

## **SPIRENT TECH-X FLEX**

### **FIELD TEST SOLUTION FOR TELCOs AND MSOs**

Tech-X Flex<sup>®</sup> is the field test solution for all telco and cable providers, enabling qualification of the service and troubleshooting of transport related issues within the consumer's home.

#### **FEATURES & BENEFITS**

- Modular platform which supports a wide range of technologies for FTTN, FTTP and cable networks.
- Full Color VGA Display to show maximum information and detail to the user
- Analyze IP Video streams to determine your customer's Quality of Experience
- 802.11 connectivity to allow signal strength measurement and validation of the customer network
- Verify Web connectivity, configure equipment, and access back-office applications with a Web browser

Spirent's new modular platform has been designed for use in a wide range of applications, equally suited to testing inside the home and for outside plant environments. Its high resolution, touch screen display and powerful processing capability delivers the most advanced test set on the market. Coupled with its ability to push data to almost any external location, Tech-X Flex offers a level of capability normally associated with a PC—not a test set with such a small form factor.

#### **IN HOME TRIPLE PLAY TESTING**

The in-home network is considered one of the last major hurdles service providers will have to overcome to efficiently deliver Triple Play services to the consumer. Previously, the in-home network was the responsibility of the consumer. However, providers have spent billions of dollars on both network and access infrastructure. They now view the in-home network as a potential stumbling block which can mean keeping or losing subscribers.

The high penetration of cable TV and satellite services has resulted in ready-to-use network installations of coaxial cabling within the subscriber home. New technologies such as MoCA have been developed to operate on these networks and allow high-speed transfer of video between devices within the home.



With new in-home technologies come additional requirements for maintaining and troubleshooting. Tech-X Flex provides a complete set of test features to ensure any problems within the home are diagnosed and resolved in an efficient and timely manner—ensuring ultimate customer satisfaction. Some of these key features include:

- IP Video testing (e.g., broadcast and VOD)
- 802.11 testing and access
- Web Browser
- MoCA testing
- High-speed Internet testing

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**TELCO TRIPLE PLAY TESTING**

Tech-X Flex enables field technicians to qualify both FTN Service Provider and MSO networks. For FTN-based networks including POTS, DSL and Triple Play offerings, the field technician can use the Tech-X Flex with its modular capabilities to ensure complete service qualification using a single platform. This single modular platform allows a unified solution—reducing time and capital equipment costs—making future standards-based network expansions easy to qualify.

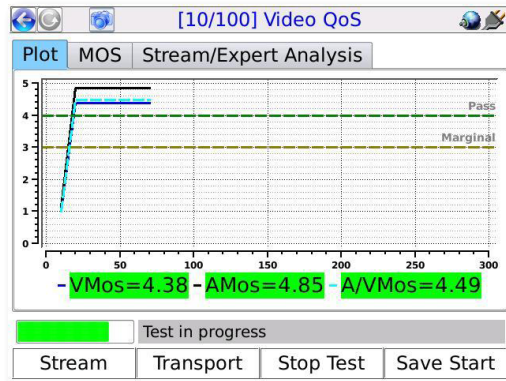
**MSO TRIPLE PLAY TESTING**

For MSO networks including DOCSIS® and RF-based Triple Play networks, the Tech-X Flex Cable Services Test Suite provides the complete range of measurements needed to fully test, analyze and assure the quality of the services offered to cable customers over DOCSIS. Automated advanced testing capabilities and ease-of-use of the Tech-X Flex base platform make the Tech-X Flex Cable Test Suite the ideal tool for field engineers and technicians installing and maintaining MSO service offerings.

**IP VIDEO TESTING**

Tech-X Flex extends Spirent’s reputation of testing IP Video to inside the home. Tech-X Flex can be configured to emulate an STB, select a video stream and measure subsequent video quality, network quality and channel change time. Tech-X Flex is also equipped with dual Ethernet ports for in-line/passive monitoring of both Ethernet and IP services. In this scenario, the STB selects the video streams, so that faults can be seen on both the Tech-X Flex and on a customer’s actual television for easy correlation. This passive testing overcomes the inability of other testers to analyze proprietary middleware and encrypted video.

Spirent’s approach to video testing is measure the network and transport metrics, and analyze the content of the video. This is the most comprehensive method of determining the customer’s Quality of Experience (QoE). An experienced Tier 2/3 technician or novice user can accommodate their respective demands for the



display of IP Video results. Tech-X Flex gives a Video MOS score (VMOS) which rates the customer’s QoE with a number between 1 and 5. The closer to 5, the better the experience. This provides a quick and easy method for the technician to evaluate the customer’s service. However, should a more detailed analysis be required, Tech-X Flex also provides additional measurements such as jitter, I/B/F frame counts, loss and more.

**802.11**

The WiFi link from the home router is often viewed as a problematic area for service providers. Using an integrated 802.11 modem, Tech-X Flex can help troubleshoot issues related to the connection link as well as providing the capability to test over that link using tests such as Ping, TraceRoute , Packet Loss, Throughput and Web browser.

Tech-X Flex allows the technician to validate the consumer’s network is configured, as it should be by way of verifying the SSID name, channel usage and encryption type used. Signal strength measurements help locate areas within the home that may be suffering from poor coverage and detect interfering networks.

The screenshot shows a "Wi-Fi Scan" interface with a table of detected networks. The table has columns for SSID, Signal Strength, CH#, Network Type, and 802.11 Type. The signal strength for the "blue" network is highlighted in red, indicating a weak signal.

SSID	Signal Strength	CH#	Network Type	802.11 Type
blue	-47 dBm	03	INFRA.	b,g
hpsetup	-53 dBm	06	ADHOC	b
lab21	-53 dBm	11	INFRA.	b,g
blue	-54 dBm	02	INFRA.	b,g
TJD12	-71 dBm	06	INFRA.	b,g
TJD1	-80 dBm	11	INFRA.	b,g
EDGEQUEST	-83 dBm	01	INFRA.	b,g
LAB5-Actiontec	-83 dBm	06	INFRA.	b,g
blue	-84 dBm	04	INFRA.	b,g

Below the table, there is a progress bar labeled "Scanning Available Network..." and buttons for "Connect", "Details", "Pause", and "Save".

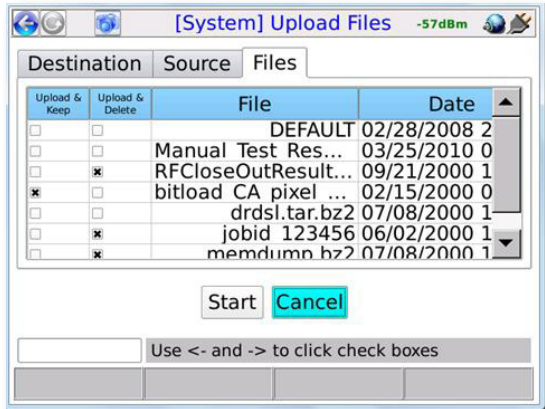
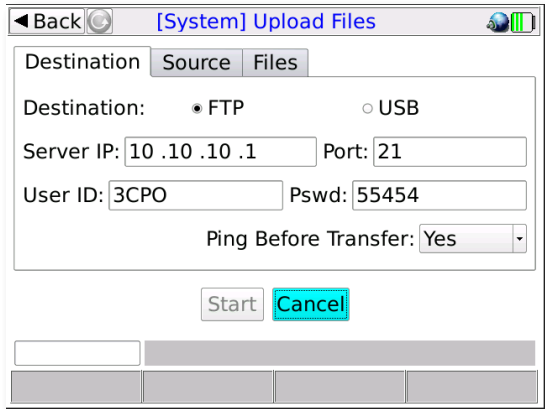
**WEB BROWSER**

The Web Browser allows technicians to verify Web connectivity from within the customer premise over the 802.11 (WiFi) or 10/100 Ethernet connections. This removes the need for the technician to carry the laptop to the customer premise to prove the service. Although Ping and TraceRoute functions may provide connectivity to destinations across the internet, they do not guarantee the absence of DNS issues which may be hampering your customer’s attempts to access various Web sites.

A high resolution, color display and touch screen allow the Web Browser to be used as a configuration tool for either the customer’s home router or any central office Web-based portals. This further eliminates the need for removing the laptop from the truck.

**INTEGRATION**

Tech-X Flex has been designed with integration in mind. Integration to local PCs, integration to back office systems. In fact, anything that a field technician’s laptop normally integrates with.



**CPE/SERVICE CONFIGURATION**

Multiple communication interfaces (wireless, Ethernet, USB) allow both CPE and access equipment to be configured trouble-free and without the need for the technician’s laptop to be present. This is easily done with the Tech-X Flex Web browser, touch screen and use of the virtual on-screen keyboard, keypad or even an external USB keyboard.

**RESULTS STORAGE AND TRANSMISSION**

Tech-X Flex offers unlimited storage capacity due to both the large internal memory and external capability via the USB slot. USB flash drives can be used for result storage, offering an inexpensive method for saving. All results are timestamped and stored in XML along with the test set’s serial number, and the technician’s name and ID number.

The retrieval of results from the Tech-X Flex differs from the normal method of hooking up a PC to pull the results from the test set. Tech-X Flex is easily configurable to have all results automatically pushed from the Tech-X Flex when they are saved. These results can be sent via Ethernet or 802.11. The field technician decides whether the results are sent to a back-office database, to a laptop in the truck or e-mailed to a supervisor.



## SPIRENT TECH-X FLEX

### FIELD TEST SOLUTION FOR TELCOs AND MSOs

GENERAL SPECIFICATIONS	
PHYSICAL CHARACTERISTICS	
Dimensions (H x W x D)	2.00 in. x 4.70 in. x 8.85 in. 51 mm x 120 mm x 225 mm
Weight	1.7 lb., 0.77 kg.
Display	Backlit Color Display VGA (640 x 480 pixels)
Case Material	FR ABS Polycarbonate
LED Indicators	Data, Errors, Alarms, Charge
Communications Interfaces	802.11, USB 2.0 10/100Base-T, 3.5 mm headset jack
Test Interfaces	10/100Base-T (x2)
POWER SPECIFICATIONS	
AC Operations	External AC adaptor/charger NOTE: Adaptor charges battery while Tech-X Flex is in use
Battery Type	LiON rechargeable
Battery Life	6-8 hours, depending on use
Battery Recharge Time	3-4 hours
ENVIRONMENTAL REQUIREMENTS	
Operating Temperature	-18°C to 55°C (-0.4°F to 131°F)
Storage Temperature	-20°C to 70°C (-4°F to 158°F)
Humidity Tolerance	0 to 93% RH at +40°C (104°F)
Bump	IEC 68-2-29
Drop	IEC 68-2-32
Vibration	IEC 68-2-6
Shock	IEC 68-2-27
Water/Dust Ingress	IP52

## 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](http://www.spirent.com) or contact your Spirent sales representative.

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ORDERING INFORMATION		
PRODUCT NUMBER	PRODUCT NAME	DESCRIPTION
T5000	Tech-X Flex	With 10/100 Ethernet interface for IP Ping, Traceroute, DHCP/Static Addressing.
T5640	WB Copper Module	Provides WB Copper test functionality to 30MHz. Includes DVOM/VF, TDR, RFL, PSD and WB measurements.
T5610	MoCA Module	Provides a single MoCA interface for joining a MoCA network to measure various stats such as throughput, bandwidth map, individual node performance, TX/TX bit loading per node, etc.
T5620	ADSL/VDSL2 Module	ADSL to VDSL2 xTU-R modem emulation.
T5624	Combined ADSL/VDSL2 and WB Copper Module	ADSL to VDSL2 xTU-R modem emulation and WB Copper test functionality to 30MHz in a single module.
T5630	RF Video Module (860 MHz)	Provides RF based video measurement and analysis including SLM, MER, BER and Constellation.
T5633	DOCSIS 3.0 Module	Provides DOCSIS 3.0 sync to CMTS, statistics, IP testing (ping, Traceroute, Web browser).
T5631-1	Cable Services Module V1 with DOCSIS	Provides support for 5-45MHz upstream and up to 1GHz downstream RF video testing including SLM, MER, BER, Constellation, Spectral analysis, Tilt, HUM and other critical RF testing functions. Also provides DOCSIS 3.0 testing support including connect to CMTS, statistics, IP testing, ECB Mode and Automated scripts.
T5645	Copper Far End Unit (FEU)	A remote device used in conjunction with the Tech-X Flex Copper module, to provide Shorts, Grounds, Opens, Termination, Tones on a cable pair for testing at a distant location.
OPTIONS		
T5001	Dual Ethernet Option	Provides a second Ethernet interface to allow in-line/passive testing of IP services.
T5002	Dual MoCA Option	Provides a second MoCA interface to allow in-line/passive testing of IP services.
T5003	IP Video Option	Provides IP Video set-top box emulation with results such as VMOS, codec type, channel change time, packet loss, latency, jitter, out-of-order packets, I/B/P frame counts, etc.
T5004	Web Browser Option	Provides the ability to surf the web to verify internet and DNS functionality.
T5005	Wi-Fi Option	Provides wireless communications to a PC as well as the ability to detect and measure signal strength and other Wi-Fi stats.
T5006	DSL Expert Option	Provides automatic loop and in-house fault analysis and data rate impact.
T5015	xTU-C Option	Enables xTU-C Emulation for ADSL thru VDSL2 sync.
T5017	ADSL Auto ATM-PTM	Enables Sync to DSLAM support for ADSL services automatically over Packet Transfer Mode (PTM) or Asynchronous Transfer Mode (ATM).
T5021	HSD Tests	Packet Loss test and Throughput test. Available for all IP interfaces (MoCA, DOCSIS, Wi-Fi and 10/100).

