

Spirent Communications

# Spirent TestCenter Software and Hardware New Features 5.22

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# New Products and Features

## Software Features

### *HLTAPI Support to RFC 8239 Microburst Testing*

The RFC 8239 Test Package is an essential tool for Data Center Networks; it provides a methodology for benchmarking data center physical network equipment DUTs, including congestion scenarios, switch buffer analysis, microburst, and head-of-line blocking, while also using a wide mix of traffic conditions.

Spirent TestCenter release 5.19 added wizard and native API support for Microburst Testing, one of five tests defined in RFC 8239. In Spirent TestCenter release 5.22, HLTAPI support for Microburst Testing is added.

RFC 8239 results are only available in Spirent TestCenter IQ, users must have JSON and REST packages in the TCL installed folder to use this function.

TCL example:

The following example creates a MicroBurst test:

```

set line_rate_cfg [sth::test_rfc8239_config \
    -mode create\
    -test_type mb \
    -streamblock_handle streamblock1 \
    -endpoint_creation 0 \
    -latency_type FIFO \
    -start_traffic_delay 3 \
    -stagger_start_delay 4 \
    -delay_after_transmission 30 \
    -enable_learning 1 \
    -learning_mode 12 \
    -learning_frequency learn_every_trial \
    -learning_rate 2000 \
    -l2_delay_before_learning 4 \
    -l2_learning_repeat_count 8 \
    -l2_fixed_frame_size 256 \
    -l2_learning_frame_size_mode fixed \
    -enable_traffic_verification true \
    -traffic_verification_freq_mode verify_every_trial \
    -traffic_verification_abort_on_fail true \
    -traffic_verification_tx_frame_count 200 \
    -traffic_verification_tx_frame_rate 2000 \
    -iteration_count 1 \
  
```

```
-test_duration_mode           bursts \  
-test_duration_bursts        1300 \  
-streamblock_frame_sizes     false \  
-frame_size_mode             custom \  
-frame_size                   "128" \  
-load_unit                    percent_line_rate\  
-load_type                    custom \  
-load_list                    "30" \  
-burst_type                   step \  
-burst_start                  20 \  
-burst_end                    20 \  
-burst_step                   20 \  
-burst_inter_frame_gap       16 ]
```

Sample Output:

```
{status 1} {handle rfc8239microburstconfig2}
```

The following example modifies a created test:

```
sth::test_rfc8239_config -mode modify \  
  -handle                      [keylget line_rate_cfg handle] \  
  -test_type                    lr \  
  -learning_rate                1200 \  
  -l2_delay_before_learning     6 \  
  -l2_learning_repeat_count     4 \  
  -l2_fixed_frame_size         512 \  
  ]
```

Sample Output:

```
{status 1}
```

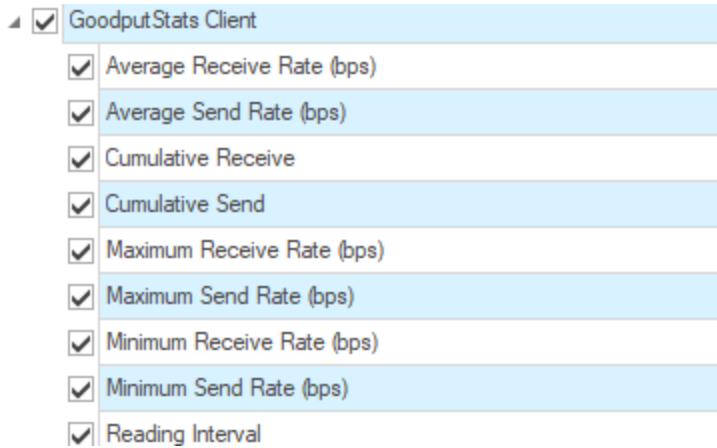
### ***Python 3.9 API Support***

Spirent TestCenter release 5.22 adds Python 3.9 API support for client side automation. Both 32-bit and 64-bit variants of Windows® and Linux® operating systems are supported.

### Enhanced L4-7: Goodput Statistics View

Enhanced L4-7 is the Spirent TestCenter package that allows the user to apply stateful application traffic over the top of certain emulated topologies. Spirent TestCenter release 5.22 adds the capability to display Goodput statistics (the actual *useful* application-layer throughput of the device or system under test) with a new Spirent TestCenter IQ view.

The GoodputStats Client view can be configured to display various parameters as shown in the screen capture.

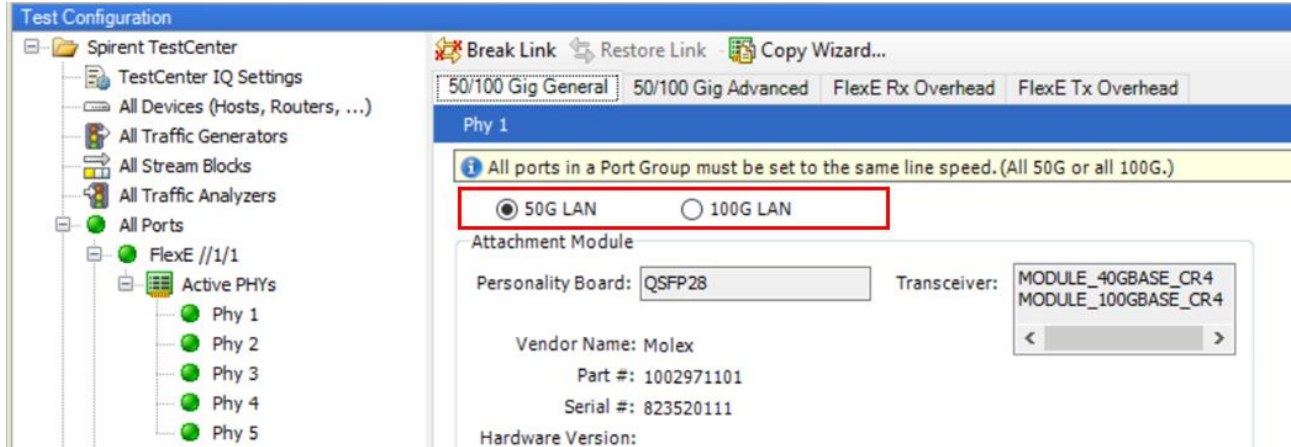


When they are configured, the parameters are displayed in a table (as shown below) and can be charted in the normal way.

Port Name	Role	Cumulative Receive	Average Receive Rate (bps)	Maximum Receive Rate (bps)	Minimum Receive Rate (bps)	Cumulative Send	Average Send Rate (bps)	Maximum Send Rate (bps)	Minimum Send Rate (bps)
Port1/1/1	Client	6,184,318,696	2,941,590,936	69,455,280	32,909,822	69,455,280	32,909,822	80,944	38,496

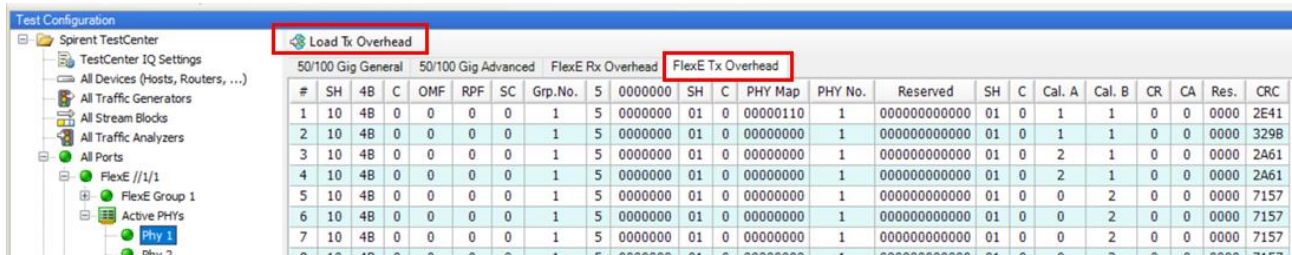
### FlexE-100 Support 50G PAM4 (KP4 FEC only)

Spirent TestCenter release 5.22 enables 50G PAM4 line rate on FlexE-100 hardware modules. The line rate is configured in the “50/100 Gig General” page. The five (5) ports in the same group must be in the same line rate. When one port is changed, the other four (4) ports will be updated automatically. Other functions are the same as 100G line rate. This feature does not require an additional license.



### Display FlexE Tx Overhead

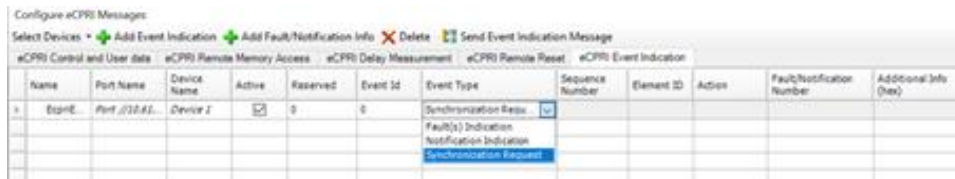
This feature adds the display of FlexE Tx Overhead in FlexE testing. In the “FlexE Tx Overhead” page, detailed values of the overhead in each frame are displayed. Refresh the values by clicking “Load Tx Overhead.”



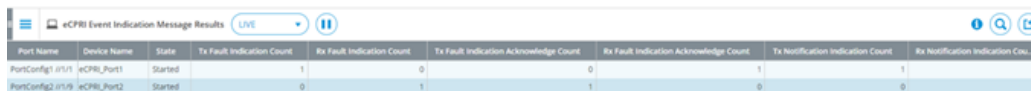
## eCPRI Event Indication Message Phase 2

Event Indication eCPRI message is used when either side of the protocol indicates to the other end that an event has occurred. Synchronization Request procedure is defined as a consistency check to synchronize the requester with the current status of active faults. After the requester sends out the Synchronization-Request message, it should receive the current list of raised faults to the requester, and the sequence is ended with a Synchronization-End message.

In the eCPRI Event Indication tab, Synchronization Request events can be added:



Spirent TestCenter IQ will display the number of Event Indication Messages sent and received by category.

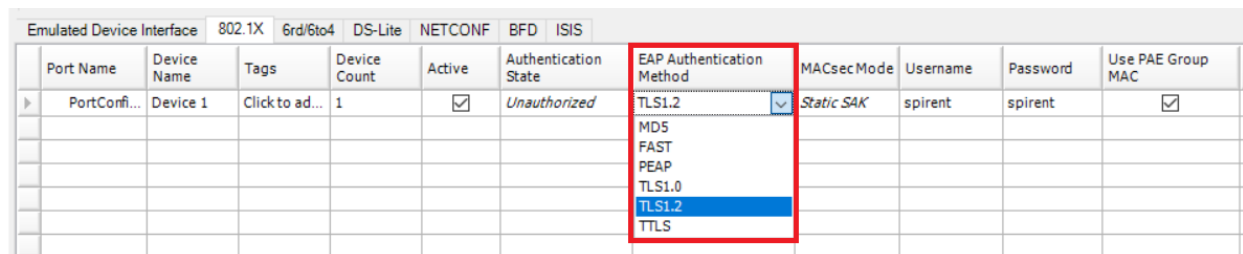


Port Name	Device Name	State	Tx Fault Indication Count	Rx Fault Indication Count	Tx Fault Indication Acknowledge Count	Rx Fault Indication Acknowledge Count	Tx Notification Indication Count	Rx Notification Indication Count
PortConfig1 (1/1)	eCPRI_Port1	Started	1	0	0	0	1	1
PortConfig2 (1/1)	eCPRI_Port2	Started	0	1	1	0	0	0

## 802.1X TLS1.2 Support

Spirent TestCenter Release 5.22 added support for TLS1.2 EAP authentication method for emulated 802.1x client/supplicant.

To enable this feature, select an emulated 802.1x client/supplicant and click on the “802.1X” protocol tab. Then click the drop-down menu in the “EAP Authentication Method” field and select “TLS1.2”.



Port Name	Device Name	Tags	Device Count	Active	Authentication State	EAP Authentication Method	MACsec Mode	Username	Password	Use PAE Group MAC
PortConf...	Device 1	Click to ad...	1	<input checked="" type="checkbox"/>	Unauthorized	TLS1.2	Static SAK	spirent	spirent	<input checked="" type="checkbox"/>

### DHCPv4 Option 60 and 61

Spirent TestCenter Release 5.22 added support for configuring options 60 and 61 in the DHCP requests for an emulated DHCPv4 client.

Option 60 is disabled by default. To enable DHCP option 60, select an emulated DHCPv4 client and click on the “DHCP” protocol tab. Then select the checkbox for the “Enable Vendor Class Identifier Option” field and set the “Vendor Class Identifier” string.

Emulated Device Interface				DHCP Server							
Port Name	Device Name	Tags	Device Count	Enable Vendor Class Identifier Option	Vendor Class Identifier (hex string)	Client Hardware Type	Fibre Channel Address	Fibre Channel Address Step	Client Identifier (hex string)	Custom Hardware Type	Client Identifier (hex string)
Port //10...	Server	Click to ad...	1	<input type="checkbox"/>							
Port //10...	Client1	Click to ad...	3	<input checked="" type="checkbox"/>	vendor_1	Fibre Channel	20:00:10:94:00:00:01	00:00:00:00:00:00:01			
Port //10...	Client2	Click to ad...	3	<input checked="" type="checkbox"/>	vendor_2	Fibre Channel	20:00:10:94:00:00:01	00:00:00:00:00:00:01			
Port //10...	Client3	Click to ad...	3	<input checked="" type="checkbox"/>	vendor_1	Ethernet					
Port //10...	Client4	Click to ad...	3	<input checked="" type="checkbox"/>	vendor_2	Ethernet					
Port //10...	Client5	Click to ad...	3	<input type="checkbox"/>		String			client_@s		
Port //10...	Client6	Click to ad...	3	<input type="checkbox"/>		Custom				255	custom_hw_addr_@s

Option 61 is always enabled. Set the client hardware type by selecting a value in the drop-down menu in the Client Hardware Type field. The default client hardware type is Ethernet. Depending on the configured client hardware type, users can set the values for Fiber Channel Address, Client Identifier string, or Custom Hardware Type.

### L2TPv3 Configurable UDP Source Port

Spirent TestCenter Release 5.22 added support for configurable UDP source port for L2TPv3 protocol for emulated LAC (L2TP access concentrator) and LNS (L2TP network server) devices.

To enable this feature, select an emulated LAC or LNS device and click the L2TP protocol tab. Then set the Version field to L2TP v3, set the Underlying Protocol field to UDP, and configure the UDP source port.

Emulated Device Interface				L2TP								
Port Name	Device Name	Tags	Device Count	Active	L2TP Block State	Version	Emulation Mode	IP Encapsulation	Underlying Protocol	UDP Source Port	Hidden AVPs	Tunnel Count per LAC/LNS
Port //1/...	LNS3	Click to ad...	2	<input checked="" type="checkbox"/>	Idle	L2TP v3	LNS	IPv4	IP		Click to ed...	2
Port //1/...	LNS4	Click to ad...	2	<input checked="" type="checkbox"/>	Idle	L2TP v3	LNS	IPv4	UDP	1701	Click to ed...	2
Port //1/...	LNS5	Click to ad...	2	<input checked="" type="checkbox"/>	Idle	L2TP v3	LNS	IPv4	UDP	1701	Click to ed...	2
Port //1/...	LAC3	Click to ad...	2	<input checked="" type="checkbox"/>	Idle	L2TP v3	LAC	IPv4	IP		Click to ed...	2
Port //1/...	LAC4	Click to ad...	2	<input checked="" type="checkbox"/>	Idle	L2TP v3	LAC	IPv4	UDP	1711	Click to ed...	2
Port //1/...	LAC5	Click to ad...	2	<input checked="" type="checkbox"/>	Idle	L2TP v3	LAC	IPv4	UDP	1701	Click to ed...	2
Port //1/...	LNS1	Click to ad...	2	<input checked="" type="checkbox"/>	Idle	L2TP v3	LNS	IPv4	IP	1722	Click to ed...	2
Port //1/...	LAC2	Click to ad...	2	<input checked="" type="checkbox"/>	Idle	L2TP v3	LAC	IPv4	UDP	1711	Click to ed...	2
Port //1/...	LAC1	Click to ad...	2	<input checked="" type="checkbox"/>	Idle	L2TP v3	LAC	IPv4		1701	Click to ed...	2
Port //1/...	LNS2	Click to ad...	2	<input checked="" type="checkbox"/>	Idle	L2TP v3	LNS	IPv4		1701	Click to ed...	2

In this release, this feature is only supported for L2TPv3 over IPv4 transport. Support for L2TPv3 configurable UDP source port over IPv6 transport will be added in future releases.



## VLAN Support for Qbu Wizard

This feature allows users to configure VLAN header fields (Type, Priority, DEI/CFI, ID) and EtherType for both express and preemptable traffic using the Qbu wizard. The default value for load unit and load has been changed to frames/sec and 1, respectively. The EtherType is auto-populated with the default values as shown in the screen capture. The detailed configuration is also shown on the summary page along with VLAN fields.

**Mixed Traffic Configuration**  
Configure Express traffic and Pre-Emption traffic with segments

Test Type:  Load units:  Load:

Bursts(frames):  Time(seconds):

**Express Traffic**

	DA	VLAN	Type	Priority (bits)	DEI/CFI (bits)	ID (int)	EtherType (hex)	Payload
> 00:02	00:10:94:00:00:03	<input checked="" type="checkbox"/>	8100	0	0	100	800	AAAA
:00:02	00:10:94:00:00:03	<input type="checkbox"/>					800	AAAA

**Pre-Emption Traffic**

	VLAN	Type	Priority (bits)	DEI/CFI (bits)	ID (int)	EtherType (hex)	Payload	SMD-S
> 10:94:00:00:03	<input checked="" type="checkbox"/>	8100	0	0	100	8865	BBBB	S0-E6
10:94:00:00:03	<input type="checkbox"/>					8865	BBBB	S0-E6

**Summary**  
Summary description of configuration

```

<-- Port Configuration -->
-MixedTraffic Tx Port: Port //10.109.115.177/1/1
-Rx Port: Port //10.109.115.181/1/1

<-- Mixed Traffic Test Parameters Configuration -->
-Test Type: : Continuous
-Load Units: : FramesPerSecond
-Fixed Load: : 1

<-- <Advanced Express Traffic-->
-Number of Express Traffic streams : 2
<ExpressStream 1>
-Frame Size: : 128
-Source Address: : 00:10:94:00:00:02
-Destination Address: : 00:10:94:00:00:03
-Vlan Type (hex): : 8100
-Priority (bits): : 0
-DEI/CFI (bit): : 0
-Vlan ID (int): : 100
-EtherType (hex): : 800
-Payload in hex: : AAAA
<ExpressStream 2>
-Frame Size: : 128
-Source Address: : 00:10:94:00:00:02
-Destination Address: : 00:10:94:00:00:03
  
```

## Qbv Rx Support on Additional Modules and Speeds

Spirent TestCenter release 5.22 adds Qbv Rx support for 1G, 2.5G, and 5G speeds on Spirent FX2 / MX2 1G/10G load modules and NIC-47.

This feature enables users to set up Qbv Filters and Qbv Buckets in Traffic Analyzer for the new modules and speeds. Users can analyze the Qbv Rx packets in detail with the Qbv results available in Spirent TestCenter IQ view.

Filter Index	PCP Offset (Bytes)	PCP Mask	PCP Start of Range	PCP End of Range	Dest Mac Offset (Bytes)	Dest Mac Mask	Dest Mac Start of Range	Dest Mac End of Range	GOE Offset (ns)
0	14	0x0	0	0	0	00:00:00:FF:FF:FF	00:00:00:00:00:00	00:00:00:FF:FF:FF	0
1	14	0x0	1	1	0	00:00:00:FF:FF:FF	00:00:00:00:00:00	00:00:00:FF:FF:FF	125000000
2	14	0x0	2	2	0	00:00:00:FF:FF:FF	00:00:00:00:00:00	00:00:00:FF:FF:FF	250000000
3	14	0x0	3	3	0	00:00:00:FF:FF:FF	00:00:00:00:00:00	00:00:00:FF:FF:FF	375000000
4	14	0x0	4	4	0	00:00:00:FF:FF:FF	00:00:00:00:00:00	00:00:00:FF:FF:FF	500000000
5	14	0x0	5	5	0	00:00:00:FF:FF:FF	00:00:00:00:00:00	00:00:00:FF:FF:FF	625000000
6	14	0x0	6	6	0	00:00:00:FF:FF:FF	00:00:00:00:00:00	00:00:00:FF:FF:FF	750000000
7	14	0x0	7	7	0	00:00:00:FF:FF:FF	00:00:00:00:00:00	00:00:00:FF:FF:FF	875000000

Bucket Index	Offset (ns)	Duration (ns)	Filter Index
0	0	125000000	0,1,2,3,4,5,6,7
1	125000000	125000000	0,1,2,3,4,5,6,7
2	250000000	125000000	0,1,2,3,4,5,6,7
3	375000000	125000000	0,1,2,3,4,5,6,7
4	500000000	125000000	0,1,2,3,4,5,6,7
5	625000000	125000000	0,1,2,3,4,5,6,7
6	750000000	125000000	0,1,2,3,4,5,6,7
7	875000000	125000000	0,1,2,3,4,5,6,7

## TR-398 i2 Support for Spirent TestCenter Wi-Fi 6/6E Products

TR-398 i2 by the Broad Band Forum (BBF) defines a set of cases that gives DUT (Device Under Test) performance test with pass/fail result for 802.11 variations. It provides a standard set of test cases and framework to measure aspects of the performance between AP and STA(s) for different scenario. TR-398 i2 version updates the earlier issue of TR-398 (which was for 802.11ac) to include additional test cases for mesh and Wi-Fi roaming between APs, and the new **802.11ax (Wi-Fi 6)** technology.

There are 15 performance test cases outlined in the main section of TR-398 i2. Spirent will implement these test cases through the implementation of Spirent TestCenter wizards and final reporting (pass/fail status) through Spirent TestCenter IQ. Spirent TestCenter TR-398 i2 support is sold as a license. The relevant P/Ns are C50-BPK-5009, AP-BPK-5009, BPK-5009 for the corresponding hardware P/N below.

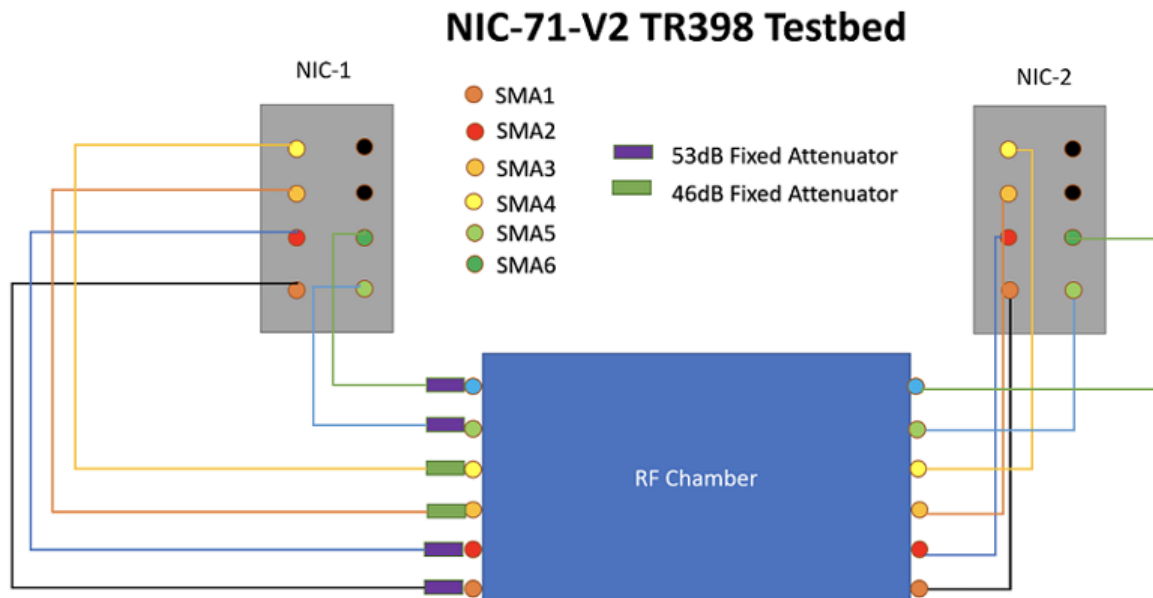
- C50-KIT-11AX-1-V2

The following 6 test cases (section 6.1 and 6.2) are now available in this release.

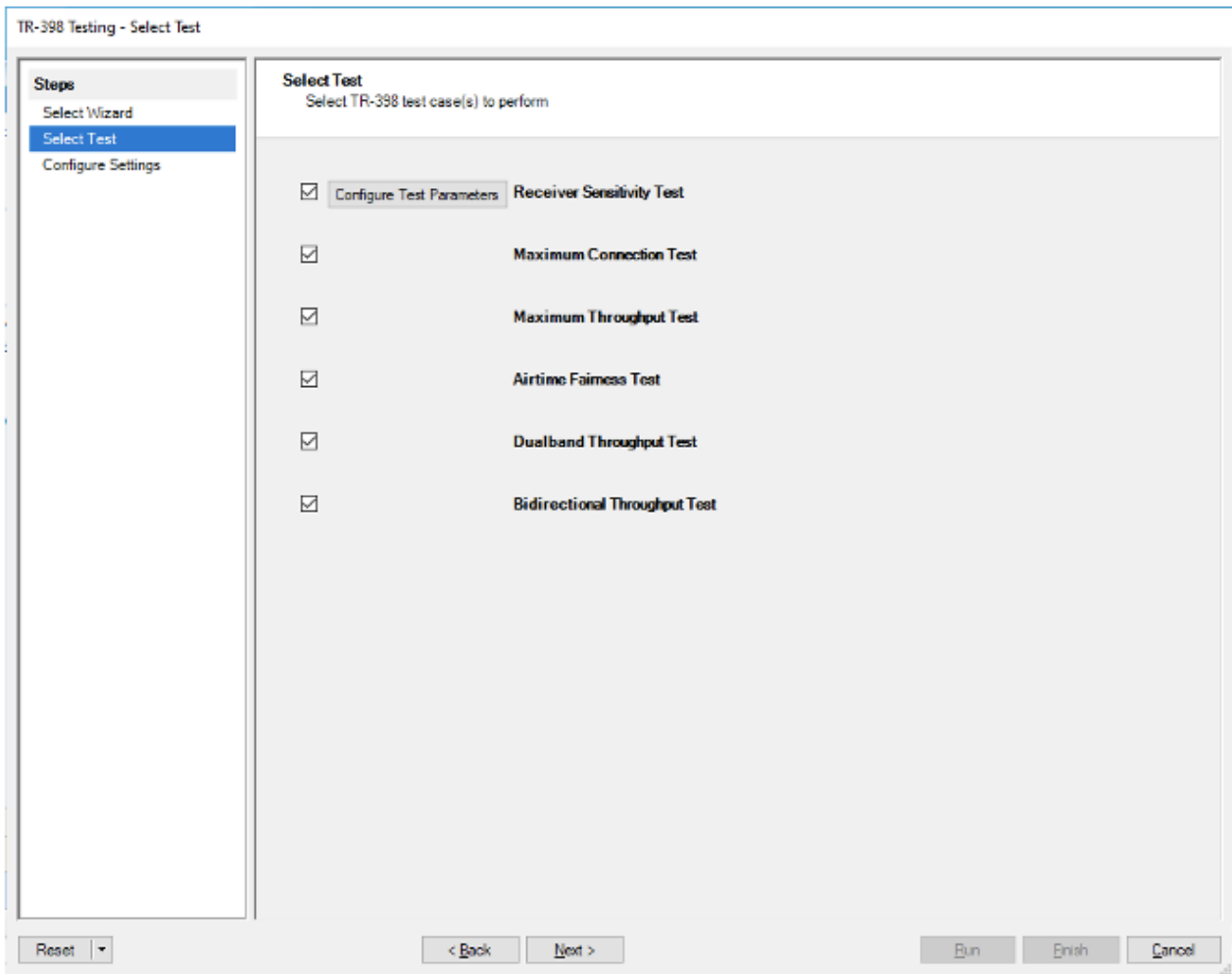
- Receiver Sensitivity Test
- Maximum Connection Test
- Maximum Throughput Test
- Airtime Fairness Test
- Dual-band Throughput Test
- Bidirectional Throughput Test

The remaining 9 test cases will be implemented in future Spirent TestCenter releases.

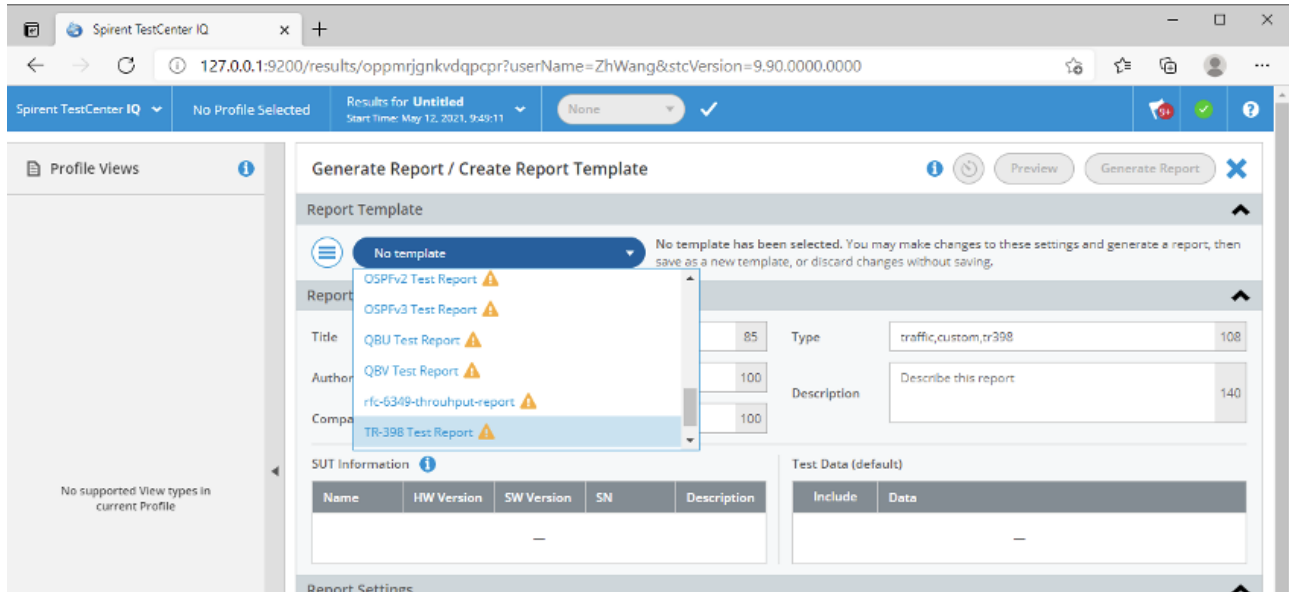
The diagram shows an example of a testbed setup TR-398 i2 for the 6 new testcases.



The screen capture shows the sub-tree for these 6 test cases. The user can select “All” to have each test run in sequence. Or users can individually select which tests they want to run consecutively.



Example: TR-398 i2 reporting through Spirent TestCenter IQ



# Spirent Support

To obtain technical support for Spirent Communications products, please contact our Support Services department using any of the following methods:

## **Americas**

E-mail: [support@spirent.com](mailto:support@spirent.com)

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Toll Free: +1 800-SPIRENT (+1 800-774-7368) (North America)

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## **Europe, Middle East, Africa**

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## **Asia Pacific**

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The latest versions of user manuals, application notes, and software and firmware updates are available on the Spirent Communications Customer Service Center website at <https://support.spirent.com>.

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