# Cisco Aironet 1562 e/i/d/ps, 2802 e/i and 3802 e/i/p Wireless LAN Access Points

## FIPS 140-2 Non Proprietary Security Policy

**Level 2 Validation**

**Version 0.1**

**September 20, 2019**

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# 1 Introduction

## 1.1 Purpose

This is a non-proprietary Cryptographic Module Security Policy for the Cisco Aironet 1562 e/i/d/ps, 2802 e/I and 3802 e/i/p Wireless LAN Access Points, Firmware version 8.3 referred to in this document as Access Points (APs). This security policy describes how the modules meet the security requirements of FIPS 140-2 Level 2 and may be freely distributed.

## 1.2 Models

- Cisco Aironet 1562e Access Point with (HW: 1562e)
- Cisco Aironet 1562i Access Point with (HW: 1562i)
- Cisco Aironet 1562d Access Point with (HW: 1562d)
- Cisco Aironet 1562ps Access Point with (HW: 1562ps)
- Cisco Aironet 2802e Access Point with (HW: 2802e)
- Cisco Aironet 2802i Access Point with (HW: 2802i)
- Cisco Aironet 3802e Access Point (HW: 3802e)
- Cisco Aironet 3802i Access Point (HW: 3802i)
- Cisco Aironet 3802p Access Point (HW: 3802p)

FIPS 140-2 (Federal Information Processing Standards Publication 140-2 — *Security Requirements for Cryptographic Modules*) details the U.S. Government requirements for cryptographic modules. More information about the FIPS 140-2 standard and validation program is available on the NIST website at http://csrc.nist.gov/groups/STM/index.html.

## 1.3 Module Validation Level

The following table lists the level of validation for each area in the FIPS PUB 140-2.

| No. | Area Title | Level |
|---|---|---|
| 1 | Cryptographic Module Specification | 2 |
| 2 | Cryptographic Module Ports and Interfaces | 2 |
| 3 | Roles, Services, and Authentication | 2 |
| 4 | Finite State Model | 2 |
| 5 | Physical Security | 2 |
| 6 | Operational Environment | N/A |
| 7 | Cryptographic Key management | 2 |
| 8 | Electromagnetic Interface/Electromagnetic Compatibility | 2 |
| 9 | Self-Tests | 2 |
| 10 | Design Assurance | 2 |
| 11 | Mitigation of Other Attacks | N/A |
| **Overall** | **Overall module validation level** | **2** |

**Module Validation Level**

## 1.4 References

This document deals only with operations and capabilities of the Cisco Aironet 1562 e/i/d/ps, 2802 e/i and 3802 e/i/p Wireless LAN Access Points cryptographic module security policy. More information is available on the routers from the following sources:

For answers to technical or sales related questions please refer to the contacts listed on the Cisco Systems website at www.cisco.com.

The NIST Validated Modules website (http://csrc.nist.gov/groups/STM/cmvp/validation.html) contains contact information for answers to technical or sales-related questions for the module.

## 1.5 Terminology

In this document, the Cisco Aironet 1562 e/i/d/ps, 2802 e/i and 3802 e/i/p Wireless LAN Access Points are referred to as access points, APs or the modules.

## 1.6 Document Organization

The Security Policy document is part of the FIPS 140-2 Submission Package. In addition to this document, the Submission Package contains:

Vendor Evidence document
Finite State Machine
Other supporting documentation as additional references

This document provides an overview of the Cisco Aironet 1562 e/i/d/ps, 2802 e/i and 3802 e/i/p Wireless LAN Access Points and explains the secure configuration and operation of the module. This introduction section is followed by Section 2, which details the general features and functionality of the appliances. Section 3 specifically addresses the required configuration for secure operation.

With the exception of this Non-Proprietary Security Policy, the FIPS 140-2 Validation Submission Documentation is Cisco-proprietary and is releasable only under appropriate non-disclosure agreements. For access to these documents, please contact Cisco Systems.

# 2 Cisco Aironet 1562 e/i/d/ps, 2802 e/i and 3802 e/i/p Wireless LAN Access Points

The Cisco Aironet 1560, 2800 and 3800 Series Access Points are highly versatile and deliver the most functionality of any access points in the industry.  For organizations paving the way for the new 802.11ac Wave 2 standard, the Cisco Aironet 1560, 2800 and 3800 Series are the perfect solution. The access points go beyond getting ready for the new standard, providing the ultimate in flexibility and versatility.

## 2.1 Cryptographic Module Physical Characteristics

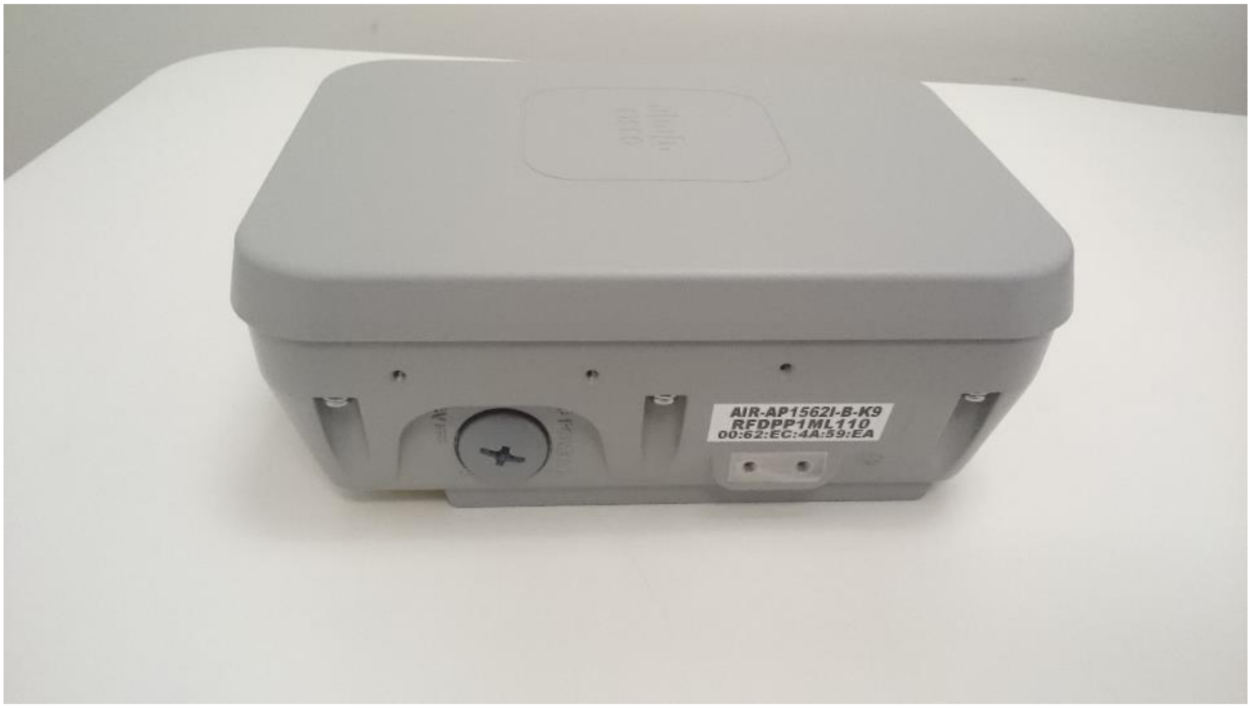
Each access point is a multi-chip standalone security appliance, and the cryptographic boundary is defined as encompassing the “top,” “front,” “left,” “right,” and “bottom” surfaces of the case.

## 2.2 Module Interfaces

The module provides a number of physical and logical interfaces to the device, and the physical interfaces provided by the module are mapped to the following FIPS 140-2 defined logical interfaces: data input, data output, control input, status output, and power. The logical interfaces and their mapping are described in the following tables:

| Router Physical Interface | FIPS 140-2 Logical Interface |
|---|---|
| Radio Antennas | Data Input Interface |
| Radio Antennas | Data Output Interface |
| Radio Antennas, Ethernet ports | Control Input Interface |
| Radio Antennas, LEDs, Ethernet ports | Status Output Interface |
| Power plug and PoE port | Power Interface |

***Module Physical Interface/Logical Interface Mapping***

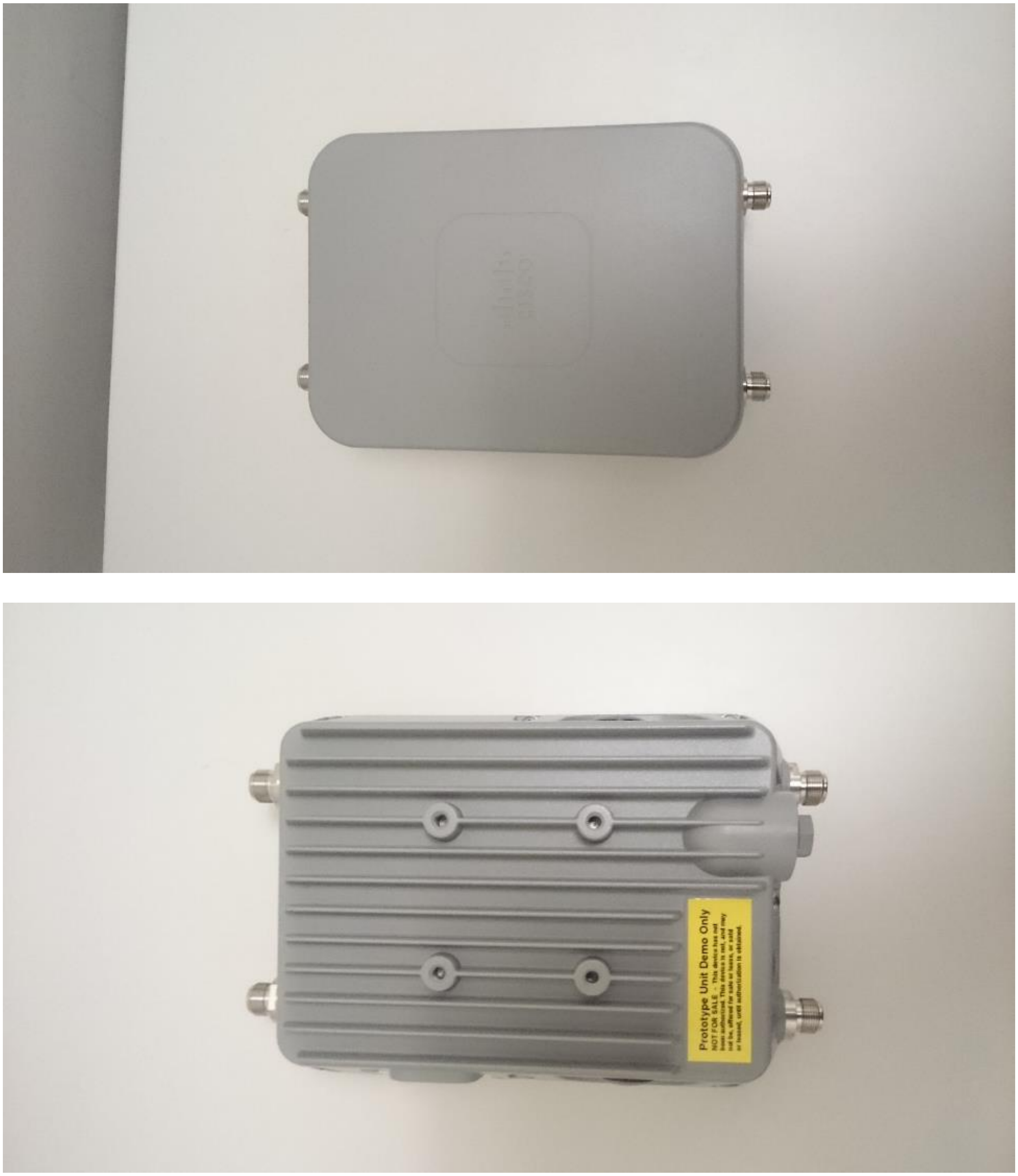

AIR-AP1562I-B-K9
RFDPP1ML110
00:62:EC:4A:59:EA

Prototype Unit Demo Only
NOT FOR SALE - This device has not been authorized. This device is not, and may not be, offered for sale or lease, or sold or leased, until authorization is obtained.

**Cisco Aironet 1562i (Front, Back, Left, Right, Top, Bottom)**

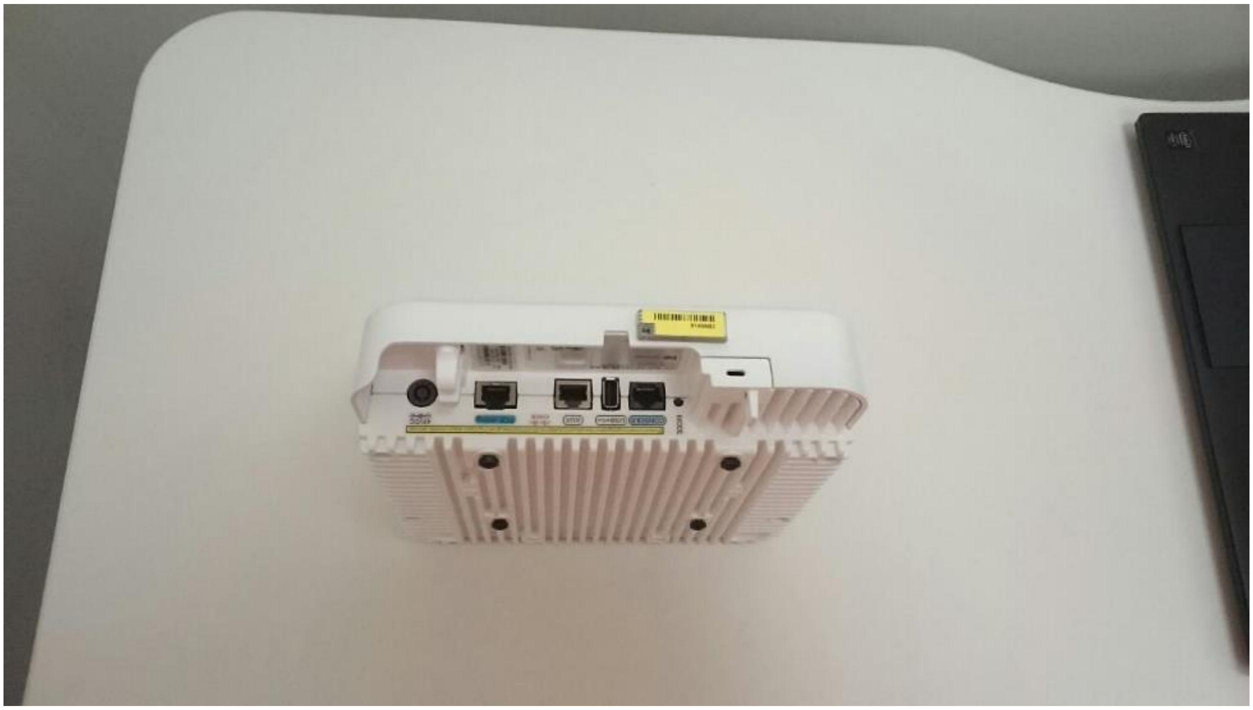
SFP
POE-IN

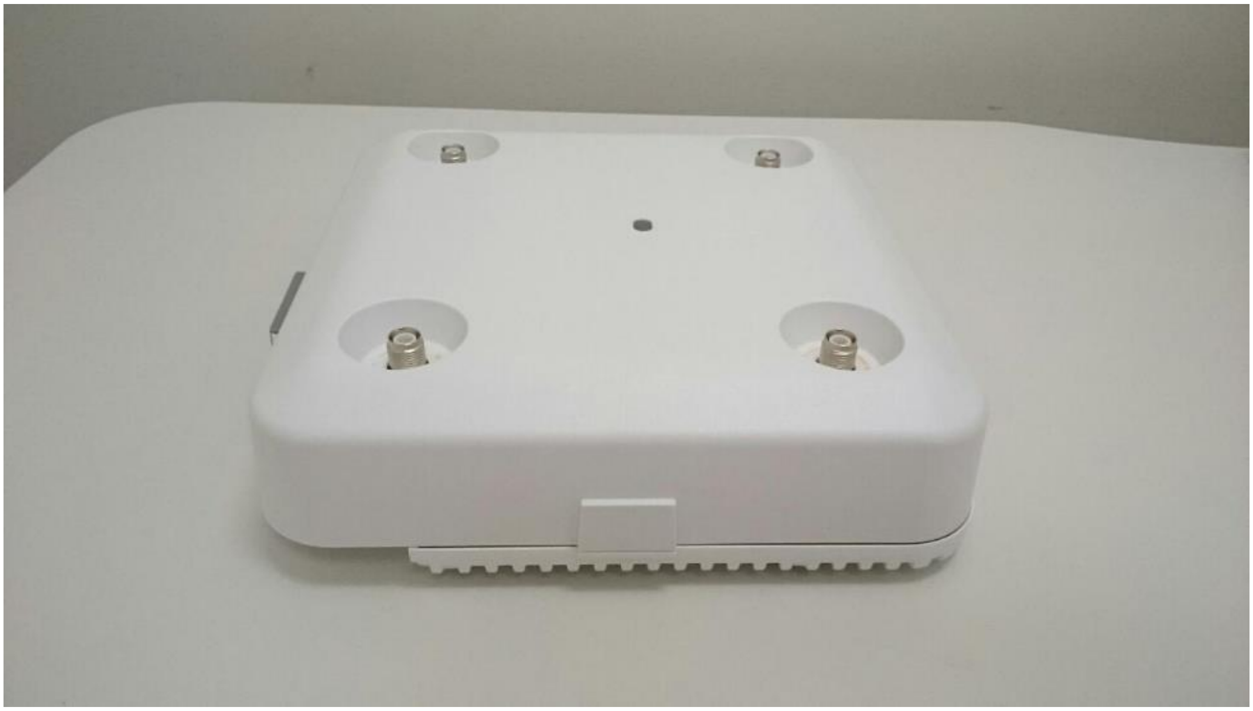
AIR-AP1562E-B-K9


Prototype Unit Demo Only
NOT FOR SALE - This device has not been authorized. This device is not, and may not be, offered for sale or lease, or sold or leased, until authorization is obtained.

**Cisco Aironet 1562e/d/ps (Front, Back, Left, Right, Top, Bottom)**

**Cisco Aironet 2802i and 3802i (Front, Back, Left, Right, Top, Bottom)**





**Cisco Aironet 2802e and 3802e (Front, Back, Left, Right, Top, Bottom)**

## 2.3 Roles and Services

The module supports the roles of Crypto Officer and User. The CO role is fulfilled by the wireless LAN controller on the network that the module communicates with, and performs routine management and configuration services, including loading session keys and zeroization of the module. The User role is fulfilled by wireless clients. The module does not support a maintenance role.

**CO Authentication**

The Crypto Officer (Wireless LAN Controller) authenticates to the module through the CAPWAP protocol, using an RSA key pair with 2048 bits modulus, which has an equivalent symmetric key strength of 112 bits. An attacker would have a 1 in 2^112 chance of randomly obtaining the key, which is much stronger than the one in a million chance required by FIPS 140-2. To exceed a one in 100,000 probability of a successful random key guess in one minute, an attacker would have to be capable of approximately 5.2x10^33 attempts per minute, which far exceeds the operational capabilities of the modules to support.

### User Authentication

The module performs mutual authentication with a wireless client through EAP-TLS or EAP-FAST protocols. EAP-FAST is based on EAP-TLS and uses EAP-TLS key pair and certificates. The RSA key pair for the EAP-TLS credentials has modulus size of 2048 bits, thus providing 112 bits of strength. Assuming the low end of that range, an attacker would have a 1 in 2^112 chance of randomly obtaining the key, which is much stronger than the one in a million chance required by FIPS 140-2. To exceed a one in 100,000 probability of a successful random key guess in one minute, an attacker would have to be capable of approximately 5.2x10^33 attempts per minute, which far exceeds the operational capabilities of the modules to support.

Please notice that RSA used in CO role (RSA 2048 bits) or User role (RSA 2048 bits) authentication above only performs RSA signature verification. More information can be obtained in section 2.6 in this document.

### User Services

The services available to the User role consist of the following:

| Services & Access | Description | Keys & CSPs |
|---|---|---|
| Run Network Functions | MFP<br>• Validating one AP with a neighboring AP's management frames using infrastructure MFP<br>• Encrypt and sign management frames between AP and wireless client using client MFP<br>CCKM<br>• Establishment and subsequent data transfer of a CCKM session for use between the wireless client and the AP.<br>802.11<br>• Establishment and subsequent data transfer of an 802.11 session for use between the wireless client and the AP. | 802.11 Pairwise Transient Key (PTK), 802.11 Group Temporal Key (GTK), 802.11 Key Confirmation Key (KCK) 802.11 Key Encryption Key (KEK), 802.11 Pairwise Transient Key (PTK) – (w, d) |

**User Services**

### Crypto Officer Services

The Crypto Officer services consist of the following:

| Services & Access | Description | Keys & CSPs |
|---|---|---|
| **Configure the AP** | Configure the AP based on the steps detailed in section 3 (Secure Operation of the Cisco Aironet Access Points) of this document. | N/A |
| **View Status Functions** | View the configuration, routing tables, active sessions, memory status, packet statistics, | N/A |

| | | |
|---|---|---|
| | review accounting logs, and view physical interface status. | |
| **Manage the AP** | Log off users, view complete configurations, view full status, manage user access, and restore configurations. | N/A |
| **Perform Self-Tests** | Execute Known Answer Test on Algorithms within the cryptographic module. | N/A |
| **DTLS Data Encrypt** | Enabling DTLS data path encryption between controller and AP. | DTLS Pre-Master Secret, DTLS Master Secret, DTLS Encryption Key (CAPWAP session key), DTLS Integrity Key, DTLS ECDSA private key, Infrastructure MFP MIC Key – (w, d) |
| **SSH** | Establishment and subsequent data transfer of a SSH session | SSH encryption key, SSH integrity key, SSH ECDSA private key – (w, d) |
| **Configure 802.11** | Establishment and subsequent data transfer of an 802.11 session for use between the client and the access point. | 802.11 Pairwise Transient Key (PTK), 802.11 Group Temporal Key (GTK), 802.11 Key Confirmation Key (KCK)<br>802.11 Key Encryption Key (KEK), 802.11 Pairwise Transient Key (PTK) – (w, d) |
| **Zeroization** | Zeroize CSPs and cryptographic keys by calling 'switchconfig key-zeroize controller' command or cycling power (shutdown and reload) to zeroize all cryptographic keys stored in SDRAM. The CSPs (Cisco Mfg CA publc key and Cisco root CA public key) stored in Flash can be zeroized by overwriting with a new value. | All Keys and CSPs will be destroyed |

**Crypto Officer Services (w = write, d = delete)**

## 2.4 Unauthenticated Services

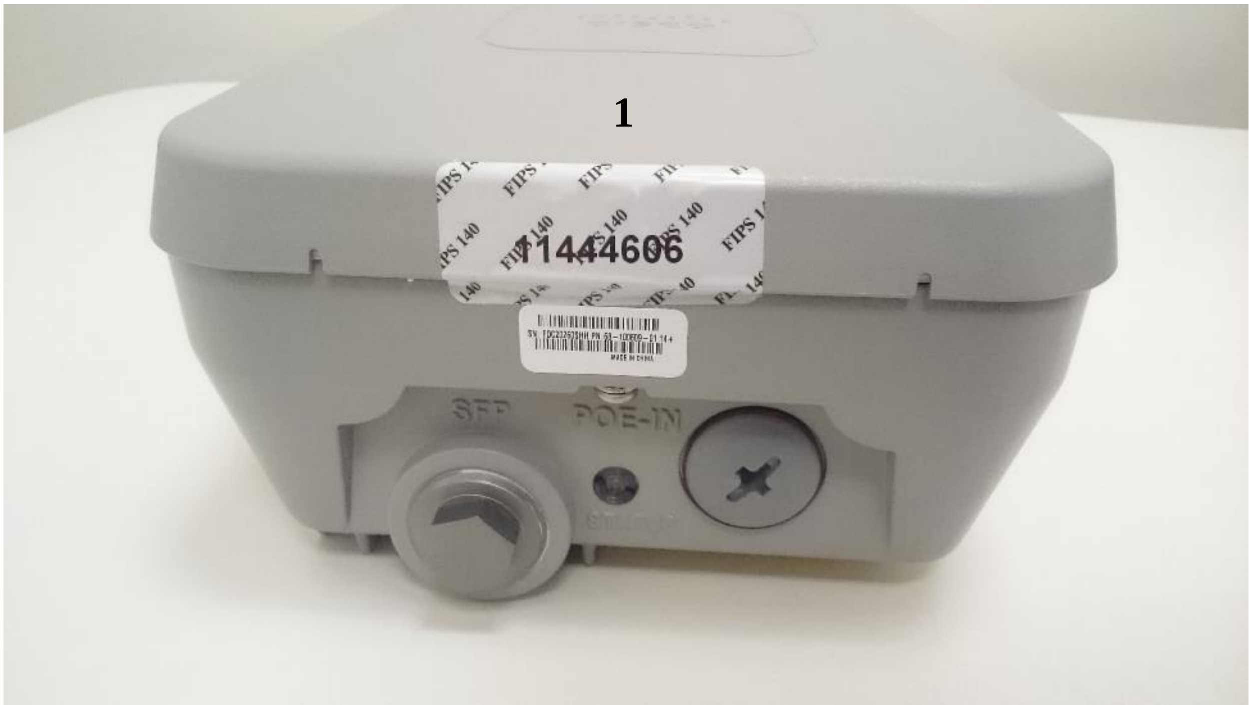
An unauthenticated operator may observe the System Status by viewing the LEDs on the module, which show network activity and overall operational status. A solid green LED indicates normal operation and the successful completion of self-tests. The module does not support a bypass capability.

## 2.5 Physical Security

This section describes placement of tamper-evident labels on the module. Labels must be placed on the device(s) and maintained by the Crypto Officer in order to operate in a FIPS approved state.

The APs (Access Points) are required to have Tamper Evident Labels (TELs) applied in order to meet the FIPS requirements. Specifically, AIRLAP-FIPSKIT=, VERSION B0 contains the necessary TELs required for the AP. The CO on premise is responsible for securing and having control at all times of any unused tamper evident labels. Below are the instructions to TEL placement on the AP's.

The vendor affirms that the module conforms to level 1 security requirements without the use of the tamper evident labels.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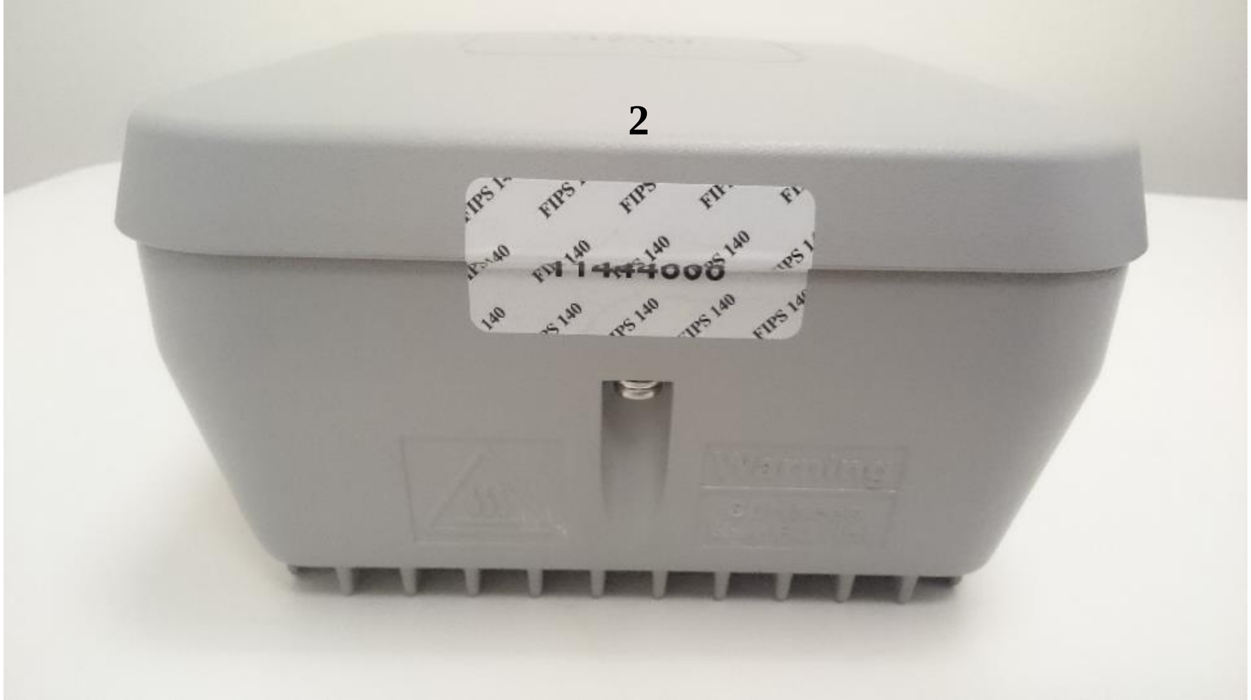
SFP
POE-IN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FIPS 140
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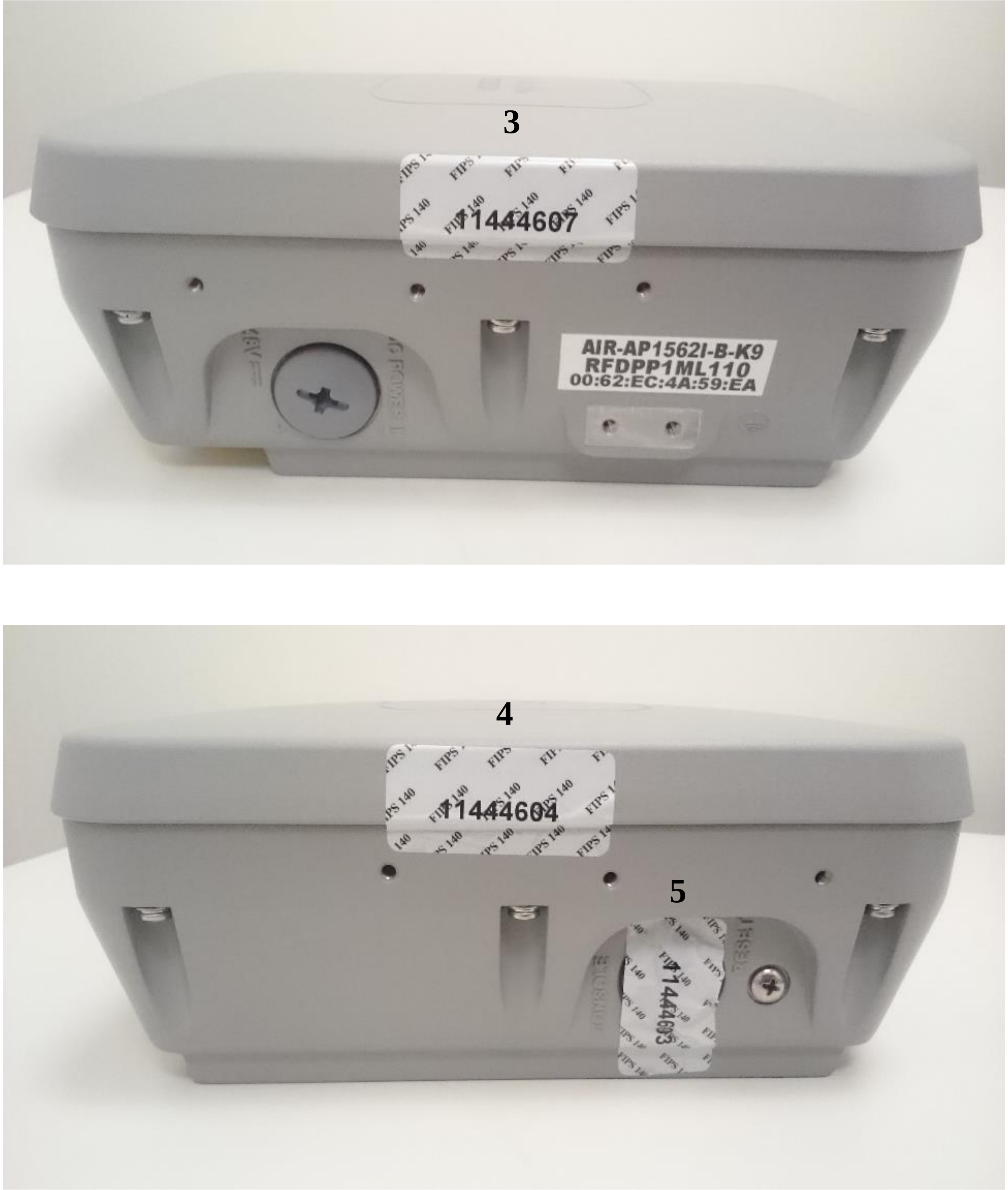
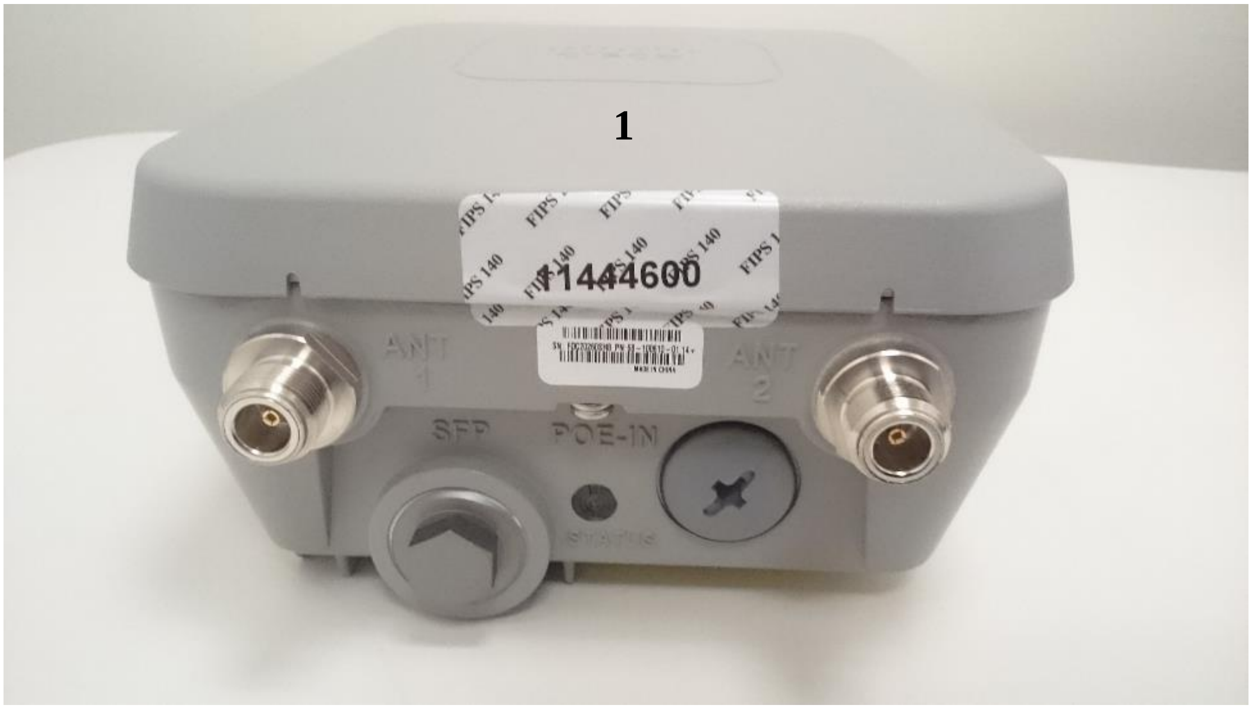
Warning



**Cisco Aironet 1562i tamper label placement (Front, Back, Left, Right)**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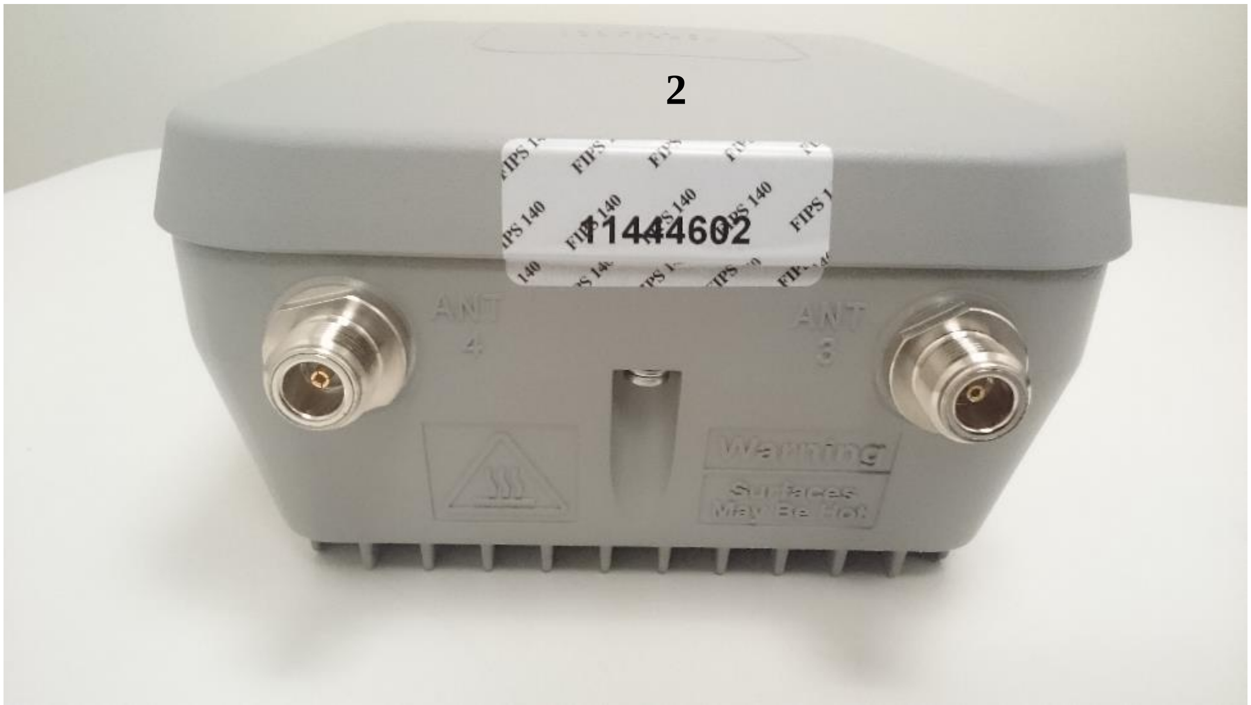
FIPS 140
ANT 1
ANT 2
SFP
POE-IN
STATUS
MADE IN CHINA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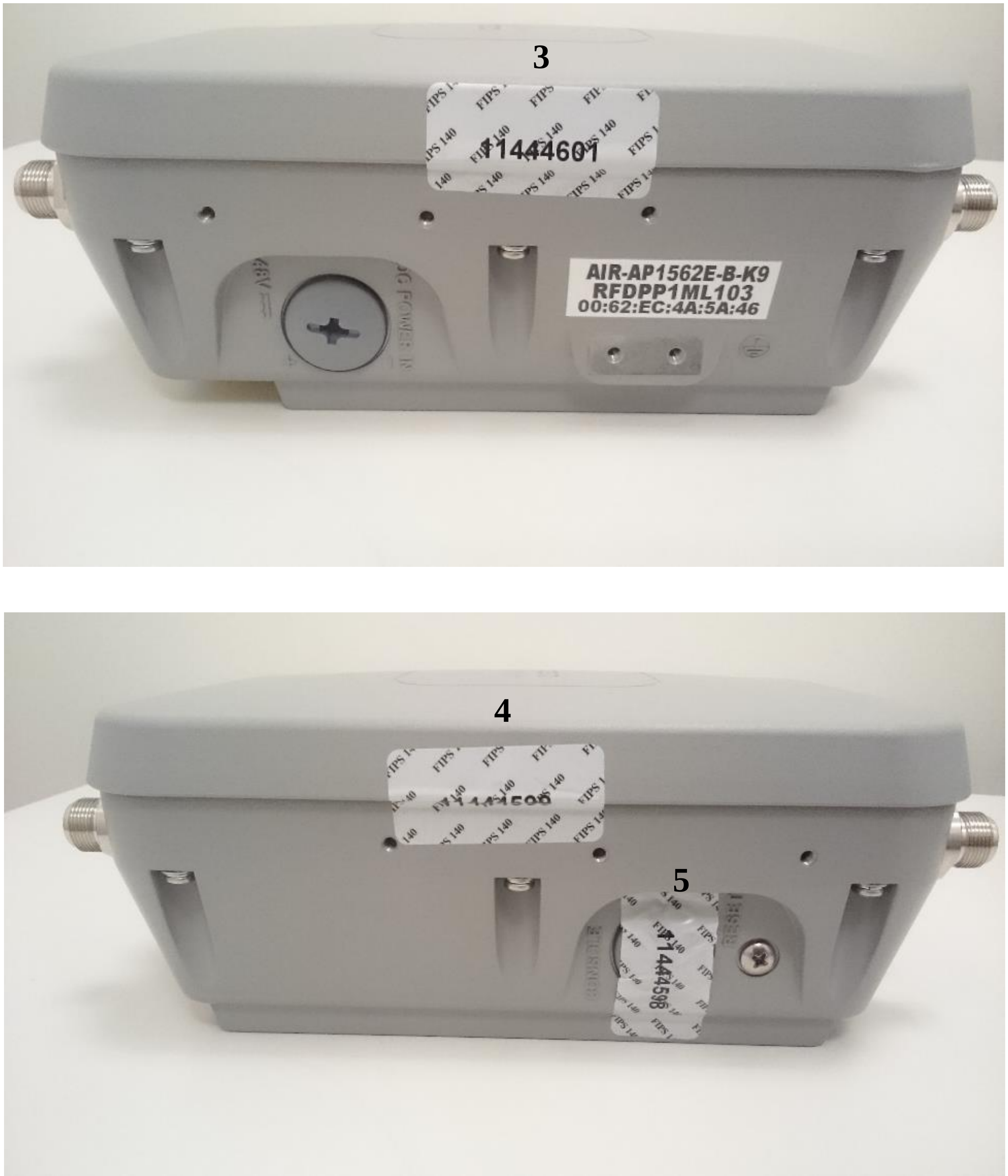
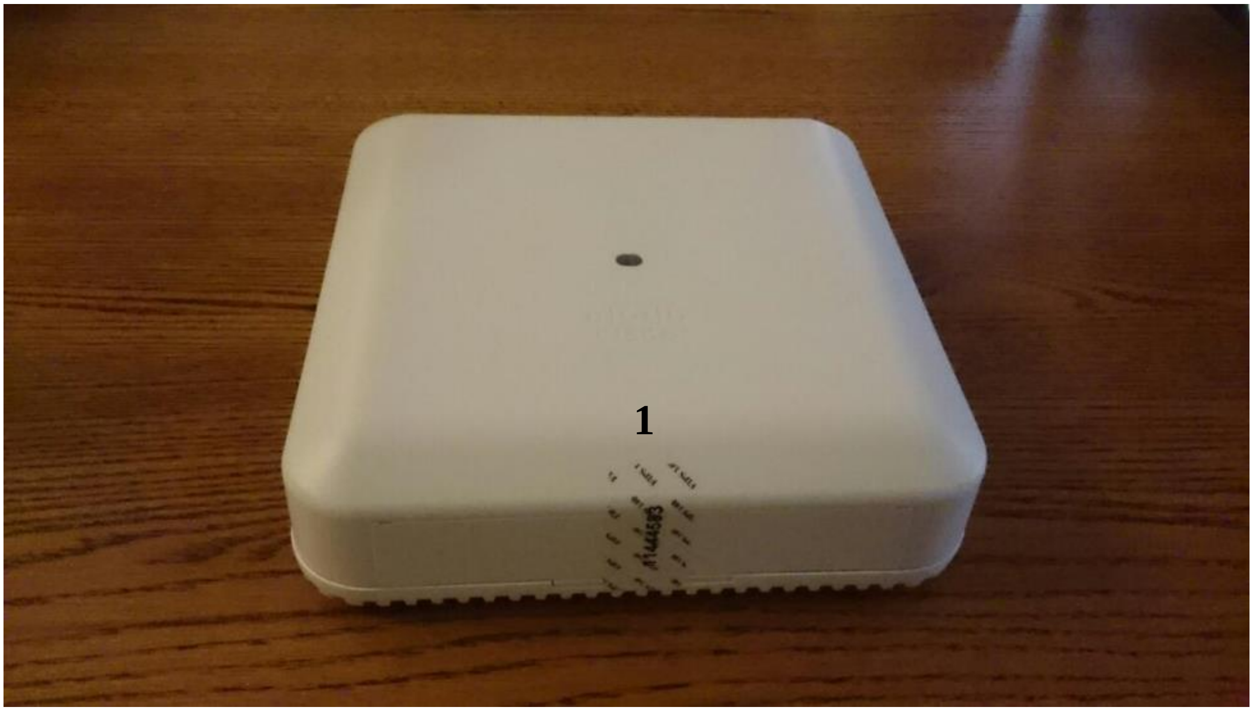
11444602
FIPS 140
ANT 4
ANT 3
Warning
Surfaces May Be Hot



**Cisco Aironet 1562e/d/ps tamper label placement (Front, Back, Left, Right)**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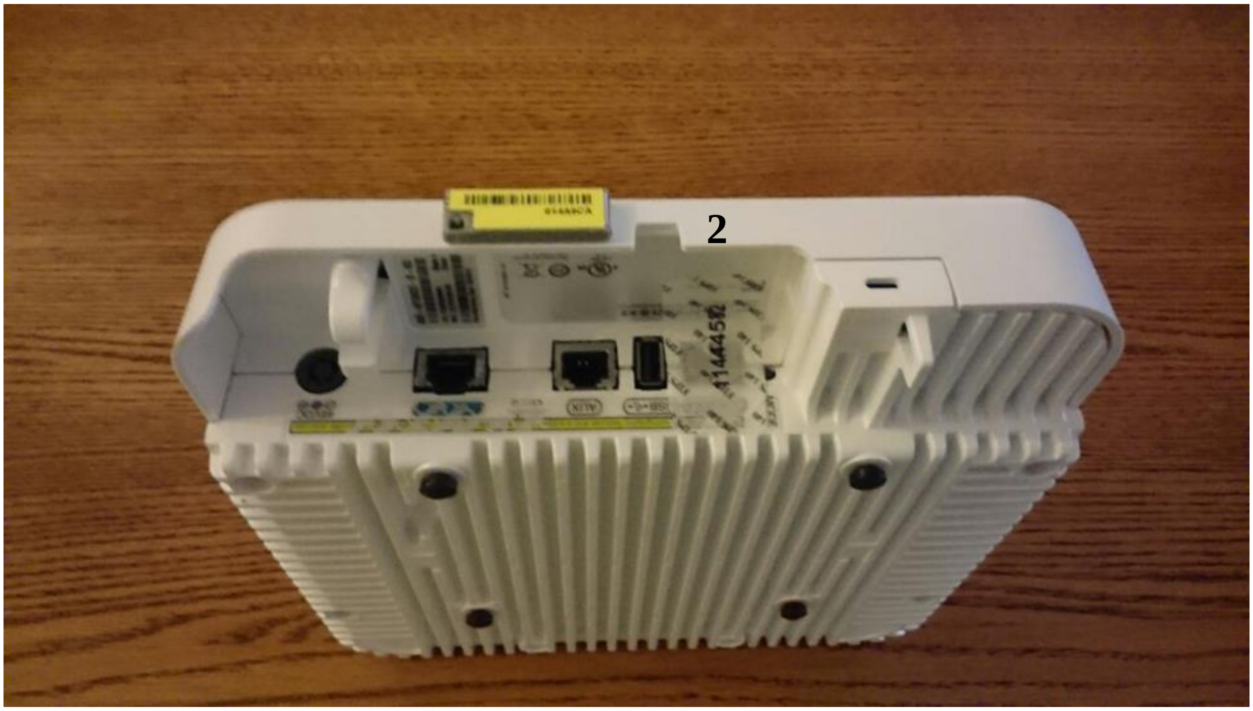
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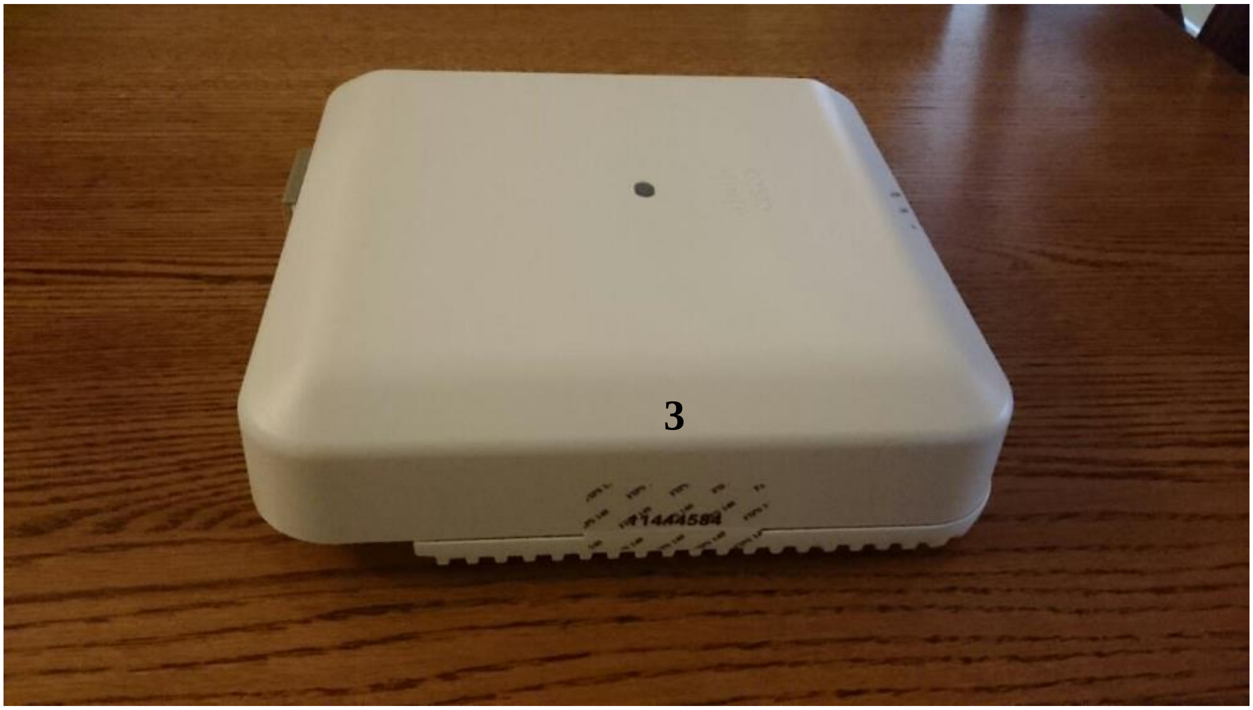
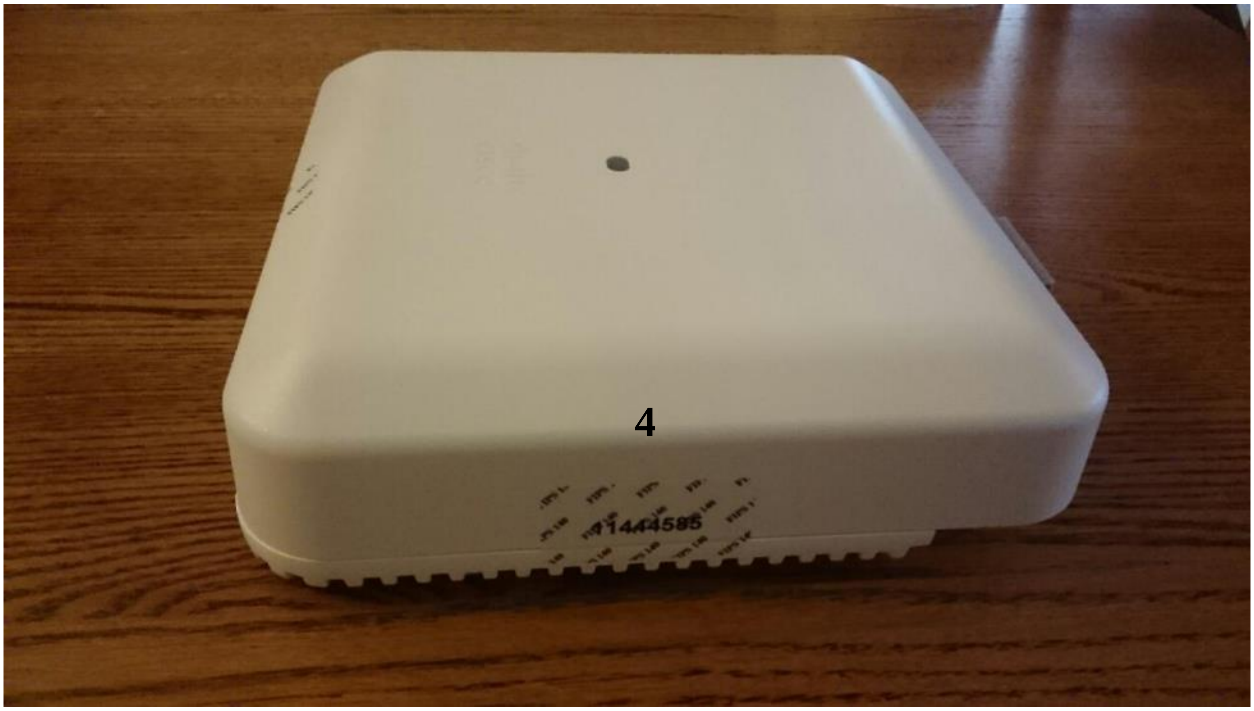
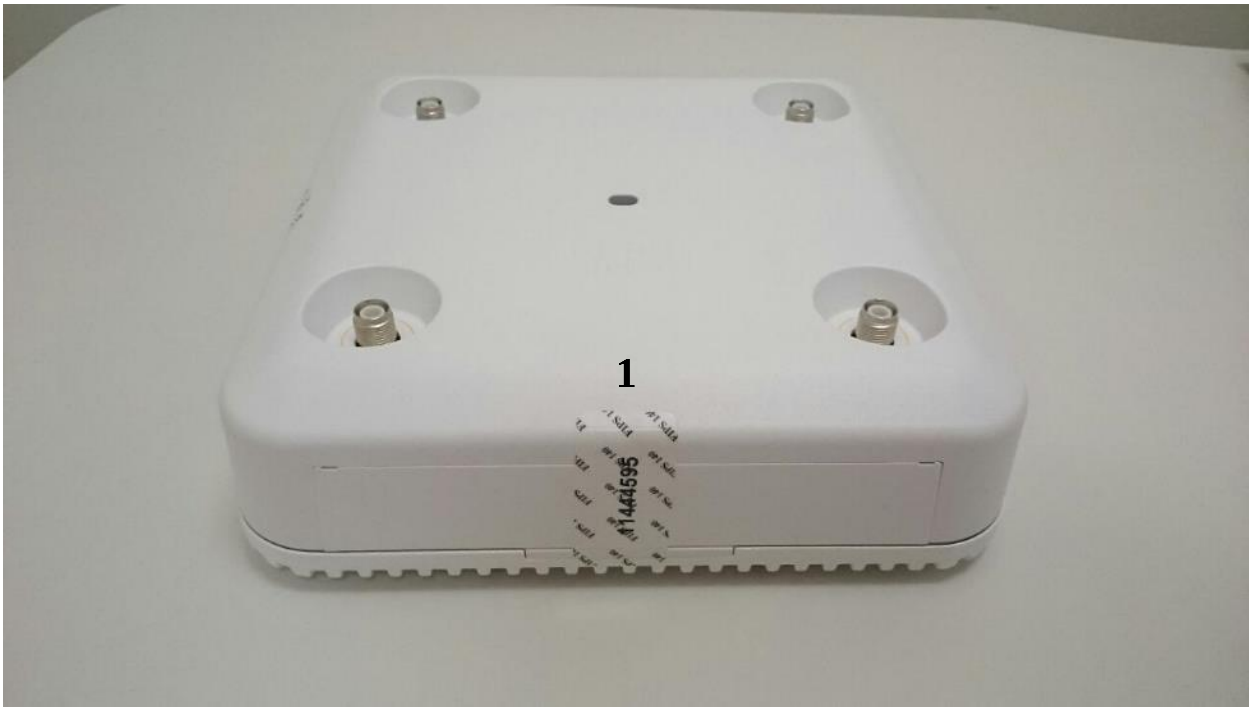




**Cisco Aironet 2802i and 3802i tamper label placement (Front, Back, Left, Right)**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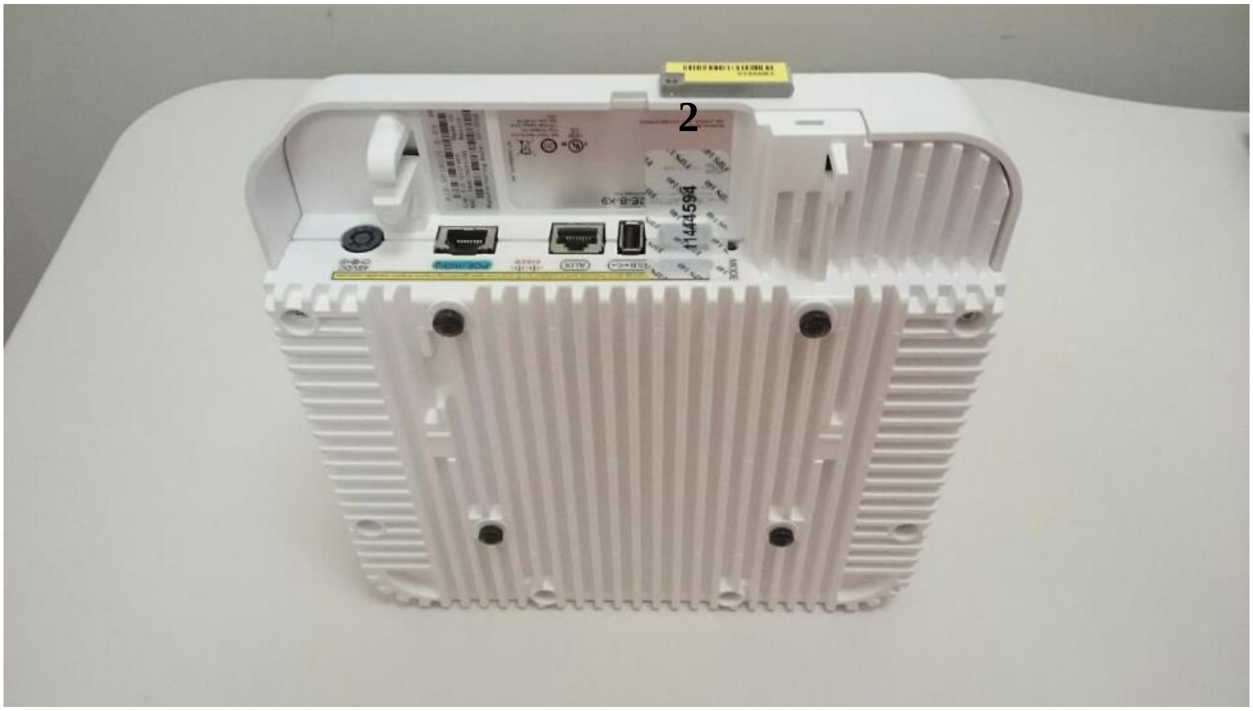
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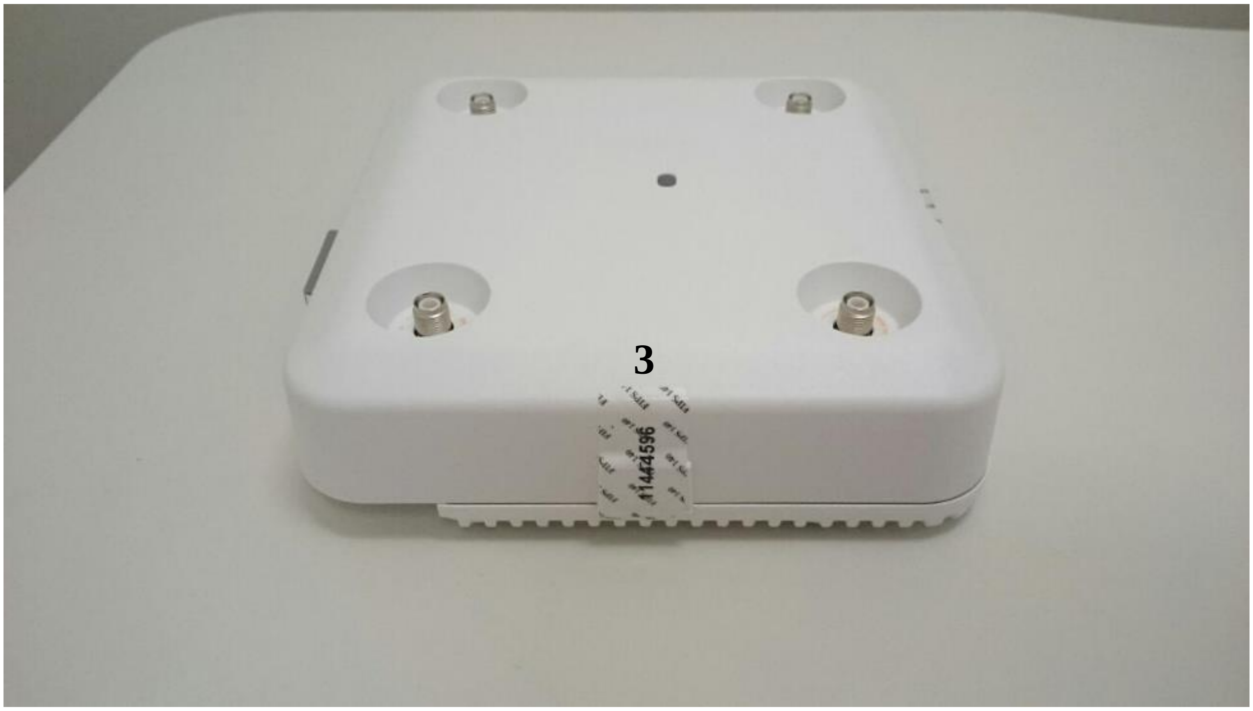

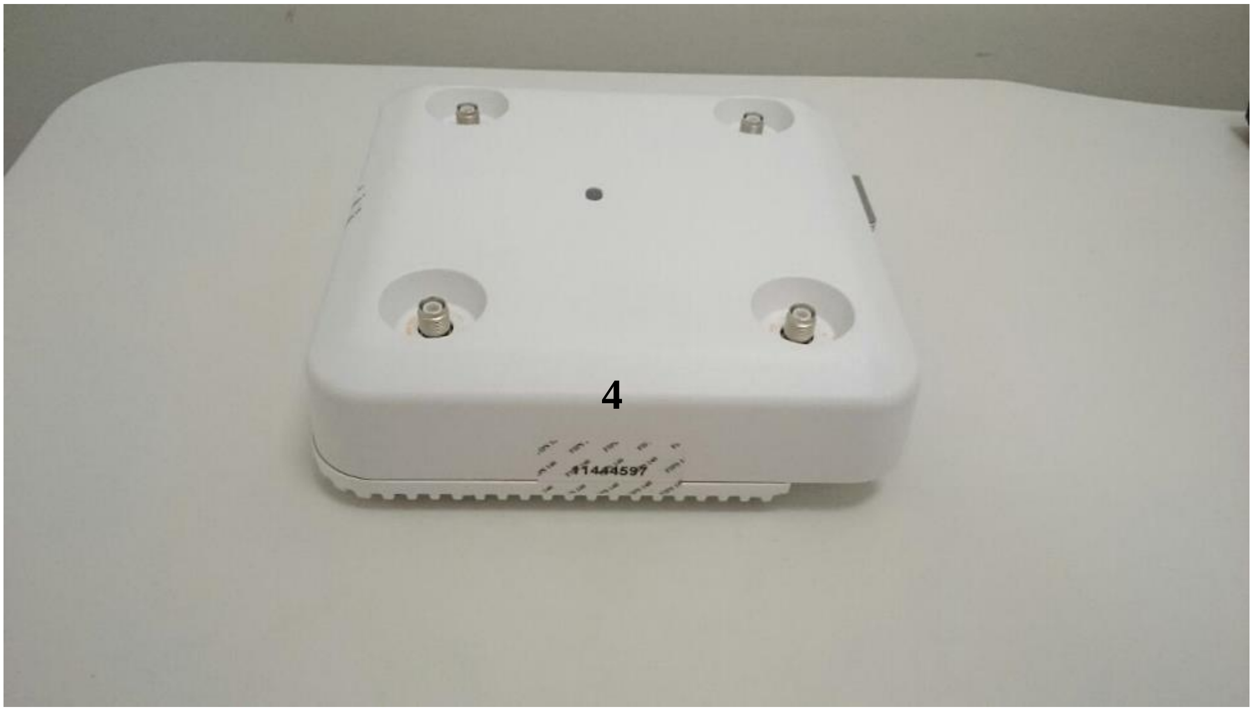

**Cisco Aironet 2802e and 3802e tamper label placement (Front, Back, Left, Right)**

The tamper evident seals are produced from a special thin gauge vinyl with self-adhesive backing. Any attempt to open the device will damage the tamper evident seals or the material of the security appliance cover. Because the tamper evident seals have non-repeated serial numbers, they may be inspected for damage and compared against the applied serial numbers to verify that the security appliance has not been tampered with. Tamper evident seals can also be inspected for signs of tampering, which include the following: curled corners, rips, and slices. The word "OPEN" may appear if the label was peeled back.

The crypto officer is required to regularly check for any evidence of tampering. If evidence of tampering is found with the TELs, the module must immediately be powered down and all administrators must be made aware of a physical security breach.

NOTE: Any unused TELs must be securely stored, accounted for, and maintained by the CO in a protected location.

## 2.6 Cryptographic Algorithms

### Approved Cryptographic Algorithms

The table below details the FIPS approved algorithms from each algorithm implementation

| | Cisco FOM | u-boot | GCM | 88W8964C | 88F6920 |
|---|---|---|---|---|---|
| AES | #4409 | N/A | #4340 | #4114 | #4367 |
| SHA | #3635 | #3576 | N/A | N/A | #3604 |
| HMAC SHA | #2931 | N/A | N/A | N/A | #2906 |
| DRBG | #1422 | N/A | N/A | N/A | N/A |
| RSA | #2396 | #2344 | N/A | N/A | N/A |
| ECDSA | #1061 | N/A | N/A | N/A | N/A |
| CVL (SP800-135) | #1115 | N/A | N/A | N/A | N/A |
| CVL (SP800-56A) | #1116 | N/A | N/A | N/A | N/A |
| KBKDF (SP800-108) | #126 | N/A | N/A | N/A | N/A |

**Approved Cryptographic Algorithms**

- KTS (AES Cert. #4409; key wrapping; key establishment methodology provides 128 and 256 bits of encryption strength)

### Non-Approved but Allowed Cryptographic Algorithms

The module supports the following non-approved, but allowed cryptographic algorithms:

- Diffie-Hellman (key agreement; key establishment methodology provides 112 bits of encryption strength)
- EC Diffie-Hellman (CVL Cert. #1116, key agreement; key establishment methodology provides 128 and 192 bits of encryption strength)
- MD5 (MD5 is allowed for use in DTLS)

- NDRNG

Note:

- The KDF (key derivation function) used in SSH and TLS protocol was certified by CAVP with CVL Cert. #1115.
- SSH and TLS protocols have not been reviewed or tested by the CAVP and CMVP. Please refer IG D.11, bullet 2 for more information.
- Note that the TLS KDF CVL cert is only listed because the module supports DTLS

## 2.7 Cryptographic Key Management

Cryptographic keys are stored in either Flash or in SDRAM for active keys.

The DTLS Pre-Master Secret is generated in the AP using the approved DRBG. The DTLS Pre-Master Secret is used to derive the DTLS Encryption and Integrity Key. All other keys are input into the module from the controller encrypted over a CAPWAP session. During a CAPWAP session, the APs first authenticate to the Wireless LAN controller. All traffic between the AP and the controller is encrypted in the DTLS tunnel. Keys such as the 802.11, CCKM and MFP keys are input into the module encrypted with the DTLS session key over the CAPWAP session. Key generation and seeds for asymmetric key generation is performed as per SP 800-133 Scenario 1. The APs rely on the embedded ACT2Lite module (Certificate #2125) for entropy output for use by the SP 800-90A DRBG and secure storage of the SUDI RSA2 and ECC CA certificates used for DTLS authentication. The module does not output any plaintext cryptographic keys.

| Key/CSP Name | Algorithm | Description | Storage | Zeroization |
|---|---|---|---|---|
| **General Keys/CSPs** | | | | |
| DRBG entropy input | SP 800-90A CTR_DRBG | 256 bit. HW based entropy source output used to construct seed | SDRAM (plaintext) | 'switchconfig key-zeroize controller' command or Power cycle |
| DRBG seed | SP 800-90A CTR_DRBG | 384-bits. Input to the DRBG that determines the internal state of the DRBG. Generated using DRBG derivation function that includes the entropy input from hardware-based entropy source. | SDRAM (plaintext) | 'switchconfig key-zeroize controller' command or Power cycle |
| DRBG V | SP 800-90A CTR_DRBG | The DRBG V is one of the critical values of the internal state upon which the security of this DRBG mechanism depends. Generated during DRBG | SDRAM (plain text) | 'switchconfig key-zeroize controller' command or Power cycle |

| Key/CSP Name | Algorithm | Description | Storage | Zeroization |
|---|---|---|---|---|
| | | instantiation and then subsequently updated using the DRBG update function. | | |
| DRBG Key | SP 800-90A CTR_DRBG | 256-bits DRBG key used for SP 800-90A CTR_DRBG. Established per SP 800-90A CTR_DRBG | SDRAM (plaintext) | 'switchconfig key-zeroize controller' command or Power cycle |
| Diffie-Hellman public key | Diffie-Hellman (Group 14) | 2048 bits DH public key used in Diffie-Hellman (DH) exchange. This key is derived per the Diffie-Hellman key agreement. | SDRAM (plaintext) | 'switchconfig key-zeroize controller' command or Power cycle |
| Diffie-Hellman private key | Diffie-Hellman (Group 14) | 224 bits DH private key used in Diffie-Hellman (DH) exchange. Generated by calling the SP 800-90A CTR-DRBG. | SDRAM (plaintext) | 'switchconfig key-zeroize controller' command or Power cycle |
| Diffie-Hellman shared secret | Diffie-Hellman (Group 14) | 2048 bits DH shared secret derived in Diffie-Hellman (DH) exchange. | SDRAM (plaintext) | 'switchconfig key-zeroize controller' command or Power cycle |
| EC Diffie-Hellman public key | Diffie-Hellman (Groups 19 and 20) | P-256 and P-384 public key used in EC Diffie-Hellman exchange. This key is derived per the Diffie-Hellman key agreement. | SDRAM (plaintext) | 'switchconfig key-zeroize controller' command or Power cycle |
| EC Diffie-Hellman private key | Diffie-Hellman (Groups 19 and 20) | P-256 and P-384 private key used in EC Diffie-Hellman exchange. Generated by calling the SP 800-90A CTR-DRBG. | SDRAM (plaintext) | 'switchconfig key-zeroize controller' command or Power cycle |
| EC Diffie-Hellman shared secret | Diffie-Hellman (Groups 19 and 20) | P-256 and P-384 shared secret derived in EC Diffie-Hellman exchange | SDRAM (plaintext) | 'switchconfig key-zeroize controller' command or Power cycle |
| Cisco Mfg CA public key | rsa-pkcs1-sha2 | Public Key used with CAPWAP to authenticate the AP. This is the RSA public key used for signature verification. This key is loaded into the module at manufacturing. | Flash (plain text) | Overwrite with new public key |
| Cisco Root CA public key | rsa-pkcs1-sha2 | Public Key used with CAPWAP to authenticate the AP This is the RSA public key used for signature verification. This key is | Flash (plain text) | Overwrite with new public key |

| Key/CSP Name | Algorithm | Description | Storage | Zeroization |
|---|---|---|---|---|
| | | loaded into the module at manufacturing. | | |
| **DTLS** | | | | |
| DTLS Pre-Master Secret | Shared Secret | Computed as specified in SP 800-135 section 4.2 | SDRAM (plain text) | 'switchconfig key-zeroize controller' command or Power cycle |
| DTLS Master Secret | Shared Secret | Derived from DTLS Pre-Master Secret. Used to derive DTLS encryption key and DTLS integrity key. | SDRAM (plain text) | 'switchconfig key-zeroize controller' command or Power cycle |
| DTLS Encryption Key (CAPWAP session key) | AES-CBC, AES-GCM | 128 and 256 bit DTLS session Key used to protect CAPWAP control messages. It is derived from DTLS Master Secret via key derivation function defined in SP800-135 (TLS). | SDRAM (plain text) | 'switchconfig key-zeroize controller' command or Power cycle |
| DTLS Integrity Key | HMAC-SHA1, HMAC-SHA256, HMAC-SHA384 | Session key used for integrity checks on CAPWAP control messages. It is derived from DTLS Master Secret via key derivation function defined in SP800-135 (TLS). | SDRAM (plain text) | 'switchconfig key-zeroize controller' command or Power cycle |
| DTLS ECDSA private key | ECDSA | P-256 and P-384 generated by calling the SP 800-90A CTR-DRBG. | SDRAM (plaintext) | 'switchconfig key-zeroize controller' command or Power cycle |
| Infrastructure MFP MIC Key | AES-CMAC, AES-GMAC | This 128 and 256-bit AES key is generated in the controller using approved DRBG. This key is sent to the AP encrypted with the DTLS encryption key. This key is used by the AP to sign management frames when infrastructure MFP is enabled. | SDRAM (plain text) | 'switchconfig key-zeroize controller' command or Power cycle |
| **SSHv2** | | | | |

| Key/CSP Name | Algorithm | Description | Storage | Zeroization |
|---|---|---|---|---|
| SSH Encryption Key | AES-CBC, AES-GCM | Symmetric AES key for encrypting SSH. | SDRAM | ‘switchconfig key-zeroize controller’ command or Power cycle |
| SSH Integrity Key | HMAC | Used for SSH integrity protection. | SDRAM | ‘switchconfig key-zeroize controller’ command or Power cycle |
| SSH ECDSA Private Key | ECDSA | P-256 and P-384 generated by calling the SP 800-90A CTR-DRBG. | SDRAM | ‘switchconfig key-zeroize controller’ command or Power cycle |
| **802.11** | | | | |
| 802.11 Pairwise Transient Key (PTK) | AES-CCM, AES-GCM | The PTK is the 128 or 256 bit 802.11 session key for unicast communications. This key is generated in the WLAN controller (outside the cryptographic boundary) and is transported into the module encrypted by DTLS Encryption Key. | SDRAM (plain text) | ‘switchconfig key-zeroize controller’ command or Power cycle |
| 802.11 Group Temporal Key (GTK) | AES-CCM, AES-GCM | The GTK is the 128 or 256 bit 802.11 session key for broadcast communications. This key is generated in the WLAN controller (outside the cryptographic boundary) and is transported into the module encrypted by DTLS Encryption Key. | SDRAM (plain text) | ‘switchconfig key-zeroize controller’ command or Power cycle |
| 802.11 Key Confirmation Key (KCK) | HMAC-SHA1, HMAC-SHA256, HMAC-SHA384 | The KCK is used to provide data origin authenticity in the 4-Way Handshake and Group Key Handshake messages. This key is generated in the WLAN controller (outside the cryptographic boundary) and is transported into the module encrypted by DTLS Encryption Key. | SDRAM (plain text) | ‘switchconfig key-zeroize controller’ command or Power cycle |
| 802.11 Key Encryption Key (KEK) | AES Key Wrap | 128 or 256 bit AES KEK. The KEK is used by the EAPOL-Key frames to provide confidentiality in the 4- | SDRAM (plain text) | ‘switchconfig key-zeroize controller’ command or Power cycle |

| Key/CSP Name | Algorithm | Description | Storage | Zeroization |
|---|---|---|---|---|
| | | Way Handshake and Group Key Handshake messages. This key is generated in the WLAN controller (outside the cryptographic boundary) and is transported into the module encrypted by DTLS Encryption Key. | | |
| 802.11 Pairwise Transient Key (PTK) | AES-CCM, AES-GCM | The CCKM PTK is 128 or 256 bit session key for unicast communications This key is generated outside the cryptographic boundary and is transported into the module encrypted by DTLS Encryption Key. | SDRAM (plain text) | ‘switchconfig key-zeroize controller’ command or Power cycle |

**Cryptographic Keys and CSPs**

Note: The KDF infrastructure used in DTLS was tested against the SP 800-135 TLS KDF requirements and was certified by CVL Cert. #1115.

## 2.8 Self-Tests

The modules include an array of self-tests that are run during startup and periodically during operations to prevent any secure data from being released and to insure all components are functioning correctly.

- Firmware Integrity Test (u-boot) RSA 2048 with SHA-512
- Cisco FOM algorithm implementation
  - AES encryption KAT
  - AES decryption KAT
  - SHA-1 KAT
  - SHA-224 KAT
  - SHA-256 KAT
  - SHA-384 KAT
  - SHA-512 KAT
  - HMAC SHA-1 KAT
  - HMAC SHA-224 KAT
  - HMAC SHA-256 KAT
  - HMAC SHA-384 KAT
  - HMAC SHA-512 KAT
  - ECDSA KAT

    - ECDH KAT
    - RSA sign and verify KATs
    - SP 800-90A DRBG KAT
    - SP 800-90A Section 11 Health Tests
- Cisco Aironet 3800 GCM SW Crypto
    - AES GCM KAT
- Cisco Aironet 3800 88W8964C
    - AES KAT
    - AES CCM KAT
    - AES GCM KAT
- Cisco Aironet 3800 88F6920
    - AES KAT
    - SHA-1 KAT
    - SHA-256 KAT
    - HMAC SHA-1 KAT
    - HMAC SHA-256 KAT

The access points perform all power-on self-tests automatically at boot. All power-on self-tests must be passed before a User/Crypto Officer can perform services. The power-on self-tests are performed after the cryptographic systems are initialized but prior to the initialization of the LAN's interfaces; this prevents the AP's from passing any data during a power-on self-test failure.

Conditional Tests performed:

- Continuous Random Number Generator Test to FIPS-approved DRBG
- Continuous Random Number Generator Test to NDRNG (output from embedded ACT2Lite entropy source module validation certificate #2125)
- ECDSA pairwise consistency test
- RSA pairwise consistency test

## 3 Secure Operation of the Cisco Aironet Access Points

This section details the steps used to securely configure the modules. The administrator configures the modules from the wireless LAN controller with which the access point is associated. The wireless LAN controller shall be placed in FIPS 140-2 mode of operation prior to secure configuration of the access points.

The Cisco Wireless LAN controller Security Policy contains instructions for configuring the controller to operate in the FIPS 140-2 approved mode of operation. Crypto Officer Guidance - System Initialization

The Cisco Aironet Access Points series security appliances were validated with firmware version 8.3. This is the only allowable image for use in FIPS. Configuring the module without maintaining the following settings will make the module be non-operational (Hard Error).

The Crypto Officer must configure and enforce the following initialization steps:

1. Configure CCKM (Cisco Centralized Key Management)

    a. CCKM is Cisco's wireless key management permitted by this security policy. It uses the same cipher suite as 802.11. The following controller CLI command configures CCKM on a given WLAN:

    ```
    > config wlan security wpa akm cckm enable index
    ```

    Refer to the Cisco Wireless LAN Controller Configuration Guide for additional instructions.

2. Connect AP to a controller

    a. Establish an Ethernet connection between the AP Cryptographic Module and a LAN controller configured for the FIPS 140-2 approved mode of operation.

3. Set Primary Controller

    a. Enter the following controller CLI command from a wireless LAN controller with which the access point is associated to configure the access point to communicate with trusted wireless LAN controllers:

    ```
      > config ap primary-base controller-name access-point
    ```

    Enter this command once for each trusted controller. Enter **show ap** summary to find the access point name. Enter **show sysinfo** to find the name of a controller.

4. Save and Reboot

    a. After executing the above commands, you must save the configuration and reboot the wireless LAN controller:

    ```
    > save config
    > reset system
    ```