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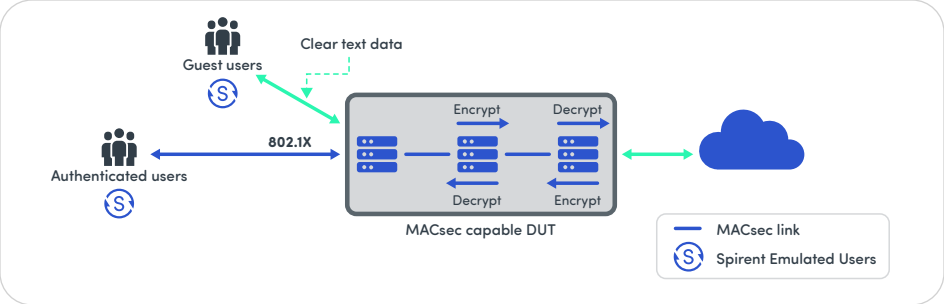
DATASHEET

Spirent TestCenter MACsec

Advanced Testing for Secure Ethernet Communications

The Spirent TestCenter MACsec Assessment Solution delivers essential validation for IEEE 802.1AE Media Access Control Security (MACsec) deployments, ensuring robust traffic emulation and protocol verification. As network security threats rise and compliance requirements tighten, MACsec plays a critical role in safeguarding data confidentiality and integrity across Ethernet networks. Spirent's solution enables equipment manufacturers, service providers, and enterprises to validate their MACsec implementations with confidence—ensuring security, regulatory compliance, and reliable network performance. By proactively testing MACsec, organizations can strengthen critical infrastructure, meet industry standards, and mitigate the financial risks associated with cyber threats.



Why MACsec Testing is Critical

- Protection Against Data Breaches: MACsec secures Ethernet frames to prevent unauthorized access and tampering at the data link layer.
- Ensuring Compliance with Industry Standards: Many industries, including finance, healthcare, and government sectors, require robust Layer 2 encryption to meet regulatory requirements.
- Preventing Man-in-the-Middle Attacks: MACsec ensures that only authenticated and authorized devices participate in a network connection, preventing rogue devices from intercepting or modifying data.
- Performance Optimization: Implementing MACsec can introduce encryption overhead; Spirent TestCenter allows precise measurement of latency, packet loss, and throughput to optimize performance.
- Interoperability Testing: With multiple vendors offering MACsec implementations, testing is crucial to ensure seamless operation across different network devices
- Ensuring Service Continuity During Key Rotation: MACsec uses dynamic key rotation to enhance security; testing ensures that rekeying does not introduce packet loss or performance degradation.
- Validating Encryption Throughput for High-Speed Networks: As networks scale to 100G, 200G, and 400G, line-rate MACsec encryption must be validated to ensure security without compromising speed.
- Supporting Various Encryption Modes: Testing verifies integrity-only vs. integrity and encryption modes to align with diverse security needs.

Highlights and Benefits

- Improved ROI: Spirent MACsec enables customers to perform comprehensive MACsec testing without the need for dedicated test hardware, maximizing ROI on test infrastructure
- Comprehensive MACsec Validation: Supports integrity-only and integrity and encryption modes.
- High-Speed Encryption Testing: Validates MACsec performance up to 400G.
- Dynamic Key Rotation Testing: Ensures seamless MKA key updates without packet loss.
- Interoperability Testing: Validates multi-vendor compatibility for MACsec implementations.
- Traffic and Performance Metrics: Measure packet loss, latency, and encryption overhead.
- Scalability Assurance: Supports up to 100 supplicants per port for large-scale validation.
- Flexible Security Modes: Enables testing for static SAK & CAK, VLAN encryption, and more.
- Automation Ready: Integrates with test automation frameworks including Python, REST APIs, and OTG.

Key Features and Capabilities

- **Conformance to IEEE 802.1AE Standard:** Ensures compliance with industry security protocols
- **Software-Based MACsec Support:** Enables flexible, scalable testing
- **Static Secure Association Key (SAK) and Static Connectivity Association Key (CAK) Support:** Allows for manual key configuration
- **Encryption and Integrity Options:**
  - Integrity Check Value (ICV) only
  - ICV + Encryption for payload
- **Rekeying Support:** Provides security updates for long-term sessions
- **Configurable Confidentiality Offset:**
  - Encrypt entire payload
  - Leave headers in plaintext (IPv4, IPv6, VLAN options)
- **Secure Channel Management:**
  - Multiple MACsec Key Agreement (MKA) members for group connectivity association support.
  - Secure connectivity association with unidirectional Secure Channels (SCs) and Security Associations (SAs)
- **Extensive Traffic and Performance Metrics:**
  - Packet integrity validation
  - Encrypted and decrypted packet counts
  - Packet loss, latency, and throughput analysis
- **Replay Protection:**
  - Configurable replay window size to prevent unauthorized retransmissions
- **Flexible Security Modes:**
  - Static SAK (manual secure key association)
  - Static CAK (manual connectivity association key)
- **Advanced Encryption Support:**
  - GCM-AES-128
  - GCM-AES-256
  - GCM-AES-XPN-128
  - GCM-AES-XPN-256
- **Session Management:**
  - Configurable Secure Association Keys (SAKs)
  - User-defined session start packet number
  - Support for up to 100 supplicants per port
- **Scalability Testing:**
  - Validate MACsec at speeds from 1G to 400G to assess encryption impact across different network environments.
  - Test across diverse frame sizes, from small control packets to large jumbo frames.
- **Key Statistics Supported:**

MKPDU Tx/Rx	SA Discarded
Live Peer Count	Tx Bytes Protected
Malformed Rx MKPDU	Tx Bytes Encrypted
ICV Mismatch	Rx Bytes Validated
Bad Packet Rx	Rx Bytes Decrypted
Invalid ICV Rx	Non-MACsec Packet Rx
Protected Packet Tx	AuthAttemptCount
Encrypted Packet Tx	AuthSuccessCount
Valid Packet Rx	AuthFailCount
Out of Window Discarded	MinAuthSuccessDuration (msec)
Unknown SCI Rx	MaxAuthSuccessDuration (msec)
Unknown SCI Discarded	AuthenticationState
Unknown SCI accepted	Full Spirent TestCenter Traffic Statistics Support

MACsec Testing Use Cases

- **Network Equipment Validation:** Verify MACsec implementations in switches, routers, and security appliances.
- **Carrier Ethernet Security Assurance:** Ensure secure Layer 2 communications for metro and wide-area networks.
- **Data Center Interconnect (DCI) Protection:** Validate encrypted connectivity between data centers.
- **Industrial and Enterprise Network Security:** Evaluate security policies for mission-critical Ethernet deployments.
- **High-Speed Cloud and 5G Network Security:** Ensure security in next-generation networks that rely on MACsec for high-speed encryption.
- **IoT Device Security:** Validate MACsec implementations in IoT devices to ensure secure communication in smart environments, including smart cities and towns.
- **Government and Military Networks:** Assess the highest level of security for sensitive government and military communications over Ethernet networks.
- **Financial Services Security:** Verify financial institutions' networks comply with regulatory standards and protect sensitive financial data.
- **Healthcare Network Security:** Test the security efficacy of healthcare networks to protect patient data and maintain compliance with industry regulations.
- **Campus Network Security:** Validate secure communication across large campuses, including educational institutions and corporate environments.

Supported Hardware and Ordering Information
Spirent TestCenter MACsec feature is available on the following hardware
MX3-QSFP28-4 test module
PX3-QSFP-DD-2 test module
PX3-QSFP-DD-8 appliance
A1-400-QD-16-T1S appliance
A2-400-QD-8-T1S appliance
A2-400-QD-16-T1 appliance
FX2-1G-S16 and FX2-10G-S16 test modules
M1 appliance
C2 appliance

About Spirent Communications
Spirent Communications (LSE: SPT) is a global leader with deep expertise and decades of experience in testing, assurance, analytics and security, serving developers, service providers, and enterprise networks. We help bring clarity to increasingly complex technological and business challenges. Spirent's customers have made a promise to their customers to deliver superior performance. Spirent assures that those promises are fulfilled. For more information visit: **www.spirent.com**

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