

# **Network Security Platform Sensor NS9300 P**

## **FIPS 140-2 Non-Proprietary Security Policy**

**Firmware Version: 10.1.17.63**

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# 1 Module Overview

The Network Security Platform Sensor NS-9300 P (HW P/N IPS-NS9300 P Version 1.30 and FW Version 10.1.17.63; FIPS Kit P/N IAC-FIPS-KT2) is a multi-chip standalone cryptographic module as defined in FIPS 140-2.

The NS9300 is an Intrusion Prevention System (IPS) and Intrusion Detection System (IDS) designed for network protection against zero-day, DoS/DDoS, encrypted and SYN Flood attacks, and real-time prevention of threats like spyware, malware, VoIP vulnerabilities, phishing, botnets, network worms, Trojans, and peer-to-peer applications. The NSP Sensors connect with the Network Security Manager (NSM). The NSM is used to manage and push configuration data and policies to the Sensors. Communication between NSM and Sensors uses secure channels that protect the traffic from disclosure and modification. Authorized administrators may access the NSM via a GUI (over HTTPS) or a CLI (via SSH or a local connection). Sensors may be accessed via CLI (via SSH or a local connection) for initial setup. Once initial setup is complete, all management occurs via the NSM.

The cryptographic boundary is the outer perimeter of the enclosure, including the removable power supplies and fan trays. (The power supplies and fan trays are excluded from FIPS 140-2 requirements, as they are not security relevant.) Optional network I/O modules are not included in the module boundary.

The Trellix NS-9300 product consists of the NS-9300 P cryptographic module physically connected with the NS-9300 S cryptographic module. This security policy describes the NS-9300 P only.

Figure 1 shows the module configuration and the cryptographic boundary.

**Figure 1 – Image of NS9300 P**



**Figure 2 - Image of the Cryptographic Module connected to its peer NS-9300 S**



## 2 Security Level

The cryptographic module meets the overall requirements applicable to Level 2 security of FIPS 140-2. Table 1 specifies the levels met for specific FIPS 140-2 areas.

**Table 1 - Module Security Level Specification**

Security Requirements Section	Level
Cryptographic Module Specification	2
Module Ports and Interfaces	2
Roles, Services and Authentication	2
Finite State Model	2
Physical Security	2
Operational Environment	N/A
Cryptographic Key Management	2
EMI/EMC	2
Self-Tests	2
Design Assurance	3
Mitigation of Other Attacks	N/A

## 3 Mode of Operation

### 3.1 FIPS Approved Mode of Operation

The module only supports a FIPS Approved mode of operation. An operator can obtain the FIPS mode indicator by executing the “show” or “status” CLI command, which returns the module’s firmware version, HW version, etc. The firmware and hardware versions must match the FIPS validated versions located on the CMVP website.

The operator must also follow the rules outlined in Sections 8 and 9 of this Security Policy and consult FIPS 140-2 IG 1.23 for further understanding of the use of functions where no security is claimed.

#### Approved Algorithms

The module supports the following FIPS Approved algorithms:

- AES CBC and ECB mode with 128 & 256 bits for encryption and decryption (Cert. #C1556)  
*(Note: CBC mode is tested but not used.)*
- AES GCM mode with 128 bits for encryption and decryption use within TLS 1.2 (Cert. #C1556)
- AES GCM mode with 128 & 256 bits for encryption and decryption use within SSH v2 (Cert. #C1556)
- KTS AES (Cert. #C1556) encryption to transport keys and authentication using HMAC (Cert. #C1556) within TLS 1.2 and SSH. This key establishment methodology provides 128 or 256 bits of encryption strength.
- KTS AES (Cert. #C1556) encryption to transport keys and authentication using GCM (Cert. #C1556) within TLS 1.2 and SSH. This key establishment methodology provides 128 or 256 bits of encryption strength.
- FIPS 186-4 RSA with 2048-bit keys for key generation and RSA PSS with 2048-bit keys for signature generation with SHA-256, and signature verification with SHA-256 (Cert. #C1556)
- SHA-1, SHA-256, SHA-384 and SHA-512 for hashing (Cert. #C1556)
- HMAC SHA-256, and HMAC SHA-512 for message authentication (Cert. #C1556)  
*(Note: The minimum HMAC key size is 20 bytes. HMAC SHA-1 and HMAC SHA-384 were CAVP tested but not used)*
- Block Cipher (CTR) DRBG using AES 256 (Cert. #C1556)
- KAS-SSC (vendor affirmed)
- ECDSA Key Generation and Key Verification using P-256, P-384, P-521 (Cert. #C1556)
- FIPS 186-4 XYSSL RSA PKCS #1 1.5 SigVer with 2048-bit keys using SHA-256 for image verification (Cert. #C1555).  
*(Note: SHA-1 is CAVP tested but not used.)*
- XYSSL SHA-256 for hashing and for use with image verification (Cert. #C1555)  
*(Note: SHA-1 is CAVP tested but not used.)*
- TLS v1.2 KDF for TLS session key derivation (CVL Cert. #C1558)
- SSH KDF for SSH session key derivation (CVL Cert. #C1557)
- SP 800-133 CKG (Vendor Affirmed)

- Asymmetric Key Generation (SP 800-133 § 5)
- Symmetric Key Generation (SP 800-133 § 6)

*(Note: The resulting symmetric keys and generated seeds are unmodified output from the DRBG)*

*(Note: There are some algorithm modes that were tested but not implemented by the module. Only the algorithms, modes, and key sizes that are implemented by the module are shown in this table)*

## Allowed Algorithms

The module supports the following FIPS allowed algorithms and protocols:

- RSA with 2048-bit keys for (key wrapping, key establishment methodology provides 112 bits of encryption strength)
- NDRNG (internal entropy source) for seeding the Block Cipher (CTR) DRBG. The module generates a minimum of 256 bits of entropy for key generation.

## Protocols

- TLS v1.2 with the following algorithm tested cipher suites. The protocol algorithms have been tested by the CAVP (see certificate #s above) but the protocol implementation itself has not been reviewed or tested by the CAVP or CMVP.
  - TLS\_ECDHE\_RSA\_WITH\_AES\_128\_GCM\_SHA256  
for communication with Network Security Manager (NSM)  
*(Note: This is restricted to RSA-2048)*
- SSH v2 with the following algorithm tested cipher suites. The protocol algorithms have been tested by the CAVP (see certificate #s above) but the protocol implementation itself has not been reviewed or tested by the CAVP or CMVP.
  - Key Exchange methods (i.e., key establishment methods): EC Diffie-hellman-P-256 SHA2
  - Public Key methods (i.e., authentication methods): SSH-ECDSA  
*(Note: This is restricted to ECDSA P-256)*
  - Encryption methods: AES128-GCM, AES256-GCM
  - MAC methods: HMAC-256, HMAC-512

AES GCM is used as part of TLS 1.2 cipher suites conformant to IG A.5, Scenario 1 RFC 5288 and SP 800-52 Rev 2 Section 3.3.1. The construction of the 64-bit nonce\_explicit part of the IV is deterministic via a monotonically increasing counter. The module ensures that that when the deterministic part of the IV uses the maximum number of possible values and new session key is established. The module generates new AES-GCM keys if the module loses power.

AES GCM is also used as part of the SSHv2 cipher suites conformant to the IG A.5 Scenario 1 and RFCs 4252, 4253 and RFC 5647. The GCM re-key limit is set to 1 hour or 1 GB of payload traffic set as the threshold. Therefore, the invocation counter maximum of  $2^{64} - 1$  is never reached nor are that many encryptions performed in a single session. When a session is terminated for any reason, a new key and new initial IV shall be derived.

## Non-Approved Algorithms and Protocols with No Security Claimed

The module supports the following non-Approved but allowed algorithms and protocols with no security claimed (per FIPS IG 1.23):

- MD5 used to identify “fingerprint” of potential malware using Global Threat Information (GTI) database (used internal to the module only). Non-Approved algorithms (no security claimed): MD5
- SNMPv3 is used as a transport mechanism between the NSM and the sensor with no security claimed. All non-CSP content is transported within SNMPv3. All CSP content is additionally encrypted by NSM and decrypted in sensor using the sensor TLS private key. In addition, the SNMPv3 protocol between NSM and Sensor is encapsulated within TLS when adopting CA-signing is turned on (TLS–ECDHE-RSA-AES128\_GCM-SHA256). Non-Approved algorithms (no security claimed): HMAC (non-compliant), SHA (non-compliant), AES (non-compliant) and SNMP KDF (non-compliant).
- SNMPv3 is used as a Read Only connection and responses to non CSP objects for 3<sup>rd</sup> Part Clients with no security claimed.
- The following algorithms are implemented independently from all other cryptographic code in the module and are used to analyze the network stream for malware and malicious network attacks in accordance with the functionality of the product. For the reasoning stated above, this functionality is allowed in the FIPS Approved mode of operation.
  - Decryption - SSLv2
    - Cipher suites:
      - SSL\_CK\_RC4\_128\_WITH\_MD5
      - SSL\_CK\_RC4\_128\_EXPORT40\_WITH\_MD5
      - SSL\_CK\_DES\_64\_CBC\_WITH\_MD5
      - SSL\_CK\_DES\_192\_EDE3\_CBC\_WITH\_MD5
    - Non-Approved algorithms (no security claimed): Triple-DES (non-compliant), HMAC (non-compliant), RC4, MD5, DES
  - Decryption - SSLv3/TLS
    - Cipher suites:
      - SSL/TLS\_NULL\_WITH\_NULL\_NULL
      - SSL/TLS\_RSA\_WITH\_NULL\_MD5
      - SSL/TLS\_RSA\_WITH\_NULL\_SHA
      - SSL/TLS\_RSA\_WITH\_RC4\_128\_MD5
      - SSL/TLS\_RSA\_WITH\_RC4\_128\_SHA
      - SSL/TLS\_RSA\_WITH\_DES\_CBC\_SHA
      - SSL/TLS\_RSA\_WITH\_3DES\_EDE\_CBC\_SHA
      - SSL/TLS\_RSA\_WITH\_AES\_128\_CBC\_SHA
      - SSL/TLS\_RSA\_WITH\_AES\_256\_CBC\_SHA
    - Non-Approved algorithms (no security claimed): AES (non-compliant), RSA (non-compliant), SHA (non-compliant), Triple-DES (non-compliant), HMAC (non-compliant), RC4, MD5, DES

## 4 Ports and Interfaces

Table 2 provides the cryptographic module’s ports and interfaces.

**Table 2 – Fixed Ports**

Fixed Ports	Number of ports	Input/Output Type
40-Gig QSFP+ Monitoring Ports	2	Data Input/Output
1-GigE Monitoring Ports	8	Data Input/Output
Network I/O slots	2	Data Input/Output



<b>Fixed Ports</b>	<b>Number of ports</b>	<b>Input/Output Type</b>
GigE Management Port	1	Control Input, Data Output, Status Output
GigE Response Port	1	Control Input, Data Output
GigE Aux Port	1	Data Output
RS232 Console	1	Control Input, Status Output
USB Ports	2	Data Input
Power Ports	2	Power Input
LEDs	Many	Status Output

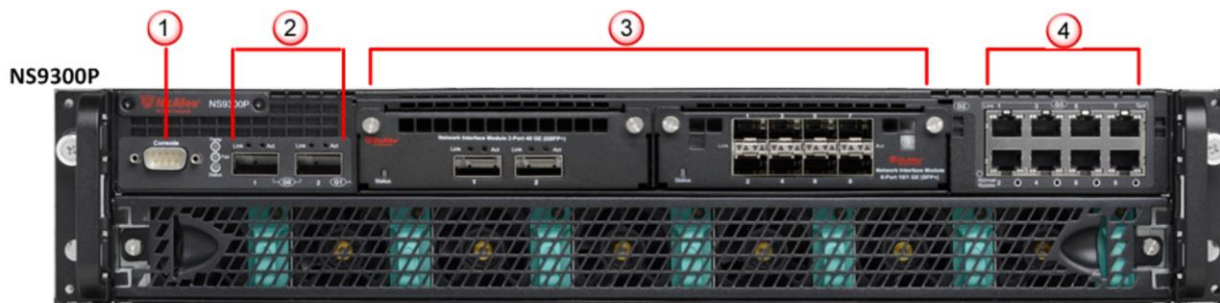
Notes:

1. The Two fixed QSFP+ 40-GigE ports are used to connect to the peer NS-9300 S unit.
2. The GigE Response Port is connected directly to the peer NS-9300 S unit's GigE Management Port.
3. The Network IO Slots each accept interface modules which provide additional monitoring ports. The interface modules are not included in the cryptographic boundary.

The module supports the following communication channels with the Network Security Platform (NSP) Manager:

- Install channel: Only used to associate a Sensor with the NSM. They use a "shared secret". NSM listening on port 8501 (Self-signed certificates) or port 8506 (CA signed certificates).
- Trusted Alert/Control channel (TLS): NSM listening on port 8502 (Self-signed certificates) or port 8507 (CA signed certificates).
- Trusted Packet log channel (TLS): NSM listening on port 8503 (Self-signed certificates) or port 8508 (CA signed certificates).
- Command channel (SNMP, plaintext): Sensor listening to 3rd Party SNMP Clients on port 8500 (Self-signed certificates).
- Command channel (TLS): Sensor listening to NSM SNMPv3 client encapsulated in TLS on port 18500 (CA signed certificates).
- Bulk transfer channel (encrypted): NSM listening on port 8504 (CA signed certificates)
- Bulk transfer channel (TLS): NSM listening on port 8509
- Trusted Authentication Gateway channel (TLS): uses same crypto context as Alert/Control channel. NSM listening on port 8502 (Self-signed certificates) or port 8507 (CA signed certificates).

**Figure 3 - Front Panels of NS-9300 P**



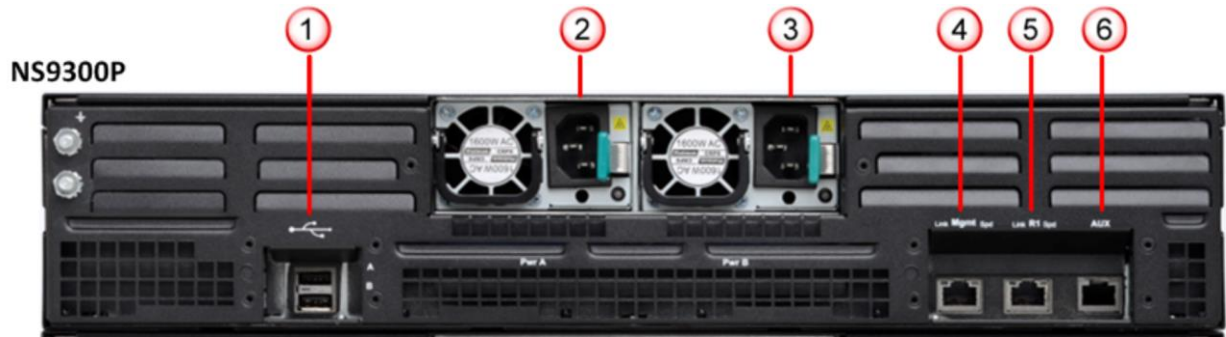
**Table 3 – NS-9300 P Front Panel Ports and Connectors**

Item	Description
1	Console ports on the NS-9300 P Sensors (1)
2	QSFP+ 40 Gigabit Ethernet Interconnect ports (2). G0/1 and G0/2 on NS-9300 P Sensor Sensor.
3	Two slots for Network I/O modules. The Network I/O modules are outside of the cryptographic boundary. There is no security relevance to using the following Network I/O modules in any combination. <ul style="list-style-type: none"> <li>• QSFP+ 40 Gigabit Ethernet ports (2)</li> <li>• QSFP+ 40 Gigabit Ethernet ports (1)</li> <li>• SFP/SFP+ 1/10 Gigabit Ethernet Monitoring ports (4)</li> <li>• RJ-45 10/100/1000 Mbps Ethernet Monitoring ports (3)</li> </ul>
4	RJ-45 10/100/1000 Mbps Ethernet Monitoring ports (8)

**Figure 4 - Front panel with no Network I/O Modules or cover plate**



**Figure 5 - Rear Panels of NS-9300 P**



**Table 4 – NS-9300 P Rear Panel Ports and Connectors**

Item	Description
1	USB ports (2)
2	Power supply A (Pwr A)
3	Power supply B (Pwr B) (optional on NS9100)
4	RJ-45 100/1000/10000 Management port (Mgmt) (1)
5	RJ-45 100/1000/10000 Response port (R1) (1). R1 on NS-9300 P Sensor is used as an interconnect port.
6	RJ-45 Auxiliary port (Aux) (1)

**Figure 6 - Rear Panel with Power Supplies Removed**



## 5 Identification and Authentication Policy

The cryptographic module shall support four distinct “User” roles (Admin, Sensor Operator(s), NS-9300 S, and 3rd Party SNMP Client(s)) and one “Cryptographic Officer” (CO) role (Network Security Platform Manager). Table 5 lists the supported operator roles along with their required identification and authentication techniques. Table 6 outlines each authentication mechanism and the associated strengths.

**Table 5 - Roles and Required Identification and Authentication**

Role	Type of Authentication	Authentication Data
Admin (User)	Role-based authentication	Username and Password
Sensor Operator(s) (User)	Role-based authentication	Username and Password
Network Security Platform Manager (CO)	Role-based authentication	Digital Signature
NS-9300 S (User)	Role-based authentication	Shared Secret
3rd Party SNMP Client(s) (User)	Role-based authentication	Username, Privacy and Authentication key

**Table 6 – Strengths of Authentication Mechanisms**

Authentication Mechanism	Strength of Mechanism
Username and Password (Admin and Sensor Operator(s))	<p>The password is an alphanumeric string of a minimum of fifteen (15) characters chosen from the set of ninety-three (93) printable and human-readable characters. Whitespace and “?” are not allowed. New passwords are required to include 2 uppercase characters, 2 lowercase characters, 2 numeric characters, and 2 special characters.</p> <p>The probability that a random attempt will succeed or a false acceptance will occur is <math>1/\{(10^2)*(26^4)*(31^2)*(93^7)\}</math>, which is less than 1/1,000,000.</p> <p>After three (3) consecutive failed authentication attempts, the module will enforce a one (1) minute delay prior to allowing retry. Additionally, the module only supports 5 concurrent SSH sessions. Thus, the probability of successfully authenticating to the module within one minute through random attempts is <math>(3*5)/\{(10^2)*(26^4)*(31^2)*(93^7)\}</math>, which is less than 1/100,000.</p>

<b>Authentication Mechanism</b>	<b>Strength of Mechanism</b>
<p>Shared Secret (NS-9300 S)</p>	<p>The Shared Secret is an alphanumeric string of a minimum of six (6) characters chosen from the set of ninety-three (93) printable and human-readable characters. Whitespace and “?” are not allowed.</p> <p>The probability that a random attempt will succeed or a false acceptance will occur is <math>1/93^6</math> which is less than <math>1/1,000,000</math>.</p> <p>After setting the Shared Secret, the module requires a reboot in order to authenticate. The reboot takes longer than one minute before authentication is achieved, and if authentication fails, the module automatically reboots a second time. The probability of successfully authenticating to the module within one minute through random attempts is <math>1/93^6</math> which is less than <math>1/100,000</math>.</p>
<p>Digital Signature and RSA Key Wrap</p>	<p>RSA 2048-bit keys using SHA-256 are used for the signing (in isolated Trellix laboratory or by Certificate Authority (CA)) and verification (by sensor) of digital signatures.</p> <p>The probability that a random attempt will succeed or a false acceptance will occur is <math>1/2^{112}</math> which is less than <math>1/1,000,000</math>.</p> <p>The module can only perform one (1) digital signature verification per second. The probability of successfully authenticating to the module within one minute through random attempts is <math>60/2^{112}</math> which is less than <math>1/100,000</math>.</p>
<p>Username, Privacy and Authentication Key</p>	<p>The privacy key and authentication key together make an alphanumeric string of a minimum of sixteen (16) characters chosen from the set of sixty-two (62) numbers, lower case letters, and upper case letters.</p> <p>The probability that a random attempt will succeed or a false acceptance will occur is <math>1/62^{16}</math> which is less than <math>1/1,000,000</math>.</p> <p>The module will allow approximately one (1) attempt per millisecond, meaning that 60,000 attempts can be made per minute. The probability of successfully authenticating to the module within one minute through random attempts is <math>60,000/62^{16}</math> which is less than <math>1/100,000</math>.</p>

## 6 Access Control Policy

### 6.1 Roles and Services

Table 7 lists each operator role and the services authorized for each role.

For additional information of operation of the module, NSP documentation is at [docs.trellix.com](https://docs.trellix.com):

1. Go to the Trellix Documentation Portal (<https://docs.trellix.com/>).
2. Scroll to the **Products A-Z** section at the bottom of the landing page (do not select Network Security Platform via the pull-down menu).
3. Click **Network Security Platform**. The NSP documentation list displays.
4. Using the **Refine Results** filter in the left pane, click **NSP 10.1.x** to display a list of NSP 10.1 documentation.

**Table 7 – Services Authorized for Roles**

Authorized Services	Admin	Sensor Operator(s)	NSP Manager	3rd Party SNMP Client(s)	NS-9300 S
<b>Show Status:</b> Provides the status of the module, usage statistics, log data, and alerts.	X	X			X
<b>Sensor Operator Management:</b> Allows Admin to add/delete Sensor Operators, set their service authorization level, set their session timeout limit, and unlock them if needed.	X				
<b>Network Configuration:</b> Establish network settings for the module or set them back to default values.	X	X*	X		
<b>Administrative Configuration:</b> Other various services provided for admin, private, and support levels.	X	X*	X		
<b>Firmware Update:</b> Install an external firmware image through SCP or USB	X	X*	X		
<b>Install with NSM:</b> Configures module for use. This step includes establishing trust between the module and the associated management station.	X	X*			
<b>Install with 3<sup>rd</sup> Party SNMP Client:</b> Configures module for 3 <sup>rd</sup> Party SNMPv3 use. This step includes establishing trust between the module and the associated 3 <sup>rd</sup> Party SNMP Client. Trust is provided by NSM.			X		
<b>Change Passwords:</b> Allows Admin and Sensor Operators to change their associated passwords. Admin can also change/reset Sensor Operators passwords.	X	X*			

<b>Zeroize:</b> Destroys all plaintext secrets contained within the module. The “Reset Config” command is used, followed by a reboot.	X	X*			
<b>Intrusion Detection/Prevention Management:</b> Management of intrusion detection/prevention policies and configurations through SNMPv3 and TLS.			X		
<b>Intrusion Detection/Prevention Monitoring:</b> Limited monitoring of Intrusion Detection/Prevention configuration, status, and statistics through SNMPv3.			X	X	
<b>Disable SSH/Console Access:</b> Disables SSH/Console access.	X	X*			

\* Depending on the authorization level granted by the Admin

### **Unauthenticated Services:**

Table 8 lists the unauthenticated services supported by the module.

**Table 8 – Unauthenticated Services**

<p><b>Unauthenticated Services</b></p>
<p><b>Authentication:</b> This service is associated with an unauthorized operator making a request in order to authenticate themselves to the module.</p>
<p><b>Self-Tests:</b> This service executes the suite of self-tests required by FIPS 140-2. Self-tests can be initiated by power cycling the module or through the CLI.</p>
<p><b>Intrusion Prevention Services:</b> Offers protection against zero-day, DoS/DDoS, encrypted and SYN Flood attacks, and real-time prevention of threats like spyware, malware, VoIP vulnerabilities, phishing, botnets, network worms, Trojans, and peer-to-peer applications.</p> <p><i>Note:</i> This service utilizes the non-Approved algorithms listed above. This includes an MD5 hash to identify the “fingerprint” of malware and decryption of SSL-encrypted streams for the purpose of detecting malware and network attacks. See the list above.</p>
<p><b>Zeroize:</b> Destroys all plaintext secrets contained within the module. The Internal Rescue process is used.</p>

## **6.2 Definition of Critical Security Parameters (CSPs)**

The following are CSPs contained in the module:

- **Administrator Passwords:** Password used for authentication of the “admin” role through Console and SSH login. Extended permissions are given to the “admin” role by using the “support” or “private” passwords.

- **Sensor Operator Passwords:** Passwords used for authentication of “user” accounts through Console and SSH login. Extended permissions are given to the “user” account by using the “support” or “private” passwords.
- **NS-9300 Password:** Password for authentication of the NS-9300 S.
- **NSM Initialization Secret (i.e., NSM Shared Secret):** Password used for mutual authentication of the sensor and NSM during initialization.
- **Bulk Transfer Channel Session Key:** AES 128 bit key used to encrypt data packages across the bulk transfer channel.
- **SSH Host Private Keys:** ECDSA P-256 bit key used for authentication of sensor to remote terminal for CLI access, generated during initialization.
- **SSH Session Keys:** Set of EC Diffie-Hellman private key with P-256, AES 128/256 bit, and HMAC (SHA-256/512 bit) keys created for each SSH session.
- **TLS Sensor Private Key (for NSM):** RSA 2048 bit key used for authentication of the sensor to NSM during TLS connections and generate the *sha256WithRSADigitalSignature* embedded within the sensor TLS certificate. This key can also be used only by that sensor for RSA unwrapping of Trellix defined secrets received from the NSM.
- **TLS Session Keys (for NSM):** Set of ephemeral EC Diffie Hellman P-256, P-384 or P-521, AES 128 bit and HMAC (SHA-256bit) keys created for each TLS session with the NSM.
- **Entropy Input String:** 8192-bit output string from the hardware NDRNG.
- **Seed for DRBG:** 384-bit seed created by NDRNG and used to seed the Block Cipher (CTR) DRBG.
- **DRBG Internal State:** *V* and *Key* used by the DRBG to generate pseudo-random numbers. (Note: The SNMP authentication data is not considered to be a CSP since the SNMP connection is tunneled within TLS)

### 6.3 Definition of Public Keys

The following are the public keys contained in the module:

- **Trellix FW Verification Key:** RSA 2048-bit key used to authenticate firmware images loaded into the module.
- **SSH Host Public Key:** ECDSA P-256 bit key used to authenticate the sensor to the remote client during SSH.
- **SSH Remote Client Public Key:** ECDSA P-256 bit key used to authenticate the remote client to the sensor during SSH.
- **TLS Sensor Public Key (for NSM):** RSA 2048-bit key used to authenticate the sensor to NSM during TLS connections, embedded within the sensor certificate. This key can also be used by the NSM for RSA wrapping of Trellix defined secrets sent to the Sensor.
- **TLS NSM Public Key:** RSA 2048-bit key used to authenticate NSM to sensor during TLS connections.
- **TLS Session Public Key:** EC Diffie-Hellman P-256, P-384 or P-521-bit session key created for each TLS session



#### **6.4 Definition of CSPs Modes of Access**

Table 9 defines the relationship between access to keys/CSPs and the different module services. The types of access used in the table are Use (U), Generate (G), Input (I), Output (O), Store (S), and Zeroize (Z).  $Z^*$  is used to denote that only the plaintext portion of the CSP is zeroized (i.e., the CSP is also stored using an Approved algorithm, but that portion is not zeroized).

**Table 9 – Key and CSP Access Rights within Services**

	Administrator Passwords	Sensor Operator Passwords	NS-9300 Password	NSM Initialization Secret	Bulk Transfer Channel Session Key	SSH Host Private Keys	SSH Session Keys	TLS Sensor Private Key (for NSM)	TLS Session Keys (for NSM)	Entropy Input String	Seed for DRBG	DRBG Internal State	Trellix FW Verification Key	SSH Host Public Key	SSH Remote Client Public Key	TLS Sensor Public Key (for NSM)	TLS NSM Public Key	TLS Session Public Key
Authentication – Admin, Sensor Operator	U	U				U	U					U		O	IU			
Authentication – NSP Manager – Digital Signature				U				U	U			U				O	U	
SNMP Authentication – NSP Manager to Sensor – Username, Privacy, and Authentication Key																		
Authentication – 3 <sup>rd</sup> Party SNMP Client(s)																		
Show Status							U		U									
Sensor Operator Management							U		U									
Network Configuration							U		U									
Administrative Configuration				I			U		U									
Firmware Update					IU		U		U				UI					
Install with NSM					IU			G	U	U	U	U	U			G		G
Install with 3 <sup>rd</sup> Party SNMP Client					IU								U					
Change Passwords	IS	IS	R W															
Zeroize (Authenticated)	Z*	Z*	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
Zeroize (Unauthenticated)	Z	Z		Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
Intrusion Detection/Prevention Management					U			U	U							U	U	U
Intrusion Detection/Prevention Monitoring																		
Disable SSH/Console Access	U																	
Self Tests																		
Intrusion Prevention Services																		

## **7 Operational Environment**

The device supports a limited operational environment.

## 8 Security Rules

The cryptographic module's design corresponds to the module's security rules. This section requirements of this FIPS 140-2 Level 2 module.

- The cryptographic module shall provide five distinct operator roles: Admin, Sensor Operator(s), Network Security Platform Manager, NS-9300 S and 3rd Party SNMP Client(s). The cryptographic module shall provide role-based authentication and each change of operator roles shall be authenticated and previous authentication results are cleared when the module transitions to a power-off state.
- When the module has not been placed in a valid role, the operator shall not have access to any cryptographic services that could cause modification to the module's CSPs.
- The cryptographic module shall perform the following tests:
  - Power up Self-Tests are performed without operator input:
    - Firmware Integrity Test: XYSSL RSA 2048 (Cert. #C1555) using SHA-256 (Cert. #C1555) for hashing
    - Cryptographic algorithm known answer tests (KATs) and pairwise consistency tests (PCT):
      - AES ECB 128 Encryption KAT and Decryption KAT (Cert. #C1556)
      - AES GCM Encryption KAT and Decryption KAT (Cert. #C1556)
      - RSA 2048 PSS Key Generation/Sign/Verify Pairwise Consistency Test (Cert. #C1556)
      - SHA-1 KAT (Cert. #C1556)
      - SHA-256 KAT (Cert. #C1556)
      - SHA-512 KAT (Cert. #C1556)
      - Block Cipher (CTR) DRBG KAT and SP 800-90A DRBG Section 11.3 Health Checks (Cert. #C1556)
      - HMAC SHA-256 KAT (Cert. #C1556)
      - HMAC SHA-512 KAT (Cert. #C1556)
      - XYSSL RSA 2048 Signature Verification KAT (Cert. #C1555) (SHA-256 based signatures)
      - XYSSL SHA-256 KAT (Cert. #C1555)
      - TLS 1.2 KDF KAT (CVL Cert. #C1558)
      - SSH KDF KAT (CVL Cert. #C1557)
      - EC Diffie-Hellman Shared Secret Primitive KAT (vendor-affirmed)
      - ECDSA PCT (Cert. #C1556)
      - SP 800-90A DRBG Section 11.3 Health Checks

If any of these tests fail the following message will be displayed:  
**!!! CRITICAL FAILURE !!!**

## FIPS 140-2 POST and KAT...Failed REBOOTING IN 15 SECONDS

- Conditional Self-Tests:
  - Block Cipher (CTR) DRBG Continuous Test
  - NDRNG Continuous Test
  - RSA KeyGen/Sign/Verify Pairwise Consistency Test (Cert. #C1556)
  - ECDSA KeyGen Pairwise Consistency Test
  - External Firmware Load Test –XYSSL RSA 2048 (Cert. #1555) using SHA-256 (Cert. #C1555) for hashing

If the firmware load test fails the following message will be displayed: "Load Image with SCP Failed."

- At any time the cryptographic module is in an idle state, the operator shall be capable of commanding the module to perform the power up self-test by power cycling.
- Data output shall be inhibited during self-tests and error states.
  - All Power Up Self-Test are run before data output ports are initialized.
  - In the case of failed Power Up Self Tests, the module enters an error state, and reboots.
- Data output shall be logically disconnected during key generation and zeroization.
- For both Zeroize services (authenticated and unauthenticated), the operator must remain in control of the module or be physically present with the module to assure that the entire zeroization process completes successfully. This may take up to one minute.
- Status information shall not contain CSPs or sensitive data that if misused could lead to a compromise of the module.
- If a non-FIPS validated firmware version is loaded onto the module, then the module is no longer a FIPS validated module.
- The module shall only support five concurrent SSH operators when SSH is enabled.
- The cryptographic module shall not be configured to transmit files to Trellix Advanced Threat Detection.
- During initial configuration of the module via its Console Port, the default admin password should be changed to a password with characteristics as listed in Table 5. Once the default password has been changed the module must be rebooted.

## 9 Physical Security Policy

### 9.1 Physical Security Mechanisms

The cryptographic module includes the following physical security mechanisms:

- Production-grade components
- Production-grade opaque enclosure with tamper evident seals. Tamper evident seals and further instructions are obtained in the FIPS Kits with the following part numbers:
  - NS9300 P: IAC-FIPS-KT2

### 9.2 Operator Required Actions

For the module to operate in a FIPS Approved mode, the tamper seals shall be placed by the Admin role as specified below. The Admin must clean the chassis of any dirt before applying the labels. Per FIPS 140-2 Implementation Guidance (IG) 14.4, the Admin role is also responsible for the following:

- Securing and having control at all times of any unused seals
- Direct control and observation of any changes to the module, such as reconfigurations, where the tamper evident seals or security appliances are removed or installed to ensure the security of the module is maintained during such changes and the module is returned to a FIPS Approved state.

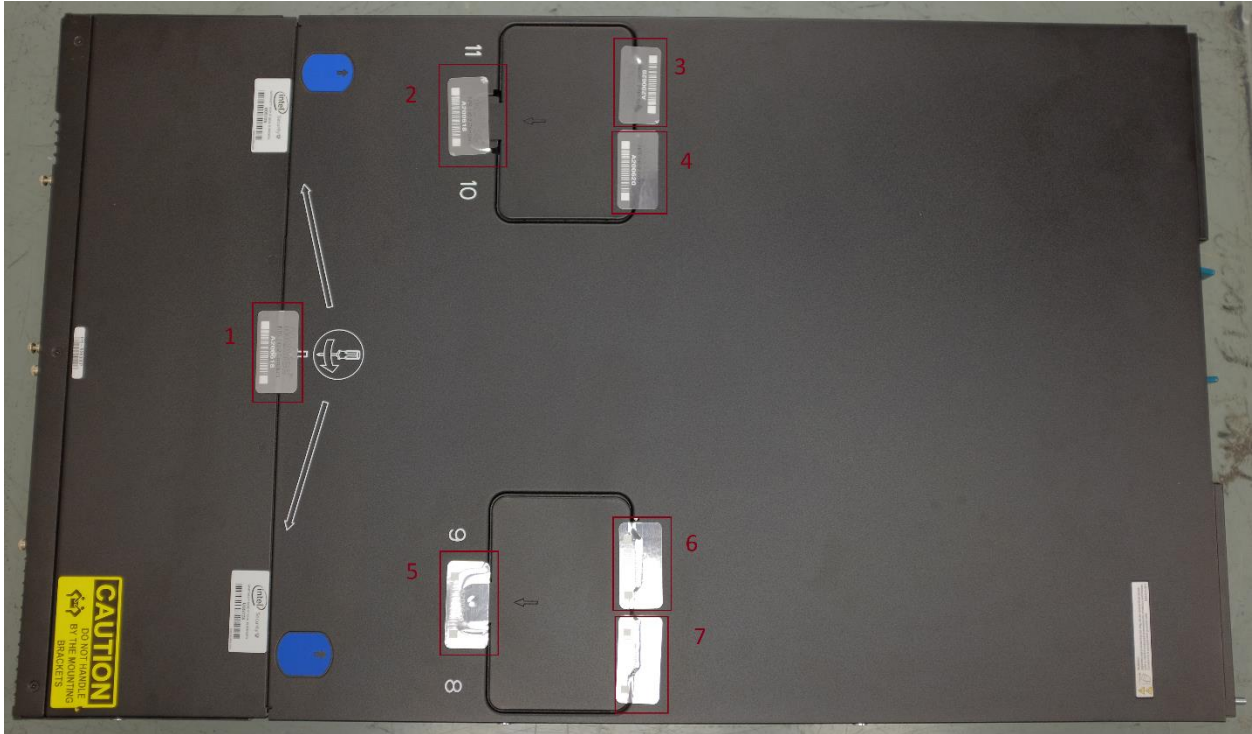
The Admin is also required to periodically inspect tamper evident seals. Table 10 outlines the recommendations for inspecting/testing physical security mechanisms of the module. If the Admin finds evidence of tampering, then the module is no longer FIPS compliant.

**Table 10 – Inspection/Testing of Physical Security Mechanisms**

<b>Physical Security Mechanisms</b>	<b>Recommended Frequency of Inspection/Test</b>	<b>Inspection/Test Guidance Details</b>
Tamper Evident Seals	As specified per end user policy, annually at a minimum	Visually inspect the labels for tears, rips, dissolved adhesive, and other signs of malice.
Opaque Enclosure	As specified per end user policy, annually at a minimum	Visually inspect the enclosure for broken screws, bent casing, scratches, and other questionable markings.

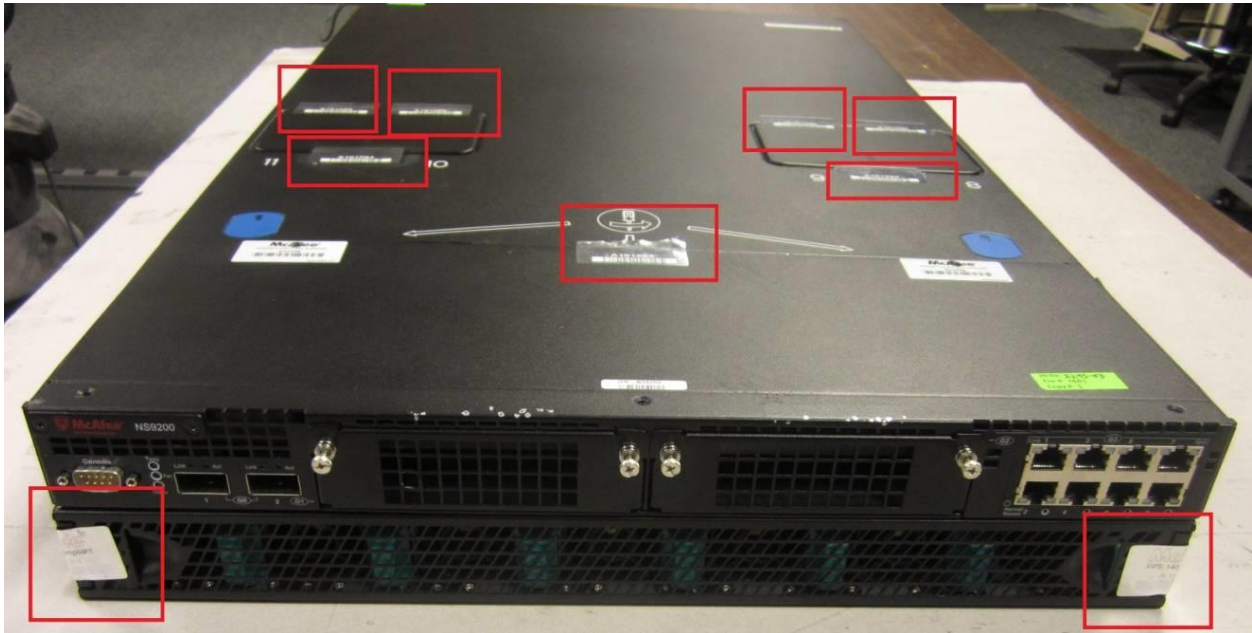
Figure 7 depicts the tamper label locations on the cryptographic module for the NS9300 P platform. There are 9 tamper labels and they are numbered in red. An example tamper label is shown in Figure 10.

**Figure 7 – Tamper Label Placement Top (NS9300 P sensors)**



**Figure 8 – Tamper Label Placement Front (NS9300 P sensor)**





**Figure 9 – Tamper Label Placement Front (NS9300 P with NS9300 S)**

**Figure 10 – Tamper Label**





## 10 Mitigation of Other Attacks Policy

The module has not been designed to mitigate any specific attacks beyond the scope of FIPS 140-2 requirements.

## 11 Glossary

<b>Acronym</b>	<b>Definition</b>
AES	Advanced Encryption Standard
CKG	Cryptographic Key Generation
CMVP	Cryptographic Module Validation Program
CO	Cryptographic Officer
CSP	Critical Security Parameter
CVL	Component Validation List
DRBG	Deterministic Random Number Generator
FIPS	Federal Information Processing Standard
HMAC	Keyed-Hash Message Authentication Code
IG	Implementation Guidance
IDS	Intrusion Detection Systems
IPS	Intrusion Prevention Systems
KAT	Known Answer Test
KDF	Key Derivation Function
KTS	Key Transport Scheme
NDRNG	Non-Deterministic Random Number Generator
NSM	Network Security Manager
NSP	Network Security Platform
PCT	Pairwise Consistency Test
RSA	Rivest, Shamir, Adleman algorithm
SHA/SHS	Secure Hash Algorithm/Standard
SCP	Secure Copy