

# SPIRENT TECH-X FLEX

## DOCSIS 3.0 TEST MODULE

Spirent's DOCSIS<sup>®</sup> 3.0 module for the Tech-X Flex<sup>®</sup> tester provides field technicians with an efficient and cost-effectiveness method for troubleshooting Docsis related issues inside the home.

### FEATURES & BENEFITS

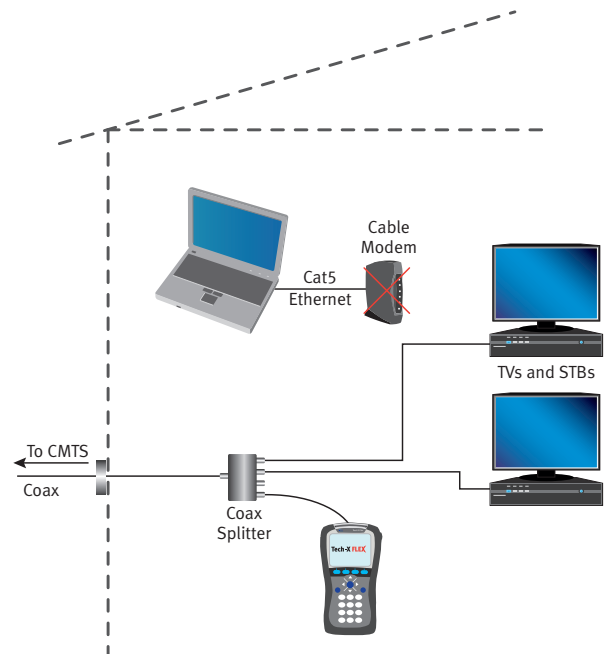
- Measure DOCSIS 1.1, 2.0, 3.0 signal quality and report quality metrics such as signal level, MER, and BER
- Support for 4x1 through 4x4 DOCSIS testing
- Auto configure or manually set DOCSIS type and Frequency
- Emulate customer premise equipment (CPE) to perform IP quality testing such as ping, Traceroute, Web browsing and packet loss measurements
- Ability to function as a DOCSIS/Ethernet bridge, like a standard cable modem to enable inline testing
- Full-rate DOCSIS 3.0 bonded services throughput testing – 152 Mb/s downstream and 108 Mb/s upstream

Data Over Cable Service Interface Specification (DOCSIS) is a technology for delivering high-bandwidth digital data over a hybrid fiber-coaxial (HFC) network. The Tech-X Flex DOCSIS 3.0 Module test suite provides the complete range of measurements needed to fully test and analyze DOCSIS channels and confidently assure the quality of the services offered to cable customers over DOCSIS. Combined with the advanced testing capabilities and ease-of-use of the Tech-X Flex base platform, the DOCSIS Module's test suite is the ideal tool for field engineers and technicians installing and maintaining DOCSIS enabled services.

### PINPOINT THE EXACT LOCATION OF THE FAULT

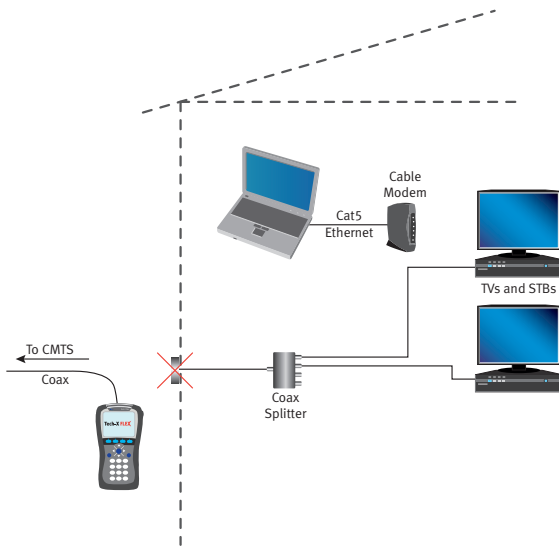
#### Residential Modem

By testing at a modem location, you can emulate that modem in order to validate the coaxial network up to that point and verify if a modem is malfunctioning and needs to be replaced.



# SPIRENT TECH-X FLEX DOCSIS 3.0

## Verifying the Premise connectivity



Testing outside the premises allows verifying whether the problem is in the premises or the “upstream” provider network

## DOCSIS 3.0 CHANNEL QUALITY

The Tech-X Flex simplifies DOCSIS 3.0 testing with tabular results for each of the downstream and upstream channels. Using the tabs, Carrier levels, MER and BER for each of the channels can be viewed and quickly compared to verify that the entire bonded service is operating within specifications

Network	Sync 0	Sync 1	Sync 2	Sync 3
DOCSIS Version:	3.0		Elapsed Time: 00:01:11	
	Downstream		Upstream	
Channel Frequency (MHz):	549.00		30.60	
Modulation:	256QAM		64QAM	
Channel Width (MHz):	6.0		6.4	
Level (dBmV):	0.87		52.50	
MER (dB):	30.82			
BER (Pre-FEC):	0.00e+00			
BER (Post-FEC):	0.00e+00			
Errored Seconds:	0			
Severely Errored Seconds:	0			

## IP CONNECTIVITY TESTS

IP Connectivity can also be tested over the DOCSIS interface using the Ping, Traceroute, Throughput test or Web Browser functionality. Testing across all layers ensures no protocol issues exist, which may not be apparent when it is only DOCSIS level tests that are performed.

Network	Sync 0	Sync 1	Sync 2	Sync 3
<b>Network Information</b>				
IP Address:	73.135.226.115			
MAC Address:	00:05:CA:80:DC:53			
Security SID:	BPI-7882			
Config File:	d11_walledgarden.cm			
TFTP Server:	68.87.73.26			
DHCP Server:	68.87.73.28			
TOD Server:	68.87.73.26			
BPI+ Status:	AUTH:authorized TEK:operational			
EAE Status:	Disabled			

Throughput - www.spirent.com	
Upload Rate:	12.346 Mbps
Download Rate:	23.457 Mbps

## MODEM STATS

This option provides visibility to modem and network statistics on the current active DOCSIS connection for quick verification of the connection quality.

The DOCSIS module allows an option for setting user specified thresholds for various synchronization results produced while connecting to a CMTS. Any result that violates a threshold is highlighted in red in the applicable results screen for easy identification by field personnel.

## PACKET LOSS TEST

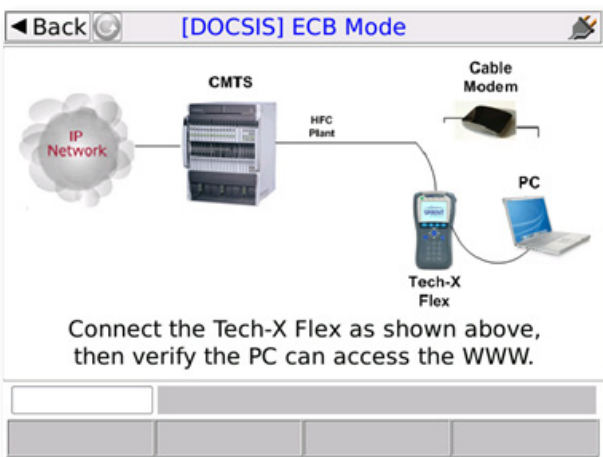
The Packet Loss Test runs a continual series of ping tests, maintaining and presenting a set of cumulative results as testing progresses. These results include the number and percentage of lost ping packets as well as the packet response time since the beginning of the test. This allows the field personnel to validate the quality of the IP connection into the network.

# Sent	# Recv	# Lost	% Lost	Min (ms)	Avg (ms)	Max (ms)
465	465	0	0.0	7.6	10.6	34.0
476	476	0	0.0	7.6	10.6	34.0
346	345	1	0.3	7.8	10.6	34.0
359	359	0	0.0	7.8	10.6	34.0
371	371	0	0.0	7.8	10.6	34.0

Buttons: Traceroute, Ping, Stop Test, Save

## ECB MODE

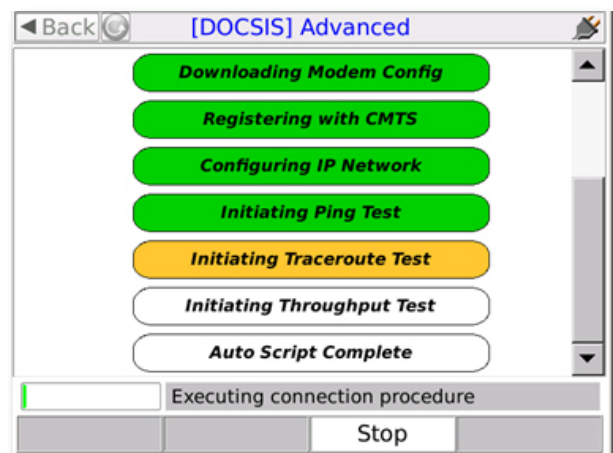
This function allows the unit to act as a complete cable modem replacement. When this mode is active, you can connect a computer to either of the physical 10/100 ports and attempt to access the provider IP network. It is most useful to verify whether a cable modem is functioning properly. If the network operates correctly with the unit in DOCSIS ECB Mode but not when the normal modem is connected, the modem is likely misconfigured or defective.



## AUTO TEST SCRIPTS

Auto Test Scripts provides access to a set of automatic scripts that run a sequence of DOCSIS-related tests, designed to quickly qualify a DOCSIS connection.

The test suite guides field engineers and technicians through each of the cable modem initialization states and provides intuitive messages showing the initialization progress. Quick diagnosis for ranging, registration or other initialization issues allows field engineers and technicians to easily identify and repair problems affecting customer's DOCSIS enabled services.



## DOCSIS TESTS

### Primary Tests

- Connect with CMTS
- IP Network Setup and Ping

### Advanced Tests

- Connect with CMTS
- IP Network Setup and Ping
- Traceroute
- DOCSIS Throughput

## SPIRENT TECH-X FLEX DOCSIS 3.0

### GENERAL TEST PARAMETERS

- Modem Connect Status Messages (“Modem Detected”, “Attempting to Train”, “Sync Successful”)
- DOCSIS Version (1.1, 2.0, 3.0)
- Upstream and Downstream QAM Type
- Upstream and Downstream Level (dBmV)
- Channel Frequency and Width
- Security SID
- Downstream MER
- Downstream BER (Pre and Post FEC)
- Tx Packets/ Rx Packets
- Lost Packets using the Packet Loss test
- Errored Seconds
- Severely Errored Seconds
- IP Address (Flex)
- MAC Address (DOCSIS Modem & Flex)

ORDERING INFORMATION		
PRODUCT NUMBER	PRODUCT NAME	PRODUCT DESCRIPTION
T5000	Tech-X Flex	With 10/100 Ethernet interface for IP Ping, Traceroute, DHCP/Static Addressing
T5633	DOCSIS module	DOCSIS data connectivity, statistics, diagnostic assessment, throughput, Modem emulation, ECB mode, and IP connectivity—Ping, Traceroute and Web Browsing

### SPIRENT SERVICES

Spirent Global Services provides a variety of professional services, support services and education services—all focused on helping customers meet their complex testing and service assurance requirements. For more information, visit the Global Services website at [www.spirent.com/gs](http://www.spirent.com/gs) or contact your Spirent sales representative.

TECHNICAL SPECIFICATIONS	
Physical interface	75 Ohms, type “F” coaxial
DOCSIS Specifications	Compliant with CableLabs DOCSIS 1.1, 2.0, 3.0 specifications
RF Frequency Range Upstream	5 Mhz to 85 Mhz
RF Frequency Range Downstream	99 Mhz to 1004 Mhz
Throughput Testing	Up to 4 channels and 152 Mbps
QAM Type	Downstream 64 QAM and 256 QAM (ITU J.83 Annex B) Upstream QPSK, 8 QAM, 16 QAM, 32 QAM and 64 QAM
Maximum Input Power	+17dBmV
Maximum transmit power	57 dBmV (75 ohm system) as specified by DOCSIS 3.0
MER Range	15 dB—40 dB (64 QAM) 21 dB—40 dB (256 QAM)
MER Accuracy	±2 dB
Pre and Post FEC BER Range	1 x 10 <sup>-4</sup> to 1 x 10 <sup>-9</sup>
GENERAL SPECIFICATIONS	
Input voltage range	6.8 VDC to 12.5 VDC
Power consumption	5.2 W
Operating temperature range	23 to 104°F (-5 to 40°C) at 5%-90% RH (non-condensing)
Storage temperature range	23 to 185°F (-5 to 85°C)
Dimensions (H x W x D)	5.4 in. x 4.1 in. x 2.4 in. (13.8 cm. x 10.3 cm. x 6.0 cm.)
Weight	10 oz. (280 g.)

**AMERICAS** 1-800-SPIRENT • +1-818-676-2683 • [sales@spirent.com](mailto:sales@spirent.com)

**EUROPE AND THE MIDDLE EAST** +44 (0) 1293 767979 • [emeainfo@spirent.com](mailto:emeainfo@spirent.com)

**ASIA AND THE PACIFIC** +86-10-8518-2539 • [salesasia@spirent.com](mailto:salesasia@spirent.com)

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