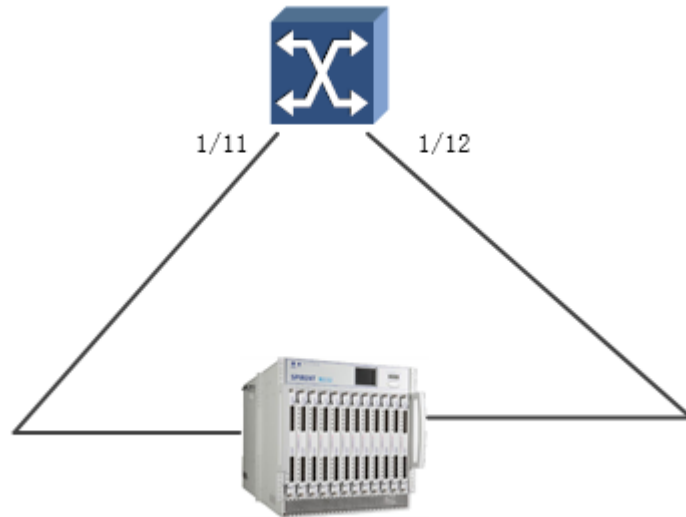


# 印度项目全局QOS测试报告

## 一、测试拓扑



## 二、测试设备配置

```
switch# config t
switch(config)# qos storm unicast 70 mbps
switch(config)# qos storm multicast 50 mbps
switch(config)# qos storm broadcast 30 mbps
switch# sh run int gi 1/11
Building configuration...
interface GigabitEthernet 1/11
 switchport access vlan 2
!
end
switch# sh run int gi 1/12
Building configuration...
interface GigabitEthernet 1/12
 switchport access vlan 2
!
```

### 三、测速记录

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 : IP (Internet Protocol)

IP Addresses

IP Source: 192.085.001.002

IP Destination: 192.000.000.001

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

Default

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: f3 65

IP Options

☐ IP Options

Default

View

OK

Cancel

Format: He

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 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: d2 65

IP Options  
☐ IP Options

**Default**

View

**OK**

Cancel

Def: 0

Format: 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  ...

Flow 2  ...

☐ Carry Chaining (VFD1 -> VFD2)

### SETUP : Ethernet Protocol

MAC Source: 00 10 94 00 00 04

MAC Destination: 01 00 5E 02 01 01

Type: 0x 08 00 IP

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 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: b4 66

IP Options

☐ IP Options

Default

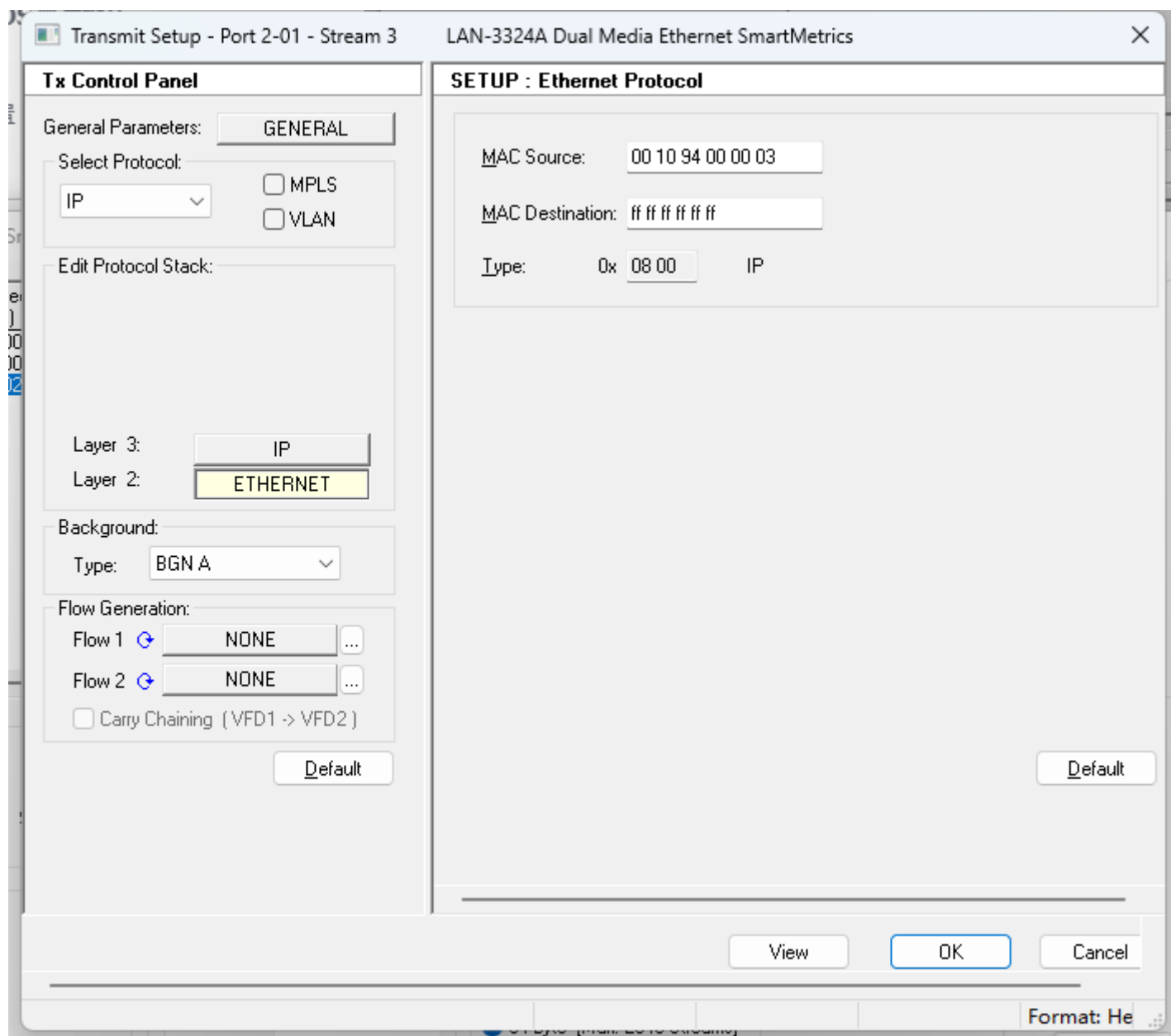
View

OK

Cancel

Destination MAC address

Format: He



分别对三类报文打100M的数据流

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  
Default

Selected Streams

Activate  
Deactivate  
Delete  
Copy  
Paste  
Undo  
Add  
Edit

Options...  
OK

## 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 5a 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			Port 2:01 LAN-3324A		Port 2:01 LAN-3324A	
			Events	Rates	Events	Rates
			Port 2:01 LAN-3324A	Port 2:01 LAN-3324A	Port 2:01 LAN-3324A	Port 2:01 LAN-3324A
Tx Frames			52,363,125	10,000		
Rx Frames			96,518	0		
Tx Bytes			43,734,632,825	15,040,758		
Rx Bytes			6,288,591	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		

			Events	Rates	Events	Rates
			Port 2:02 LAN-3324A	Port 2:02 LAN-3324A	Port 2:02 LAN-3324A	Port 2:02 LAN-3324A
Tx Frames			3,200,129	0		
Rx Frames			12,687,764	5,754		
Tx Bytes			204,808,256	0		
Rx Bytes			18,026,554,330	8,654,224		
Tx Triggers			0	0		
Rx Triggers			0	0		
CRC Errors			0	0		
OverSize			0	0		
Frag/UnderSize			0	0		
Tx To Stack			708,304	1		

发送为120M（15\*8），接收约为70M（8.6\*8），符合限速预期。

## 2. 仅组播报文

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 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	12.192000	12.192000		01 00 5a 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

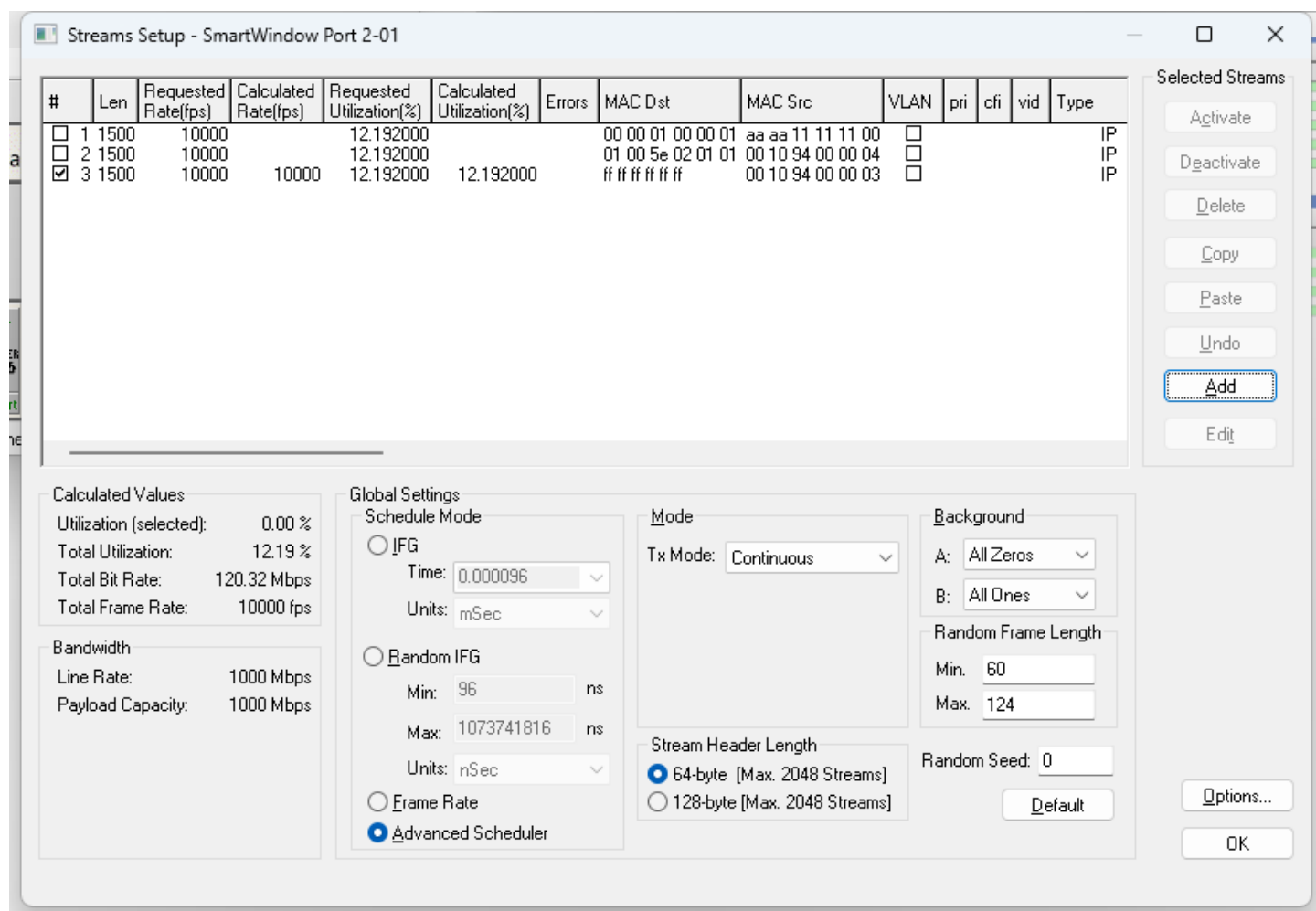
Port Counters		Events	Port 2-01 LAN-3324A	Rates	Port 2-01 LAN-3324A
Tx Frames		54,040,327		10,000	
Rx Frames		96,729		0	
Tx Bytes		46,317,811,584		15,039,937	
Rx Bytes		6,319,436		0	
Tx Triggers		0		0	
Rx Triggers		0		0	
CRC Errors		0		0	
OverSize		0		0	

Port Counters		Events	Port 2-02 LAN-3324A	Rates	Port 2-02 LAN-3324A
Tx Frames		3,200,129		0	
Rx Frames		13,200,283		4,110	
Tx Bytes		204,800,256		0	
Rx Bytes		18,798,332,274		6,181,456	
Tx Triggers		0		0	
Rx Triggers		0		0	
CRC Errors		0		0	

发送为120M (15\*8) ，接收约为50M (6.18\*8) ，符合限速预期。

### 3. 仅广播报文



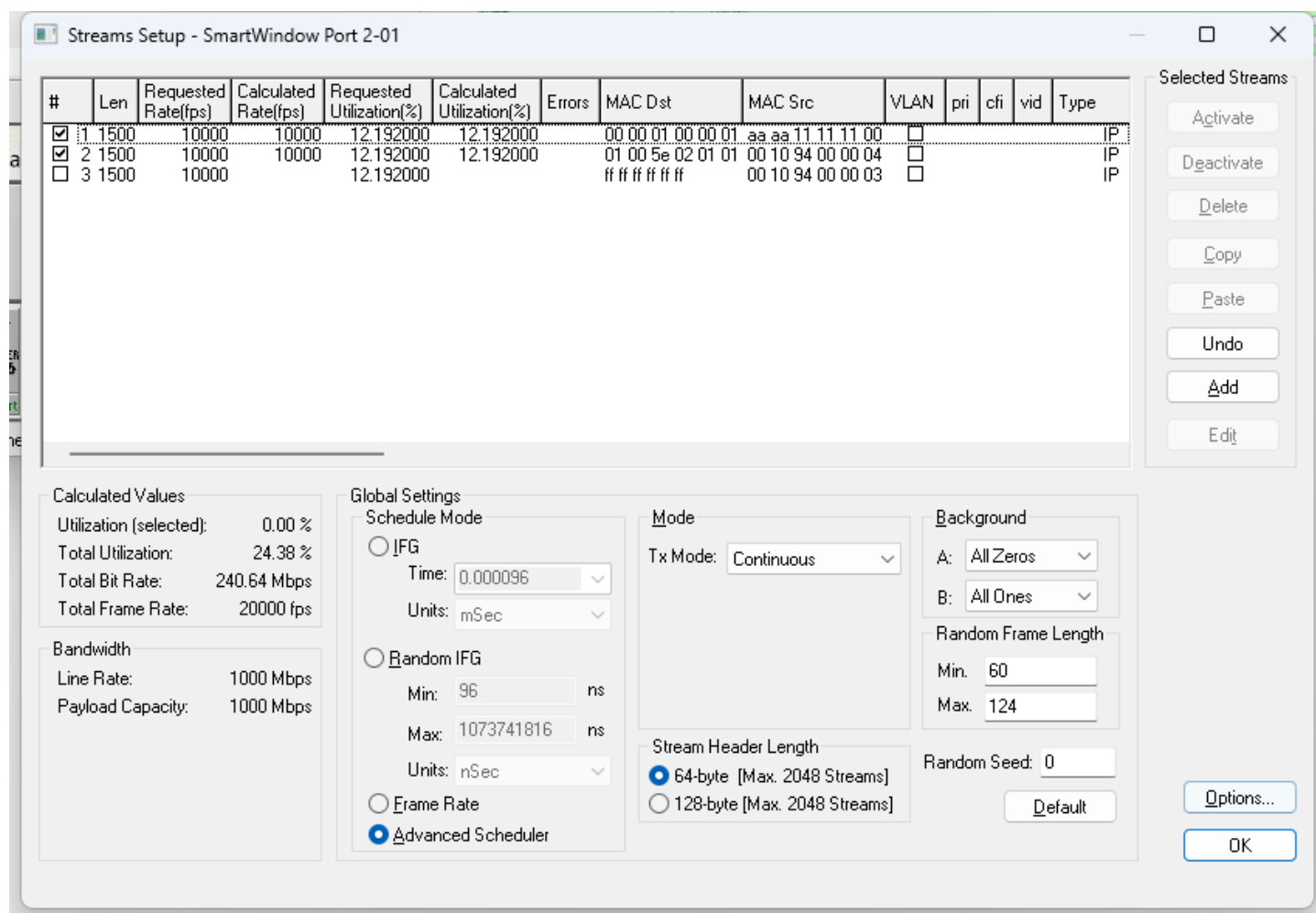
Port Counters			Events		Rates	
			Port 2-01 LAN-3324A		Port 2-01 LAN-3324A	
Tx Frames			55,359,835		10,000	0
Rx Frames			96,809		15,039,373	0
Tx Bytes			48,299,345,216		0	0
Rx Bytes			6,329,266		0	0
Tx Triggers			0		0	0
Rx Triggers			0		0	0
CRC Errors			0		0	0
Queue Size			0		0	0
Forward Index Size			0		0	0

Port Counters			Events		Rates	
			Port 2-02 LAN-3324A		Port 2-02 LAN-3324A	
Tx Frames			3,200,129		0	0
Rx Frames			13,683,962		2,468	0
Tx Bytes			204,800,256		0	0
Rx Bytes			19,525,527,362		3,710,976	0
Tx Triggers			0		0	0
Rx Triggers			0		0	0
CRC Errors			0		0	0
Queue Size			0		0	0
Forward Index Size			0		0	0

发送为120M (15\*8)，接收约为30M (3.7\*8)，符合限速预期。

#### 4. 未知名单播报文+组播报文



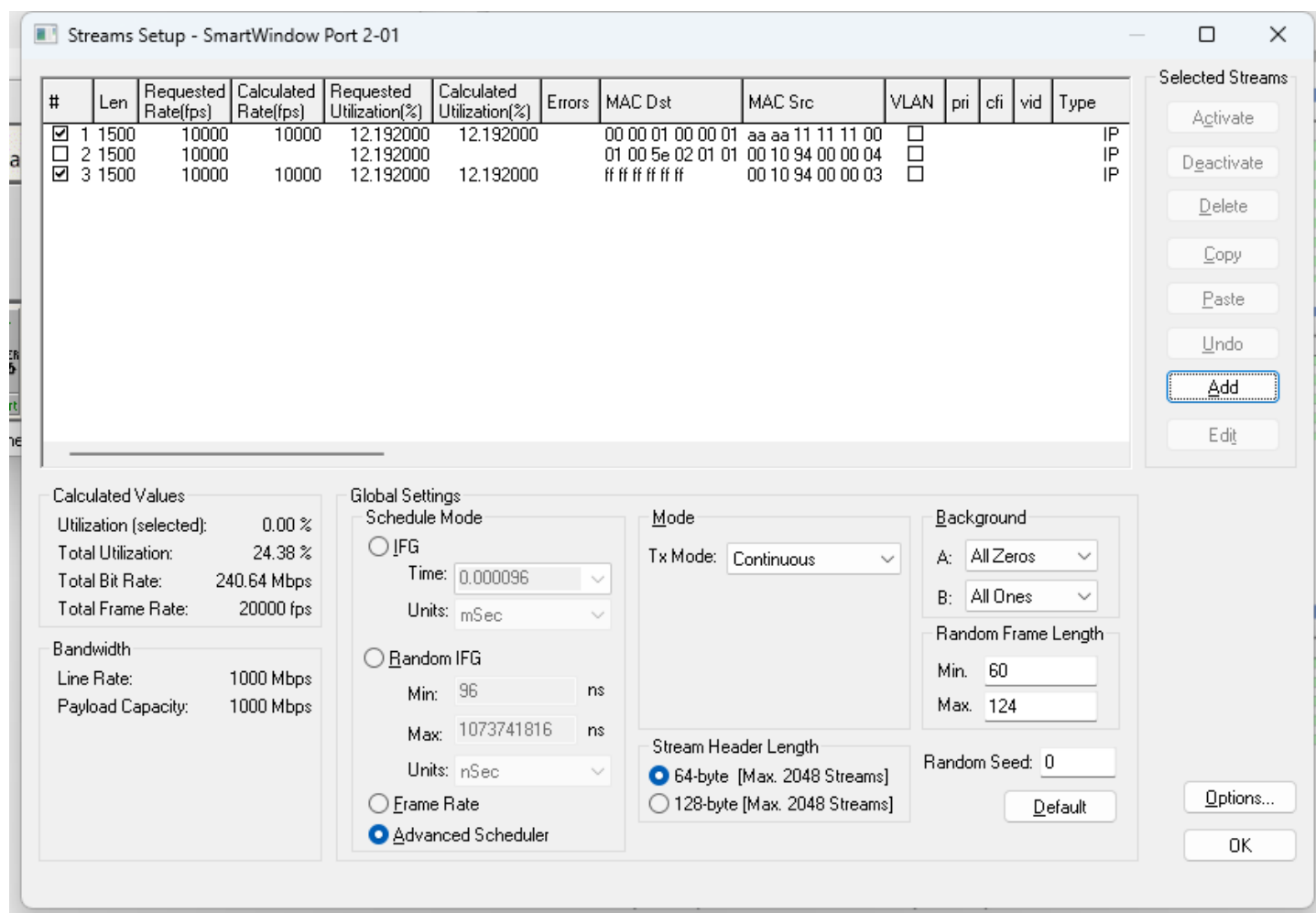
Port Counters			Events		Rates	
			Port 2-01 LAN-3324A		Port 2-01 LAN-3324A	
Tx Frames	56,416,573				20,000	
Rx Frames	36,876					
Tx Bytes	49,890,783,168				30,080,583	
Rx Bytes	6,337,499				128	
Tx Triggers	0				0	
Rx Triggers	0				0	
CRC Errors	0				0	
OverSize	0				0	
Frag/UnderSize	0				0	
Tx From 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	3,200,129				0	
Rx Frames	14,273,432				9,865	
Tx Bytes	204,808,256				0	
Rx Bytes	20,412,143,364				14,834,367	
Tx Triggers	0				0	
Rx Triggers	0				0	
CRC Errors	0				0	
OverSize	0				0	

发送为240M (30\*8) ，接收约为120M (14.8\*8) ，符合限速预期。

## 5. 未知名单播报文+广播报文



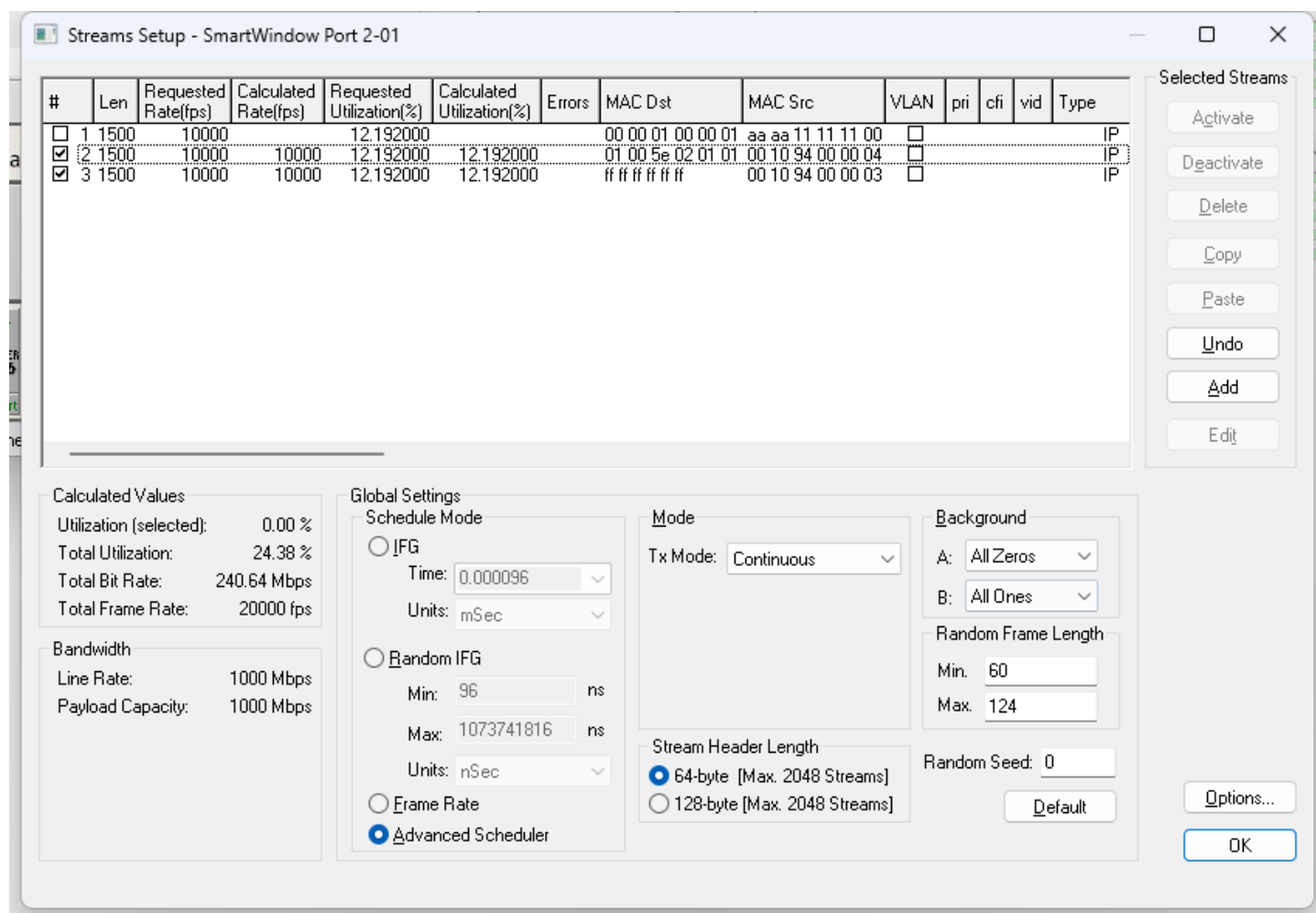
Port Counters			Rates	
Port 2:01 LAN-3324A			Port 2:01 LAN-3324A	
Tx Frames	57,946,660			19,999
Rx Frames	96,323			0
Tx Bytes	52,192,034,016			30,078,899
Rx Bytes	6,343,274			0
Tx Triggers	0			0
Rx Triggers	0			0
CRC Errors	0			0
OverSize	0			0

Port Counters			Rates	
Port 2:02 LAN-3324A			Port 2:02 LAN-3324A	
Tx Frames	3,200,129			0
Rx Frames	15,020,201			8,222
Tx Bytes	204,800,256			0
Rx Bytes	21,535,214,101			12,364,899
Tx Triggers	0			0
Rx Triggers	0			0
CRC Errors	0			0
OverSize	0			0

发送为240M (30\*8) ，接收约为100M (12.3\*8) ，符合限速预期。

## 6. 组播报文+广播报文



Port Counters		Events		Rates	
		Port 2:01 LAN-3324A		Port 2:01 LAN-3324A	
Tx Frames	59,446,254			20,000	
Rx Frames	96,970			0	
Tx Bytes	54,447,423,392			30,080,009	
Rx Bytes	6,349,048			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	3,200,129			0	
Rx Frames	15,421,918			6,577	
Tx Bytes	204,000,256			9,891,967	
Rx Bytes	22,139,349,511			0	
Tx Triggers	0			0	
Rx Triggers	0			0	
CRC Errors	0			0	

发送为240M (30\*8) ，接收约为80M (9.89\*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

Background

A: All Zeros  
B: All Ones  
Random Frame Length  
Min: 60  
Max: 124  
Random Seed: 0

Stream Header Length

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

Default

Options...

OK

		Events	Rates	
		Port 2-01 LAN-3324A	Port 2-01 LAN-3324A	
Tx Frames		60,590,681	29,996	
Rx Frames		97,005	1	
Tx Bytes		56,168,641,600	45,114,532	
Rx Bytes		6,363,390	129	
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	

		Events	Rates	
		Port 2-02 LAN-3324A	Port 2-02 LAN-3324A	
Tx Frames		3,200,129	0	
Rx Frames		16,050,099	12,333	
Tx Bytes		204,808,256	18,547,047	
Rx Bytes		23,084,074,348	0	
Tx Triggers		0	0	
Rx Triggers		0	0	

发送为360M（45\*8），接收约为150M（18.5\*8），符合组播限速预期。

#### 四、测试结果

全局QOS限速通过。