

Lab Testing Summary Report

March 2012

Report SR120126B

Product Category:

Enterprise Layer 2 Switch

Vendor Tested:



Product Tested:

S2700-EI Series Switches



Key findings and conclusions:

- Huawei S2700-EI is resilient and robust to meet enterprise reliability requirements
- High performing throughput capabilities
- Exceptionally large capacity for ACL, MAC address, and VLAN
- QoS capabilities allow prioritization and full functionality, even under heavy load
- Proven interoperability in tests with Cisco switches

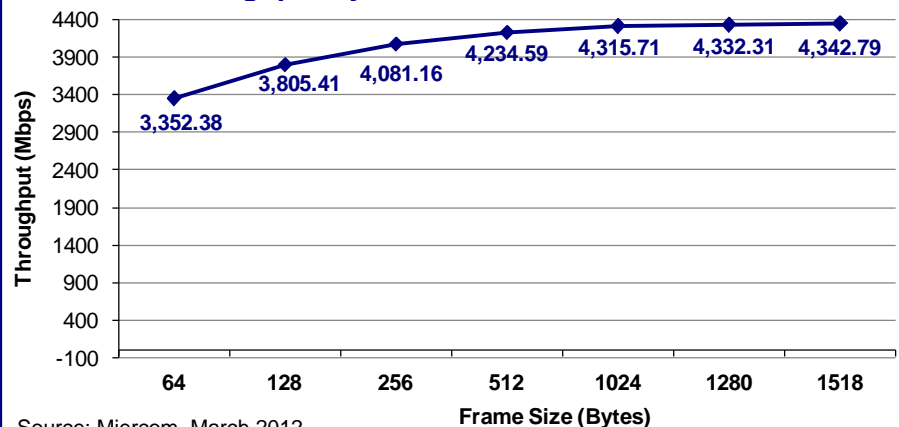
Huawei Technologies engaged Miercom to evaluate the S2700-EI series of 10/100Base-T Ethernet switches and show the versatility, performance, and functionality of these business enterprise switches.

The S2700-EI series of enterprise switches are next-generation energy-saving 100M Layer 2 Ethernet switches. The S2700-EI utilizes switching technologies and Huawei Versatile Routing Platform (VRP) software to meet the demand for multi-service provisioning and access on 100Base-T networks. Installation and maintenance for various scenarios is straightforward. The series includes the S2700-9TP-EI, S2700-18TP-EI, S2700-26TP-EI, S2700-52P-EI, S2700-9TP-PWR-EI, and S2700-26TP-PWR-EI.

The S2700-26TP-PWR-EI switch was chosen for testing because it has all the features and capabilities of the series, and represents the best performance the series has to offer.

The switches are available in 9- to 26-port configurations and two models have PoE+ for endpoint devices. The tested model S2700-26TP-PWR-EI has 24 10/100Base-TX ports and two GE combination

**Figure 1: Huawei S2700-26TP-PWR-EI Enterprise Switch
Throughput by Frame Size**



Source: Miercom, March 2012

Throughput increases on the Huawei S2700-EI switch as frame size increases, approaching the allowable line rate limit of 4400Mbps.

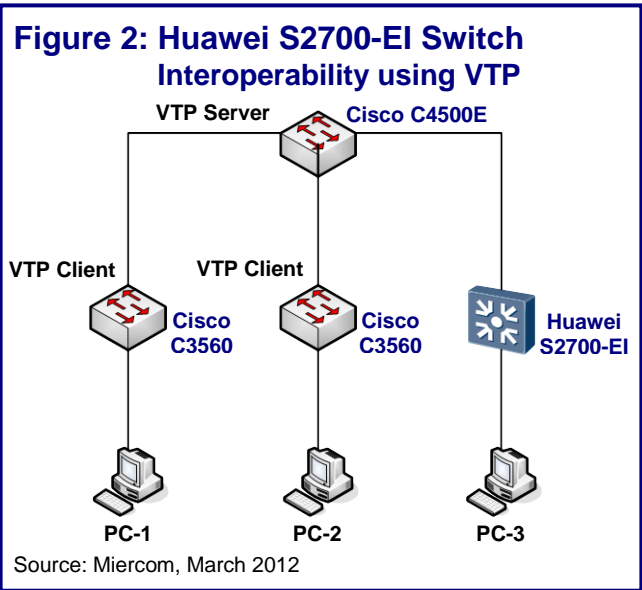
ports. The device requires an AC power supply and supports PoE+ for third party devices including IP phones. We examined this switch for performance, resiliency of the architecture, service features including policy-based QoS and security, and IPv6 support.

Layer 2 Features The S2700-EI switch series features a 4K VLAN table, a MAC address table of 8K and QinQ of 512. In addition, the switches support 1K multicast groups and IGMP snooping.

LACP supports 14 separate groups with a maximum of eight member ports for every group. Convergence time for the LACP is less than 50ms. All switches in the series are Ethernet trunking capable, and support STP, RSTP, MSTP, and RRPP ring.

Security In addition to basic routing and switching features, the switches have many security options. This includes Mac Forced Forwarding (MFF), DHCP Snooping, HTTPS management, Voice VLAN support, IP Source guarding, and Dynamic ARP Inspection (DAI). Queuing is allowed for eight queues on the S2700-52EI and four queues for the rest of the series.

Suppression of multicast, broadcast, and unknown unicast packets thwarts unauthorized access. Port-based rate limiting, port isolation, port security and sticky MAC are also part of the security features included in the S2700-EI switch series.



Network diagram showing interoperability between Huawei and Cisco using VTP protocol.

Easy Management Designed for easy management and maintenance a Web GUI is an integral part for providing ease of managing the switches. Included features such as auto configuration (in the event of corruption or improperly configured files), SNMP v1-3, GVRP (which is a substitute for Cisco's VTP), and HGMP. In addition, the fan-less design for non-PoE models allows for less maintenance.

S2700-EI series of switches supports HGMP v1-3, SSH v2, HWTACACS, RMON, and port-based traffic statistics.

Figure 3: S2700-26TP-PWR-EI Switch Test Center Output of Throughput Validation

Name/ID	Tx Port Name	Rx Port Names	Aggregated Rx Port Count	Tx Count (Frames)	Rx Count (Frames)	Tx
StreamBloc...	Port //2/3	Port //2/2	1	148,764	148,764	0

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StreamBloc...	Port //2/3	Port //2/2	1	148,764	0	

Source: Miercom, March 2012

No packet loss was observed in test run with ingress 512 ACLs enabled. When the ACLs were enabled to disallow inbound traffic, all packets were rejected, as expected.

The RX and TX loads differ showing our queues functioned properly. The system slowed down and limited low priority traffic properly, delivering expected results.

**Figure 4: S2700-26TP-PWR-EI Switch
Test Center Output of QoS Queue Testing**

Name/ID	Count (bits)	Rx L1 Count (bits)	Tx L1 Rate (bps)	Rx L1 Rate (bps)	Tx Rate (fps)	Rx Rate (fps)	Rx Sig Count (Frames)	Rx Sig Rate (fps)
AF1 traffic/65537	1,256	132,770,208	24,999,799	5,749,504	21,114	4,856	112,137	4,856
AF2 traffic/65538	1,440	134,174,432	24,999,784	5,811,060	21,114	4,907	113,323	4,907
AF3 traffic/65539	1,624	132,771,392	24,999,733	5,751,866	21,114	4,857	112,138	4,857
BE traffic/65536	1,888	134,174,432	24,999,930	5,813,465	21,114	4,910	113,323	4,910

Source: Miercom, March 2012

Performance

The switch can function as a desktop access device with 100Mbit/s access rate for terminals and 1000Mbits/s uplink interfaces for uplink devices. Performance testing focused on normal desktop utilization. This switch was robust and resilient, and had a large buffer, high throughput, low latency, advanced security and QoS. Huawei demonstrated that the S2700-26TP-PWR-EI switch showed strong results. The switch throughput achieved line rate bi-directionally using all 24 10/100Base-T and two Gigabit combination ports as shown in [Figure 1 on page 1](#).

S2700-EI forwarded 6.4 Million packets per second. A simple test bed was set up to test operational capacity and table sizes of the S2700-EI switch series.

The switch accommodates a MAC table size of 8,000 addresses, and was verified to route all 8,000 correctly. Additionally, the switch is capable of routing for 4,094 VLANs. 512 Ingress ACLs were supported and validated at zero packet loss, shown in [Figure 3 on page 2](#).

QoS accepts four queues on each port for traffic prioritization. [Figure 4](#) shows the test results for the QoS testing. The switch exhibits four queues and prioritizes traffic appropriately. To test four types of queuing, we set the priority bits to 1, 2, 3, and 4, and applied all four kinds of traffic to the switch while monitoring the lowest priority for throughput. The switch prioritized traffic as expected and exhibited proper QoS behavior.

Interoperability

Cisco VLAN Trunking Protocol (VTP) Huawei S2700-EI series of switches works with Huawei and other third party switches for VLAN trunking and propagation. This was validated with Cisco devices operating the VTP protocol for VLAN

propagation. With a Cisco 4500E as a VTP server, Cisco 3560s as VTP clients, and Huawei S2700 as VTP clients, we could establish functionality for both server and client operation. We saw that the devices could communicate across the network, including through VTP servers. No special configuration is required for interoperability. See [Figure 2 on page 2](#) for the networking diagram.

Batch Upgrading S2700-EI series supports remote batch upgrades for easy configuration and deployments. Web GUI provides automatic topology discovery, alarm management and visual configuration, which enables easier operation and maintenance. Configuration files can be uploaded from FTP and TFTP servers for rapid deployment. This can be enabled by default or set for manual retrieval. If a configuration was corrupt or inoperable, a default last-known-configuration is loaded from a local server, automatically providing the proper files.

Bottom Line

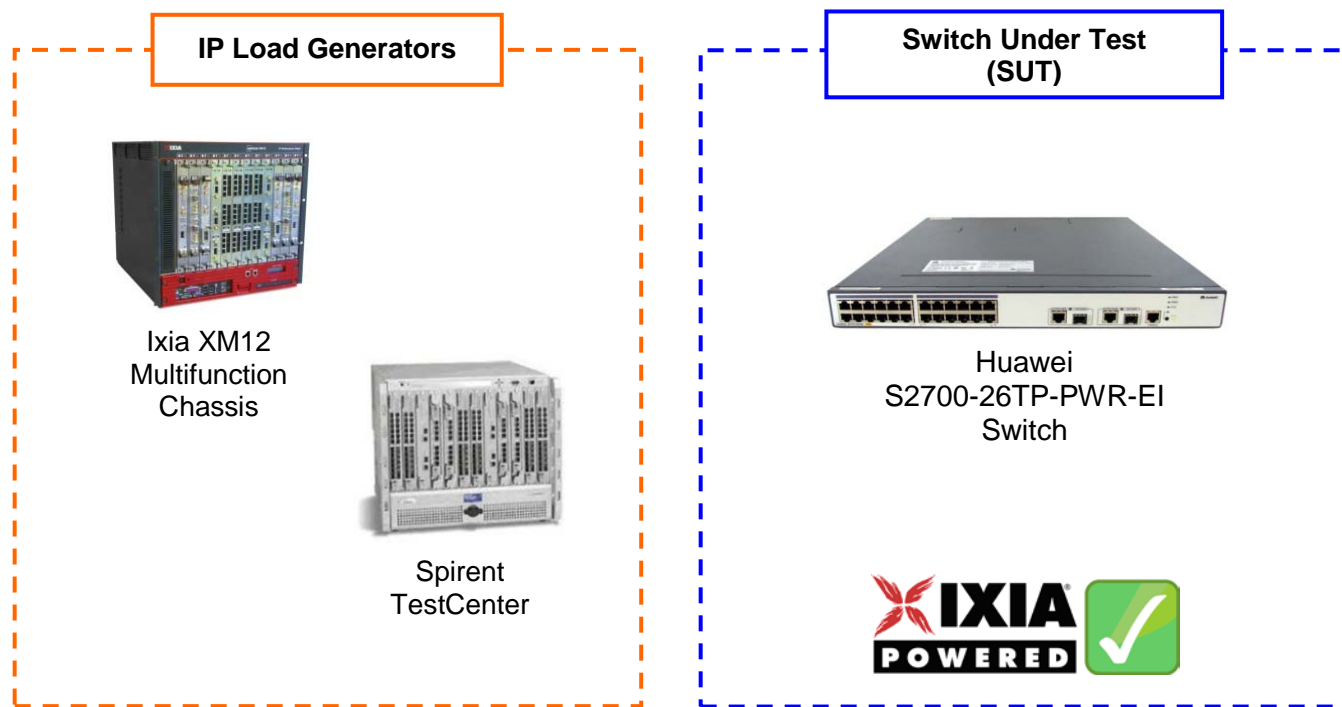
The S2700-EI series of switches are easy to install and simple to maintain. iStack allows a network to be easily expanded for future growth.

Interoperability with other third party switches provides flexibility in network deployments with mixed vendor products configurations.

PoE and PoE+ support allows connection to third party IP phones and other devices.

The Huawei S2700-EI series of switches are very resilient and feature-rich. With built-in security such as ARP, HWTACACS and CPU defense the network can be protected from attacks and subsequent network failures.

Test Bed Diagram



Source: Miercom, March 2012

How We Did It

The Huawei S2700-EI series of switches were evaluated for feature functions and operation in ring topologies. Testing was conducted to verify that the features in this report operated as advertised. BFD convergence was verified by constructing various networks with set links, and then intentionally faulting the system either by removing a link, disabling a trunk, or various other methods depending on the scenario. This action forced the switch to detect the fault, and converge to a new transmission protocol to deliver traffic from one tester to the other.

The Huawei S2700-EI switch was running the latest firmware, version 5.7 OS. Sections of testing required using a traffic generator to evaluate the features of the product. Two different traffic generators were used, Ixia XM12 running IxNetwork version 5.50.121.48 and Spirent TestCenter running version 3.76.0076.

Miercom recognizes Ixia as an industry leader in energy efficiency testing of networking equipment. Ixia's unique approach utilizes coordination of energy measurements with network traffic load – allowing energy consumption to be graphed against network traffic volume. Real-world traffic is generated by Ixia's test platform and test applications, principally IxNetwork for Layer 2-3 routing and switching traffic and IxLoad for Layer 4-7 application traffic.

The tests in this report are intended to be reproducible for customers who wish to recreate them with the appropriate test and measurement equipment. Current or prospective customers interested in repeating these results may contact reviews@miercom.com for details on the configurations applied to the Device Under Test and test tools used in this evaluation. Miercom recommends customers conduct their own needs analysis study and test specifically for the expected environment for product deployment before making a product selection.

Miercom Performance Verified

The performance of Huawei S2700-26TP-PWR-EI enterprise-class switch was verified by Miercom. In hands-on testing, Huawei demonstrated advanced performance features such as:

- Huawei S2700-EI switch is resilient and robust
- S2700-EI had high performance and throughput
- ACL, MAC address, and VLAN table size exceed expectations for a switch of this class
- DHCP snooping, dynamic ARP inspection and Mac Forced Forwarding provide network security
- LACP improves network reliability and increases the connection bandwidth



**S2700-26TP-PWR-EI
Switch**



HUAWEI

Huawei Technologies, Co., Ltd.

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Miercom's private test services include competitive product analyses, as well as individual product evaluations. Miercom features comprehensive certification and test programs including: [Certified Interoperable](#), [Certified Reliable](#), [Certified Secure](#) and [Certified Green](#). Products may also be evaluated under the [NetWORKS As Advertised](#) program, the industry's most thorough and trusted assessment for product usability and performance.



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