Triggers	0	0
CRC Errors	0	0
OverSize	0	0
Frag/UnderSize	0	0
Tx From Stack	0	0
Rx To Stack	94,864	1
ARP Replies Sent	0	0
ARP Requests Sent	0	0
ARP Replies Received	0	0

Port Counters		
	Events	Rates
	Port 2-02 LAN-3324A	Port 2-02 LAN-3324A
Tx Frames	12,019,782	0
Rx Frames	40,202,103	13,971
Tx Bytes	18,077,752,128	0
Rx Bytes	60,444,348,399	21,013,209
Tx Triggers	0	0
Rx Triggers	0	0
CRC Errors	0	0

发送为240M（30*8），接收约为170M（21.0*8），符合限速预期。

5. 未知名单播报文+广播报文

Streams Setup - SmartWindow Port 2-01

#	Len	Requested Rate(fps)	Calculated Rate(fps)	Requested Utilization(%)	Calculated Utilization(%)	Errors	MAC Dst	MAC Src	VLAN	pri	cfi	vid	Type
<input checked="" type="checkbox"/> 1	1500	10000	10000	12.192000	12.192000		00 00 01 00 00 01	aa aa 11 11 11 00	<input type="checkbox"/>				IP
<input type="checkbox"/> 2	1500	10000	10000	12.192000	12.192000		01 00 5e 02 01 01	00 10 94 00 00 04	<input type="checkbox"/>				IP
<input checked="" type="checkbox"/> 3	1500	10000	10000	12.192000	12.192000		ff ff ff ff ff ff	00 10 94 00 00 03	<input type="checkbox"/>				IP

Selected Streams

Activate

Deactivate

Delete

Copy

Paste

Undo

Add

Edit

Calculated Values

Utilization (selected): 0.00 %

Total Utilization: 24.38 %

Total Bit Rate: 240.64 Mbps

Total Frame Rate: 20000 fps

Bandwidth

Line Rate: 1000 Mbps

Payload Capacity: 1000 Mbps

Global Settings

Schedule Mode

☐ IFG

Time: 0.000096

Units: mSec

☐ Random IFG

Min: 96 ns

Max: 1073741816 ns

Units: nSec

☐ Frame Rate

☒ Advanced Scheduler

Mode

Tx Mode: Continuous

Background

A: All Zeros

B: All Ones

Random Frame Length

Min: 60

Max: 124

Stream Header Length

☒ 64-byte [Max. 2048 Streams]

☐ 128-byte [Max. 2048 Streams]

Random Seed: 0

Default

Options... OK

Port Statistics

Port Counters	Events	Rates
	Port 2-01 LAN-3324A	Port 2-01 LAN-3324A
Tx Frames	57,946,660	19,999
Rx Frames	96,323	0
Tx Bytes	52,192,034,016	30,078,352
Rx Bytes	6,343,274	0
Tx Triggers	0	0
Rx Triggers	0	0
CRP Errors	0	0
OverSize	0	0

Port Statistics

Port Counters	Events	Rates
	Port 2-02 LAN-3324A	Port 2-02 LAN-3324A
Tx Frames	12,019,782	0
Rx Frames	40,992,795	13,152
Tx Bytes	18,077,752,128	0
Rx Bytes	61,633,498,064	19,780,647
Tx Triggers	0	0
Rx Triggers	0	0

发送为240M (30*8)，接收约为160M (19.7*8)，符合限速预期。

6. 组播报文+广播报文

Streams Setup - SmartWindow Port 2-01

#	Len	Requested Rate(fps)	Calculated Rate(fps)	Requested Utilization(%)	Calculated Utilization(%)	Errors	MAC Dst	MAC Src	VLAN	pri	cfi	vid	Type
<input type="checkbox"/> 1	1500	10000		12.192000			00 00 01 00 00 01	aa aa 11 11 11 00	<input type="checkbox"/>				IP
<input checked="" type="checkbox"/> 2	1500	10000	10000	12.192000	12.192000		01 00 5e 02 01 01	00 10 94 00 00 04	<input type="checkbox"/>				IP
<input checked="" type="checkbox"/> 3	1500	10000	10000	12.192000	12.192000		ff ff ff ff ff ff	00 10 94 00 00 03	<input type="checkbox"/>				IP

Calculated Values

Utilization (selected): 0.00 %

Total Utilization: 24.38 %

Total Bit Rate: 240.64 Mbps

Total Frame Rate: 20000 fps

Bandwidth

Line Rate: 1000 Mbps

Payload Capacity: 1000 Mbps

Global Settings

Schedule Mode

☐ IFG

Time: 0.000096

Units: mSec

☐ Random IFG

Min: 96 ns

Max: 1073741816 ns

Units: nSec

☐ Frame Rate

☒ Advanced Scheduler

Mode

Tx Mode: Continuous

Stream Header Length

☒ 64-byte [Max. 2048 Streams]
 ☐ 128-byte [Max. 2048 Streams]

Background

A: All Zeros

B: All Ones

Random Frame Length

Min: 60

Max: 124

Random Seed: 0

Default

Options...

OK

Port Counters		Events	Rates
		Port 2-01 LAN-3324A	Port 2-01 LAN-3324A
Tx Frames	59,446,254	20,000	0
Rx Frames	96,970	0	30,080,009
Tx Bytes	54,447,423,392	0	0
Rx Bytes	6,349,048	0	0
Tx Triggers	0	0	0
Rx Triggers	0	0	0
CRC Errors	0	0	0
OverSize	0	0	0

Port Counters		Events	Rates
		Port 2-02 LAN-3324A	Port 2-02 LAN-3324A
Tx Frames	12,019,782	0	12,328
Rx Frames	42,450,076	0	0
Tx Bytes	18,077,752,128	0	0
Rx Bytes	63,825,157,534	0	18,540,940
Tx Triggers	0	0	0
Rx Triggers	0	0	0

发送为240M (30*8) ，接收约为150M (18.5*8) ，符合限速预期。

7. 未知名单播报文+组播报文+广播报文

Streams Setup - SmartWindow Port 2-01

#	Len	Requested Rate(fps)	Calculated Rate(fps)	Requested Utilization(%)	Calculated Utilization(%)	Errors	MAC Dst	MAC Src	VLAN	pri	cfi	vid	Type
<input checked="" type="checkbox"/>	1	1500	10000	9999	12.192000	12.190781	00 00 01 00 00 01	aa aa 11 11 11 00	<input type="checkbox"/>				IP
<input checked="" type="checkbox"/>	2	1500	10000	9999	12.192000	12.190781	01 00 5e 02 01 01	00 10 94 00 00 04	<input type="checkbox"/>				IP
<input checked="" type="checkbox"/>	3	1500	10000	9999	12.192000	12.190781	ff ff ff ff ff ff	00 10 94 00 00 03	<input type="checkbox"/>				IP

Calculated Values

Utilization (selected): 0.00 %

Total Utilization: 36.57 %

Total Bit Rate: 360.92 Mbps

Total Frame Rate: 29997 fps

Bandwidth

Line Rate: 1000 Mbps

Payload Capacity: 1000 Mbps

Global Settings

Schedule Mode

☐ IFG

Time: 0.000096

Units: mSec

☐ Random IFG

Min: 96 ns

Max: 1073741816 ns

Units: nSec

☐ Frame Rate

☒ Advanced Scheduler

Mode

Tx Mode: Continuous

Stream Header Length

☒ 64-byte [Max. 2048 Streams]

☐ 128-byte [Max. 2048 Streams]

Background

A: All Zeros

B: All Ones

Random Frame Length

Min: 60

Max: 124

Random Seed: 0

Options...

OK

	Events	Rates
	Port 2-01 LAN-3324A	Port 2-01 LAN-3324A
Tx Frames	60,590,681	29,996
Rx Frames	37,005	45,114,532
Tx Bytes	56,168,641,600	129
Rx Bytes	6,353,390	0
Tx Triggers	0	0
Rx Triggers	0	0
CRC Errors	0	0
OverSize	0	0
Frag/UnderSize	0	0
Tx From Stack	0	0
Rx To Stack	0	0

Port Statistics

Port Counters

	Events	Rates
	Port 2-02 LAN-3324A	Port 2-02 LAN-3324A
Tx Frames	12,019,782	0
Rx Frames	45,432,881	19,729
Tx Bytes	18,077,752,128	0
Rx Bytes	68,311,123,613	29,670,780
Tx Triggers	0	0
Rx Triggers	0	0

发送为360M（45*8），接收约为240M（29.67*8），符合组播限速预期。

四、测试结果

接口QOS测试通过。