# Configure and Verify Wi-Fi 6E WLAN Layer 2 Security

## Contents



## Introduction

This document describes how to configure Wi-Fi 6E WLAN Layer 2 security and what to expect on different clients.

## Prerequisites

### Requirements

Cisco recommends that you have knowledge of these topics:

- Cisco Wireless Lan Controllers (WLC) 9800
- Cisco Access Points (APs) that support Wi-Fi 6E.

- IEEE Standard 802.11ax.
- Tools: Wireshark v4.0.6

### Components Used

The information in this document is based on these software and hardware versions:

- WLC 9800-CL with IOS® XE 17.9.3.
- APs C9136, CW9162, CW9164 and CW9166.
- Wi-Fi 6E Clients:
  - Lenovo X1 Carbon Gen11 with Intel AX211 Wi-Fi 6 and 6E Adapter with driver version 22.200.2(1).
  - Netgear A8000 Wi-Fi 6 and 6E Adapter with driver v1(0.0.108);
  - Mobile Phone Pixel 6a with Android 13;
  - Mobile Phone Samsung S23 with Android 13.

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

## Background Information

The key thing to know is that Wi-Fi 6E is not an entirely new standard, but an extension. At its base, Wi-Fi 6E is an extension of the Wi-Fi 6 (802.11ax) wireless standard into the 6-GHz radio-frequency band.

Wi-Fi 6E builds on Wi-Fi 6, which is the latest generation of the Wi-Fi standard, but only Wi-Fi 6E devices and applications can operate in the 6-GHz band.

### Wi-Fi 6E Security

Wi-Fi 6E uplevels security with Wi-Fi Protected Access 3 (WPA3) and Opportunistic Wireless Encryption (OWE) and there is no backward compatibility with Open and WPA2 security.

WPA3 and Enhanced Open Security are now mandatory for Wi-Fi 6E certification and Wi-Fi 6E also requires Protected Management Frame (PMF) in both AP and Clients.

When configuring a 6GHz SSID there are certain security requirements that must be met:

- WPA3 L2 security with OWE, SAE or 802.1x-SHA256
- Protected Management Frame Enabled;
- Any other L2 security method is not allowed, that is, no mixed mode possible.

#### WPA3

WPA3 is designed to improve Wi-Fi security by enabling better authentication over WPA2, providing expanded cryptographic strength and increasing the resiliency of critical networks.

Key features of WPA3 include:

- **Protected Management Frame (PMF)**protects unicast and broadcast management frames and encrypts unicast management frames. This means wireless intrusion detection and wireless intrusion prevention systemsnow have fewer brute-force ways to enforce client policies.
- **Simultaneous Authentication of Equals (SAE)**enables password-based authentication and a key

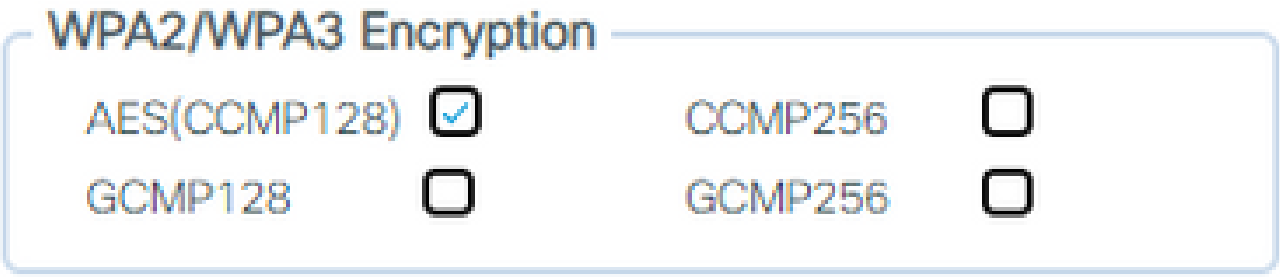
agreement mechanism. This protects against brute-force attacks.

- **Transition mode**is a mixed mode that enables the use of WPA2 to connect clients that do not support WPA3.

WPA3 is about continuous security development and conformance as well as interoperability.
There is no Information Element that designates WPA3 (same as WPA2). WPA3 is defined by AKM/Cipher Suite/PMF combinations.

On the 9800 WLAN configuration, you have 4 different WPA3 encryption algorithms you can use.

They are based on Galois/Counter Mode Protocol (GCMP) and Counter Mode with Cipher Block Chaining  Message Authentication Code Protocol (CCMP): AES (CCMP128), CCMP256, GCMP128 and GCMP256:

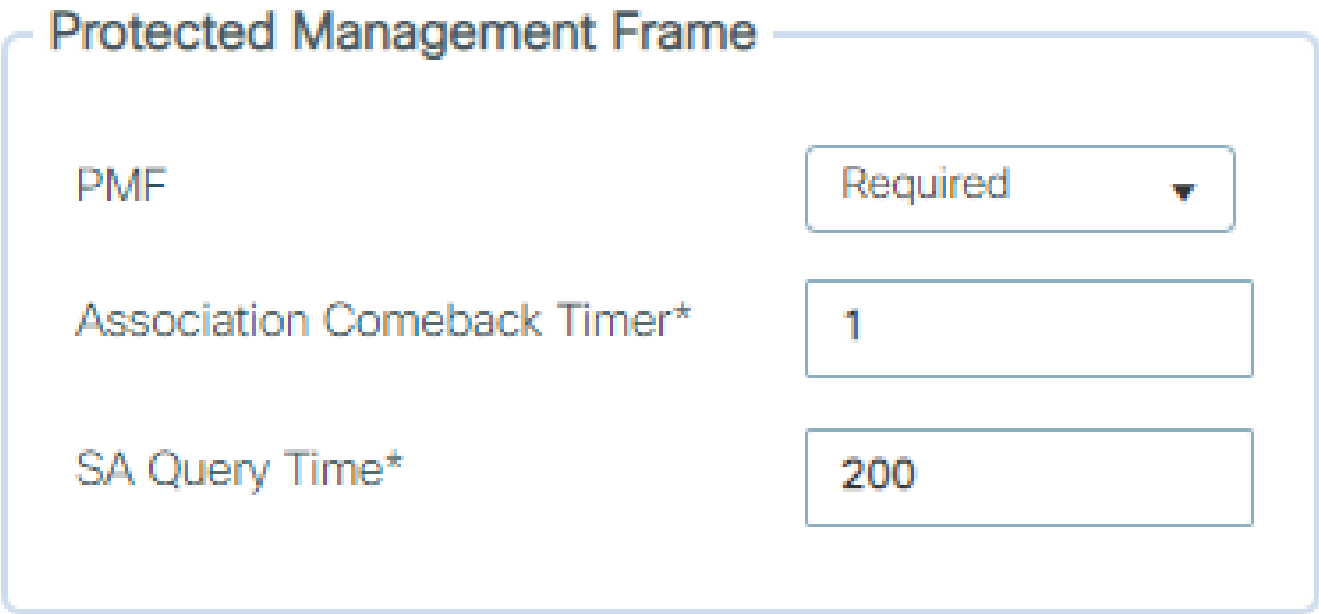



*WPA2/3 Encryption options*

**PMF**

PMF is activated on a WLAN when you enable PMF.

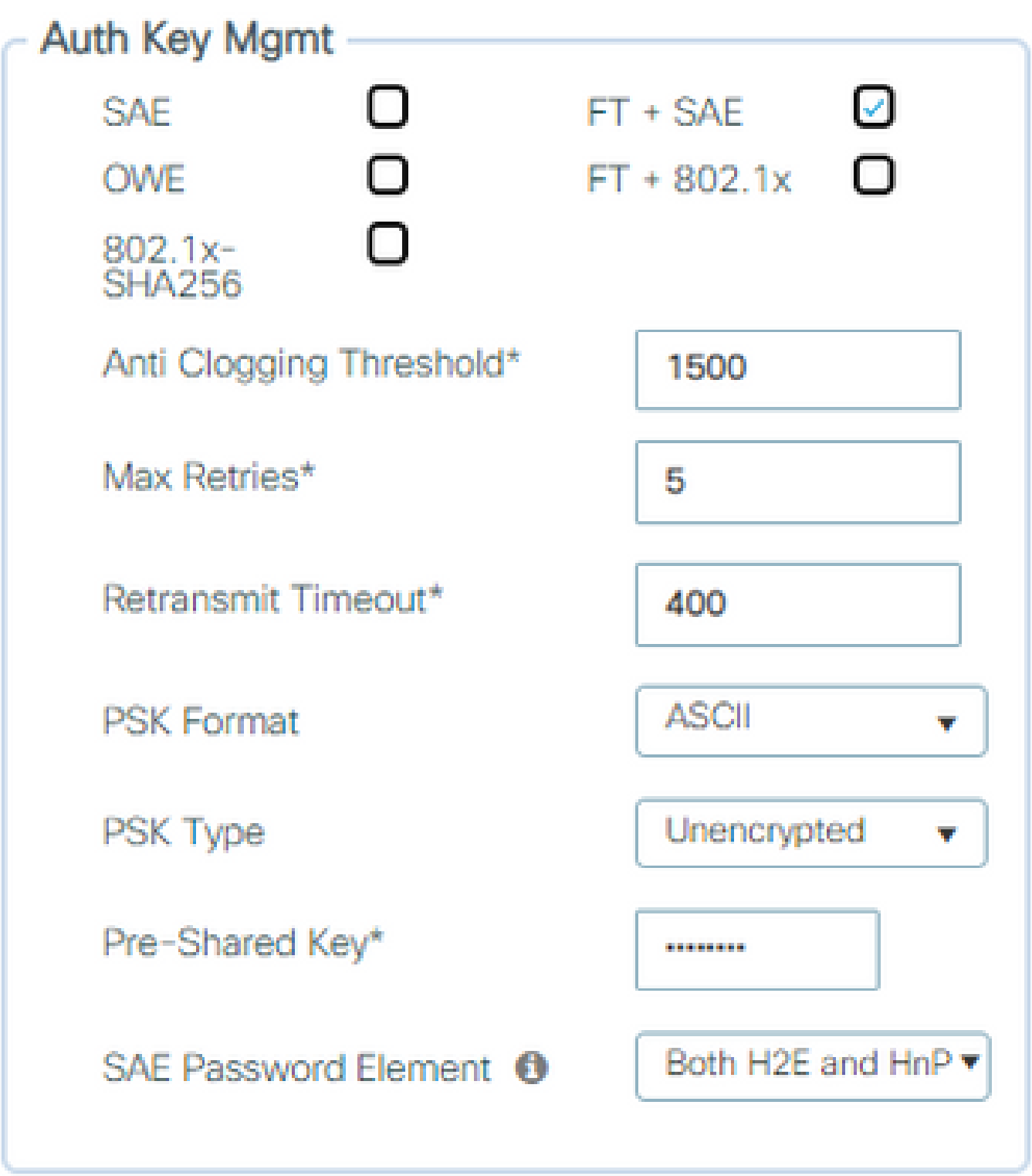
By default, 802.11 management frames are unauthenticated and hence not protected against spoofing. Infrastructure Management Protection Frame (MFP) and 802.11w protected management frames (PMF) provide protection against such attacks.




*PMF Options*

**Authentication Key Management**

These are the AKM options available in the 17.9.x version:

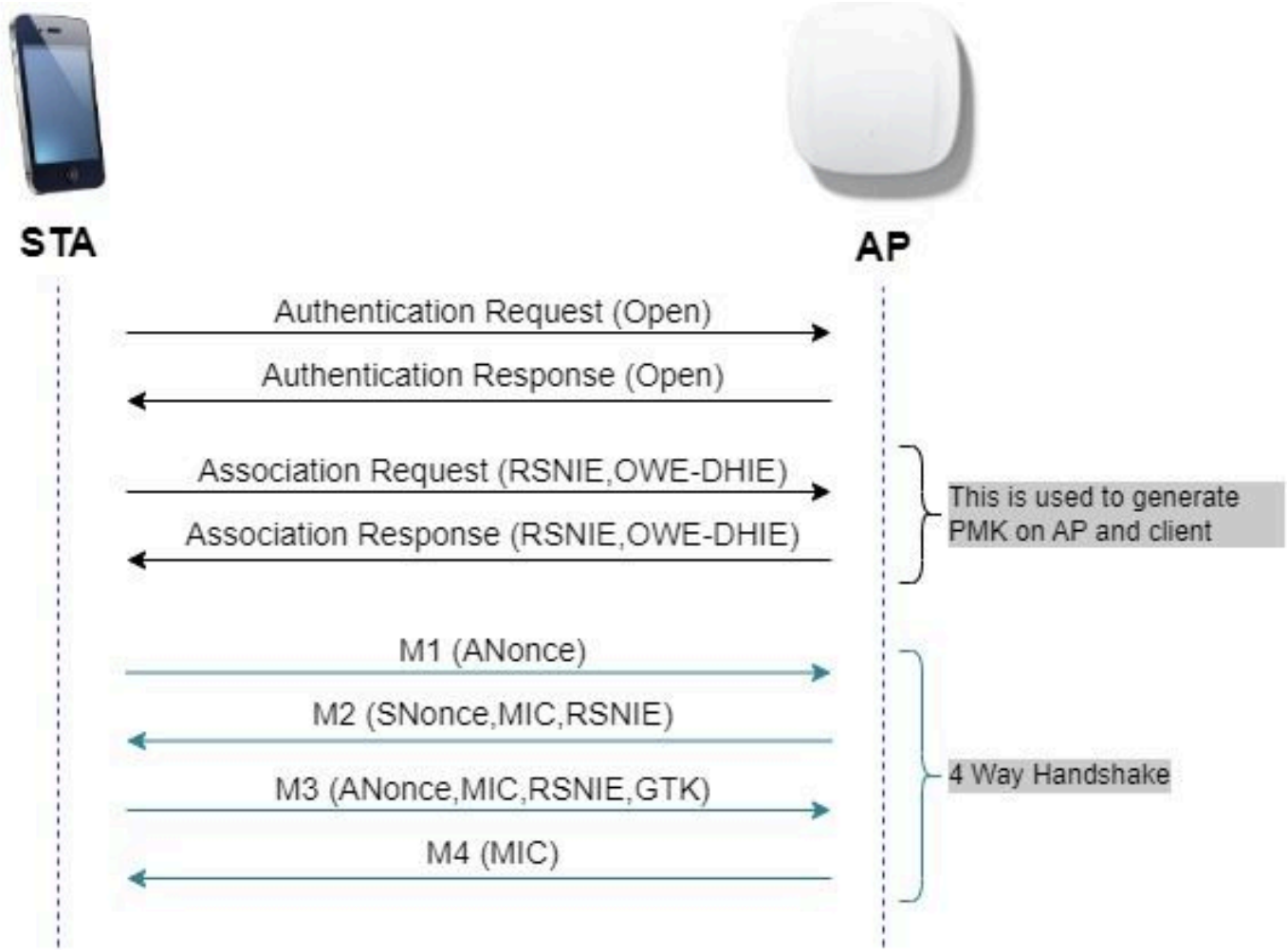



*AKM Options*

**OWE**

Opportunistic Wireless Encryption (OWE) is an extension to IEEE 802.11 that provides encryption of the wireless medium (IETF RFC 8110). The purpose of OWE based authentication is avoid open unsecured wireless connectivity between the AP's and clients. The OWE uses the Diffie-Hellman algorithms based

Cryptography to setup the wireless encryption. With OWE, the client and AP perform a Diffie-Hellman key exchange during the access procedure and use the resulting pairwise master key (PMK) secret with the 4-way handshake. The use of OWE enhances wireless network security for deployments where Open or shared PSK based networks are deployed.




*OWE frame exchange*

**SAE**

WPA3 use a new authentication and key management mechanism called Simultaneous Authentication of Equals. This mechanism is further enhanced through the use of SAE Hash-to-Element (H2E).

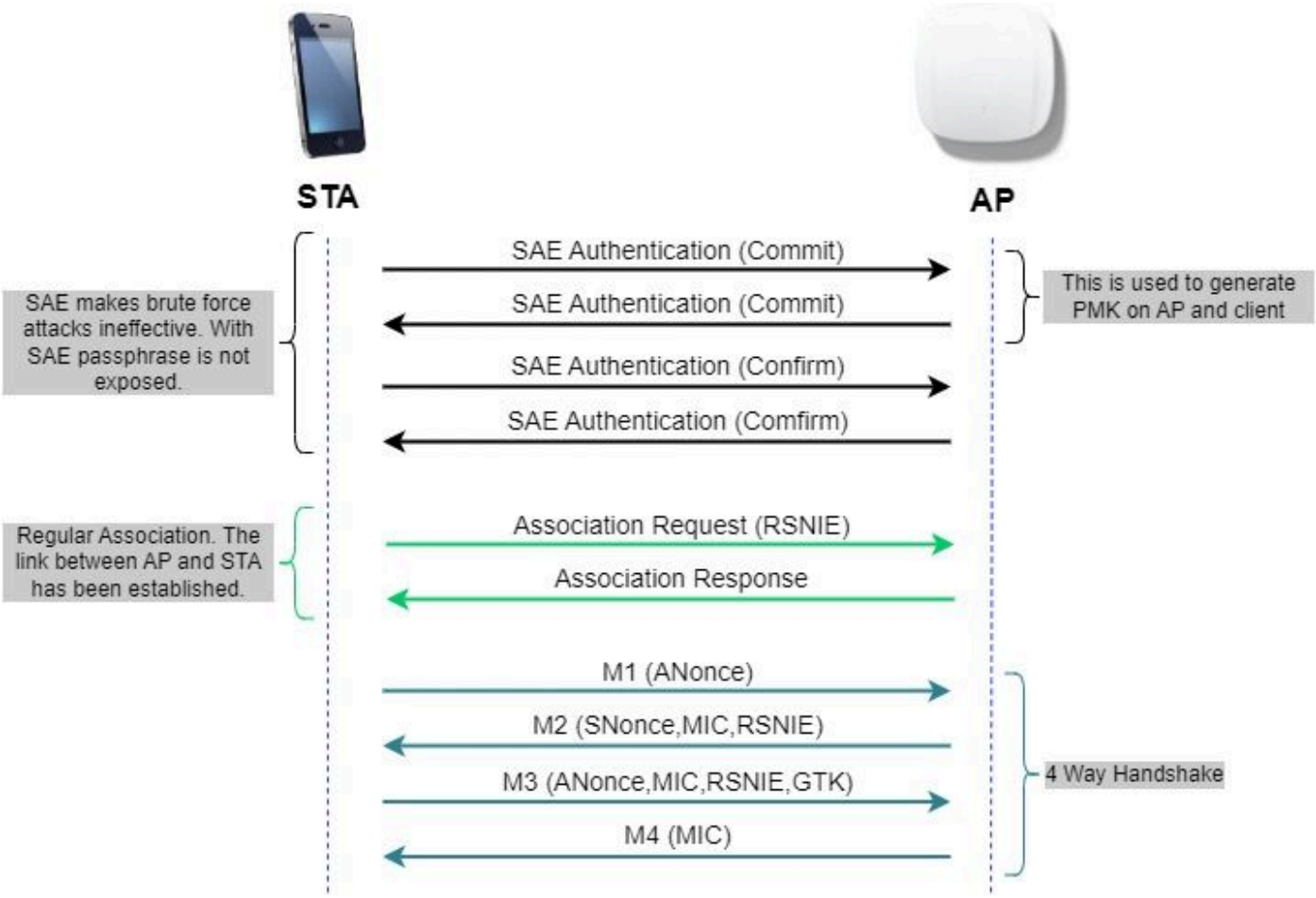
SAE with H2E is mandatory for WPA3 and Wi-Fi 6E.

SAE employs a discrete logarithm cryptography to perform an efficient exchange in a way that performs mutual authentication using a password that is probably resistant to an offline dictionary attack.

An offline dictionary attack is where an adversary attempts to determine a network password by trying possible passwords without further network interaction.

When the client connects to the access point, they perform an SAE exchange. If successful, they create each a cryptographically strong key, from which the session key is derived. Basically a client and access point goes into phases of commit and then confirm.

Once there is a commitment, the client and access point can then go into the confirm states each time there is a session key to be generated. The method uses forward secrecy, where an intruder could crack a single key, but not all of the other keys.




*SAE frame exchange*

**Hash-to-Element (H2E)**

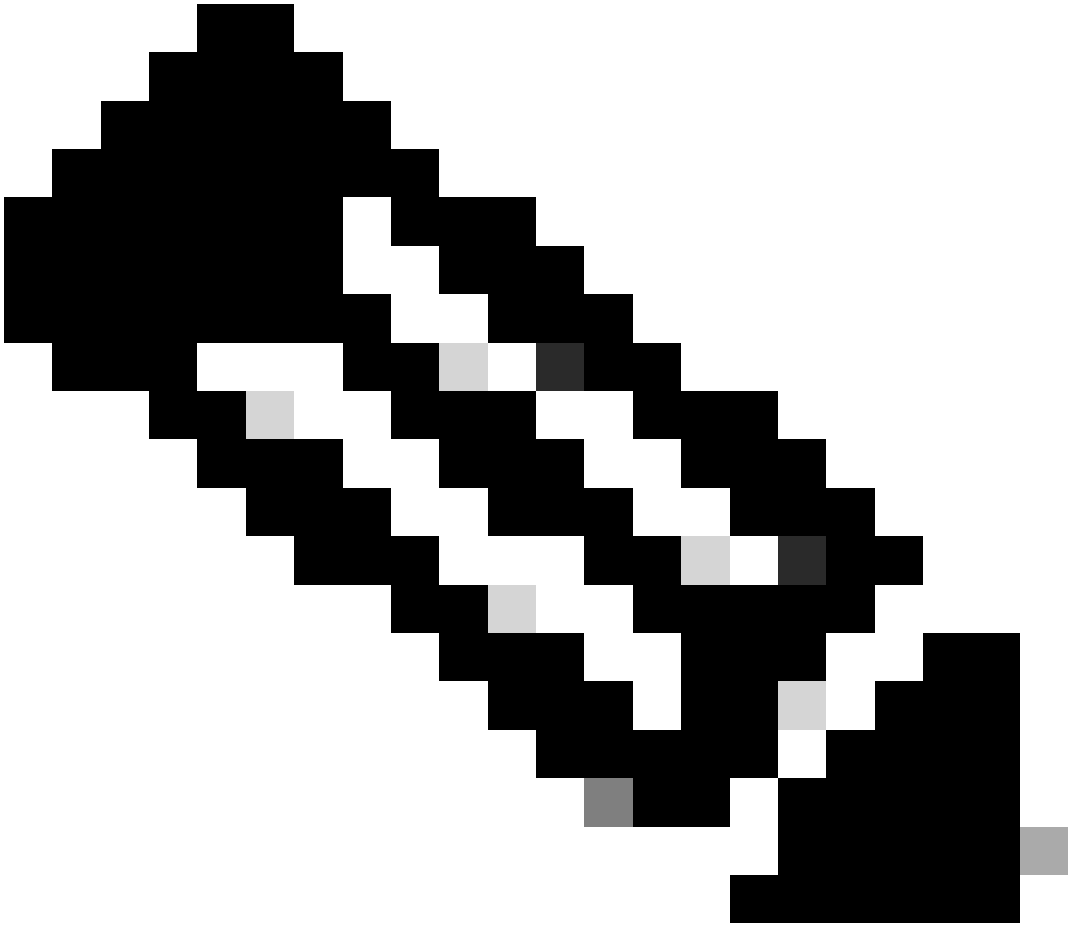
Hash-to-Element (H2E) is a new SAE Password Element (PWE) method. In this method, the secret PWE used in the SAE protocol is generated from a password.

When a station (STA) that supports H2E initiates SAE with an AP, it checks whether AP supports H2E. If yes, the AP uses the H2E to derive the PWE by using a newly defined Status Code value in the SAE Commit message.

If STA uses Hunting-and-Pecking (HnP), the entire SAE exchange remains unchanged.

While using the H2E, the PWE derivation is divided into these components:

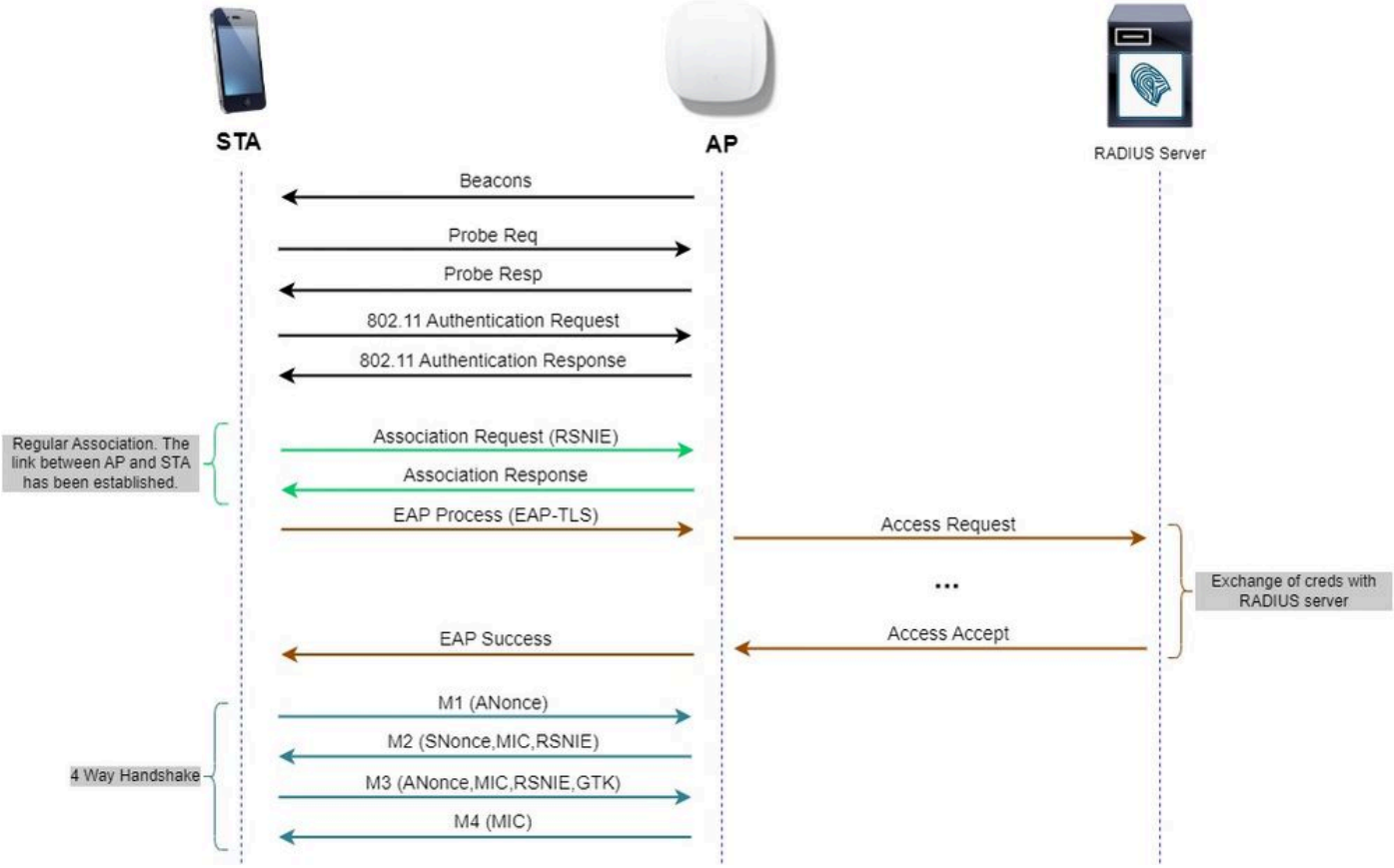
- Derivation of a secret intermediary element (PT) from the password. This can be performed offline when the password is initially configured on the device for each supported group.
- Derivation of the PWE from the stored PT. This depends on the negotiated group and MAC addresses of peers. This is performed in real-time during the SAE exchange.



**Note**: 6-GHz supports only Hash-to-Element SAE PWE method.

### WPA-Enterprise aka 802.1x

WPA3-Enterprise is the most secure version of WPA3 and uses a username plus password combination with 802.1X for user authentication with a RADIUS server. By default, WPA3 uses 128-bit encryption, but it also introduces an optionally configurable 192-bit cryptographic strength encryption, which gives additional protection to any network transmitting sensitive data.




*WPA3 Enterprise diagram flow*

**Level Set: WPA3 Modes**

- WPA3-Personal
  - WPA3-Personal only mode
    - PMF Required
  - WPA3-Personal Transition mode
    - Configuration rules: On an AP, whenever WPA2-Personal is enabled, the WPA3-Personal Transition mode must also be enabled by default, unless explicitly overridden by the administrator to operate in WPA2-Personal only mode

- WPA3-Enterprise
  - WPA3-Enterprise only mode
    - PMF shall be negotiated for all WPA3 connections
  - WPA3-Enterprise Transition mode
    - PMF shall be negotiated for a WPA3 connection
    - PMF optional for a WPA2 connection
  - WPA3-Enterprise suite-B “192-bit” mode aligned with Commercial National Security Algorithm (CNSA)
    - More than just for the federal government
    - Consistent cryptographic cipher suites to avoid misconfiguration
    - Addition of GCMP & ECCP for crypto and better hash functions (SHA384)
    - PMF Required

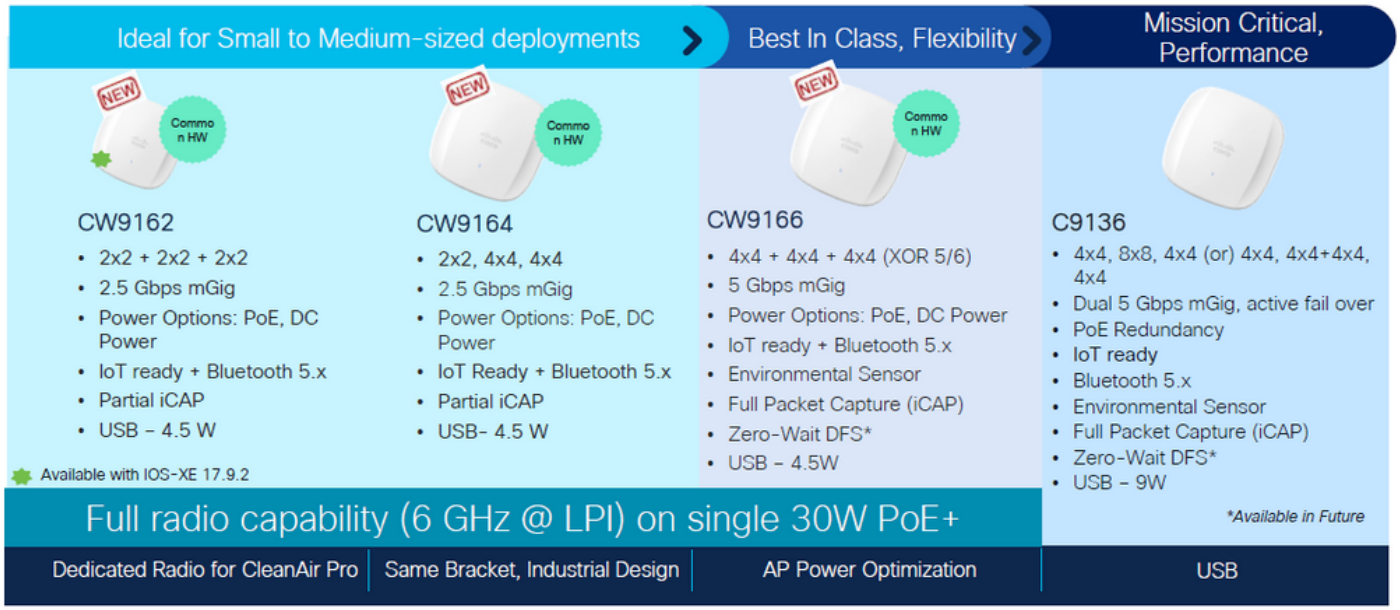
    - WPA3 192-bit security shall be exclusive for EAP-TLS, which shall require certificates on both the supplicant and RADIUS server.

- To use WPA3 192-bit enterprise, the RADIUS servers must use one of the permitted EAP ciphers:

  TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384
  TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384
  TLS_DHE_RSA_WITH_AES_256_GCM_SHA384

To know more about detailed information about WPA3 implementation in Cisco WLANs, including client security compatibility matrix, please feel free to check the [WPA3 Deployment Guide](#).

### Cisco Catalyst Wi-Fi 6E APs




*Wi-Fi 6E Access Points*

### Clients Supported Security Settings

You can find which product support WPA3-Enterprise using WiFi Alliance webpage [product finder](#).

On windows devices you can verify what are the security settings supported by the adapter using the command "netsh wlan show drivers".

Here you can see the output of Intel AX211:

```
C:\Users\tantunes>netsh wlan show drivers

Interface name: Wi-Fi

    Driver                    : Intel(R) Wi-Fi 6E AX211 160MHz
    Vendor                    : Intel Corporation
    Provider                  : Intel
    Date                      : 3/9/2023
    Version                   : 22.200.2.1
    INF file                  : oem151.inf
    Type                      : Native Wi-Fi Driver
    Radio types supported     : 802.11b 802.11g 802.11n 802.11a 802.11ac 802.11ax
    FIPS 140-2 mode supported : Yes
    802.11w Management Frame Protection supported : Yes
    Hosted network supported  : No
    Authentication and cipher supported in infrastructure mode:
                                Open             None
                                Open             WEP-40bit
                                Open             WEP-104bit
                                Open             WEP
                                WPA-Enterprise   TKIP
                                WPA-Enterprise   CCMP
                                WPA-Personal     TKIP
                                WPA-Personal     CCMP
                                WPA2-Enterprise  TKIP
                                WPA2-Enterprise  CCMP
                                WPA2-Personal    TKIP
                                WPA2-Personal    CCMP
                                Open             Vendor defined
                                WPA3-Personal    CCMP
                                Vendor defined   Vendor defined
                                WPA3-Enterprise 192 Bits GCMP-256
                                OWE              CCMP
                                WPA3-Enterprise  CCMP
                                WPA3-Enterprise  TKIP
    Number of supported bands : 3
                                2.4 GHz [ 0 MHz - 0 MHz]
                                5 GHz   [ 0 MHz - 0 MHz]
                                6 GHz   [ 0 MHz - 0 MHz]
    IHV service present       : Yes
    IHV adapter OUI           : [00 00 00], type: [00]
    IHV extensibility DLL path: C:\WINDOWS\System32\DriverStore\FileRepository\netwtw6e.inf_amd64_eda979fbdedea064\IntelIHVRouter12.dll
```

*Windows output of _netsh wlan show driver_ for client AX211*

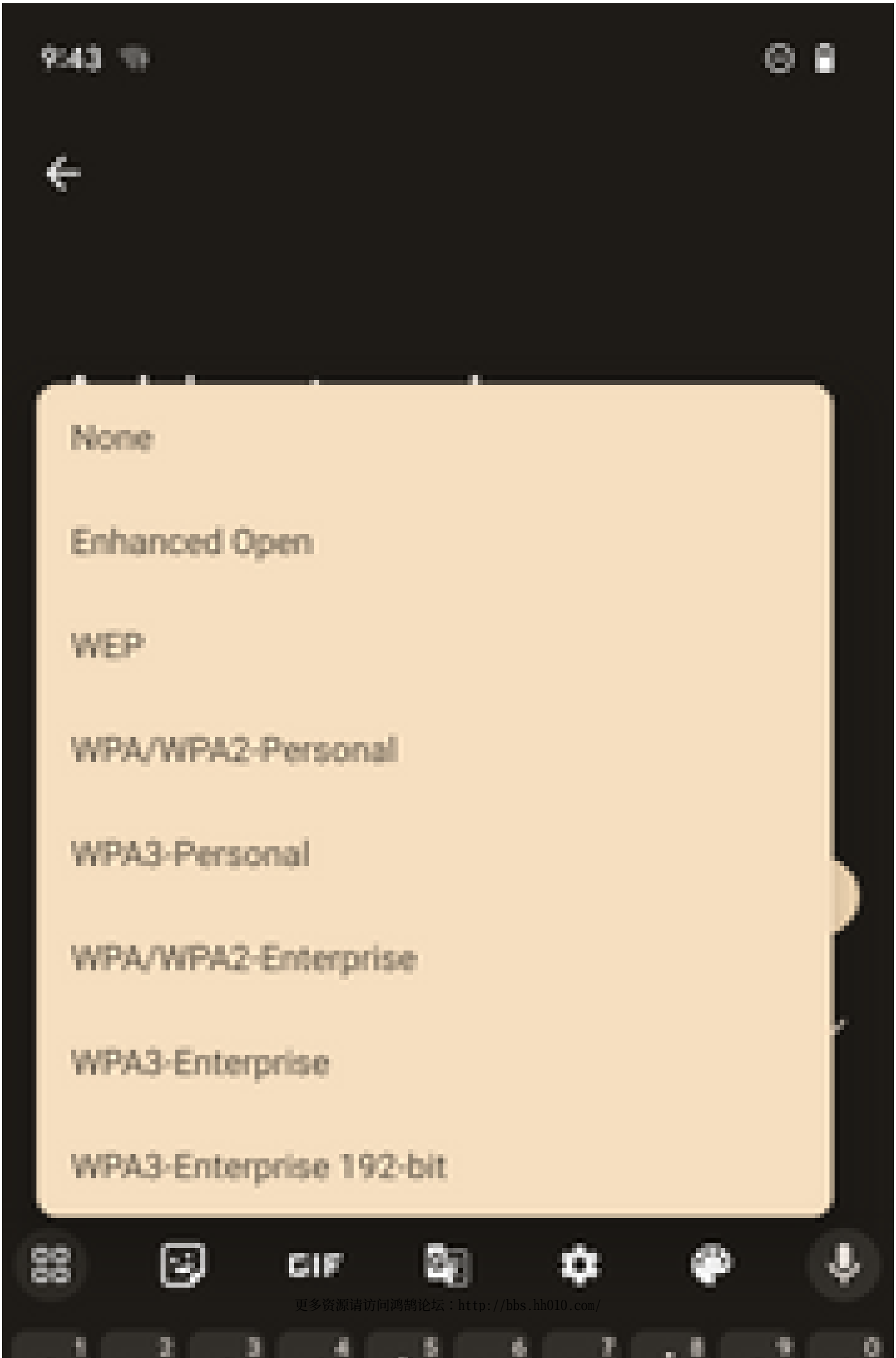
Netgear A8000:

```
Interface name: A8000_NETGEAR

    Driver                    : NETGEAR A8000 WiFi 6 & 6E Adapter
    Vendor                    : NETGEAR Inc.
    Provider                  : MediaTek, Inc.
    Date                      : 11/25/2022
    Version                   : 1.0.0.108
    INF file                  : oem9.inf
    Type                      : Native Wi-Fi Driver
    Radio types supported     : 802.11b 802.11a 802.11g 802.11n 802.11ac 802.11ax
    FIPS 140-2 mode supported : Yes
    802.11w Management Frame Protection supported : Yes
    Hosted network supported  : No
    Authentication and cipher supported in infrastructure mode:
                                Open             None
                                Open             WEP-40bit
                                Open             WEP-104bit
                                Open             WEP
                                WPA-Enterprise   TKIP
                                WPA-Enterprise   CCMP
                                WPA3-Personal    CCMP
                                OWE              CCMP
                                WPA-Personal     TKIP
                                WPA-Personal     CCMP
                                WPA2-Enterprise  TKIP
                                WPA2-Enterprise  CCMP
                                WPA2-Personal    TKIP
                                WPA2-Personal    CCMP
    Number of supported bands : 3
                                2.4 GHz [ 0 MHz - 0 MHz]
                                5 GHz   [ 0 MHz - 0 MHz]
                                6 GHz   [ 0 MHz - 0 MHz]
    IHV service present       : Yes
    IHV adapter OUI           : [00 00 00], type: [00]
    IHV extensibility DLL path: C:\WINDOWS\system32\mtkihvux.dll
    IHV UI extensibility CLSID: {00000000-0000-0000-0000-000000000000}
    IHV diagnostics CLSID     : {00000000-0000-0000-0000-000000000000}
    Wireless Display Supported: Yes (Graphics Driver: Yes, Wi-Fi Driver: Yes)
```

*Windows output of _netsh wlan show driver_ for client Netgear A8000s*

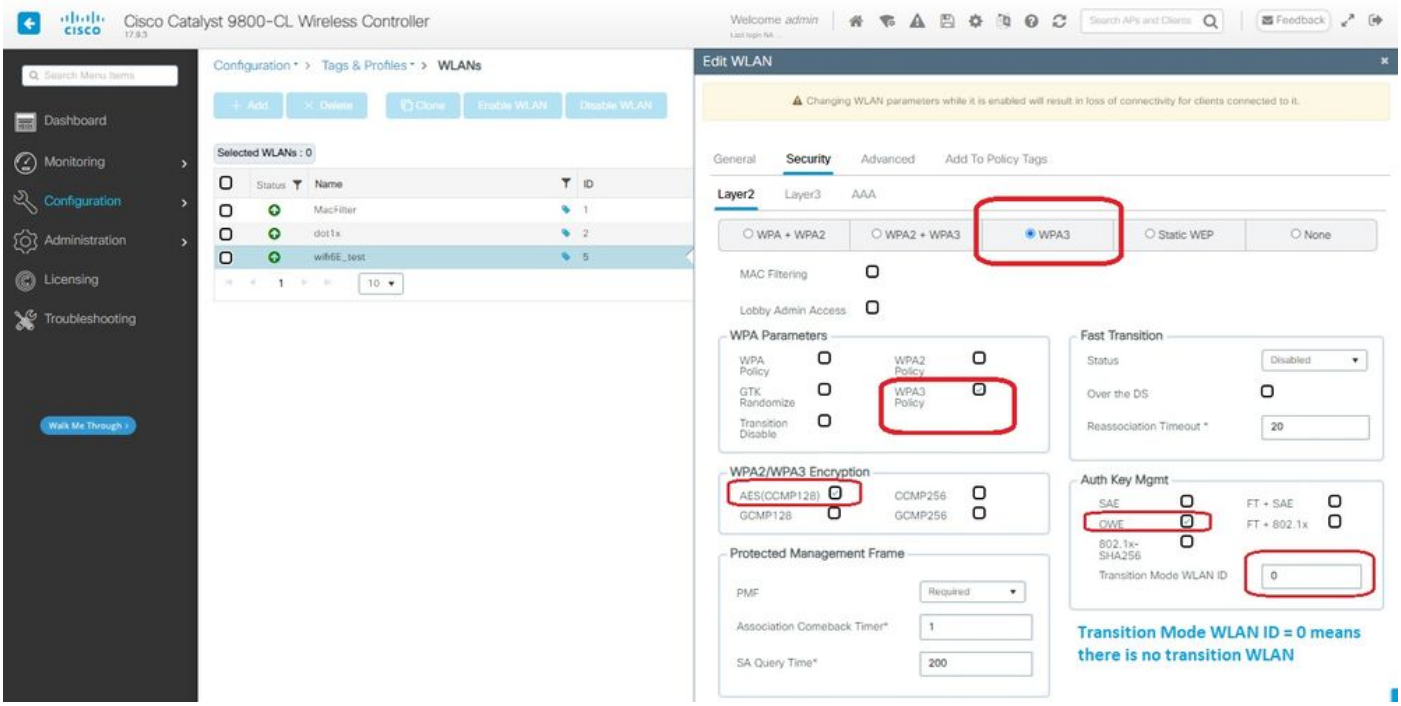
Android Pixel 6a:



: Even though there are no clients supporting GCMP128 cipher + SUITEB-1X as of writting this document, it was tested to observe it being broadcasted and check the RSN info in the beacons.

### WPA3 - AES(CCPM128) + OWE

This is the WLAN Security configuration:




*OWE Security Settings*

View on WLC GUI of the WLAN Security settings:




*WLAN Security settings on WLC GUI*

Here we can observe Wi-Fi 6E clients connection process:

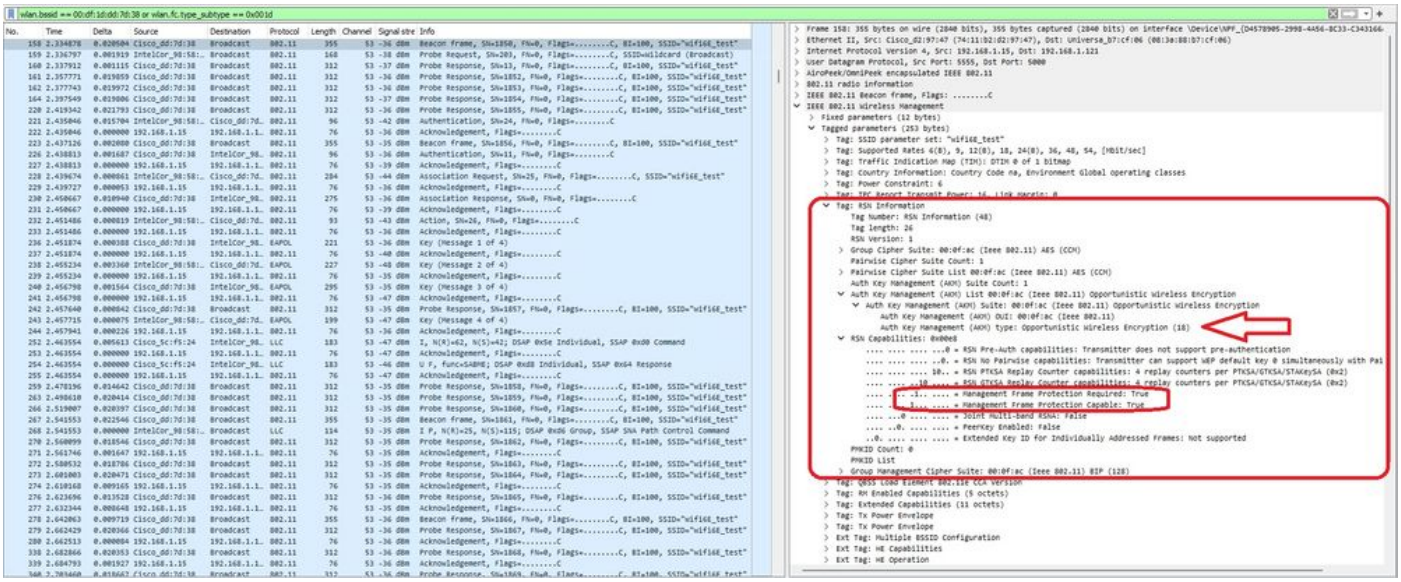
### Intel AX211

Here we show the complete connection process of client Intel AX211.

### OWE Discovery

Here you can see the beacons OTA. The AP advertises support for OWE using AKM suite selector for OWE under RSN information element.

You can see AKM suite type value 18 (**00-0F-AC:18**) that indicates OWE support.



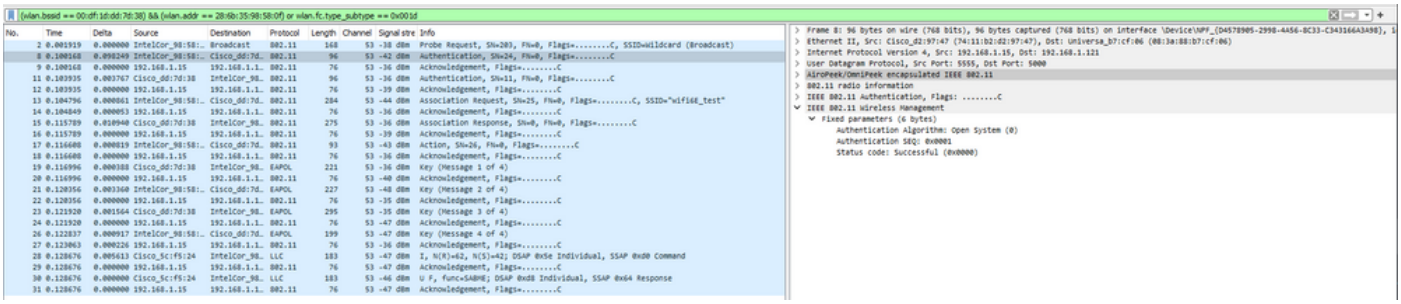
*OWE beacon frame*

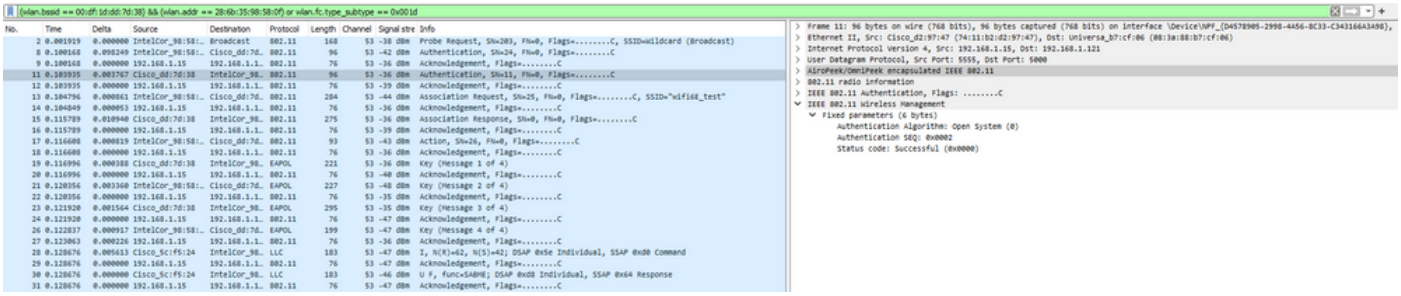
If you look at RSN capabilities field, you can see AP is advertising both Management Frame Protection (MFP) capabilities and MFP required bit set to 1.

## OWE Association

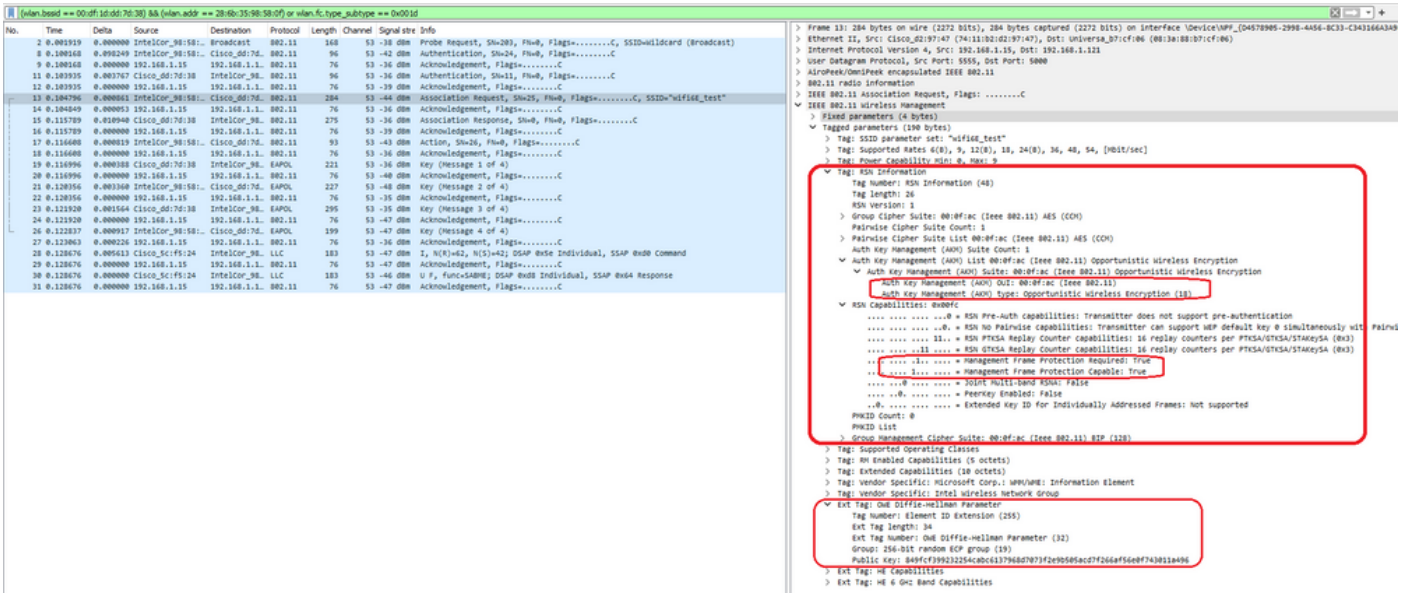
You can see the UPR sent in broadcast mode and then the association itself.

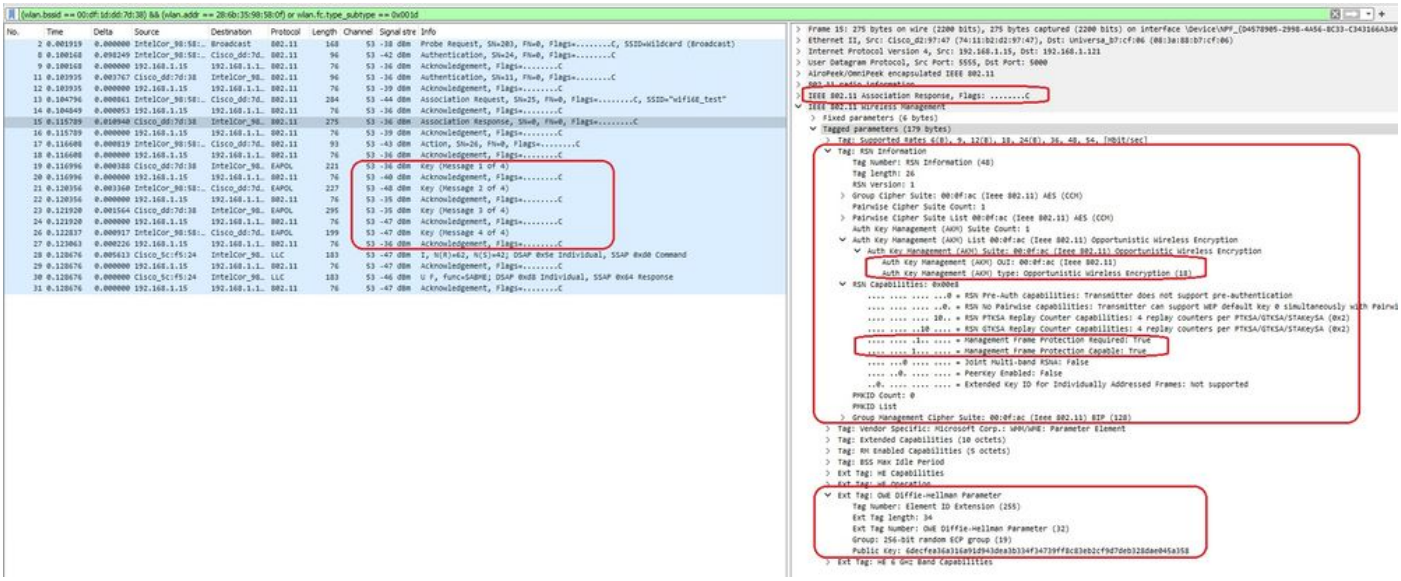
The OWE starts with the OPEN authentication request and response:





Then, a client that wants to do OWE must indicate OWE AKM in the RSN IE of Association Request frame and include Diffie Helman (DH) parameter element:

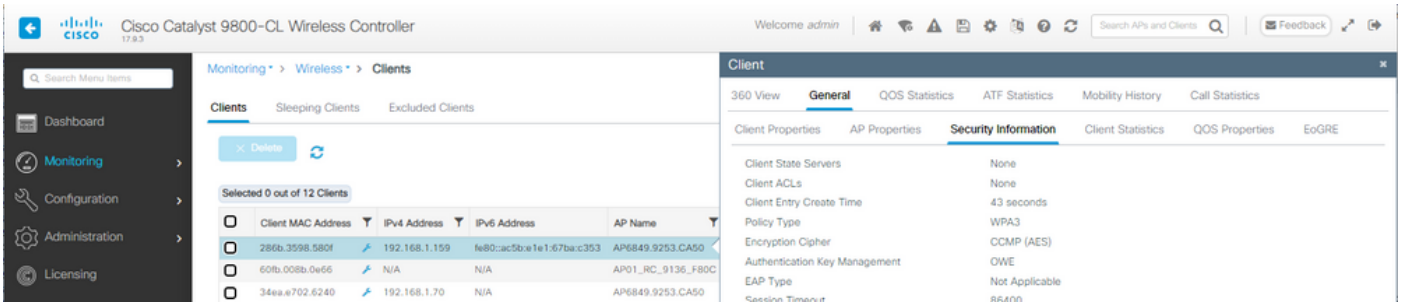




*OWE Association response*

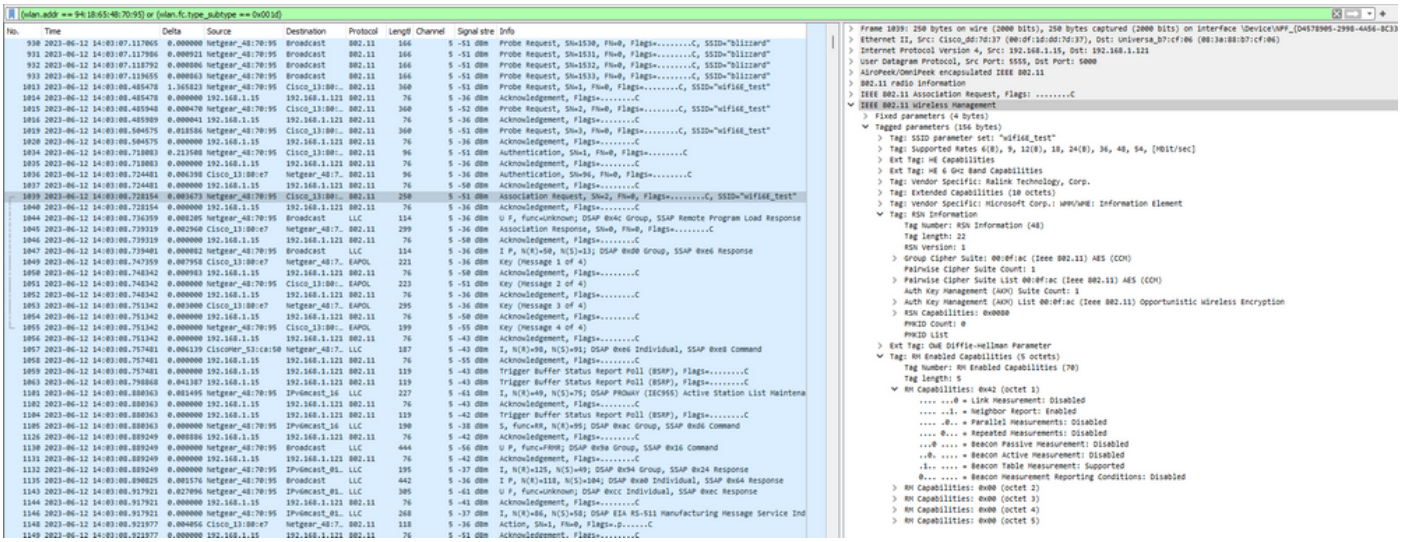
After the association response we can see the 4-way handshake and client moves to connected state.

Here you can see the client details on the WLC GUI:

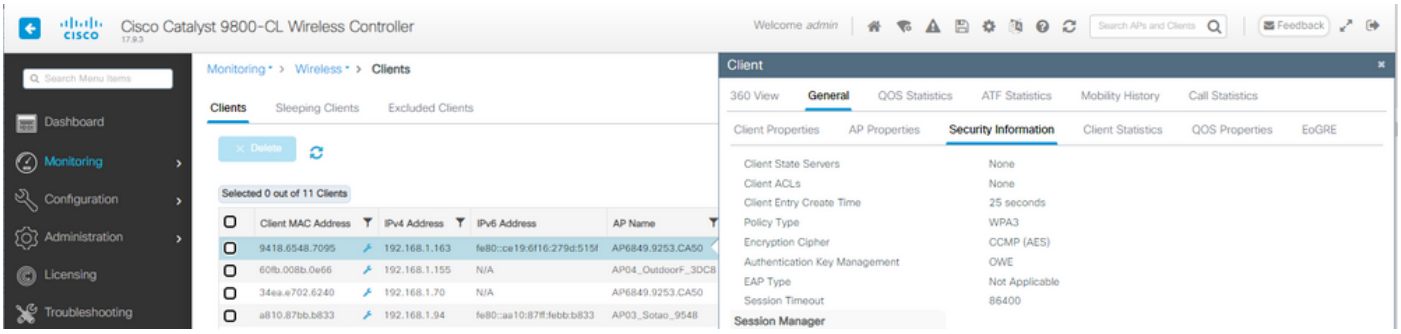



## NetGear A8000

Connection OTA with focus on the RSN information from client:

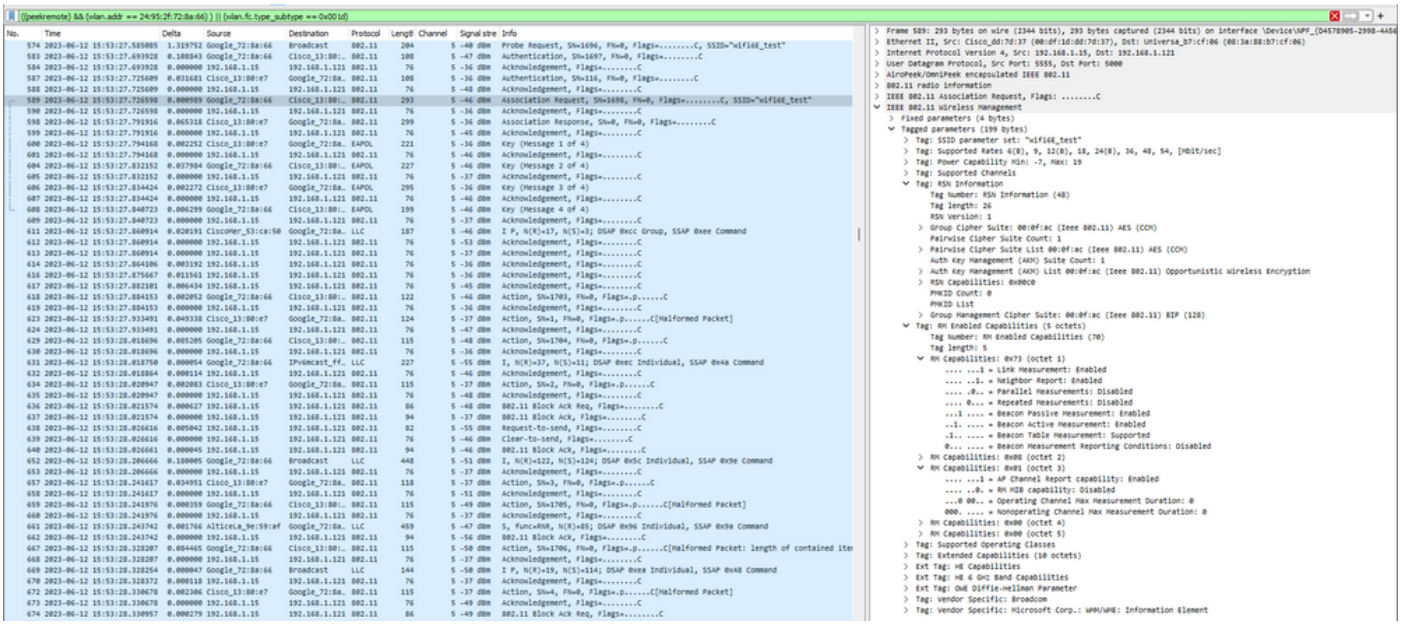


Client details in WLC:

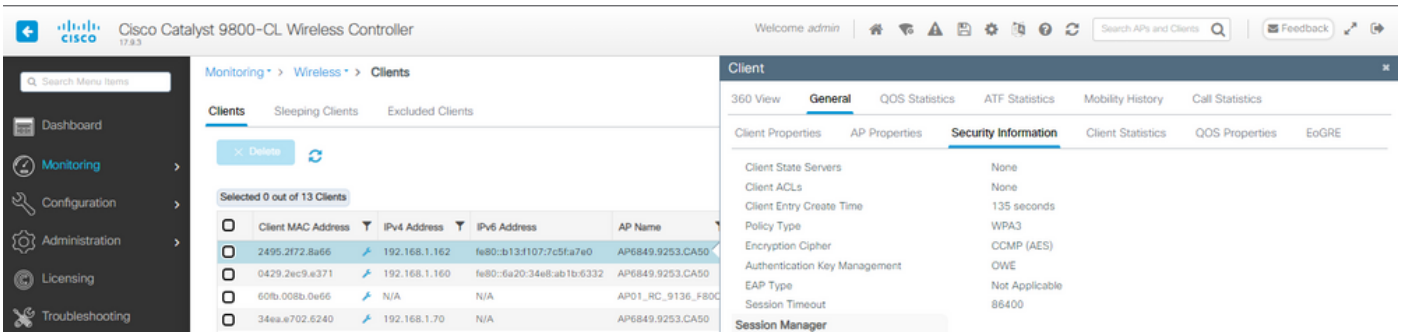



## Pixel 6a

Connection OTA with focus on the RSN information from client:

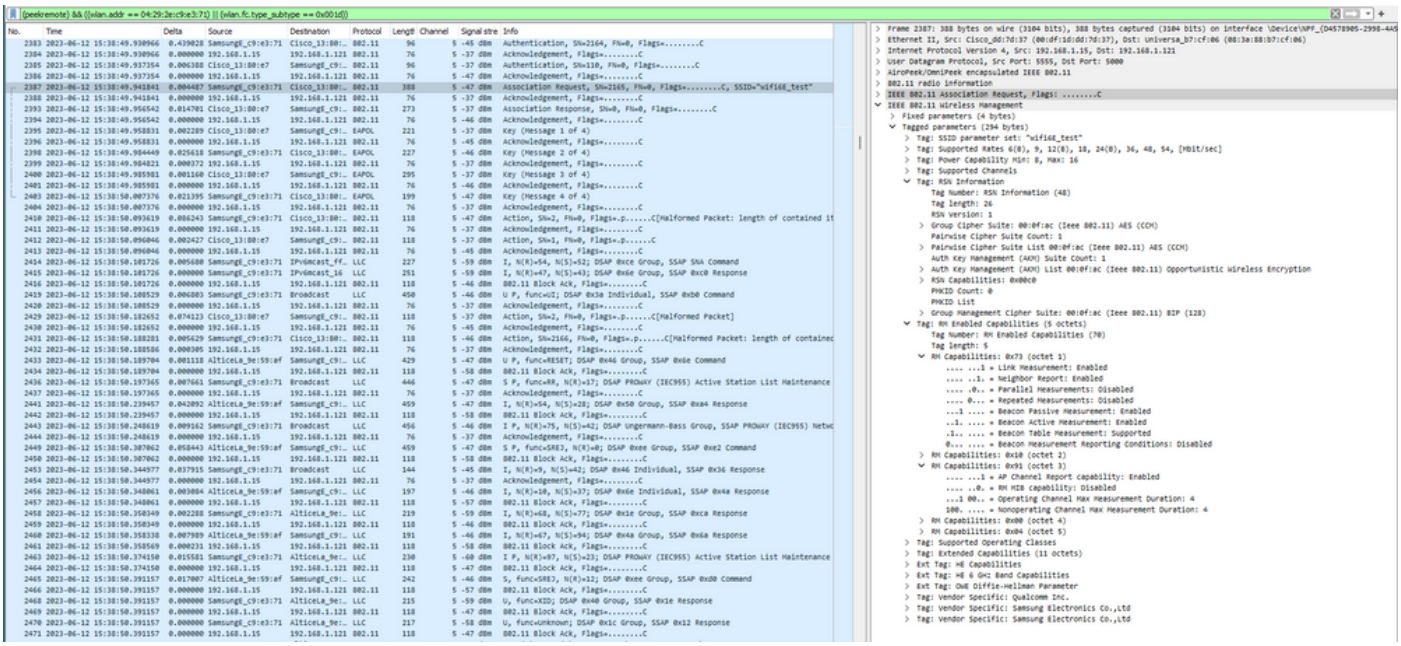


Client details in WLC:

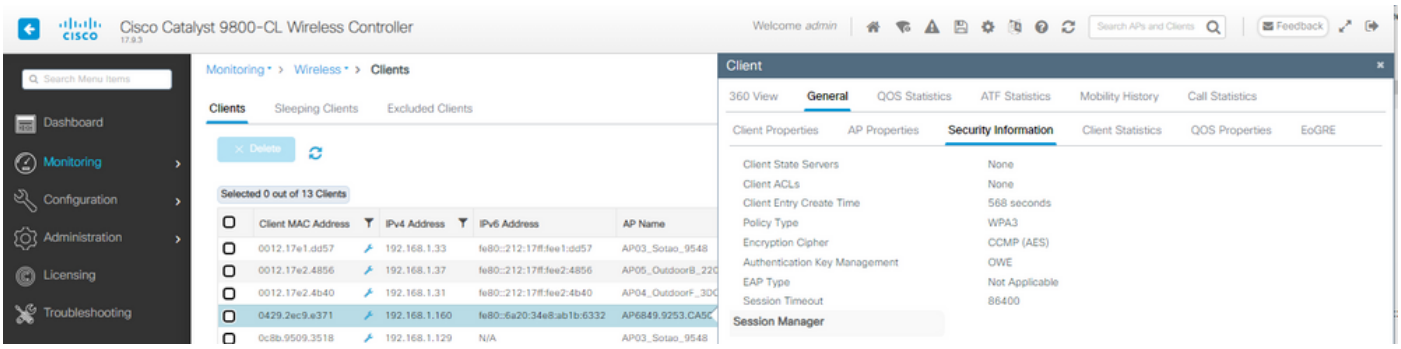



## Samsung S23

Connection OTA with focus on the RSN information from client:



Client details in WLC:

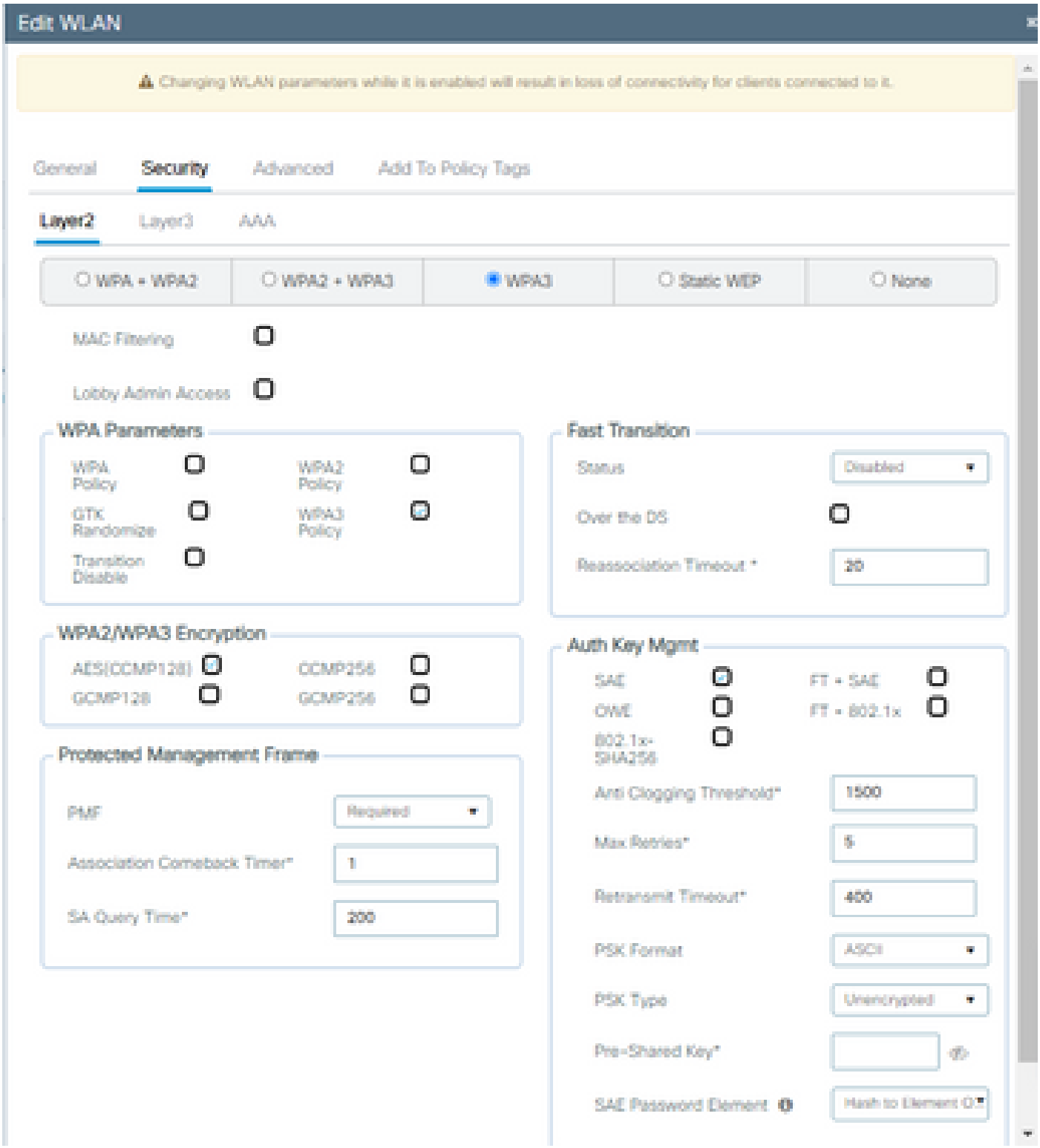



## WPA3 - AES(CCPM128) + OWE with Transition Mode

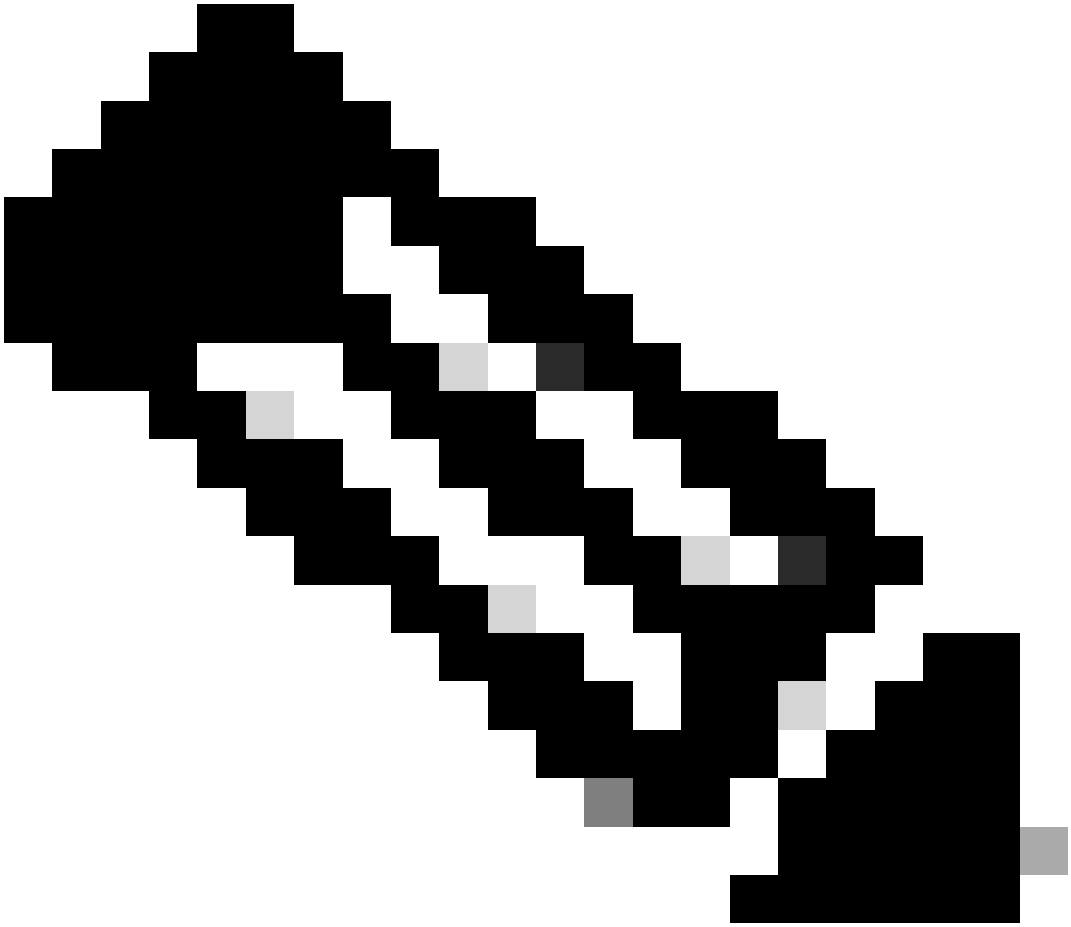
Detailed configuration and troubleshooting of OWE Transition Mode available in this document: [Configure Enhanced Open SSID with Transition Mode - OWE](#).

## WPA3-Personal - AES(CCMP128) + SAE

WLAN Security configuration:



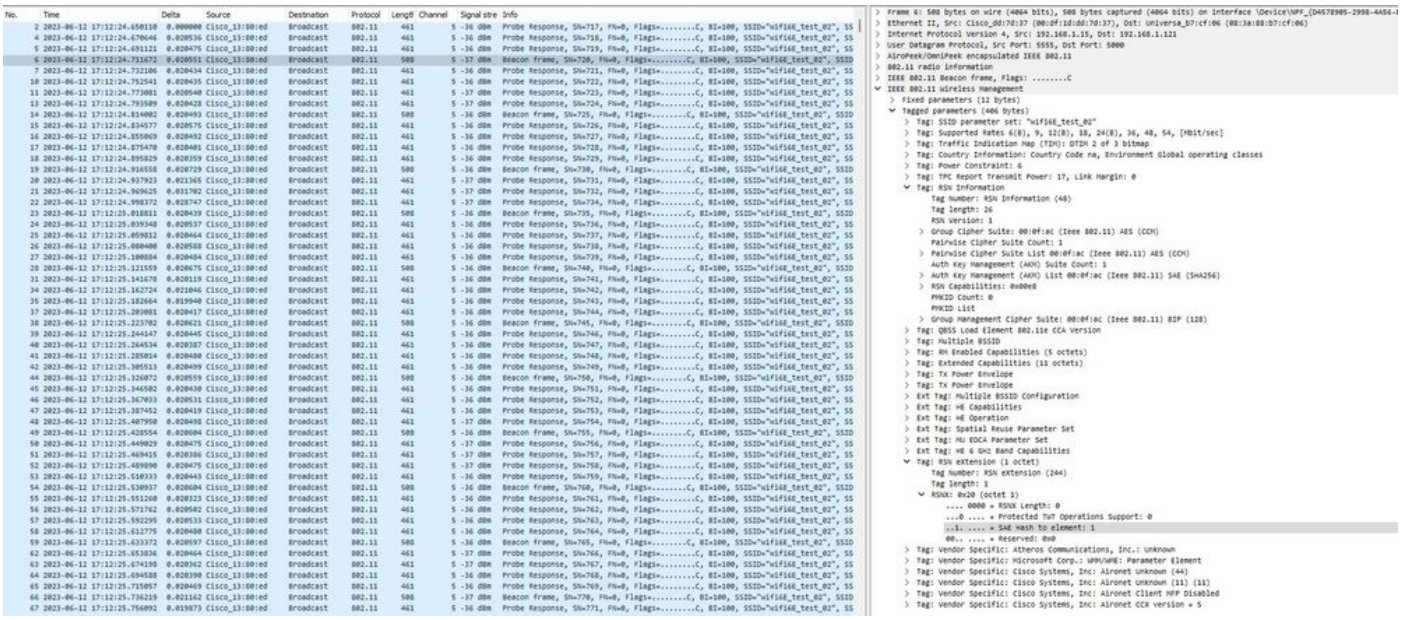

*WPA3 SAE Configuration*



**Note**: Keep in mind that Hunting and Pecking is not allowed with 6 GHz radio policy. When you configure a 6GHz only WLAN, you must select H2E SAE Password Element.

View on WLC GUI of the WLAN Security settings:


Verification of beacons OTA:

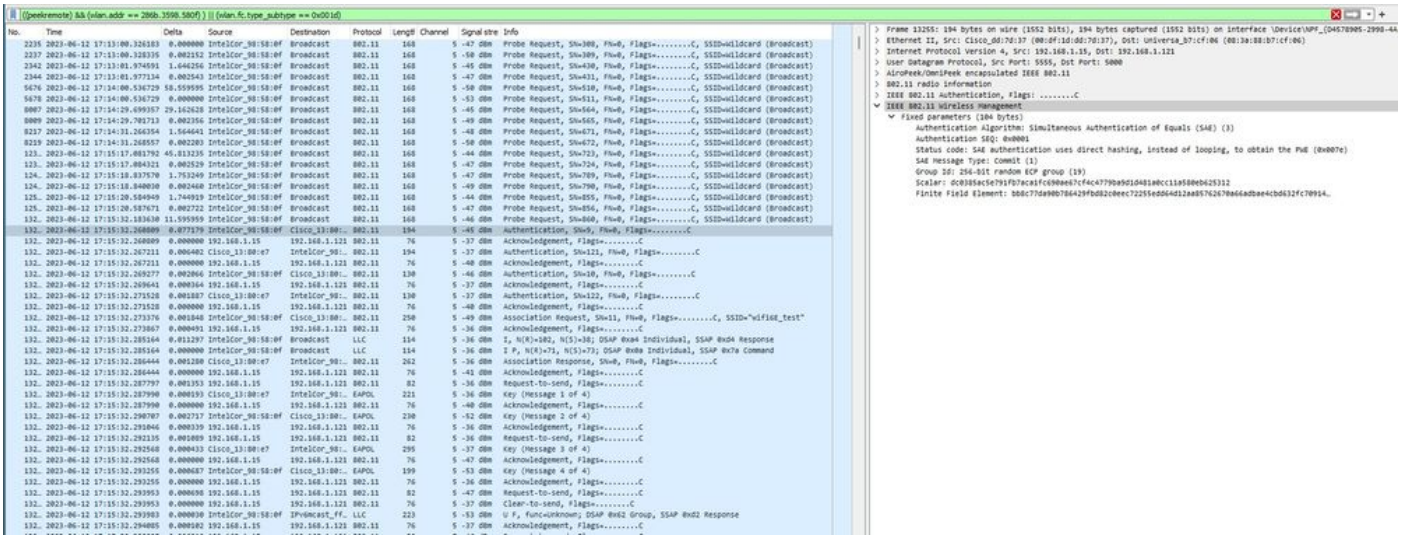


*WPA3 SAE Beacons*

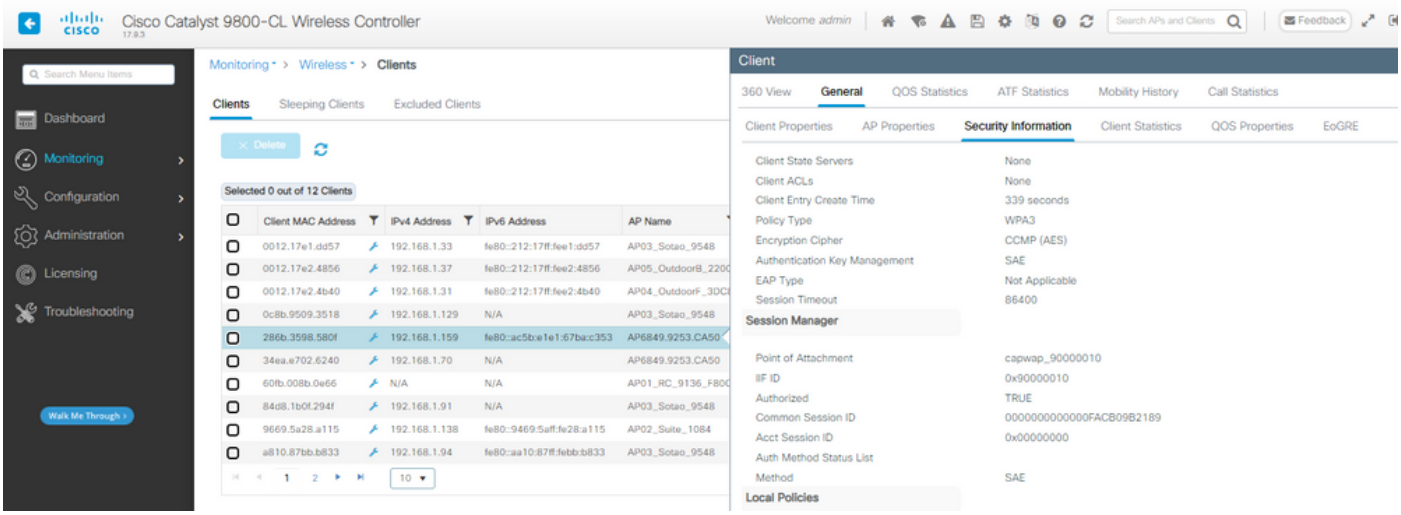
Here we can observe Wi-Fi 6E clients associating:

**Intel AX211**

Connection OTA with focus on the RSN information from client:

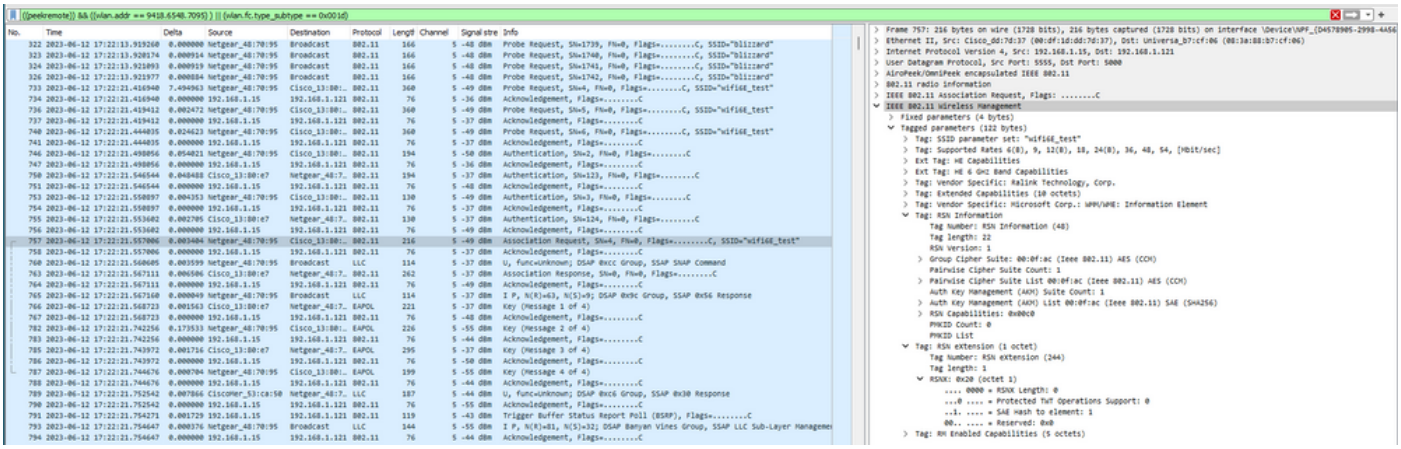


Client details in WLC:

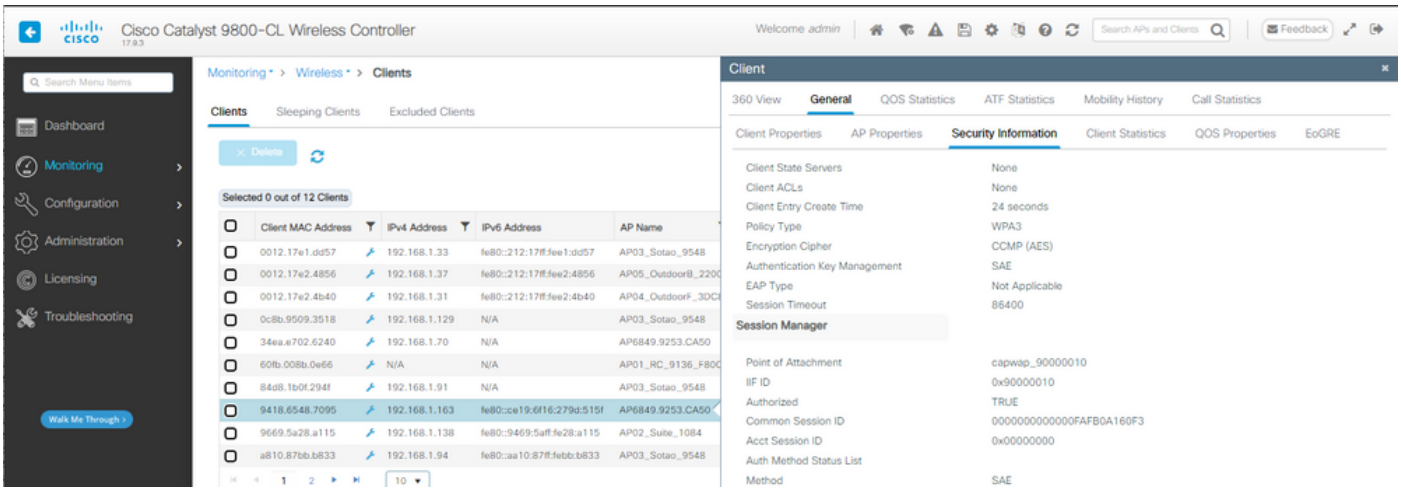



## NetGear A8000

Connection OTA with focus on the RSN information from client:

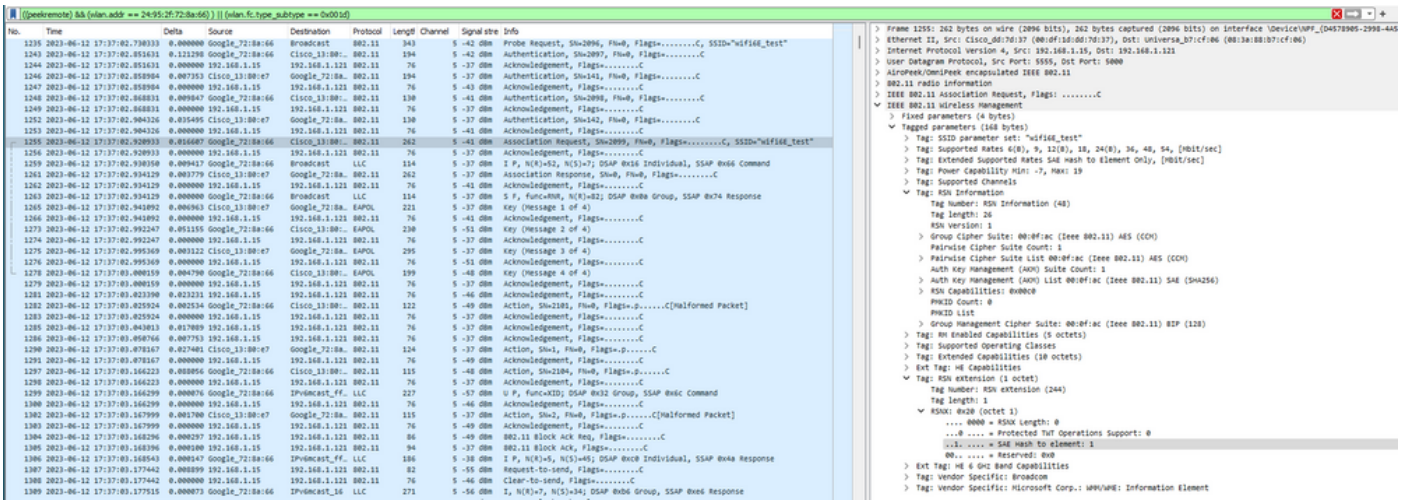


Client details in WLC:

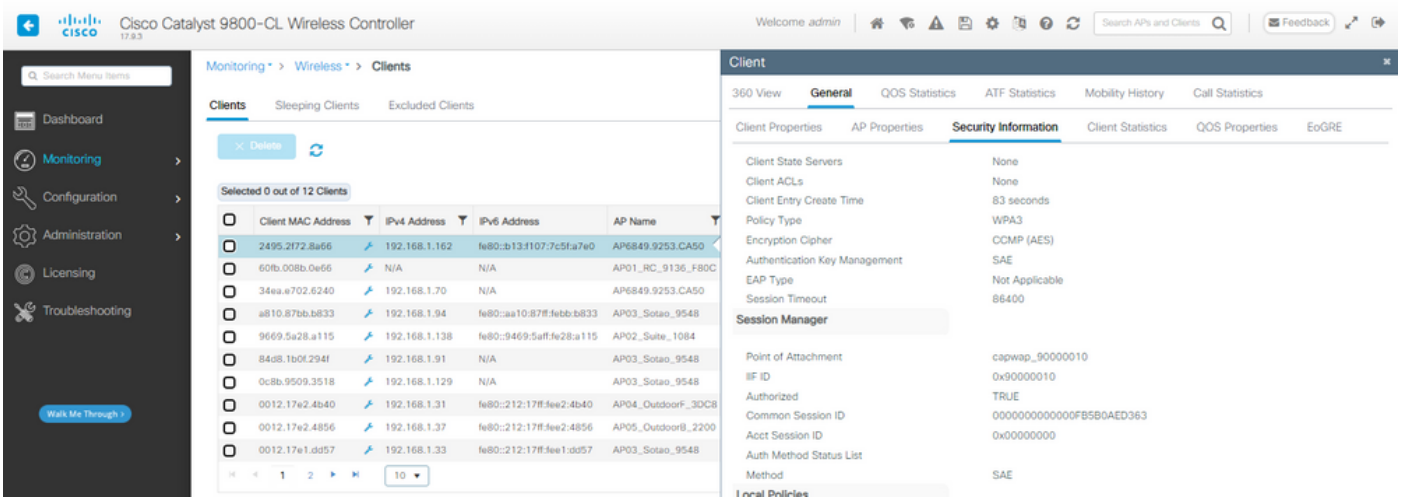



## Pixel 6a

Connection OTA with focus on the RSN information from client:

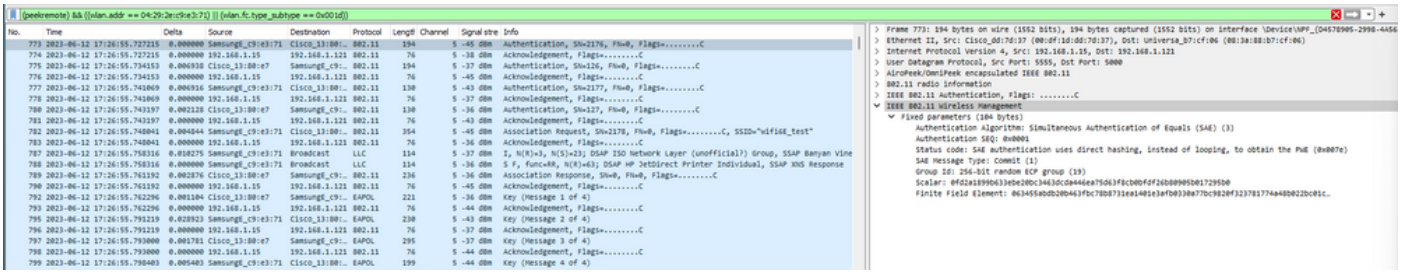


Client details in WLC:

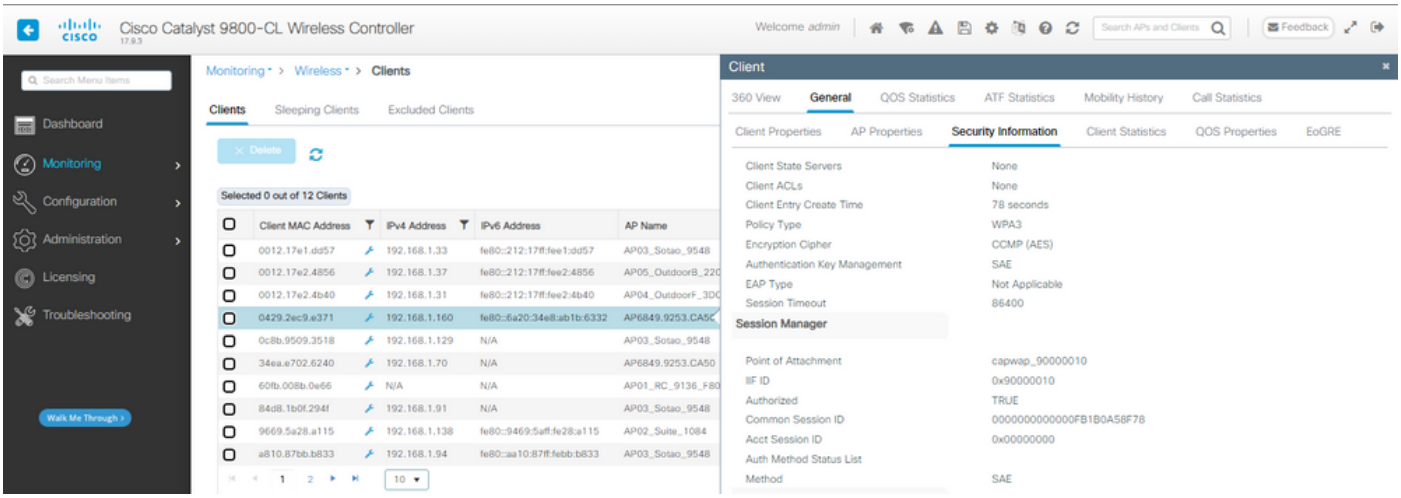



## Samsung S23

Connection OTA with focus on the RSN information from client:



Client details in WLC:




**WPA3-Personal - AES(CCMP128) + SAE + FT**

WLAN Security configuration:

Edit WLAN

⚠ Changing WLAN parameters while it is enabled will result in loss of connectivity for clients connected to it.

General | Security | Advanced | Add To Policy Tags

Layer2 | Layer3 | AAA

○ WPA + WPA2 | ○ WPA2 + WPA3 | ● WPA3 | ○ Static WEP | ○ None

MAC Filtering ☐

Lobby Admin Access ☐

**WPA Parameters**

WPA Policy ☐ | WPA2 Policy ☐

GTK Randomize ☐ | WPA3 Policy ☑

Transition Disable ☐

**WPA2/WPA3 Encryption**

AES(CCMP128) ☑ | CCMP256 ☐

GCMP128 ☐ | GCMP256 ☐

**Protected Management Frame**

PMF: Required

Association Comeback Timer*: 1

SA Query Time*: 200

**Fast Transition**

Status: Enabled

Over the DS ☐

Reassociation Timeout *: 20

**Auth Key Mgmt**

SAE ☑ | FT + SAE ☑

OWE ☐ | FT + 802.1x ☐

802.1x-SHA256 ☐

Anti Clogging Threshold*: 1500

Max Retries*: 5

Retransmit Timeout*: 400

PSK Format: ASCII

PSK Type: Unencrypted

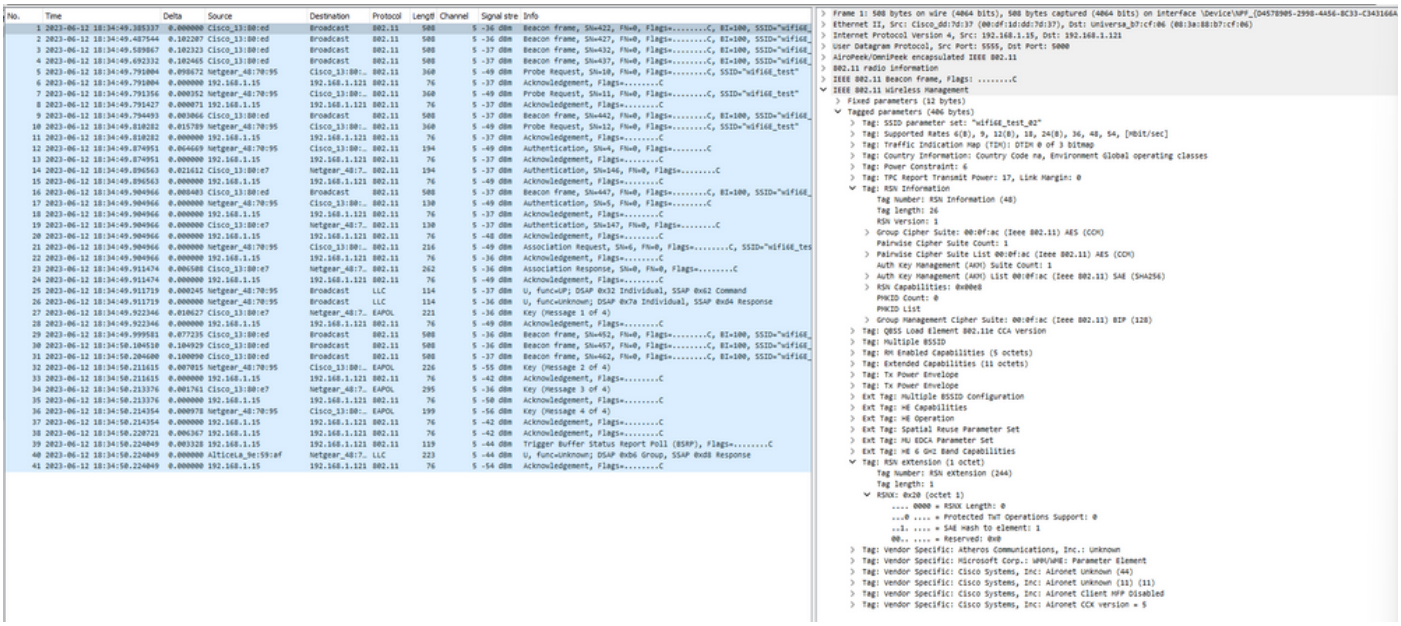
Pre-Shared Key*: ••••••

SAE Password Element ⓘ: Hash to Element (H

**Caution**: In the Authentication Key Management, the WLC allows to select FT+SAE without SAE enabled, however it was observed the clients were not able to connect. Always enable both check boxes SAE and FT+SAE if you want to use SAE with Fast Transition.

View on WLC GUI of the WLAN Security settings:


Verification of beacons OTA:

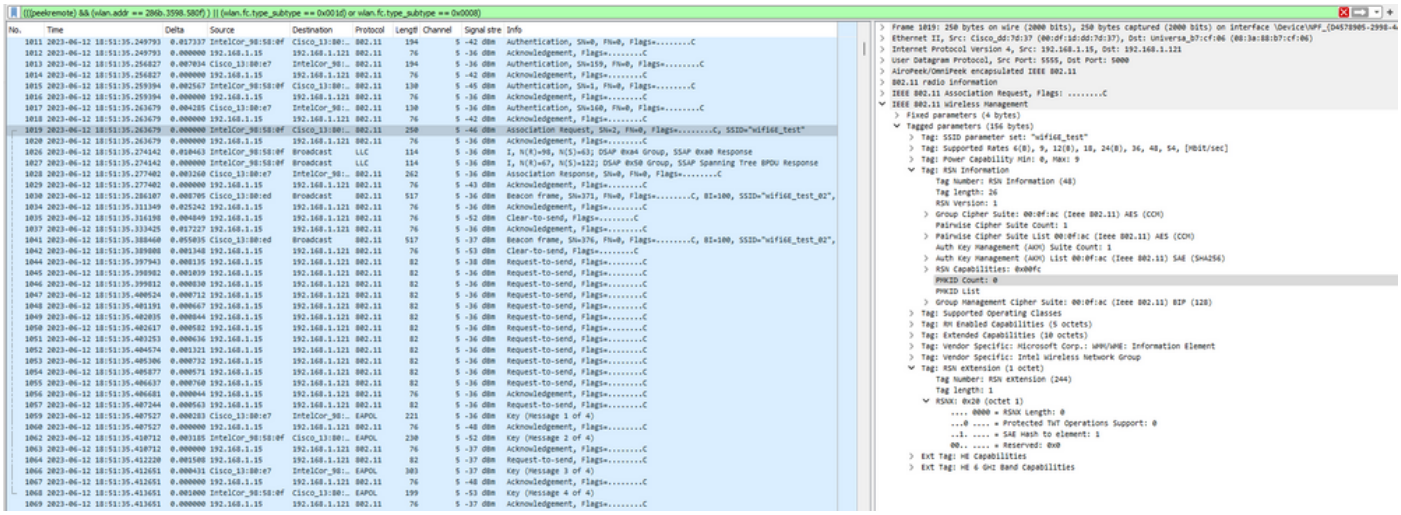


*WPA3 SAE + FT Beacons*

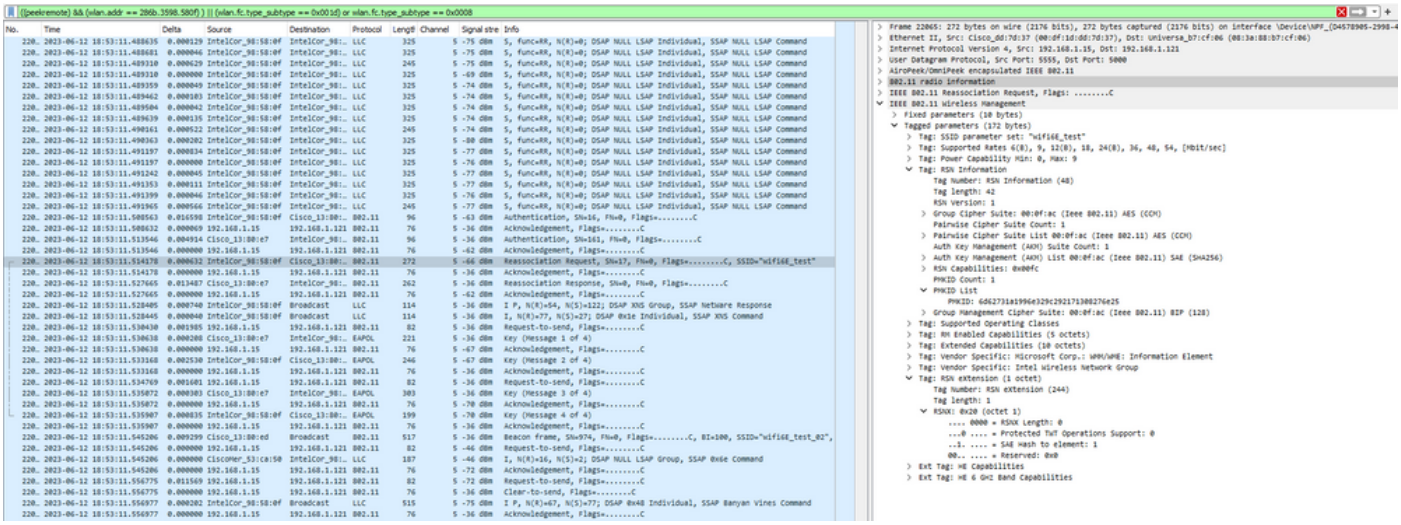
Here we can observe Wi-Fi 6E clients associating:

**Intel AX211**

Connection OTA with focus on the RSN information from client:

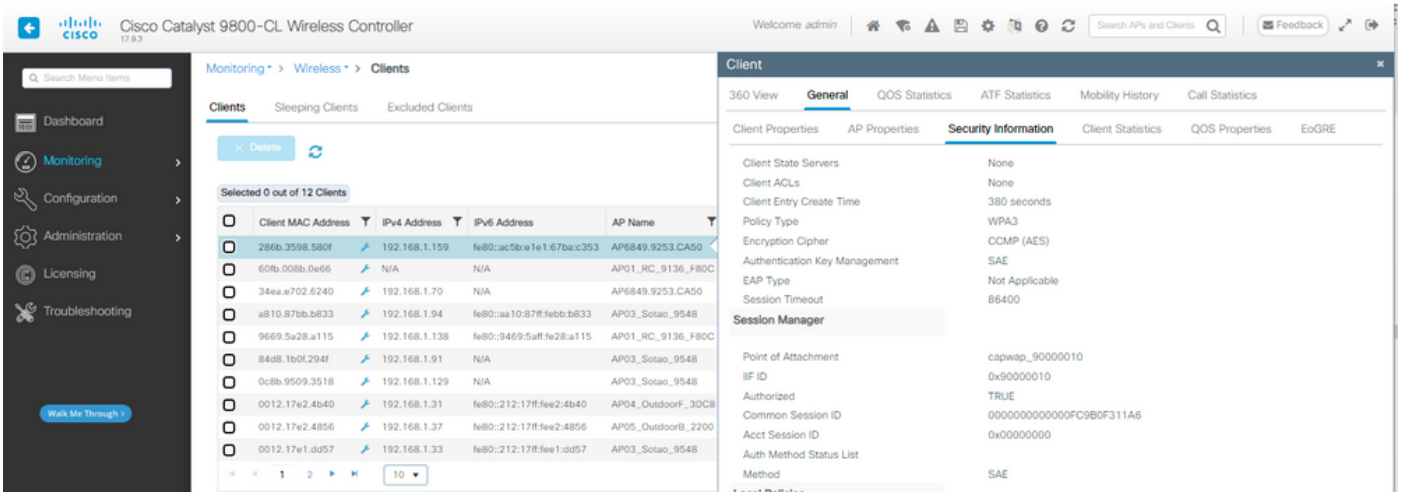


Roaming event where you can see the PMKID:



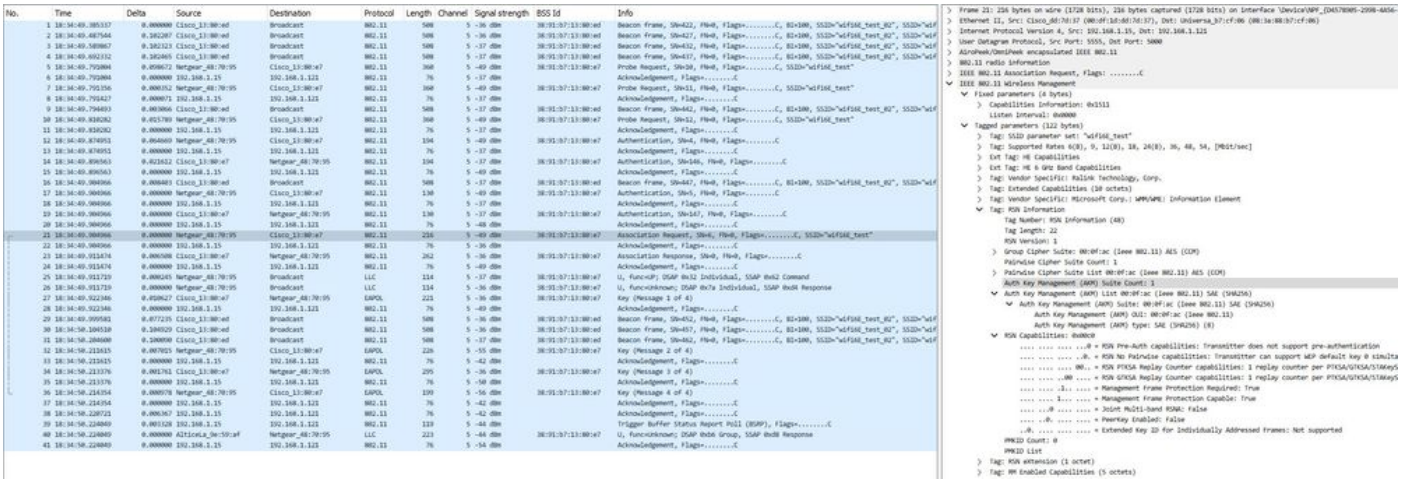
*WPA3 SAE + FT Reassociation Request*

Client details in WLC:



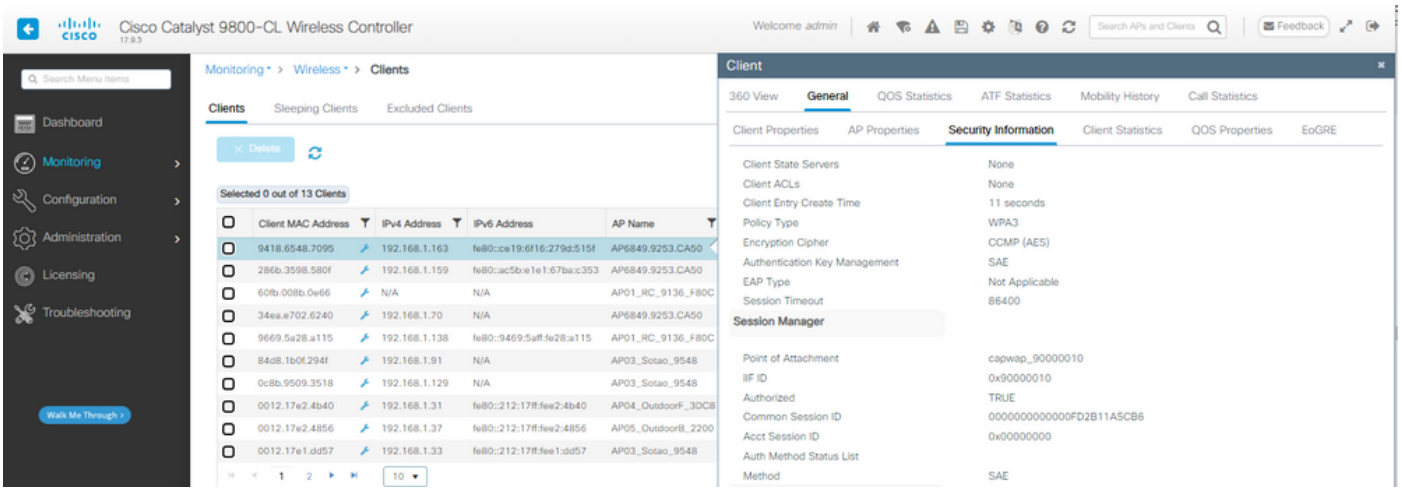

## NetGear A8000

Connection OTA with focus on the RSN information from client. Initial connection:



*SSSS*

Client details in WLC:




**Pixel 6a**

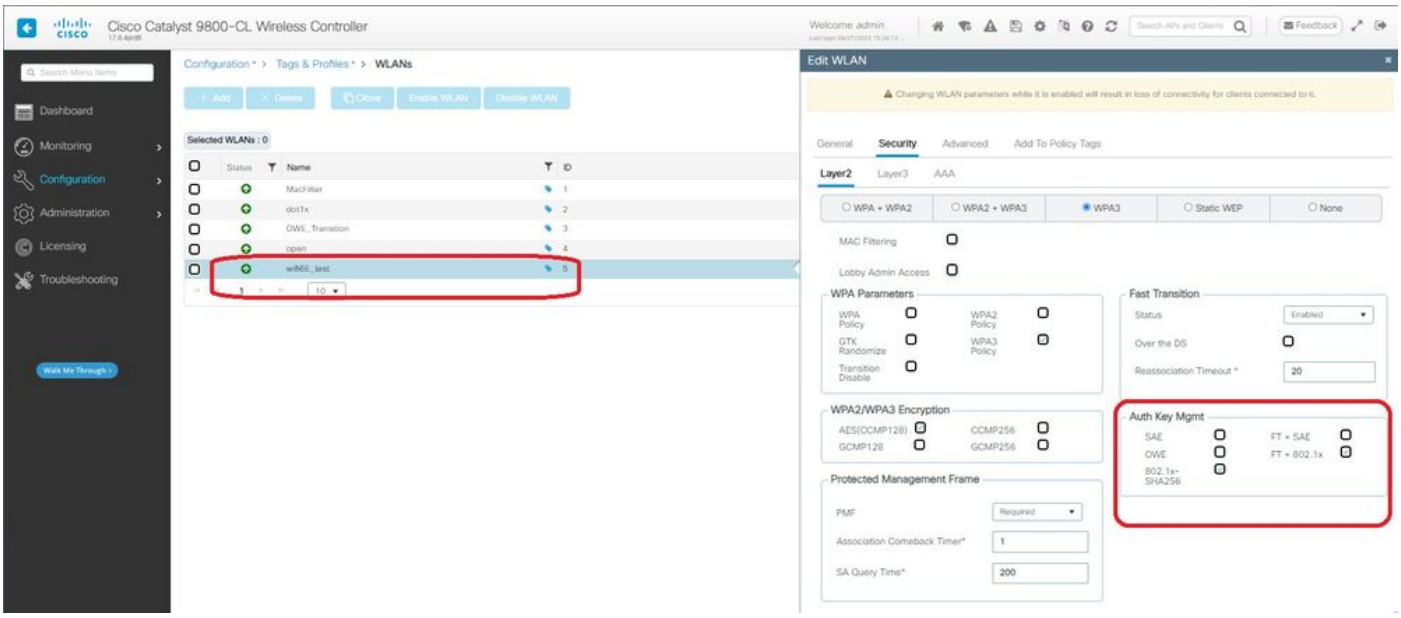
Device was not able to roam when FT is enabled.

**Samsung S23**

Device was not able to roam when FT is enabled.

**WPA3-Enterprise + AES(CCMP128) + 802.1x-SHA256 + FT**

WLAN Security configuration:




*WPA3 Enterprise 802.1x-SHA256 + FTWLAN Security Configuration*

View on WLC GUI of the WLAN Security settings:

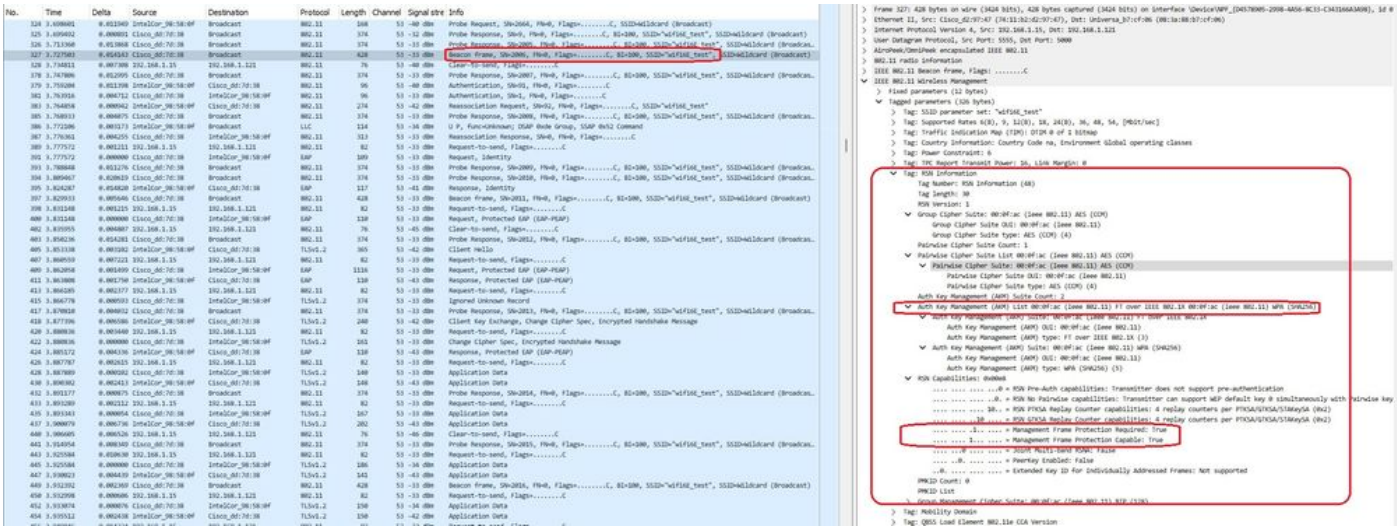


Here we can see the ISE Live logs showing the authentications coming from each device:

| Time | Status | Details | Repeat ... | Identity | Endpoint ID | Endpoint Profile | Authenticat... | Authorizati... | Authorizati... | IP Address | Network Device |
|---|---|---|---|---|---|---|---|---|---|---|---|
| × | | | | Identity | Endpoint ID | Endpoint Profile | Authentication | Authorization | Authorization | IP Address | Network Device |
| Jun 27, 2023 01:52:38.130 PM | | | 0 | tantunes | 04:29:2E:C9:E3:71 | | WirelessDot... | WirelessDot... | PermitAccess | | |
| Jun 27, 2023 01:52:38.130 PM | | | | tantunes | 04:29:2E:C9:E3:71 | | WirelessDot... | WirelessDot... | PermitAccess | | eWLC-9800-01 |
| Jun 27, 2023 01:51:53.850 PM | | | 0 | tantunes | 24:95:2F:72:8A:66 | Unknown | WirelessDot... | WirelessDot... | PermitAccess | | |
| Jun 27, 2023 01:51:53.850 PM | | | | tantunes | 24:95:2F:72:8A:66 | Unknown | WirelessDot... | WirelessDot... | PermitAccess | | eWLC-9800-01 |
| Jun 27, 2023 01:50:58.679 PM | | | 0 | tantunes | 94:18:65:48:70:95 | Netgear-Device | WirelessDot... | WirelessDot... | PermitAccess | | |
| Jun 27, 2023 01:50:58.679 PM | | | | tantunes | 94:18:65:48:70:95 | Netgear-Device | WirelessDot... | WirelessDot... | PermitAccess | | eWLC-9800-01 |
| Jun 27, 2023 01:50:43.883 PM | | | | tantunes | 94:18:65:48:70:95 | Netgear-Device | WirelessDot... | WirelessDot... | PermitAccess | | eWLC-9800-01 |
| Jun 27, 2023 01:50:42.877 PM | | | 0 | tantunes | 28:6B:35:98:58:0F | Intel-Device | WirelessDot... | WirelessDot... | PermitAccess | | |
| Jun 27, 2023 01:50:42.877 PM | | | | tantunes | 28:6B:35:98:58:0F | Intel-Device | WirelessDot... | WirelessDot... | PermitAccess | | eWLC-9800-01 |

*ISE Live Logs*

Beacons OTA look like this:

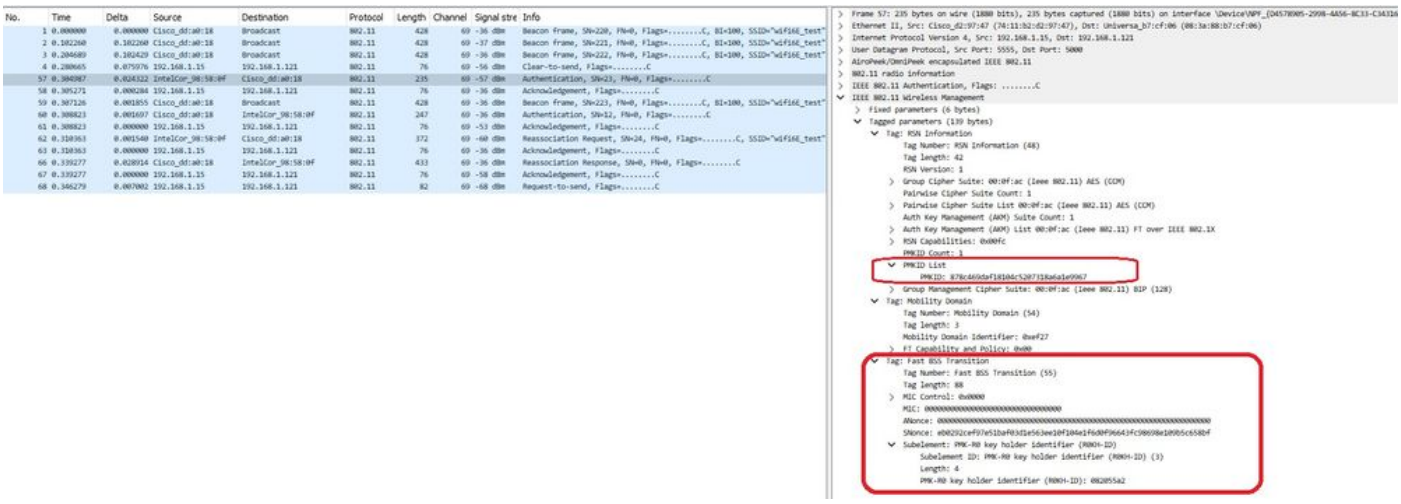


*WPA3 Enterprise 802.1x +FT Beacon*

Here we can observe Wi-Fi 6E clients associating:

**Intel AX211**

Connection OTA with focus on the RSN information from client on a roaming event:

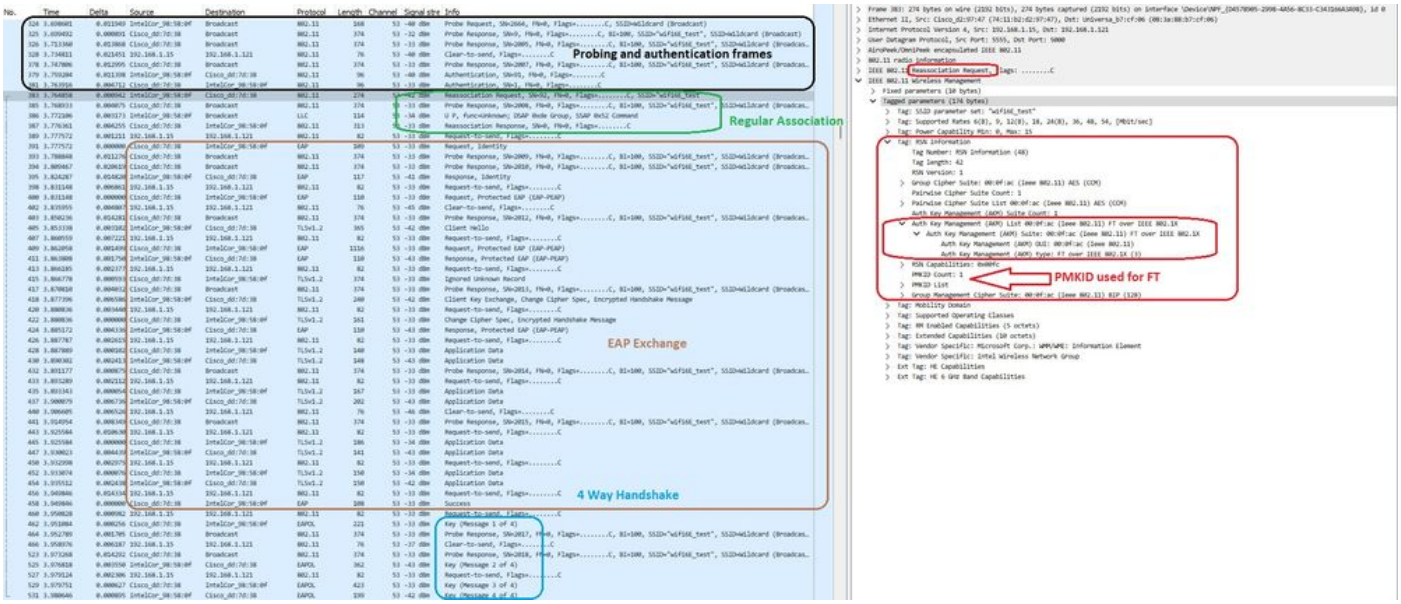


*WPA3 Enterprise 802.1x + FT Roaming event*

An interesting behavior happens if you manually delete the client from the WLAN (from WLC GUI for example). The client receives a disassociation frame but tries to reconnect to the same AP and uses a re-

association frame followed by a complete EAP exchange because the client details were deleted from the AP/WLC.

This is basically the same frame exchange as in a new Association process. Here you can see the frame exchange:




*WPA3 Enterprise 802.1x + FT Ax211 Connection flow*

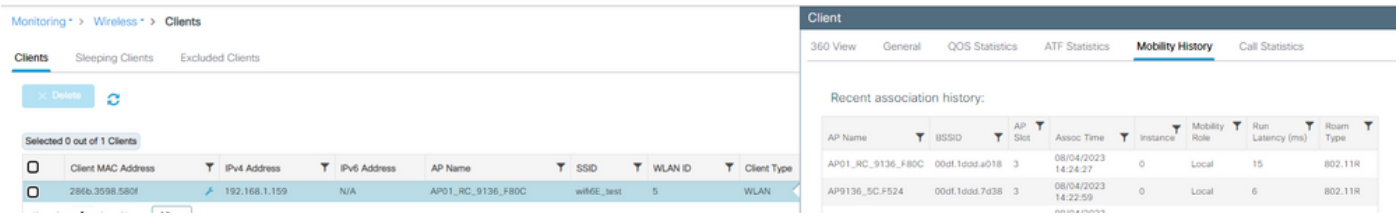
Client details in WLC:


*WPA3 Enterprise 802.1x + FT Client details*

This client was also tested using FT over the DS and was able to roam using 802.11r:

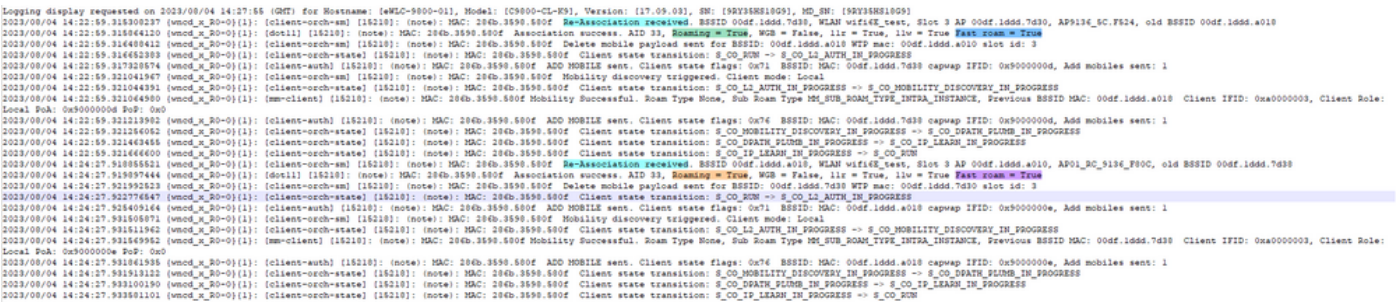
*AX211 roaming with FT over DS*

We can also see the FT roaming events:




*WPA3 Enterprise with FT*

And client ra trace from wlc:

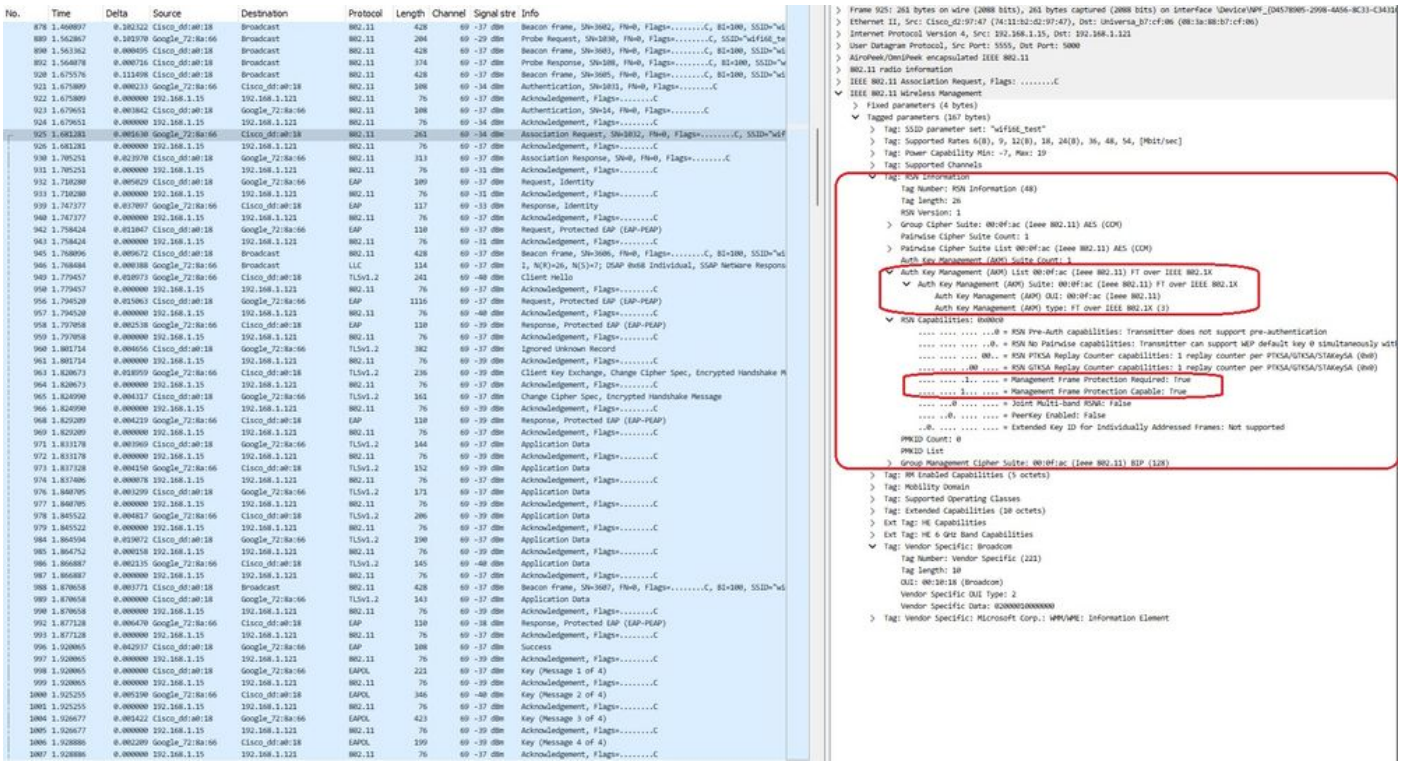


## NetGear A8000

WPA3-Enterprise is not supported on this client.

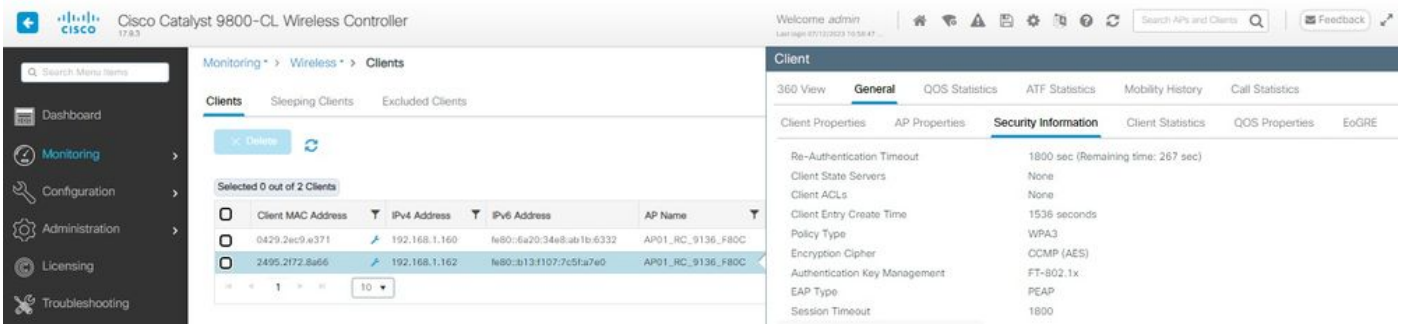
## Pixel 6a

Connection OTA with focus on the RSN information from client:



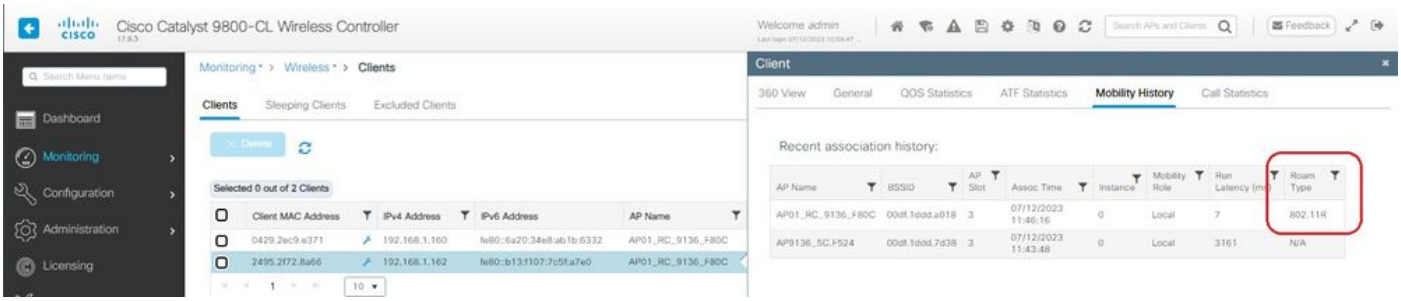
*WPA3 Enterprise 802.1x + FT Pixel6a Association*

Client details in WLC:



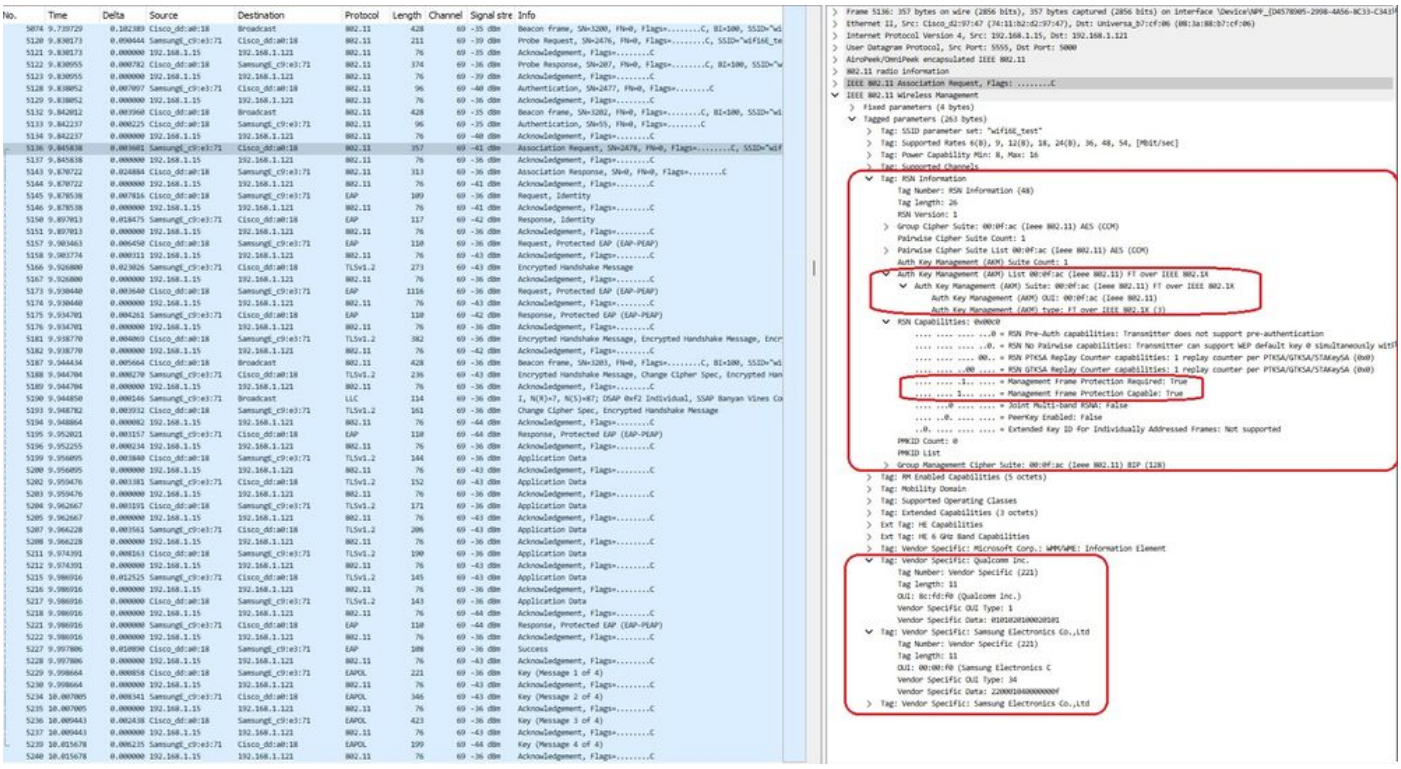

*WPA3 Enterprise 802.1x + FT Pixel6a Client details*

Focus on the roam type Over the Air where we can see the roam type 802.11R:



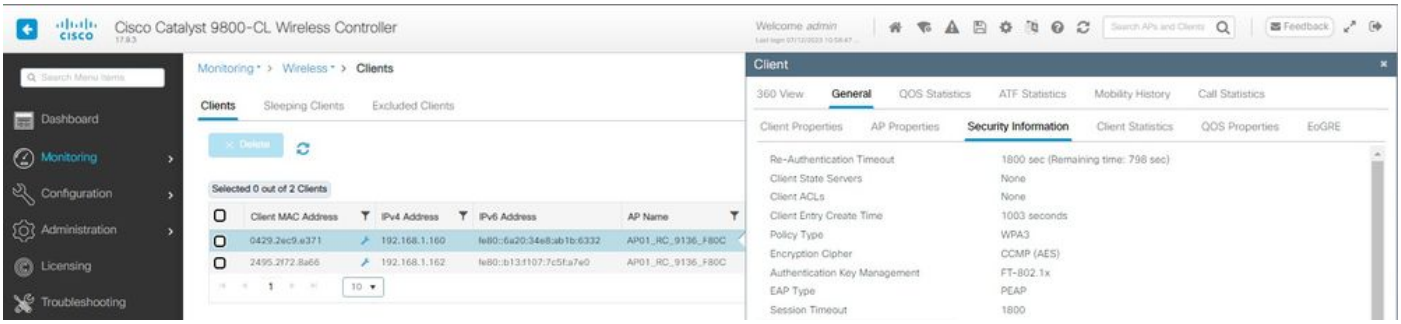

## Samsung S23

Connection OTA with focus on the RSN information from client:



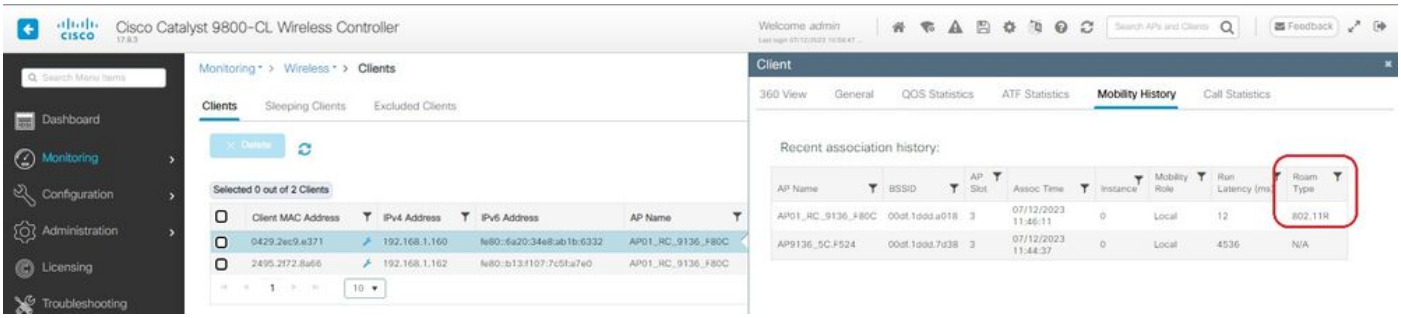
*S23 FToTA Roaming event*

Client details in WLC:



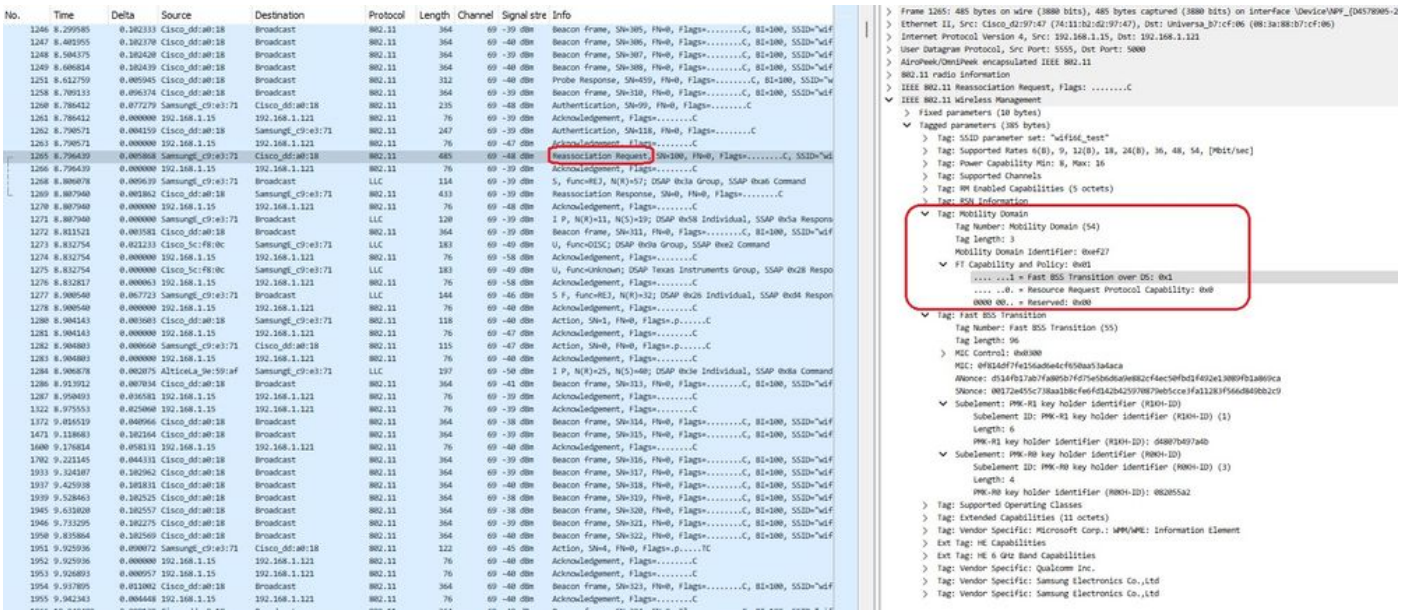

*S23 Client Properties*

Focus on the roam type Over the Air where we can see the roam type 802.11R:




*S23 Roaming type 802.11R*

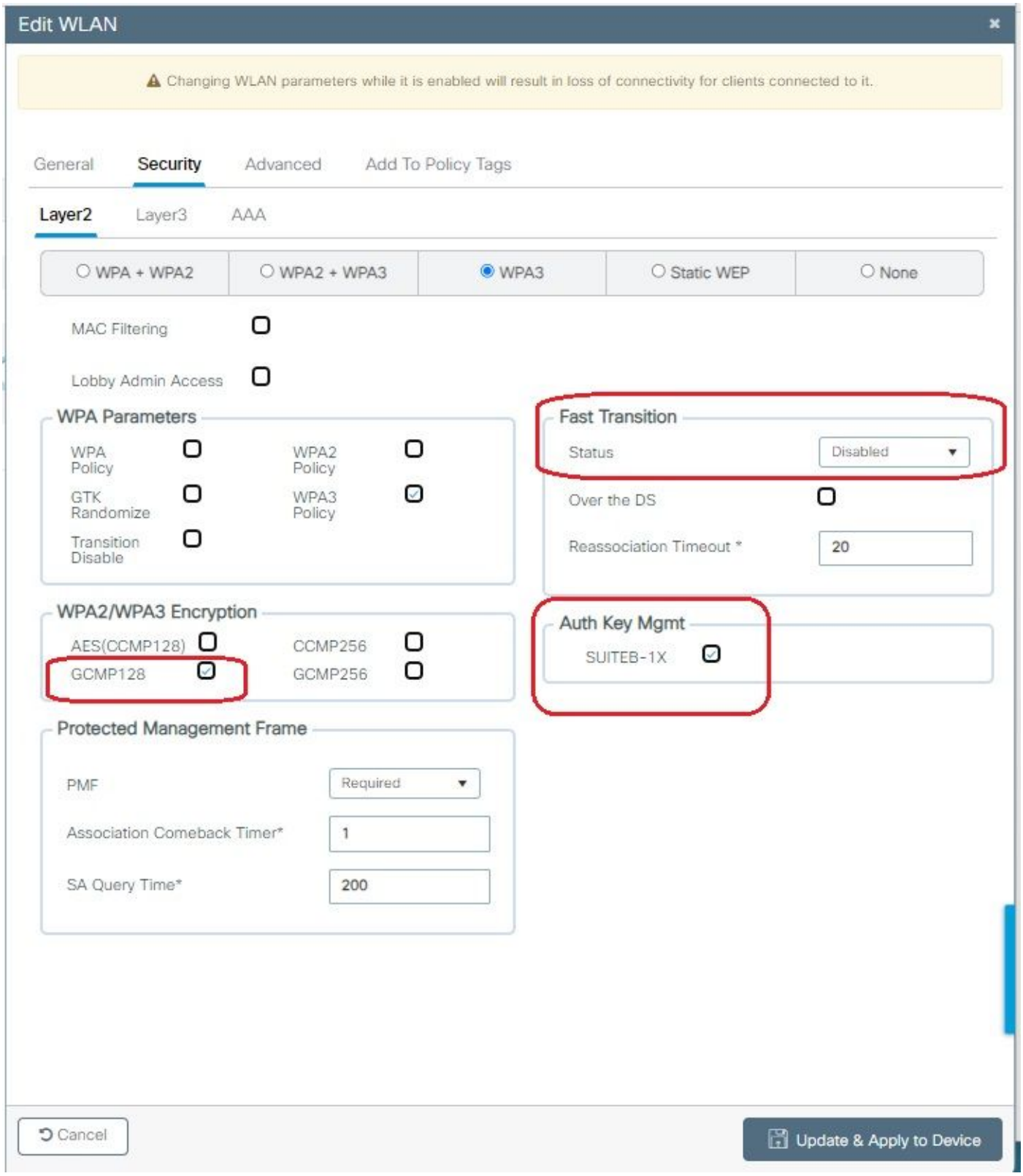
This client was also tested using FT over the DS and was able to roam using 802.11r:



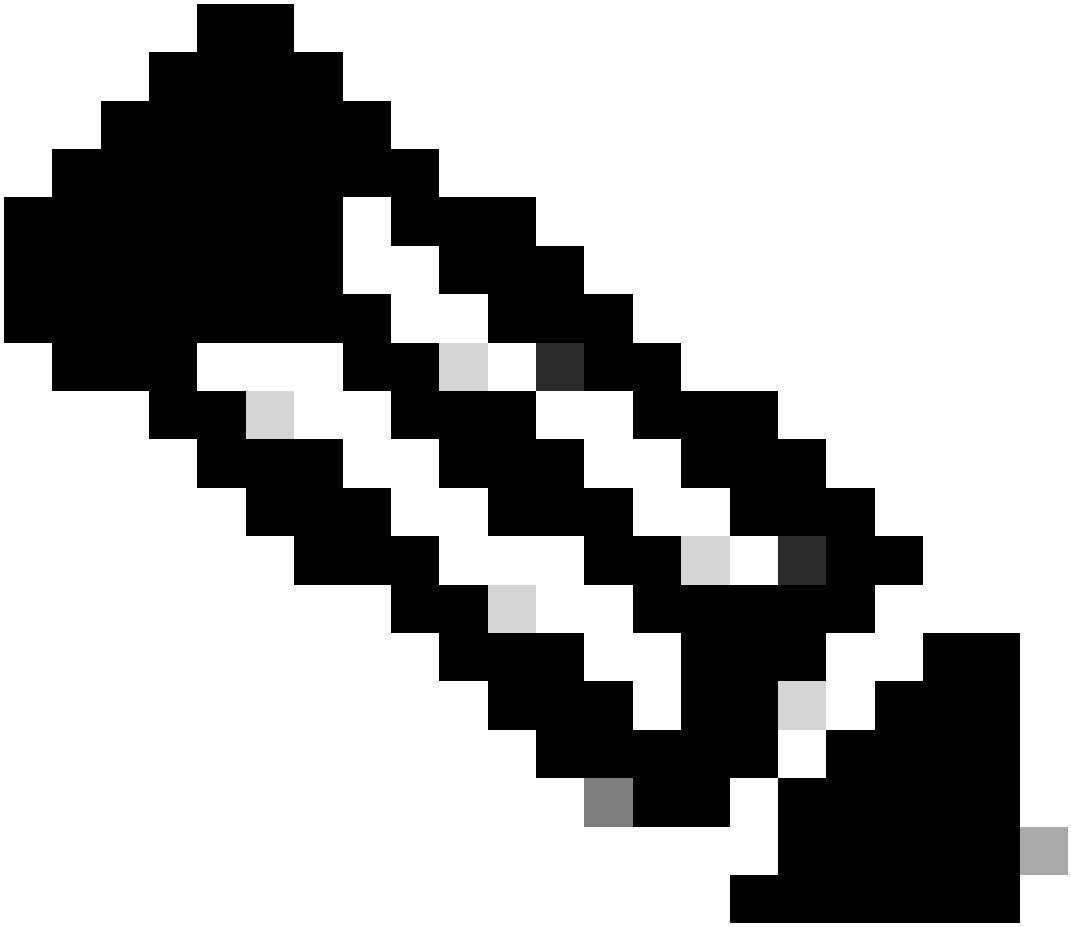
*S23 Roaming FToDS packets*

## WPA3-Enterprise + GCMP128 cipher + SUITEB-1X

WLAN Security configuration:



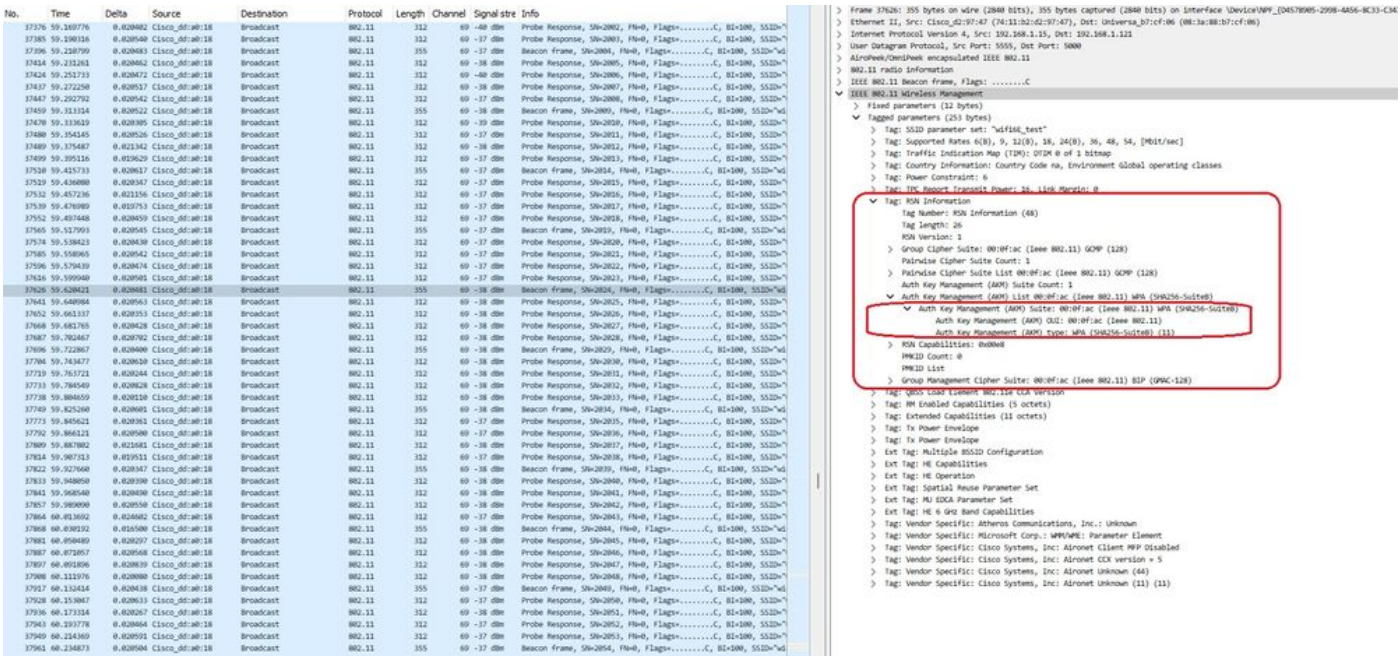

*WPA3 Enterprise SuiteB-1X Security Configuration*



**Note**: FT is not suported in SUITEB-1X

View on WLC GUI of the WLAN Security settings:


Verification of beacons OTA:

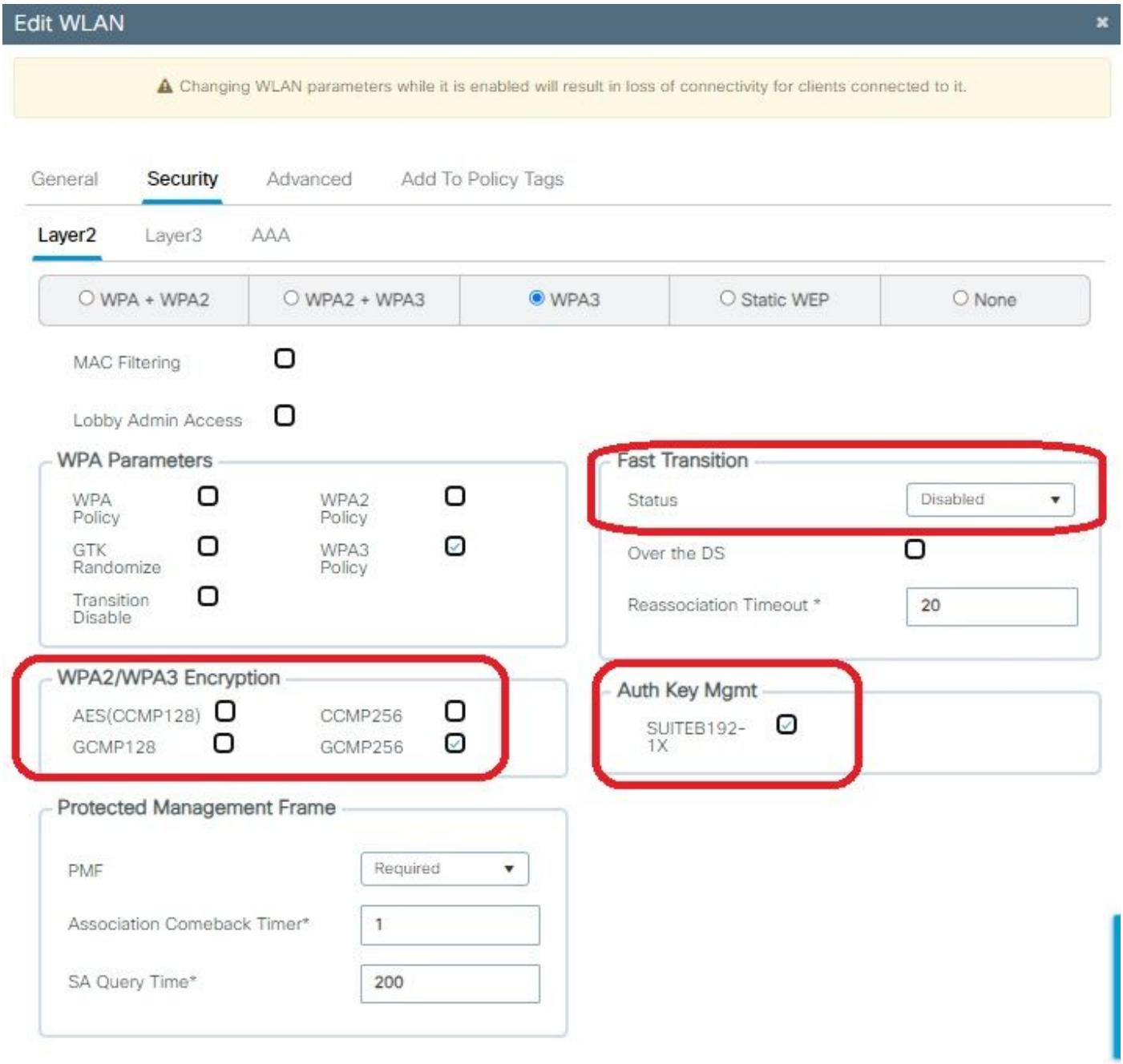


*WPA3 Enterprise SuiteB-1X Beacon*

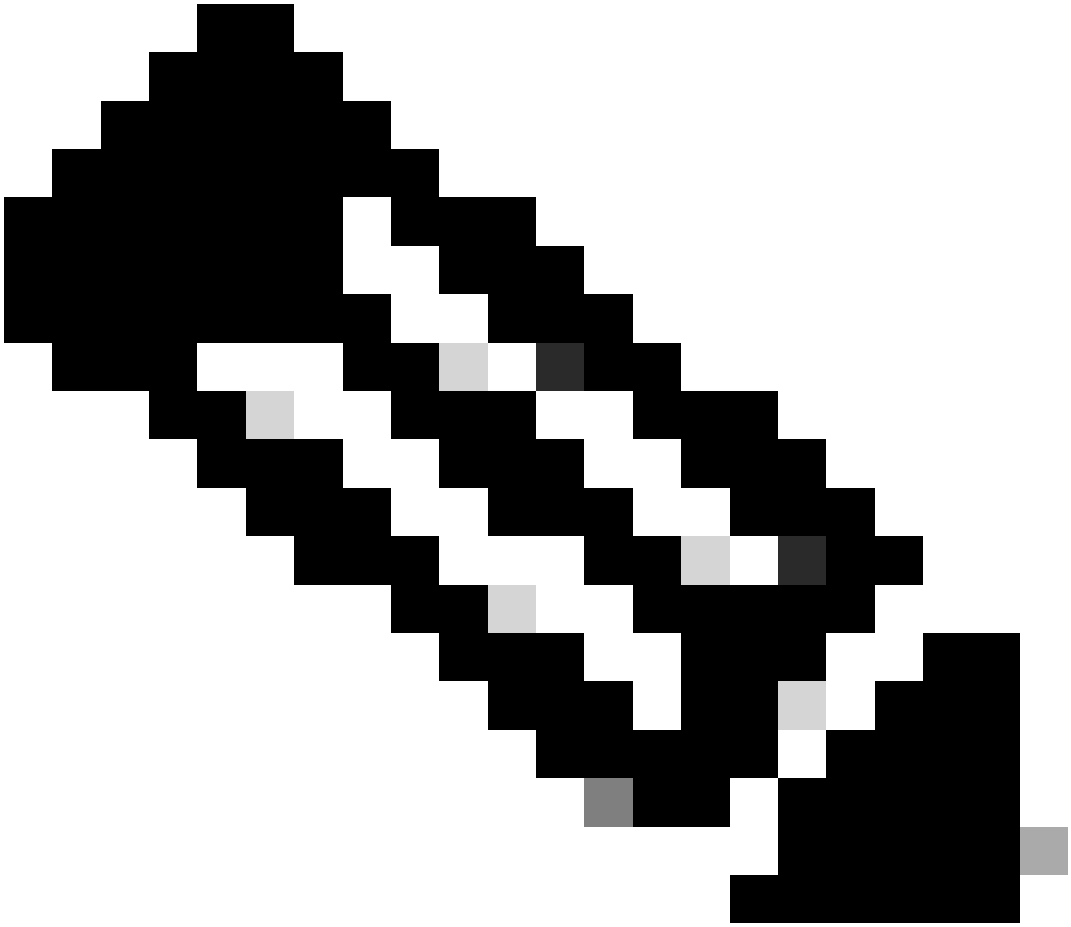
None of the tested clients were able to connect to the WLAN using SuiteB-1X confirming that none supports this security method.

**WPA3-Enterprise + GCMP256 cipher + SUITEB192-1X**

WLAN Security configuration:

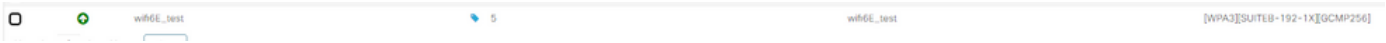



*WPA3 Enterprise SUITEB192-1x security settings*



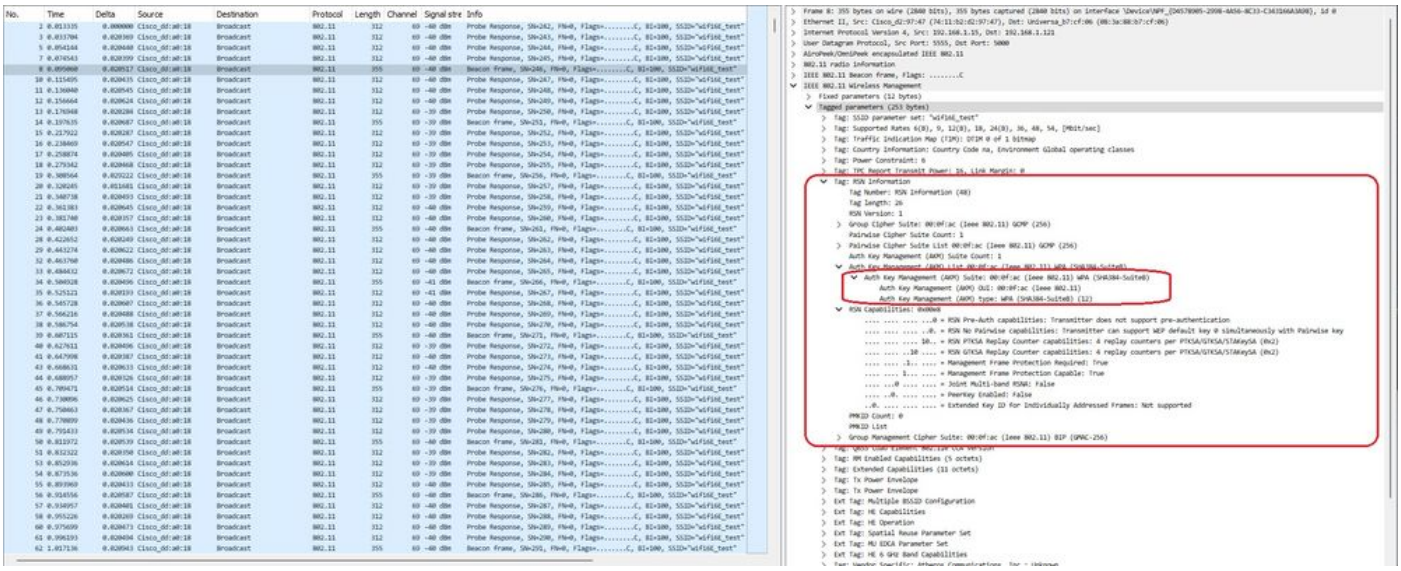
**Note**: FT is not supported with GCMP256+SUITEB192-1X.

WLAN on WLC GUI WLANs list:




*WLAN used for tests*

Verification of beacons OTA:

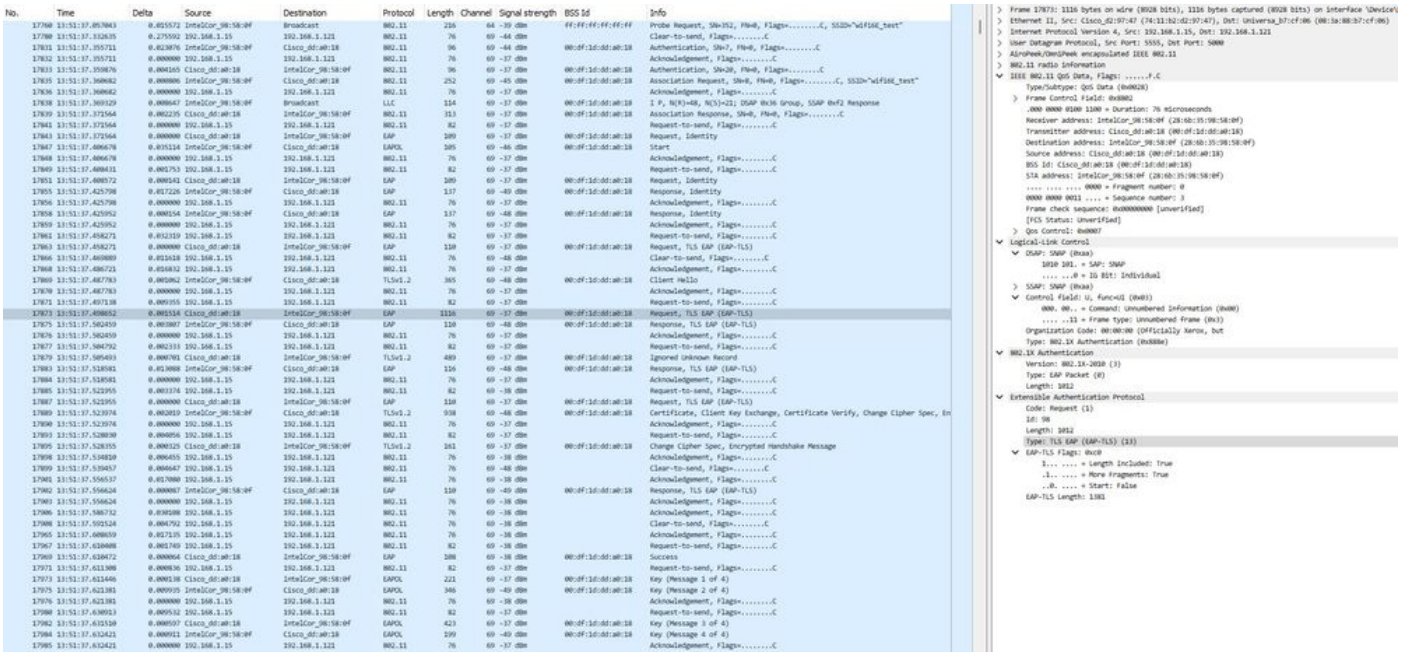


*WPA3 Enterprise SUITEB192-1x beacons*

Here we can observe Wi-Fi 6E clients associating:

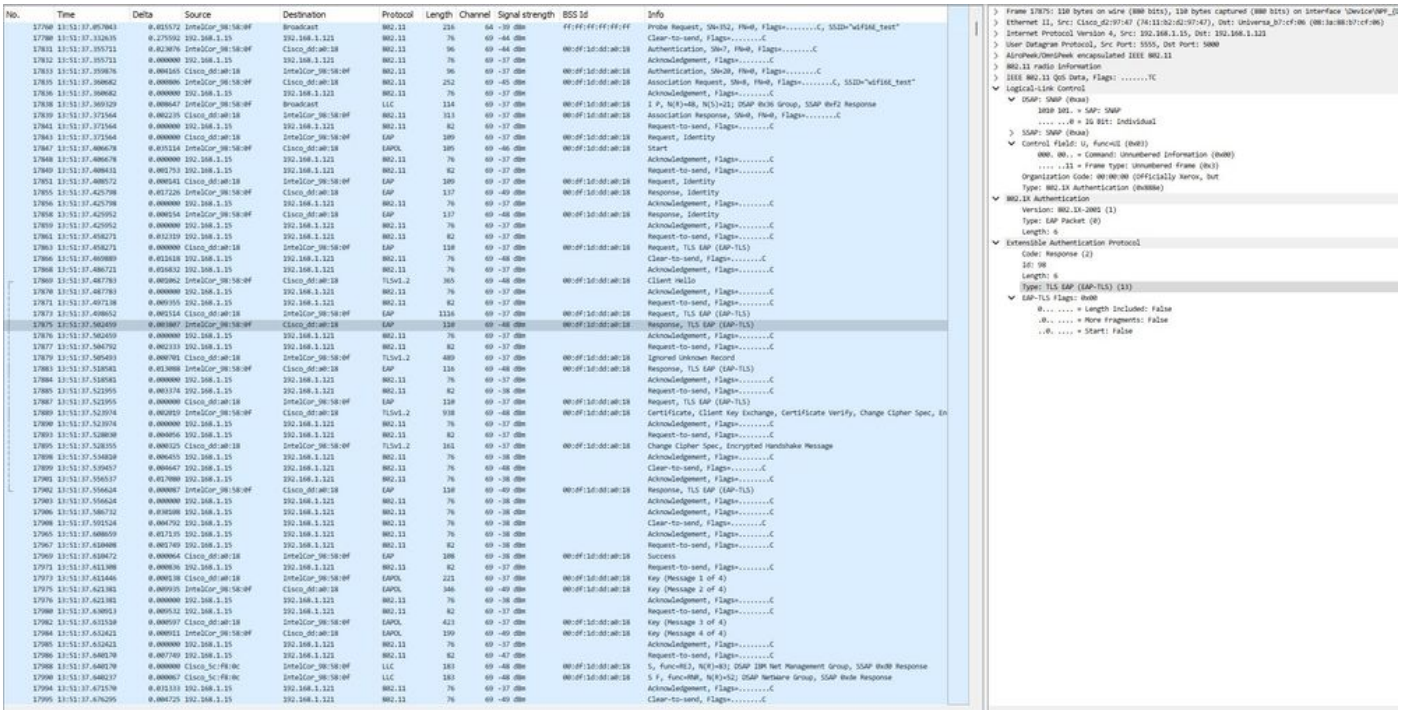
**Intel AX211**

Connection OTA with focus on the RSN information from client:



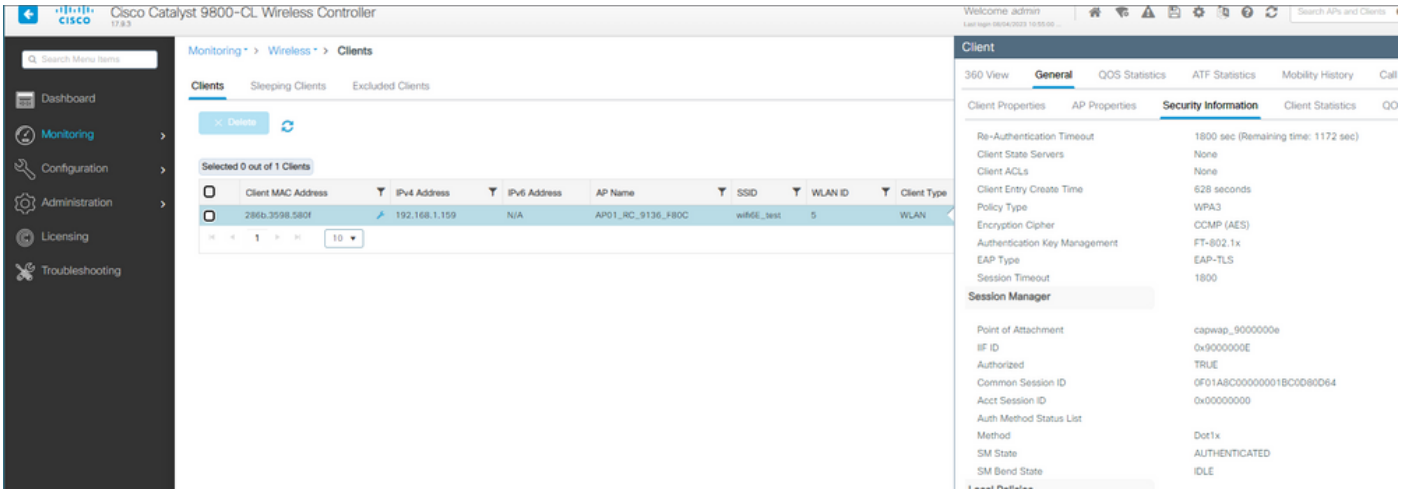
*WPA3 Enterprise with EAP-TLS Association with Intel AX211 client and RSN Info*

And the EAP-TLS exchange:



*WPA3 Enterprise with EAP-TLS Association with Intel AX211 client and EAP-TLS Focus*

Client details in WLC:




*WPA3 Enterprise with EAP-TLS client details*

### NetGear A8000

WPA3-Enterprise is not supported on this client.

### Pixel 6a

At the date of writing this document, this client was not able to connect to WPA3 Enterprise using EAP-TLS.

This was a client side issue that is being worked on and as soon its resolved, this document shall be updated.

### Samsung S23

At the date of writing this document, this client was not able to connect to WPA3 Enterprise using EAP-TLS.

This was a client side issue that is being worked on and as soon its resolved, this document shall be updated.

**Security Conclusions**

After all the previous tests, this is the resultant conclusions:

| Protocol | Encryption | AKM | AKM Cipher | EAP Method | FT-OverTA | FT-OverDS | Intel AX211 | Samsung/Google Android | Net A80 |
|---|---|---|---|---|---|---|---|---|---|
| OWE | AES-CCMP128 | OWE | NA. | NA. | NA | NA | Supported | Supported | Sup |
| SAE | AES-CCMP128 | SAE (H2E Only) | SHA256 | NA. | Supported | Supported | Supported: H2E Only and FT-oTA | Supported: H2E Only.<br>FT Failed. FT-oDS Failed. | Sup<br>H2E and oTA FT- Fail |
| Enterprise | AES-CCMP128 | 802.1x-SHA256 | SHA256 | PEAP/FAST/TLS | Supported | Supported | Supported: SHA256 and FT-oTA/oDS<br>Not-Supported: EAP-FAST | Supported: SHA256 and FT-oTA, FT-oDS (S23)<br>Not-Supported: EAP-FAST, FT-oDS (Pixel6a) | Sup SHA and oTA Not Sup EAP FAS FT- |
| Enterprise | GCMP128 | SuiteB-1x | SHA256-SuiteB | PEAP/FAST/TLS | Not Supported | Not Supported | Not Supported | Not Supported | Not Sup |
| Enterprise | GCMP256 | SuiteB-192 | SHA384-SuiteB | TLS | Not Supported | Not Supported | NA/TBD | NA/TBD | Not Sup |

# Troubleshoot

The troubleshooting used in this document was based on the online document:

Troubleshoot COS APs

The general guideline for troubleshooting is to collect RA trace in debug mode from the WLC using the client mac address making sure that the client is connecting using the device mac and not a randomized mac address.

For Over the Air troubleshooting, the recommendation is to use AP in sniffer mode capturing the traffic on

the channel of the client serving AP.

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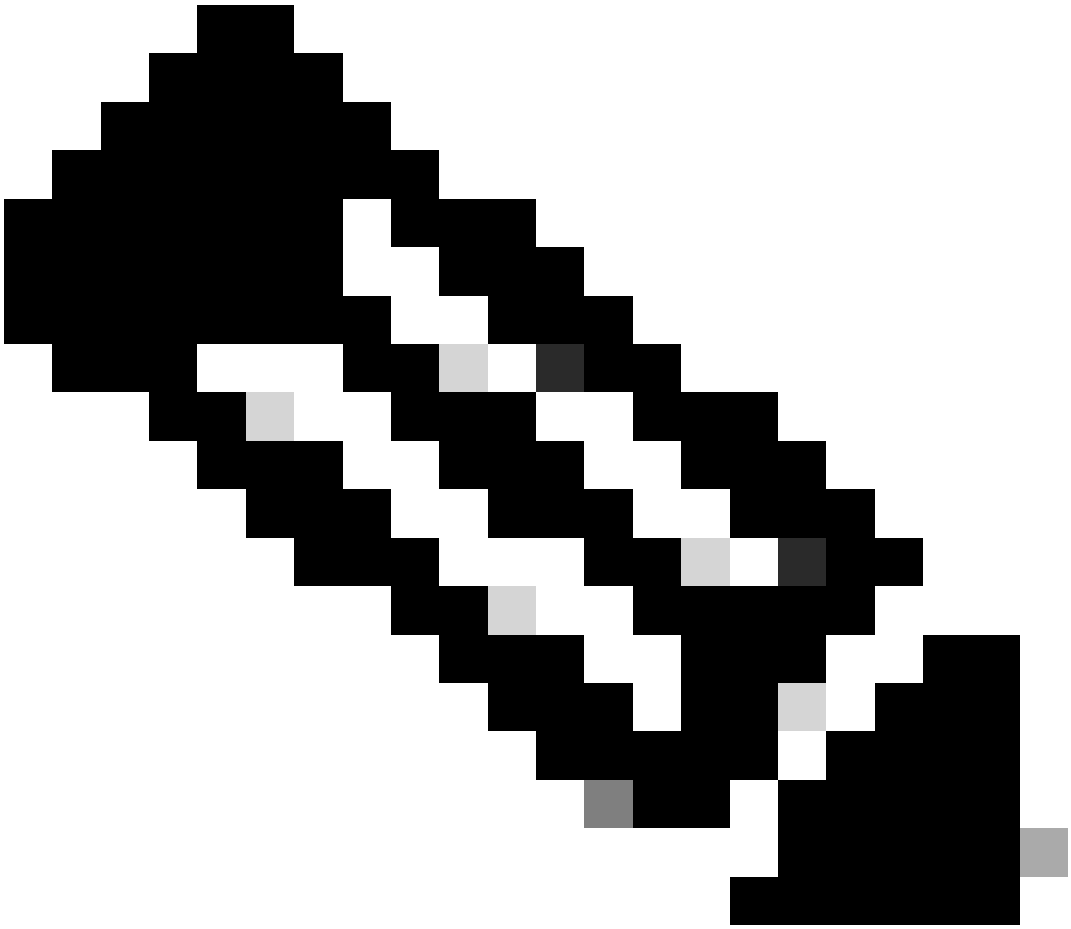

**Note**: Refer to Important Information on Debug Commandsbefore you use **debug** commands.

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## Related Information

What is Wi-Fi 6E?

What Is Wi-Fi 6 vs. Wi-Fi 6E?

Wi-Fi 6E At-a-Glance

Wi-Fi 6E: The Next Great Chapter in Wi-Fi White Paper

Cisco Live - Architecting Next Generation Wireless Network with Catalyst Wi-Fi 6E Access Points

Cisco Catalyst 9800 Series Wireless Controller Software Configuration Guide 17.9.x

WPA3 Deployment Guide