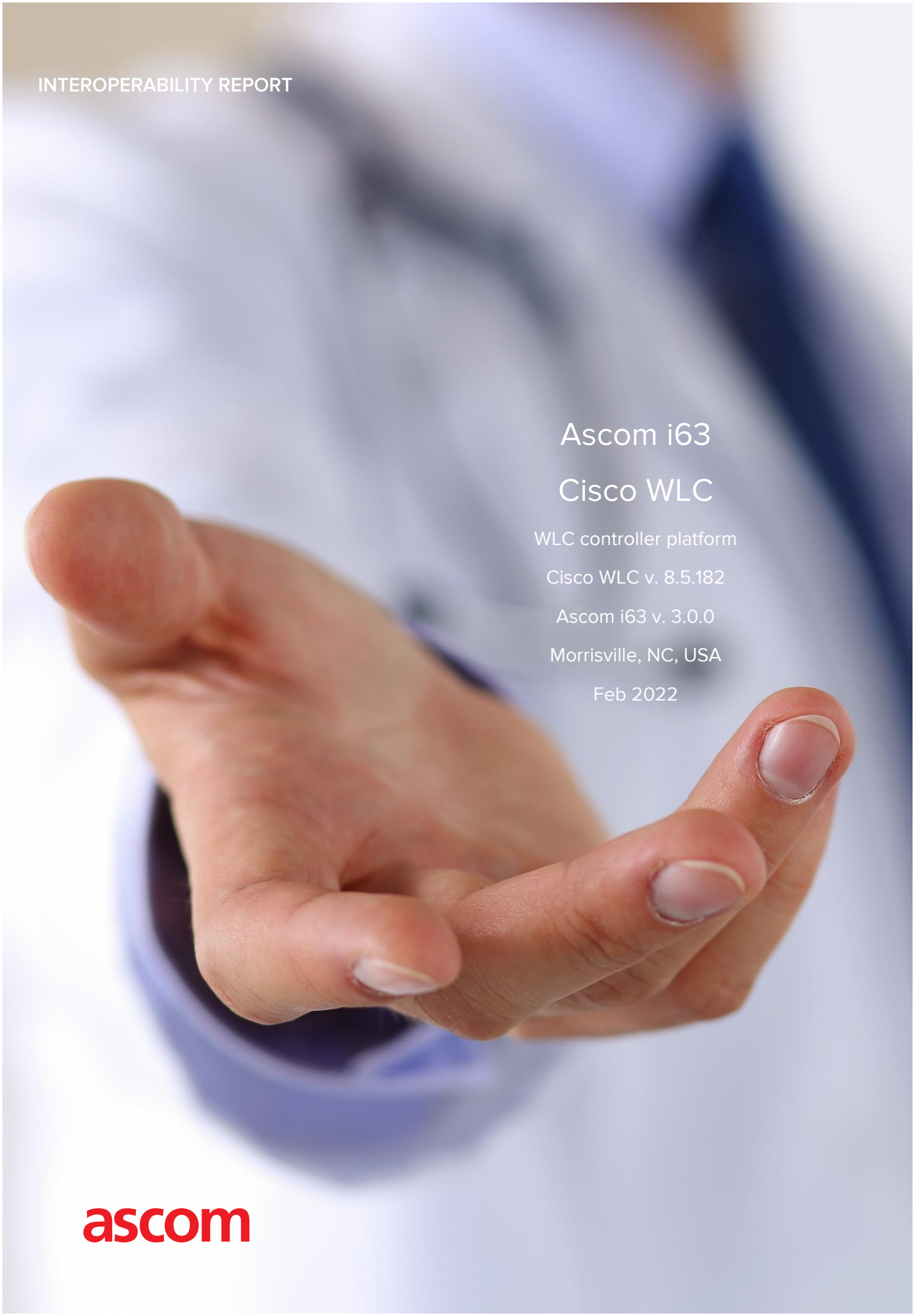
INTEROPERABILITY REPORT



Ascom i63

Cisco WLC

WLC controller platform

Cisco WLC v. 8.5.182

Ascom i63 v. 3.0.0

Morrisville, NC, USA

Feb 2022

ascom

Contents

Introduction

This document describes a summary of the interoperability verification results of the Ascom's and Cisco's platform, necessary steps and guidelines to optimally configure the platforms and support contact details. The report should be used in conjunction with both Cisco's and Ascom's platform configuration guides.

About Ascom

Ascom is a global solutions provider focused on healthcare ICT and mobile workflow solutions. The vision of Ascom is to close digital information gaps allowing for the best possible decisions – anytime and anywhere. Ascom's mission is to provide mission-critical, real-time solutions for highly mobile, ad hoc, and time-sensitive environments. Ascom uses its unique product and solutions portfolio and software architecture capabilities to devise integration and mobilization solutions that provide truly smooth, complete and efficient workflows for healthcare as well as for industry, security and retail sectors.

Ascom is headquartered in Baar (Switzerland), has operating businesses in 18 countries and employs around 1,300 people worldwide. Ascom registered shares (ASCN) are listed on the SIX Swiss Exchange in Zurich.

About Cisco

Cisco (NASDAQ: CSCO) is the worldwide technology leader that has been making the Internet work since 1984. Our people, products and partners help society securely connect and seize tomorrow's digital opportunity today. Discover more at thenetwork.cisco.com and follow us on Twitter at @Cisco.

Site Information

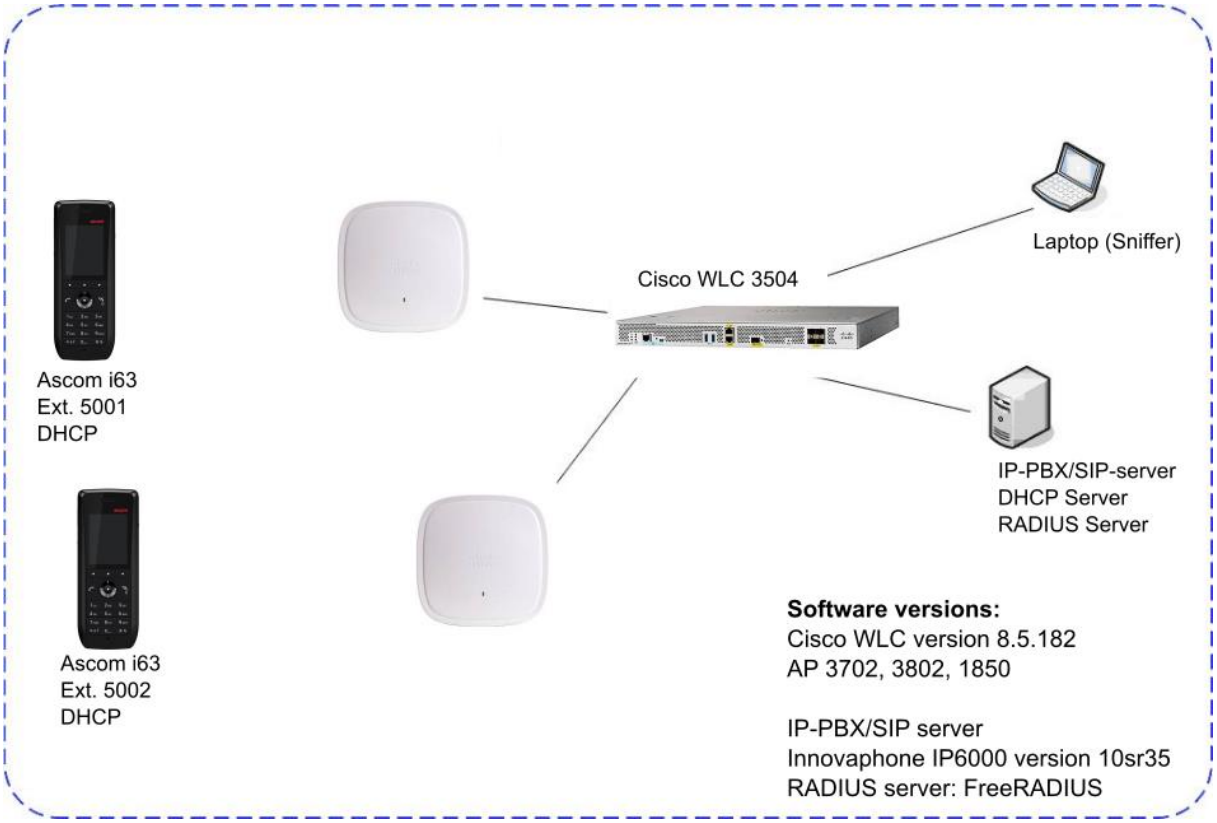
Verification site

Ascom US
300 Perimeter park drive
Morrisville, NC, US-27560
USA

Participants

Karl-Magnus Olsson, Ascom, Morrisville

Verification topology



Summary

General conclusions

The Ascom interoperability verification produced very good results with regards to authentication, stability and roaming.

This test is considered a regression test and some test cases that has previously been tested on the 8.5.x track has been left out. Test cases left out includes for example battery measurements and capacity tests.

OKC is no longer being tested and it is mandatory to use 11r/FT together with EAP based authentication. Also for PSK it its strongly recommended to use 11r/FT

Compatibility information

One Access point model from every product generation has been selected as a representation (3702, 3802 and 1850). By testing these access points, we are considered cover all supported major Cisco access points based on chipset compatibility listed below

Supported Partner Access Points with SW version 8.5.182:

AP1602, 2602, 3502, 3602

AP1702, 2702, 3700

AP2802, 3802

AP1832, 1852

Supported Partner Controller Platforms with SW version 8.5.182:

Cisco 2500 Series Wireless Controllers (Cisco 2504 Wireless Controller)

Cisco 3500 Series Wireless Controllers (Cisco 3504 Wireless Controller)

Cisco 5500 Series Wireless Controllers (Cisco 5508 and 5520 Wireless Controllers)

Cisco Flex 7500 Series Wireless Controllers (Cisco Flex 7510 Wireless Controller)

Cisco 8500 Series Wireless Controllers (Cisco 8510 and 8540 Wireless Controllers)

Cisco Virtual Wireless Controller (vWLC) (VMware ESXi, HyperV, and KVM)

Verification overview

WLAN Compatibility and Performance

High Level Functionality	Result	Comments
Association, Open with No Encryption	OK	
Association, WPA2-PSK / AES Encryption	OK	
Association, PEAP-MSCHAPv2 Auth, AES Encryption	OK	
Association with EAP-TLS authentication	OK	
Association with WPA3 SAE (Personal) authentication	N/A	Not supported in WLC 8.5
Association with WPA3 Enterprise authentication	N/A	Not supported in WLC 8.5
Association, Multiple ESSIDs	OK	
Beacon Interval and DTIM Period	OK	
PMKSA Caching	N/T	Not tested
WPA2-opportunistic/proactive Key Caching	N/T	Not tested
WMM Prioritization	OK	
802.11 Power-save mode	OK	
802.11e U-APSD	OK	
Roaming, WPA2-PSK, AES Encryption	OK *	Typical roaming time 45ms
Roaming, WPA2-PSK, AES Encryption, 802.11r/FT	OK	Typical roaming time 35ms
Roaming, PEAP-MSCHAPv2 Auth, AES Encryption	N/T *	802.11r required
Roaming, PEAP-MSCHAPv2 Auth, AES Encryption, 802.11r/FT	OK	Typical roaming time 40ms
Channel usage controlled by 802.11k	OK	

Average roaming times are measured using 802.11a/n/ac. Refer to Appendix B for detailed test results

*) 802.11r / FT is generally recommended to enhance roaming performance.

Known limitations

Description and Consequence	Workaround	Ticket(s) raised
It's now mandatory to use 802.11r/FT with EAP authentication. OKC is no longer tested.		

For additional information regarding the known limitations please contact **interop@ascom.com** or **support@ascom.com**.

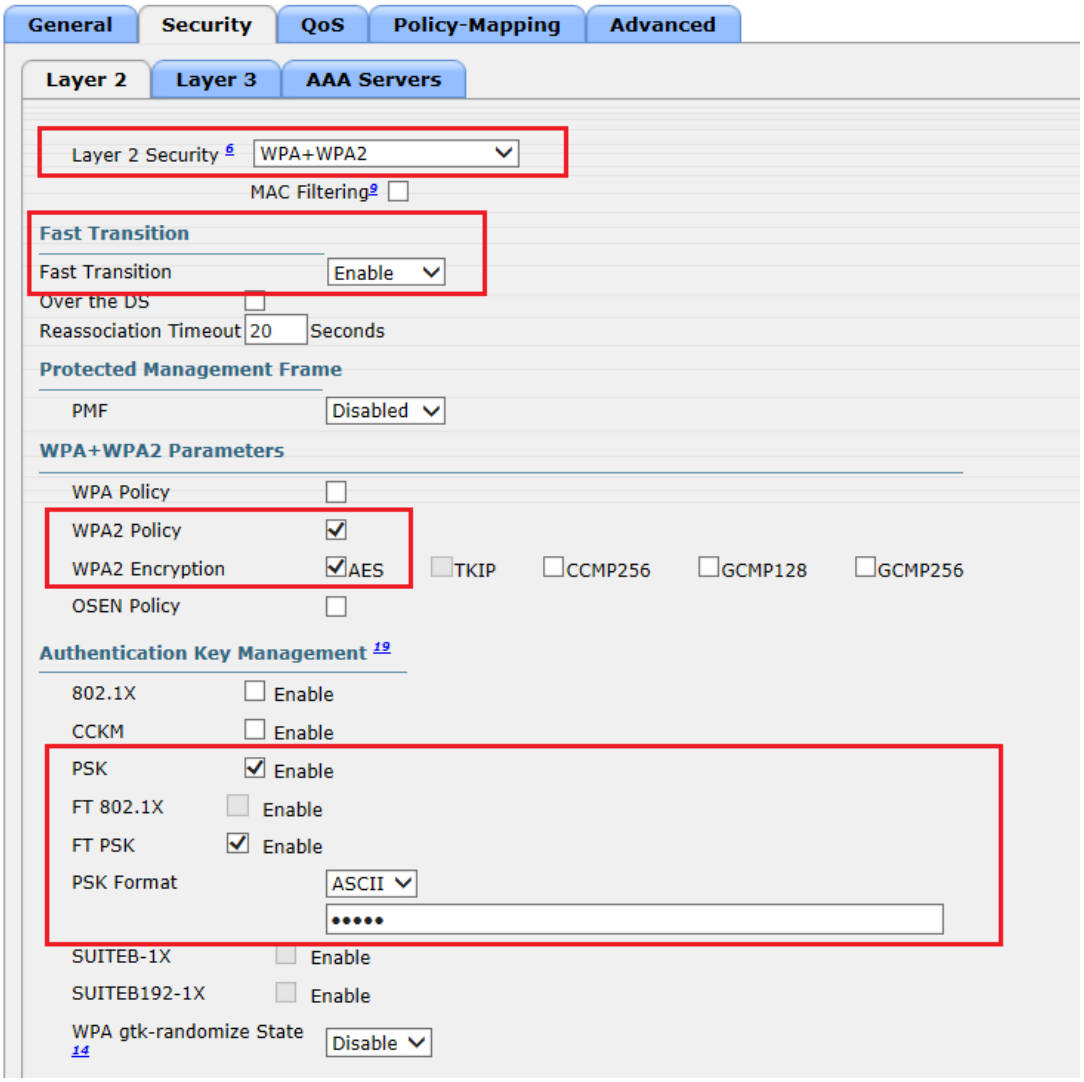
For detailed verification results, refer to Appendix B: Interoperability Validation Records.

Appendix A: Validation Configurations

Cisco WLC platform Version 8.5.182

In the following chapter you will find screenshots and explanations of basic settings in order to get a Cisco WLC WLAN system to operate with an Ascom i63. Please note that security settings were modified according to requirements in individual test cases.

Security settings (PSK)



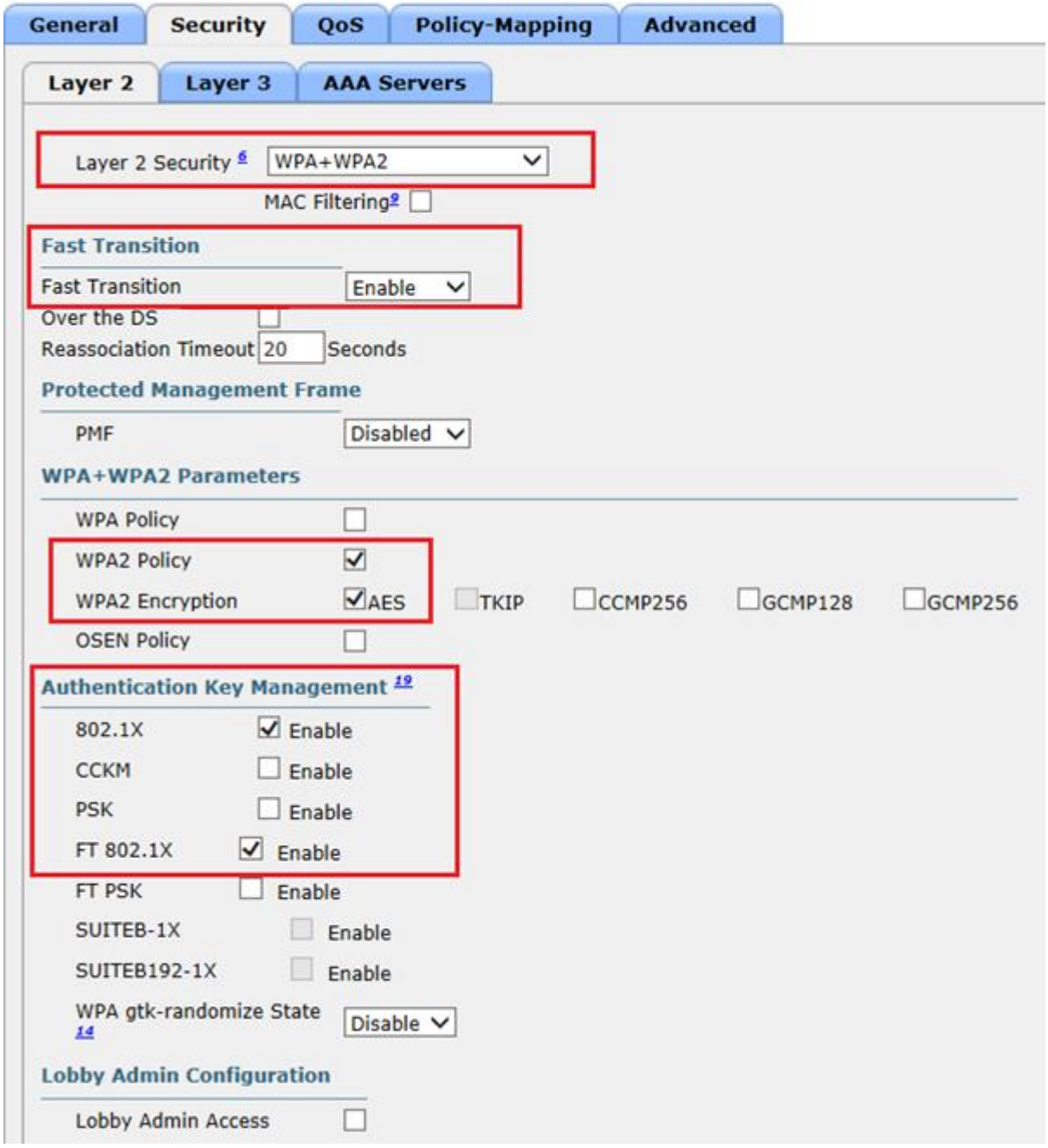
Example of how to configure the system for PSK (WPA2-AES)

Security profile WPA2-PSK, AES encryption

- Select WPA2 Policy with AES encryption.
- Select PSK and enter a key (Here in ASCII format)
- It is strongly recommended to use Fast Transition (802.11r) for enhanced roaming performance
- Select both PSK and FT PSK for compatibility with i62 and Myco 1 & 2 on the same SSID.

Compatibility Note. 802.11r is not supported by Ascom i62 and Myco 1 & 2 but the devices have no problem operating on a SSIDs were 802.11r (FT) is advertised in conjunction with a legacy method.

802.1X authentication (PEAP-MSCHAPv2).



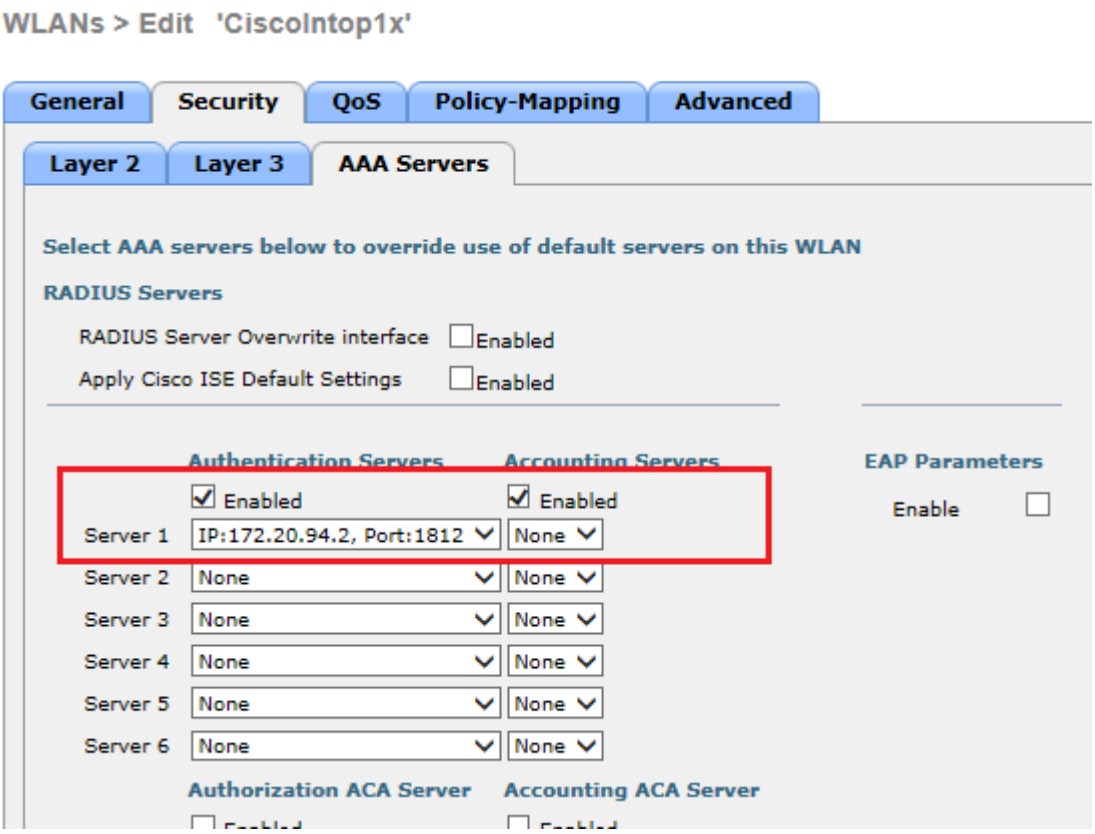
Example of how to configure the system for .1X authentication

Configuration of authentication using external Radius server, 802.1X (Step 1). In this example is WPA2-AES used. Select 802.1X as Authentication Key Management.

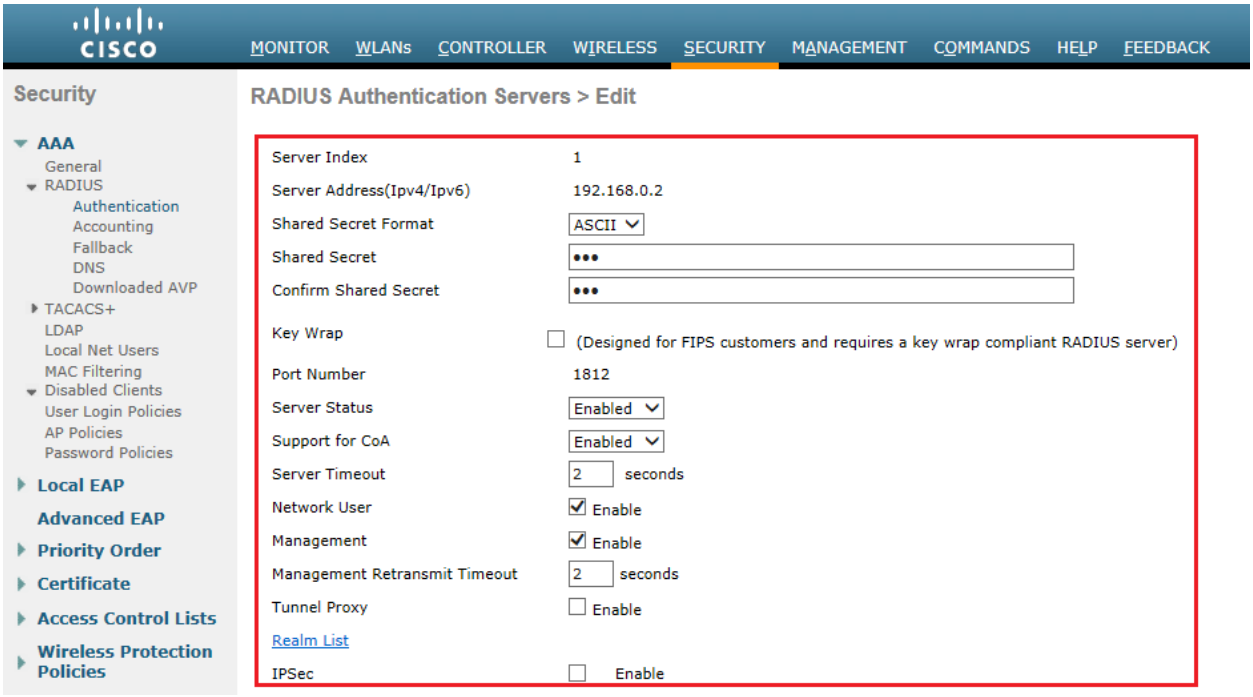
- It is mandatory use Fast Transition (802.11r). OKC is no longer tested
- Select WPA2 Policy with AES encryption.
- Select both 802.1X and FT 802.1X for compatibility with i62 and Myco 1 and 2 on the same SSID.

  In cases were i62 and Myco 1 & 2 using CCKM, select both CCKM and FT 802.1X for compatibility.

Compatibility Note.. 802.11r is not supported by Ascom i62 and Myco 1 & 2 but the devices have no problem operating on a SSIDs were 802.11r (FT) is advertised in conjunction with a legacy method.



Example of authentication configuration using external Radius server (Step 2). Select the server to use. The server is configured under tab Security/Radius. See configuration of server below.

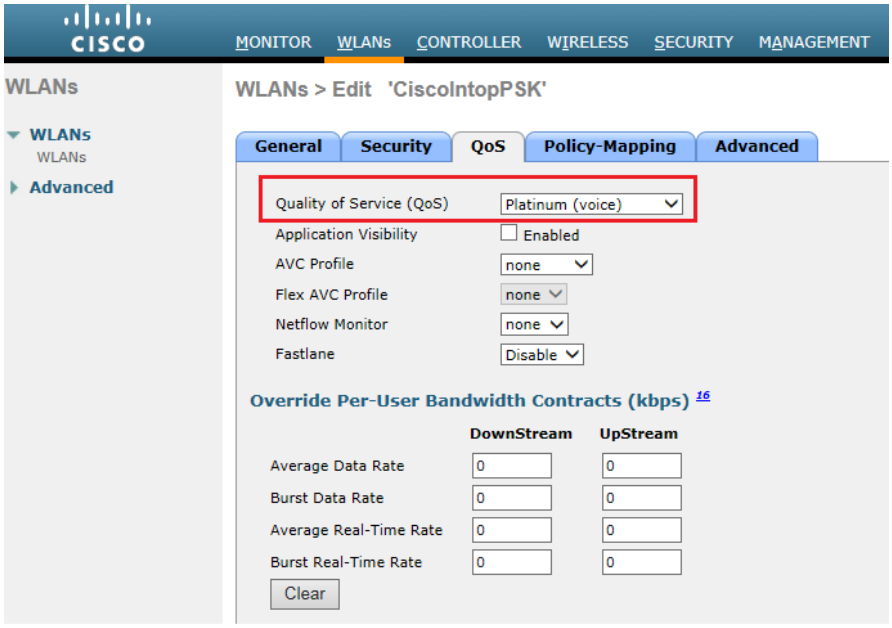


Configuration of authentication using external Radius server (Step 3). The IP address and the secret must correspond to the IP and the credential used by the Radius server. Tests were performed using FreeRadius as RADIUS server.

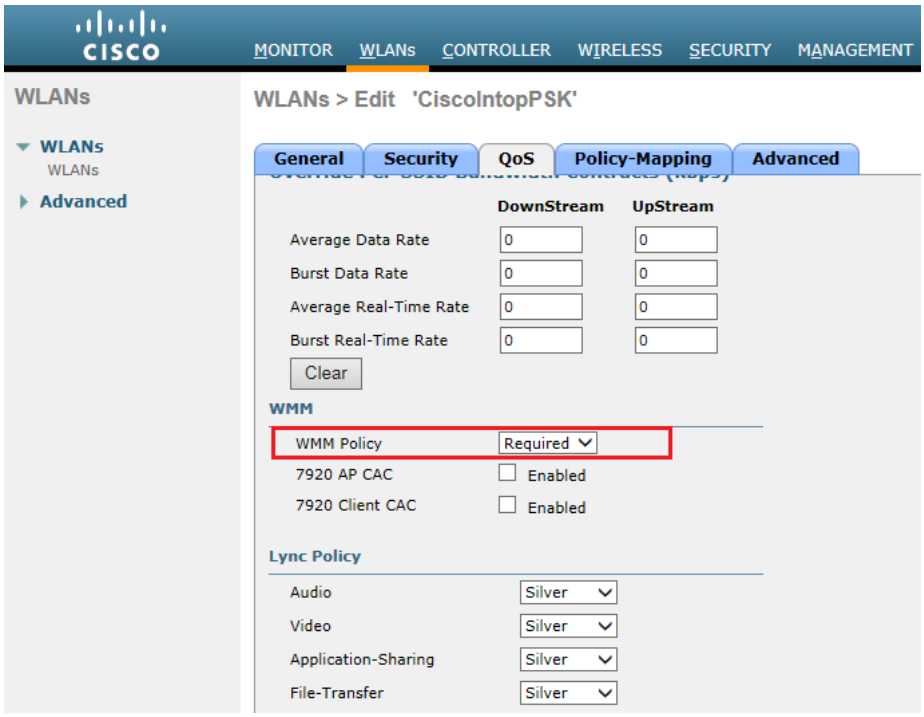
Note. Depending on authentication method used it might be necessary to add a certificate into the i63. PEAP-MSCHAPv2 requires a CA certificate and EAP-TLS requires both a CA certificate and a client certificate.

Note. Refer to the i63 section in for matching handset configurations.

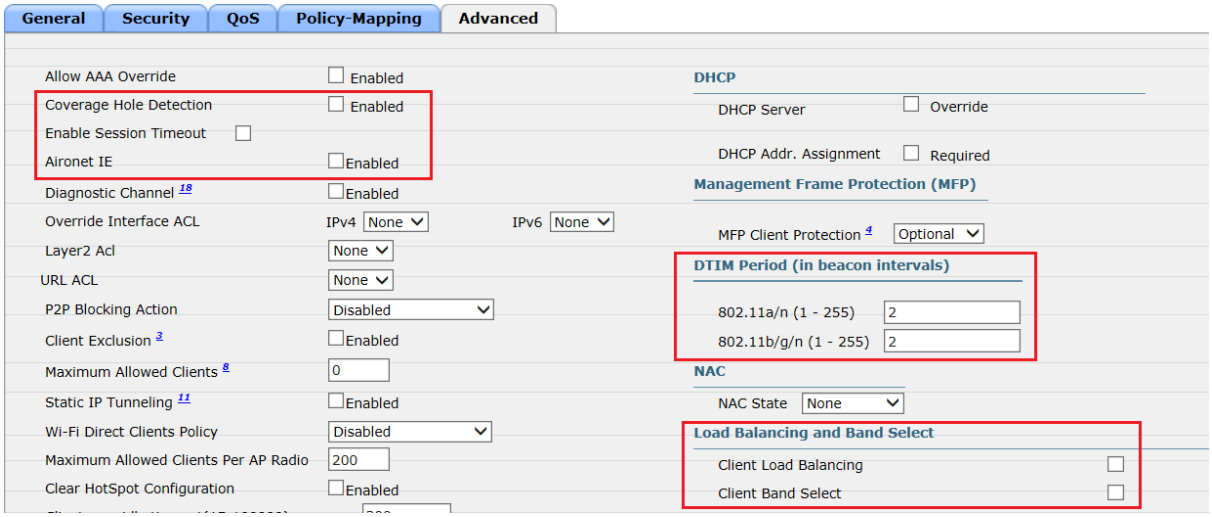
General settings (QoS, Radio)



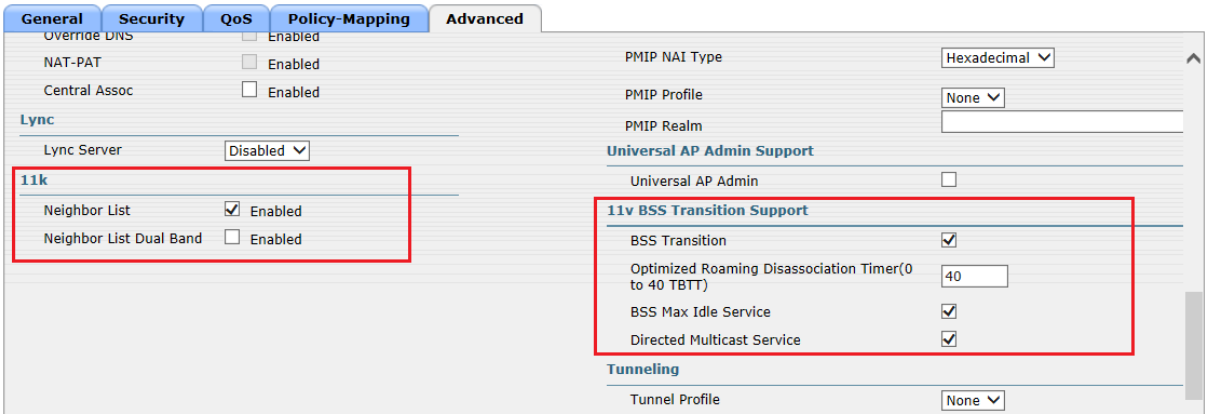
Set QoS to “Platinum (Voice)”



Make sure that WMM policy is set to “Required” or “Allowed”



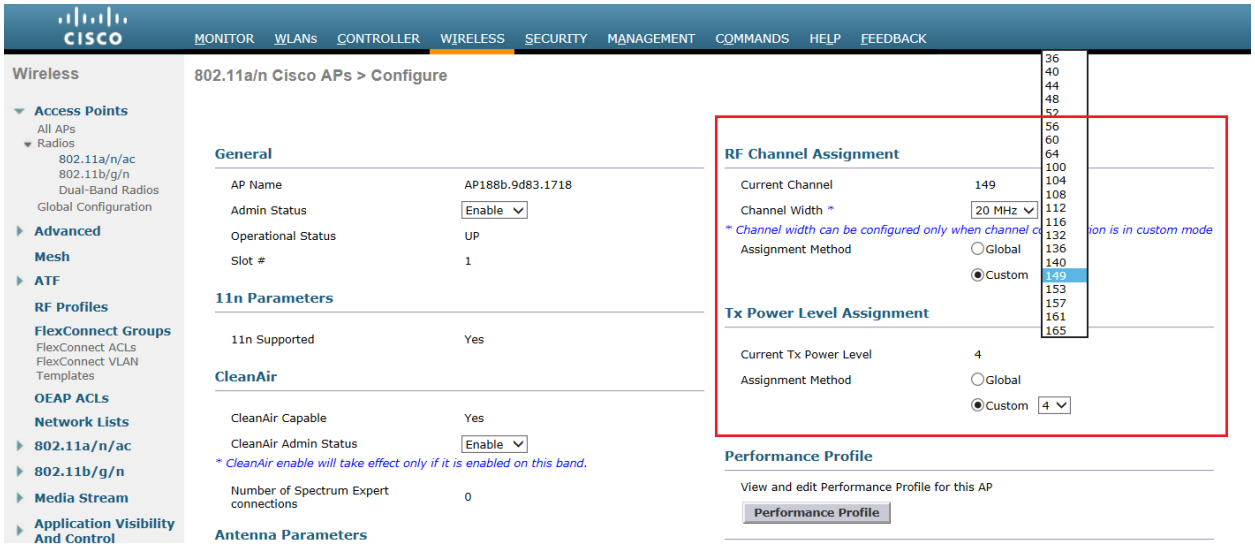
- Make sure “Session timeout” is disabled or set to a very large value.
- Coverage Hole Detection can be left enabled if RRM is used in the system.
- Aironet IE is not needed for i63
- Ascom recommends a DTIM period of at least 2 but no higher than 5. A higher value offers slightly better standby time for i62 while the effect for i63, Myco 2 and Myco 3 is marginal.
- Make sure Client Load Balancing and Client Band select is disabled.



- Make sure 11k – Neighbour list is enabled (Default setting).
- 11v BSS Transition Support is not supported by Ascom i63 but can be left enabled per default configuration.

Note for mixed device installation. Ascom i62 and Myco 1 & 2 do not support 11k but have no problem operating on an SSID were these settings are enabled. (Assuming i62 version 6.0.0 and later)

Channel configuration. See next picture for additional information.

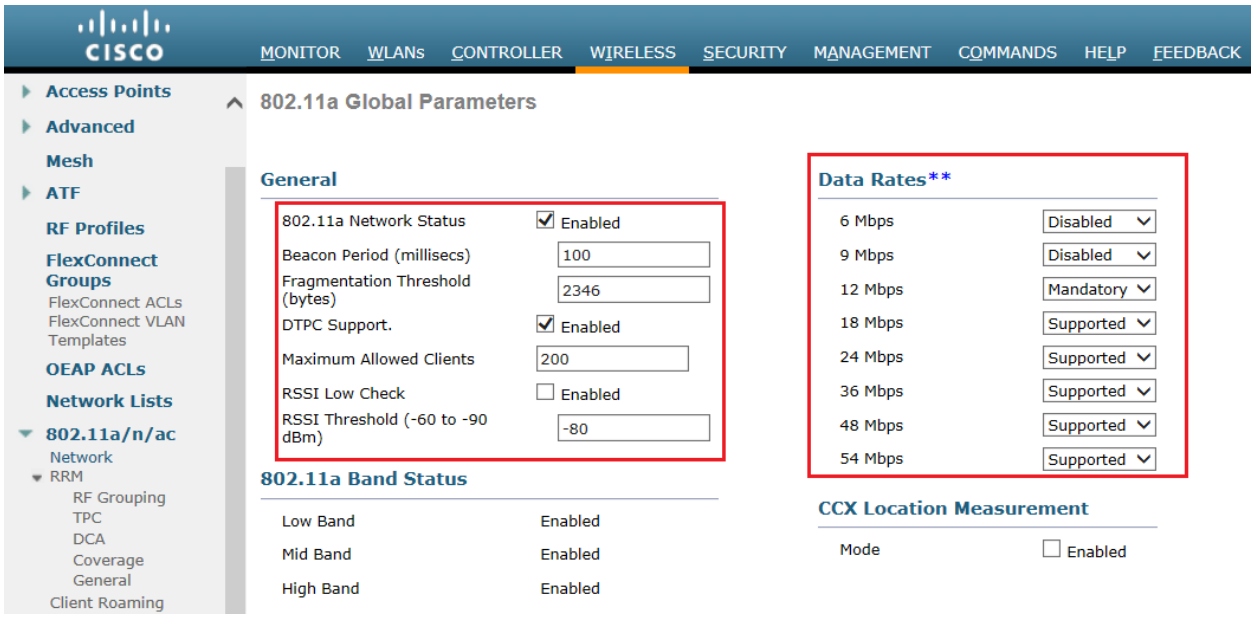


Ascom recommended settings for 802.11b/g/n are to only use channel 1, 6 and 11. For 802.11a/n/ac use channels according to the infrastructure manufacturer, country regulations and per guidelines below.

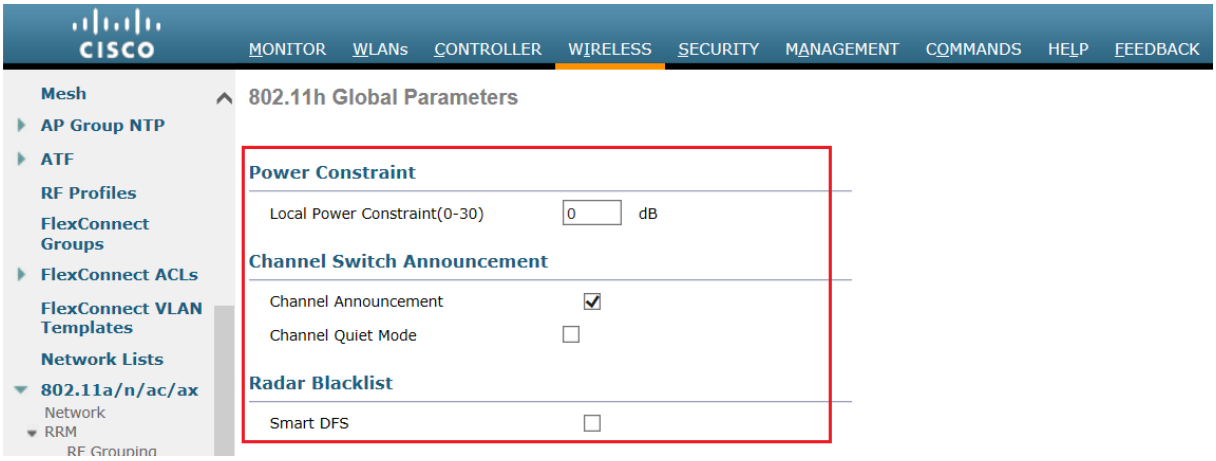
Note that Tx power level and channel was manually set for test purpose. A typical setup will rely on the Global setting for channel and power configuration.

General guidelines when deploying Ascom i63 handsets in 802.11a/n/ac environments:

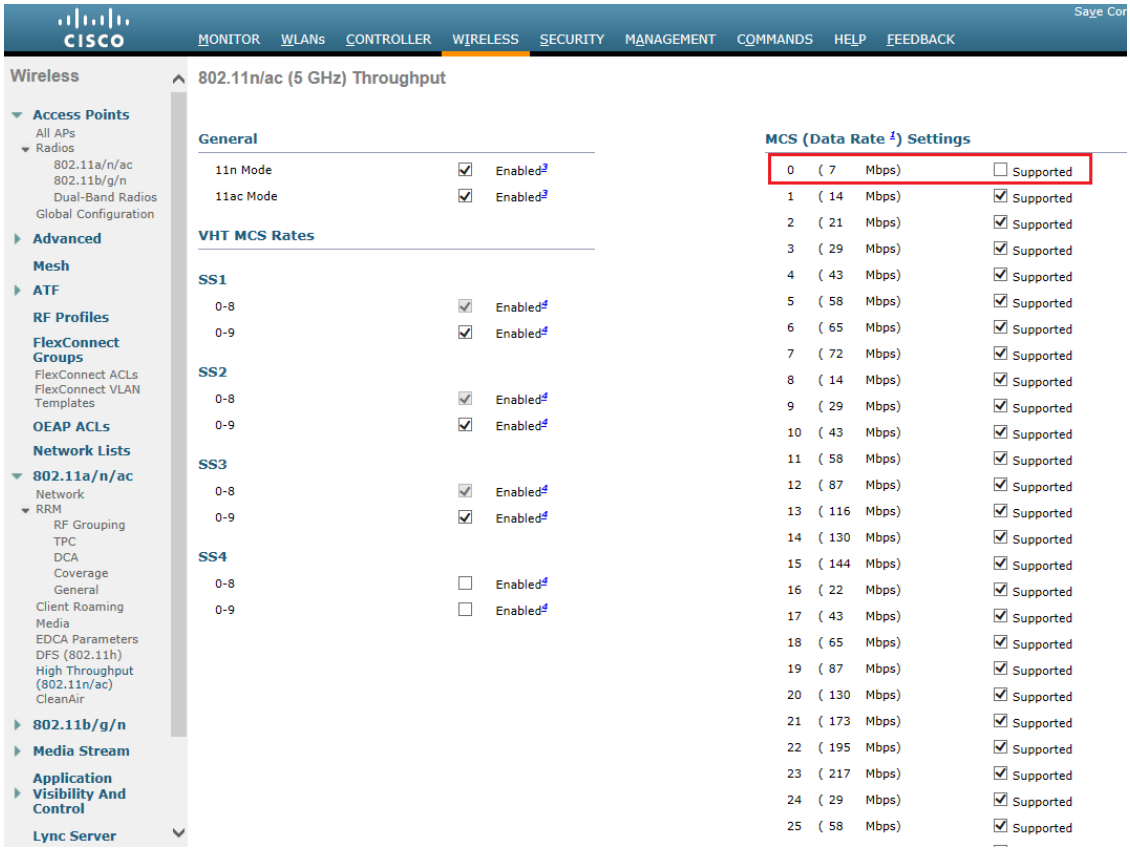
1. **For environments not utilizing 802.11k Neighbor Report - Enabling more than 8 channels will degrade roaming performance. (In situations where UNII1 and UNII3 are used, a maximum of 9 enabled channels can be allowed) Ascom does not recommend exceeding this limit unless 802.11k is in use.**
2. **Ascom do support and can coexist in 80MHz channel bonding environments. The recommendations is however to avoid 80 MHz channel bonding as it severely reduces the number of available non overlapping channels.**
3. **Make sure that all non-DFS channel are taken before resorting to DFS channels. The handset can cope in mixed non-DFS and DFS environments; however, due to "unpredictability" introduced by radar detection protocols, voice quality may become distorted and roaming delayed. Hence Ascom recommends if possible avoiding the use of DFS channels in VoWiFi deployments.**



The default data rate set will work just fine, however Ascom recommends disabling the lowest data rates and have 12Mbps as lowest data rate.

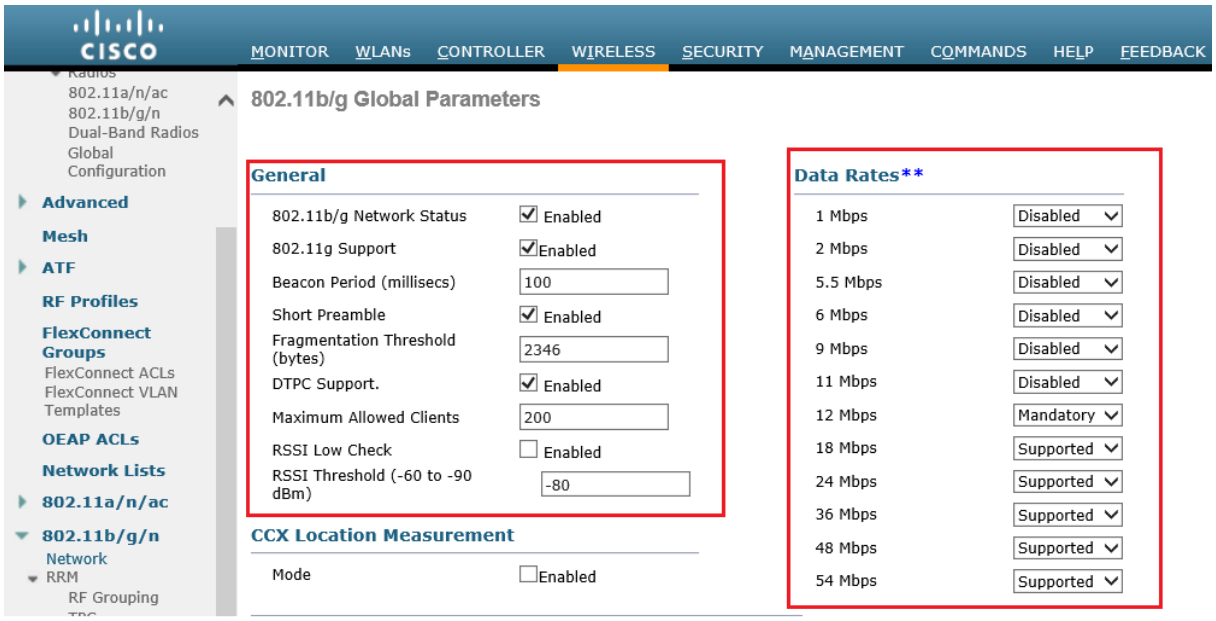


As Ascom i63 do support Channel Switch Announcement it's recommended to have this setting enabled in the system (only applicable when DFS channels are used)

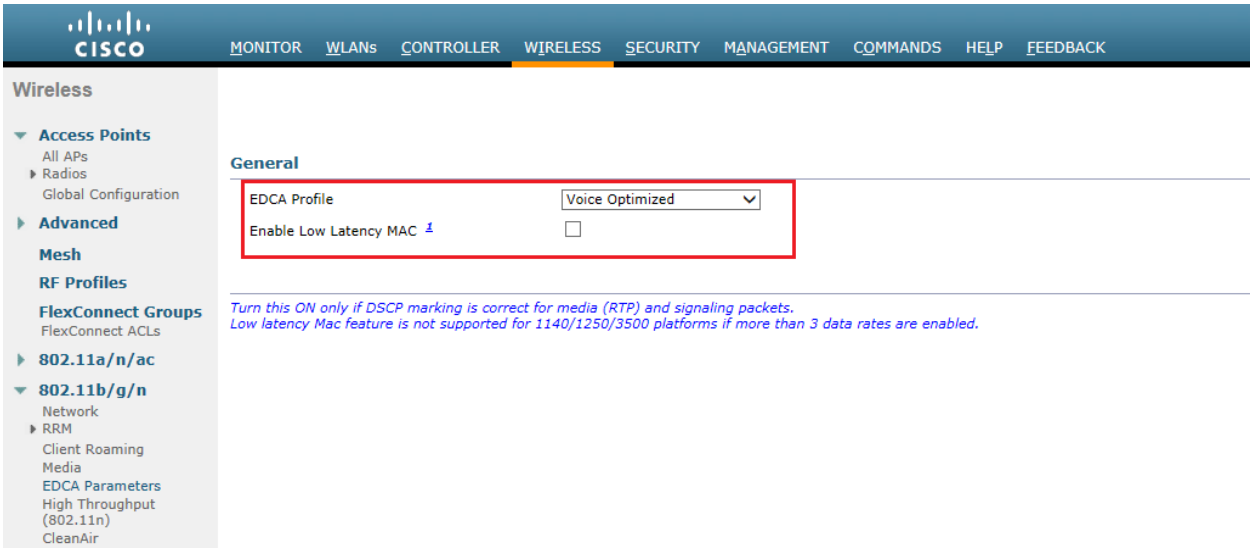


Ascom does support both usage of “11n Mode” and “11ac Mode” including 40 MHz and 80MHz channels. Its possible to also disable the lowest MCS data rates for optimal performance.

Follow the recommendations “General guidelines when deploying Ascom i63 handsets in 802.11a/n/ac environments“



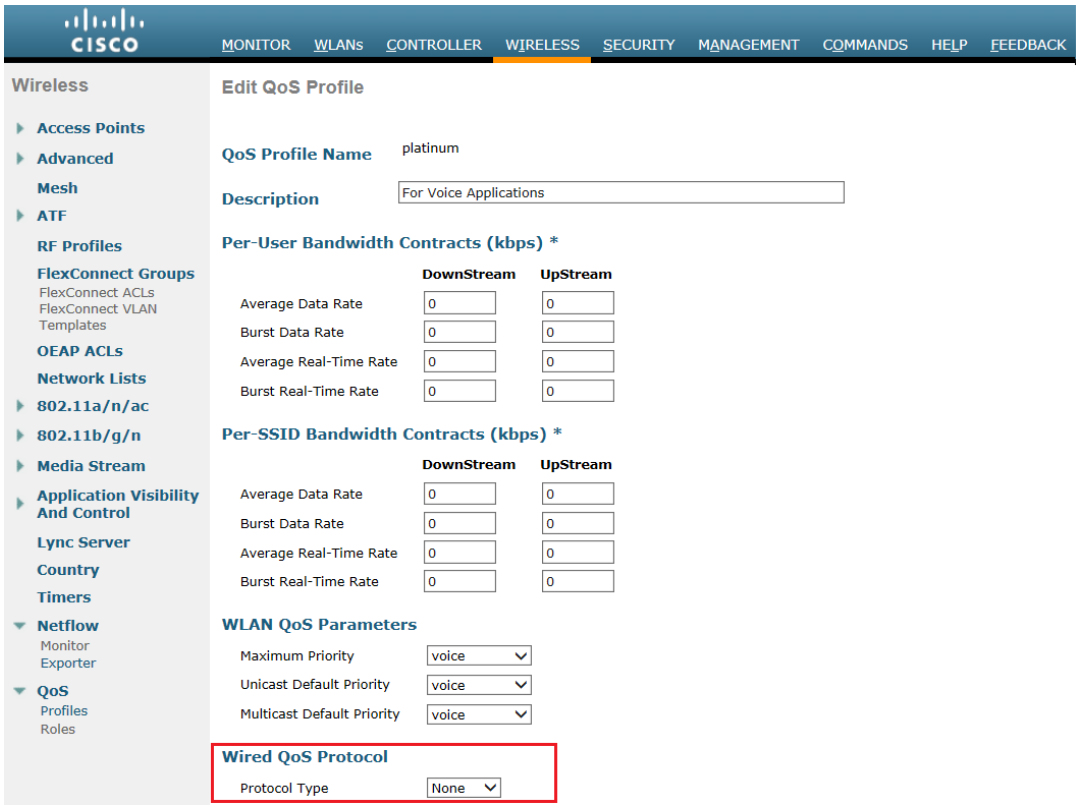
The default data rate set will work fine, however for optimization Ascom recommends disabling the lowest data rates and have 12Mbps as lowest mandatory rate.



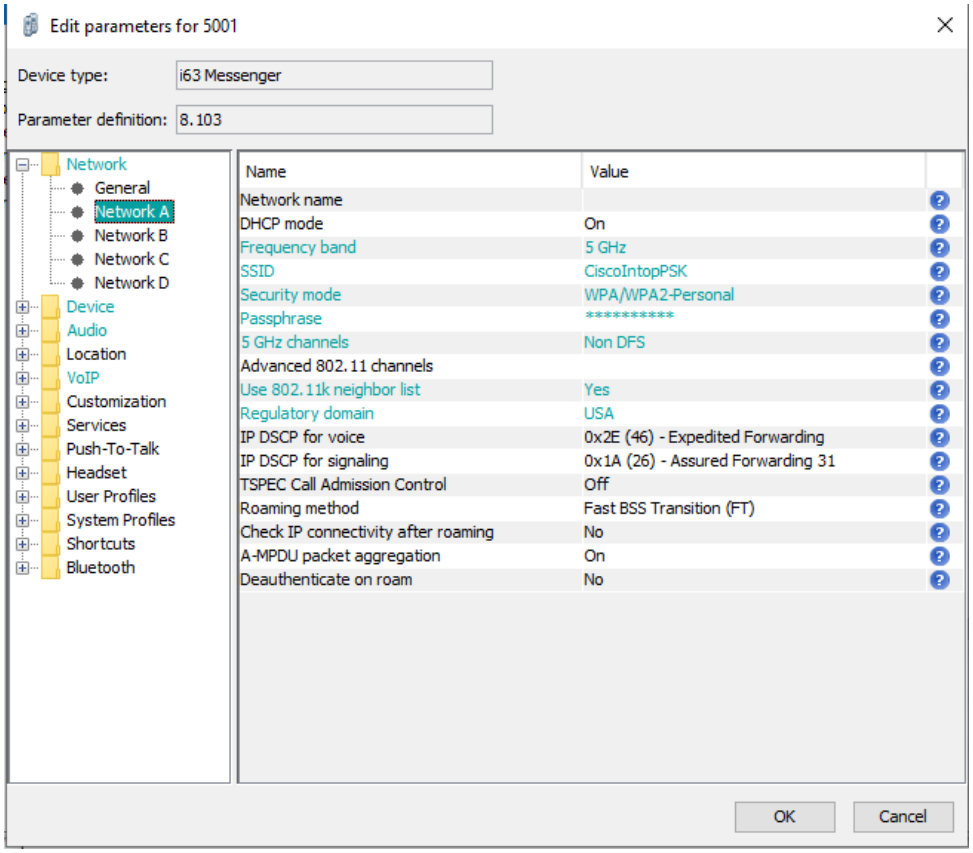
Ascom recommends “EDCA Profile”: Voice Optimized

Make sure Low Latency MAC is disabled. (Both 802.11a/n/ac and 802.11b/g/n)

Note. Using EDCA Profile “WMM” is acceptable but “Voice Optimized” is to prefer when voice clients are present in the system.



Depending on the infrastructure (switches) ”Protocol Type” may have to be disabled.

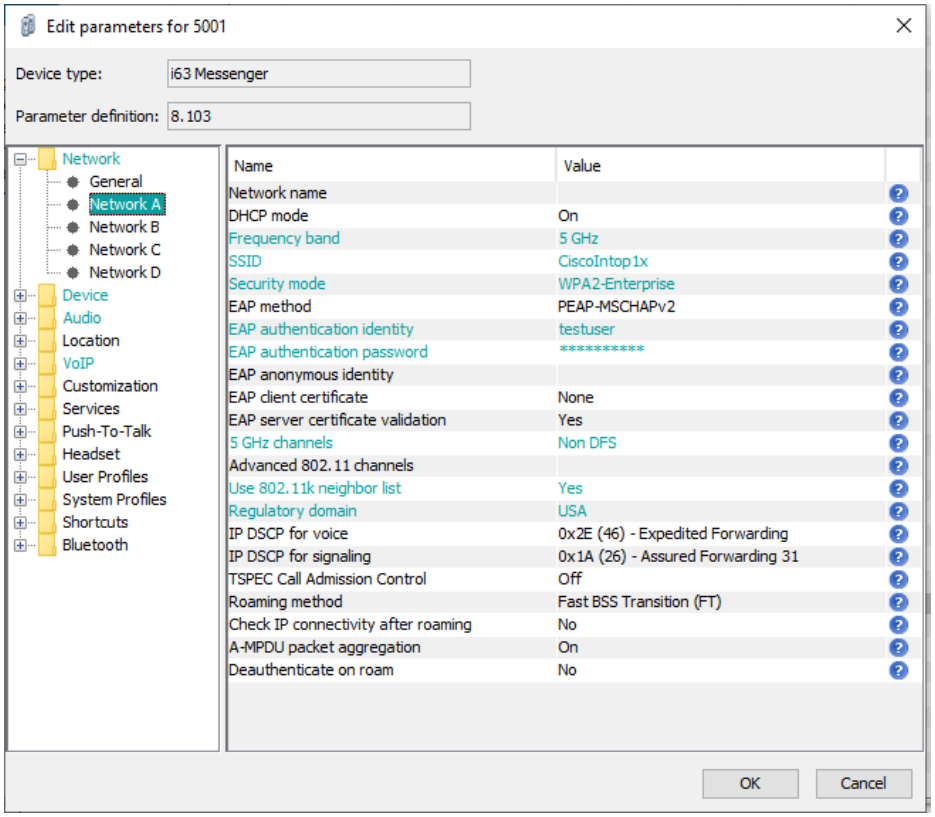


Network settings for WPA2-PSK

Make sure that the enabled channels in the i63 handset match the channel plan used in the system.

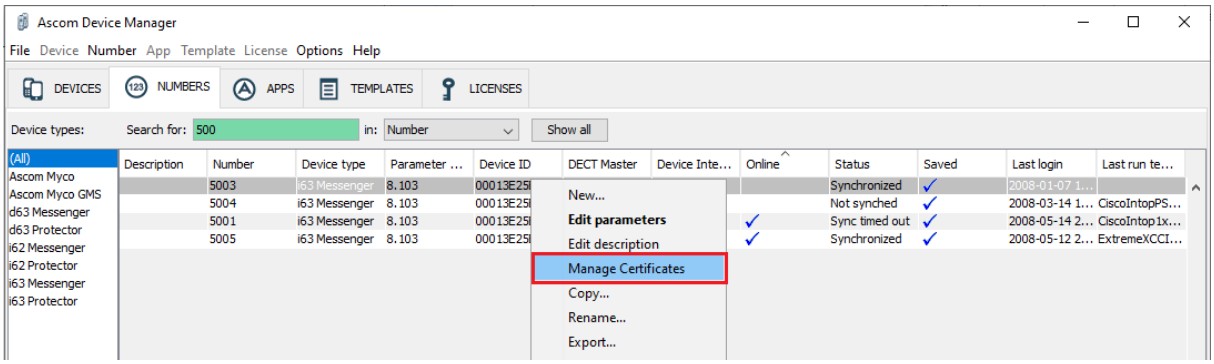
802.11k neighbor list will improve roaming performance especially when the number of channels in the system exceed the 9 non-DFS channels .

Note. FCC is no longer allowing 802.11d to determine regulatory domain. Devices deployed in USA must set Regulatory domain to “USA”.



Network settings for .1X authentication (PEAP-MSCHAPv2)

802.11k neighbor list will improve roaming performance especially when the number of channels in the system exceed the non 9 non-DFS channels .



802.1X Authentication requires a CA certificate to be uploaded to the phone by “right clicking” - > Edit certificates. EAP-TLS will require both a CA and a client certificate.

Note that both a CA and a client certificate are needed for TLS. Otherwise only a CA certificate is needed. Server certificate validation can be overridden in version 4.1.12 and above per handset setting.

Appendix B: Interoperability Validation Records

Pass	13
Fail	0
Comments	3
Not verified	14
Total	30

Refer to the attached file for detailed verification results.

Refer to the verification specification for explicit information regarding each verification case.
The specification can be found here (requires login):
https://www.ascom-ws.com/AscomPartnerWeb/en/startpage/Sales-tools/Interoperability/Templates/

Document History

Rev	Date	Author	Description
P1	14-Feb-22	SEKMO	Draft
R1	21-Feb-22	SEKMO	Minor adjustments after internal review.