INTEROPERABILITY REPORT

Ascom i63

Ruckus Wireless

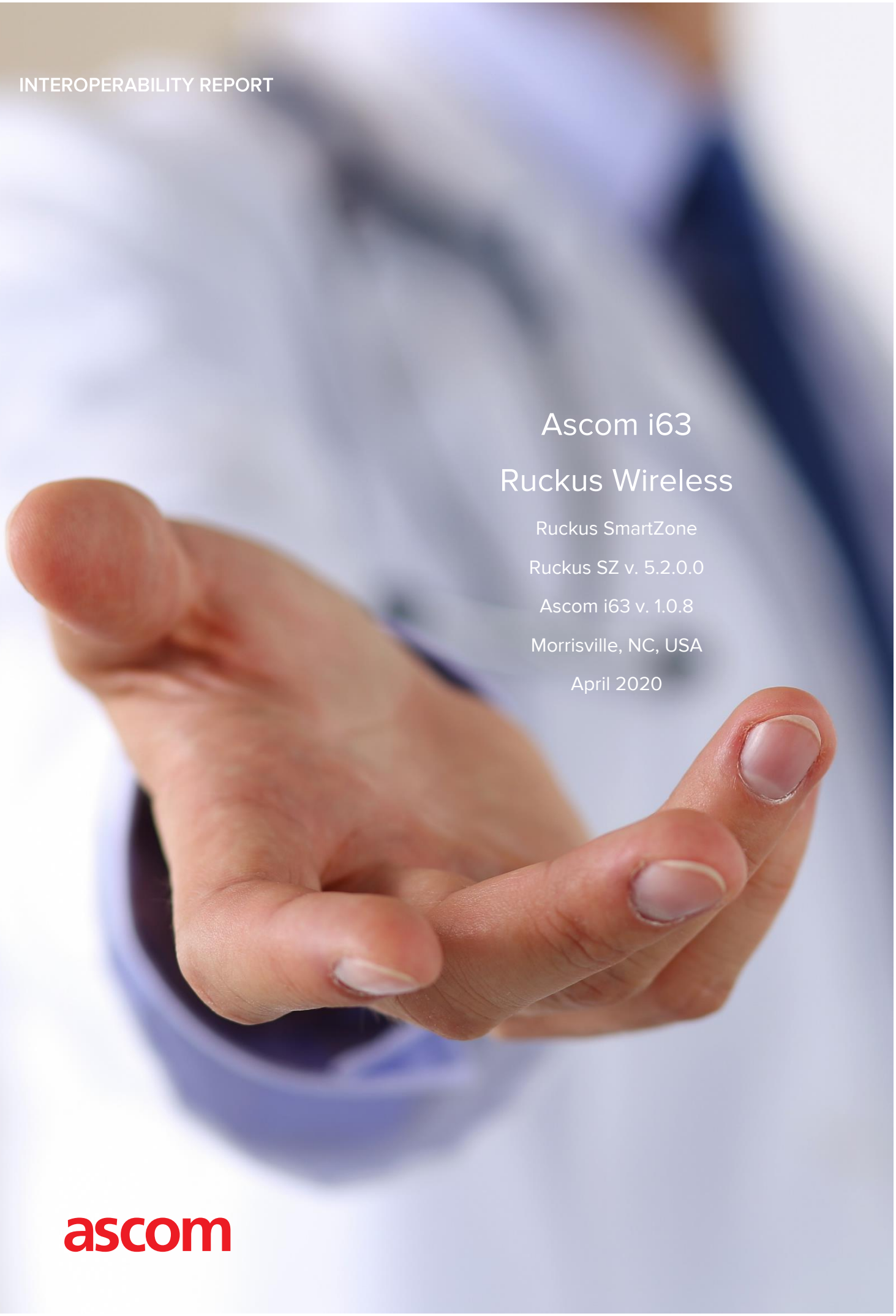
Ruckus SmartZone

Ruckus SZ v. 5.2.0.0

Ascom i63 v. 1.0.8

Morrisville, NC, USA

April 2020



ascom

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Introduction

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

Ruckus Networks, an ARRIS company, is redefining connectivity around the globe. With our partners, we build secure wired and wireless access networks for organizations that place a premium on connectivity experiences for end users as well as simplicity. Follow Ruckus on Twitter, Facebook, LinkedIn, Instagram, YouTube and subscribe to our blog.

About CommScope & Ruckus

CommScope (NASDAQ: COMM) and the recently acquired ARRIS and Ruckus Networks are redefining tomorrow by shaping the future of wired and wireless communications. Our combined global team of employees, innovators and technologists have empowered customers in all regions of the world to anticipate what's next and push the boundaries of what's possible. Discover more at www.commscope.com.Site Information

Site Information

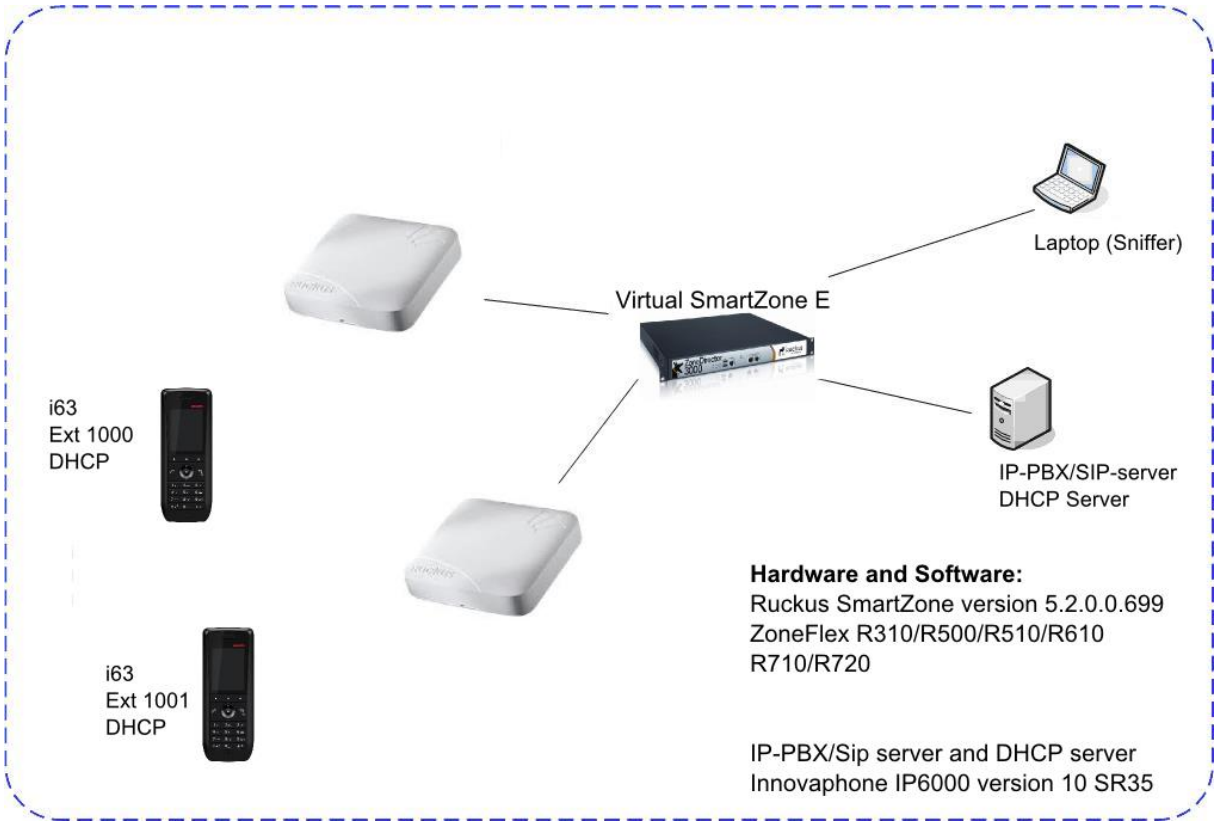
Verification site

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

Participants

Karl-Magnus Olsson, Ascom, Morrisville

Verification topology



Summary

General conclusions

Validation includes new access point R720 which has undergone the complete test. The previously already validated access points has undergone a less extensive test. For example, capacity test and battery measurements have been left out. For test cases left out we consider the test results from previous full test valid.

Test cases, such as authentication and roaming and power save have however all been successful across the board.

Compatibility information

All test were performed using a Virtual SmartZone E. We ensure compatibility/interoperability with all the access points and controllers listed below given that they run the software tested.

Supported Partner Access Points with Ruckus Wireless version SmartZone 5.2.0.0.699:

ZoneFlex R300, R310, R500, R510, R600, R610, R710, R720, T310

Supported controller platforms with Ruckus Wireless version SmartZone 5.2.0.0.699:

Virtual SmartZone H (vSZ-H)

Virtual SmartZone E (vSZ-E)

Virtual SmartZone D (vSZ-D)

SmartZone 100 & 300

Verification overview

WLAN Compatibility and Performance

High Level Functionality	Result	Comments
Association, Open with No Encryption	NOK	
Association, WPA2-PSK / AES Encryption	OK	
Association, WPA2-PSK, AES Encryption, 802.11r/FT	OK	
Association, PEAP-MSCHAPv2 Auth, AES Encryption	OK	
Association, PEAP-MSCHAPv2 Auth, AES Encryption, 802.11r/FT	OK	
Association with EAP-TLS authentication	OK	
Association, Multiple ESSIDs	OK	
Beacon Interval and DTIM Period	OK	
PMKSA Caching	OK	
WPA2-opportunistic/proactive Key Caching	OK	
WMM Prioritization	OK	
802.11 Power-save mode	OK	
802.11e U-APSD	OK	
802.11e U-APSD (load test)	OK	
Roaming, WPA2-PSK, AES Encryption	OK	Avg. typical roaming time 75-100 ms
Roaming, WPA2-PSK, AES Encryption, 802.11r/FT	OK	Avg. typical roaming time 20-35 ms
Roaming, PEAP-MSCHAPv2 Auth, AES Encryption	OK *	Avg. typical roaming time 75-100 ms
Roaming, PEAP-MSCHAPv2 Auth, AES Encryption, 802.11r/FT	OK	Avg. typical roaming time 20-35 ms

Average roaming times are measured using on the 5GHz band. Refer to Appendix B for detailed test results

*) Measured times is with opportunistic/proactive Key Caching enabled (default enabled)

Known limitations

Description and Consequence	Workaround	Ticket(s) raised
Open authentication not working. To be corrected in next Ascom i63 release.		WH2-2382
Authentication with 802.11w (Protected Management Frames) does not work in conjunction with 802.11r	Disable Protected Management Frames in system.	WH2-2356

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

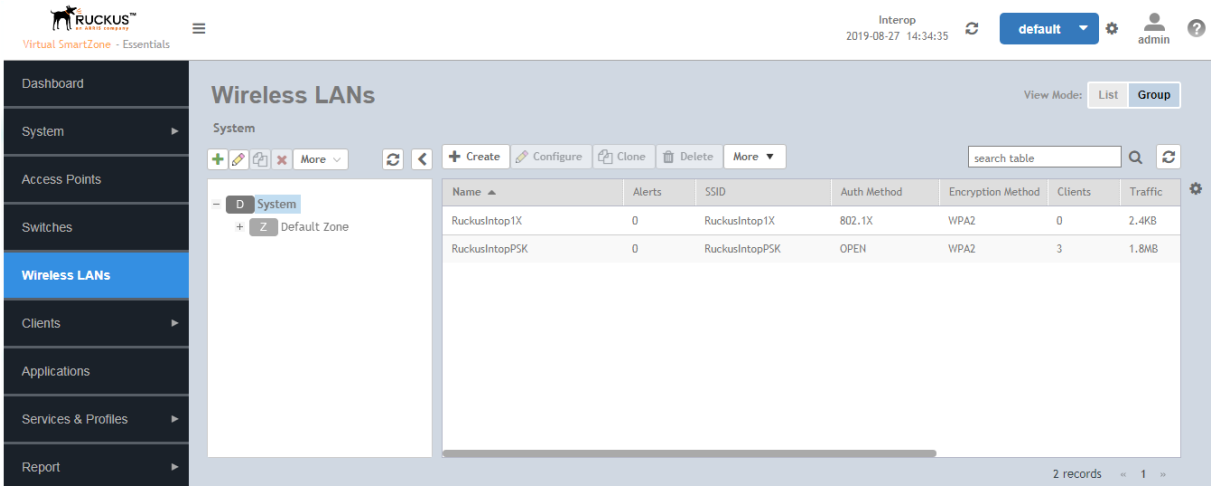
For detailed verification results, refer to Appendix B: Detailed Verification Records.

Appendix A: Verification Configurations

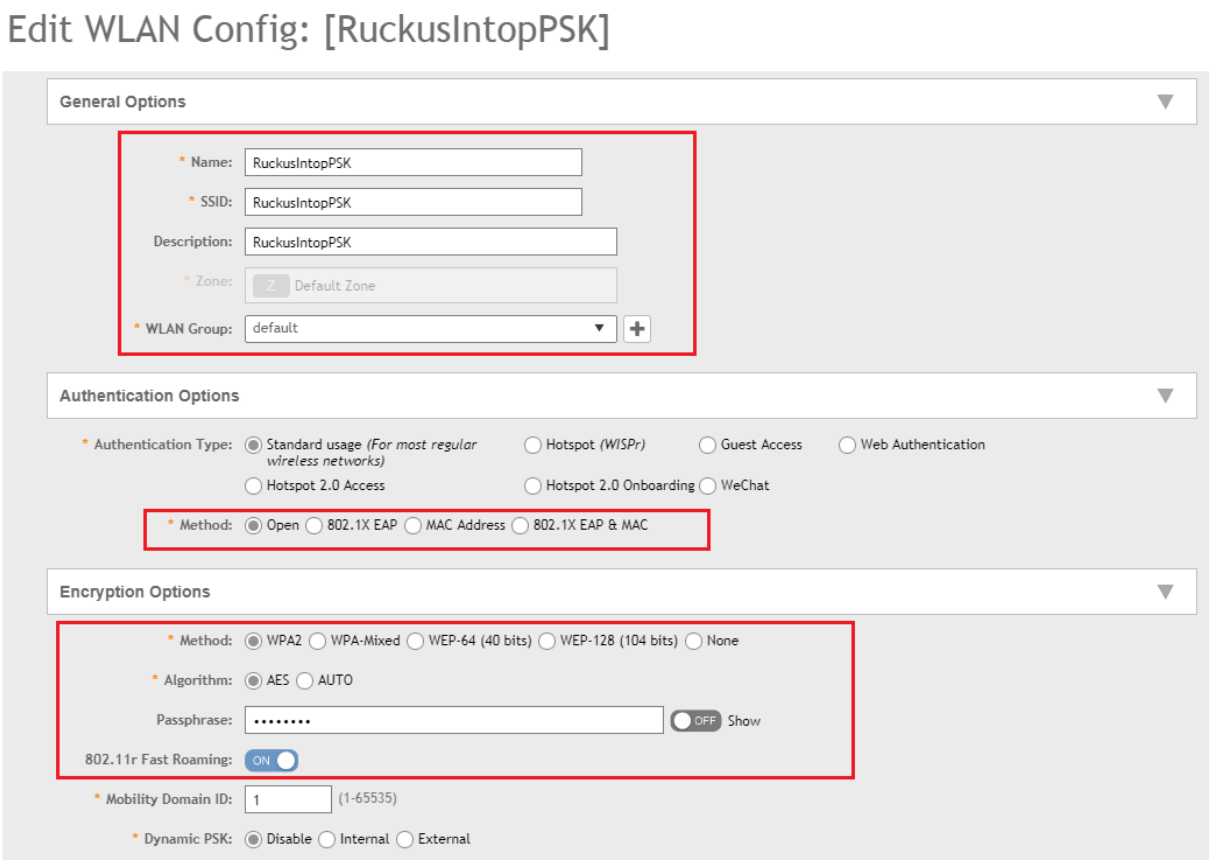
Ruckus Wireless SmartZone version 5.2.0.0.699

In the following chapter you will find screenshots and explanations of basic settings in order to get a Ruckus Smartzone 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)

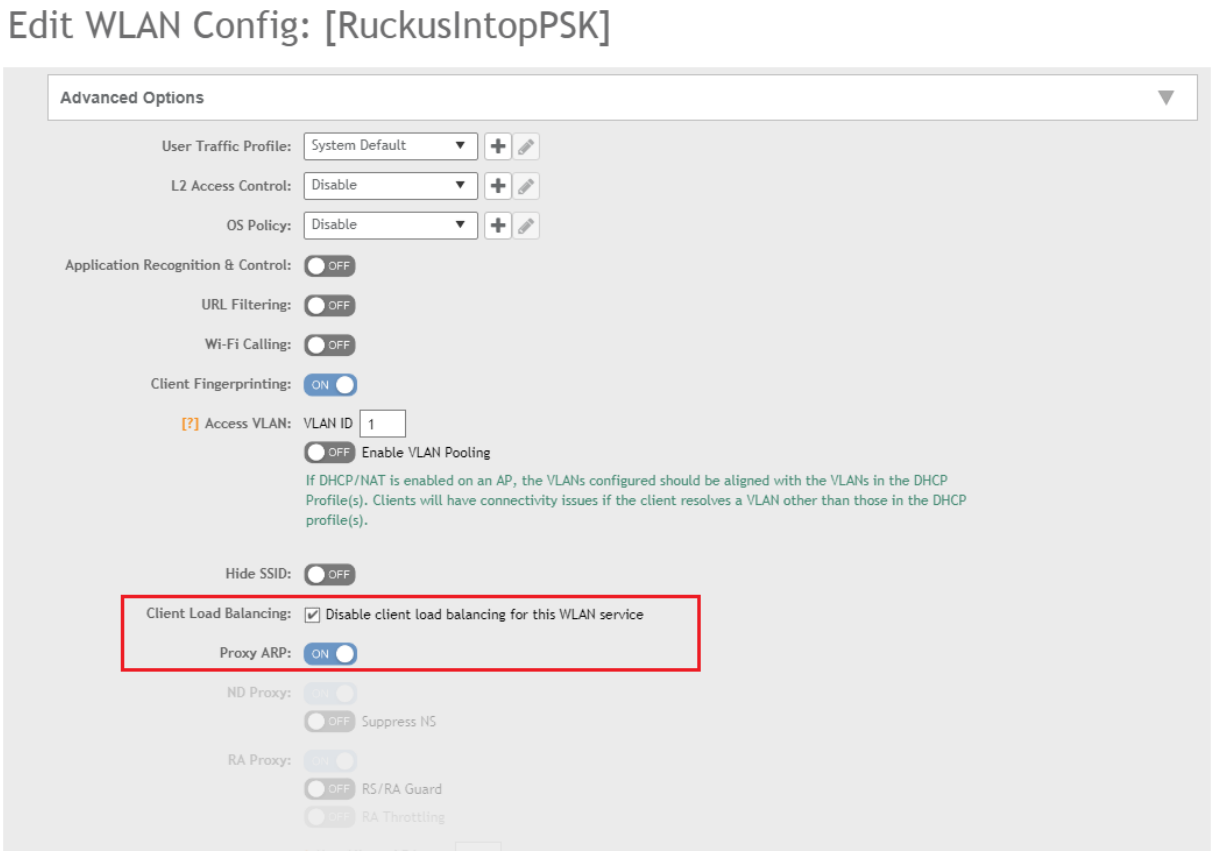


Wireless LAN overview.



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

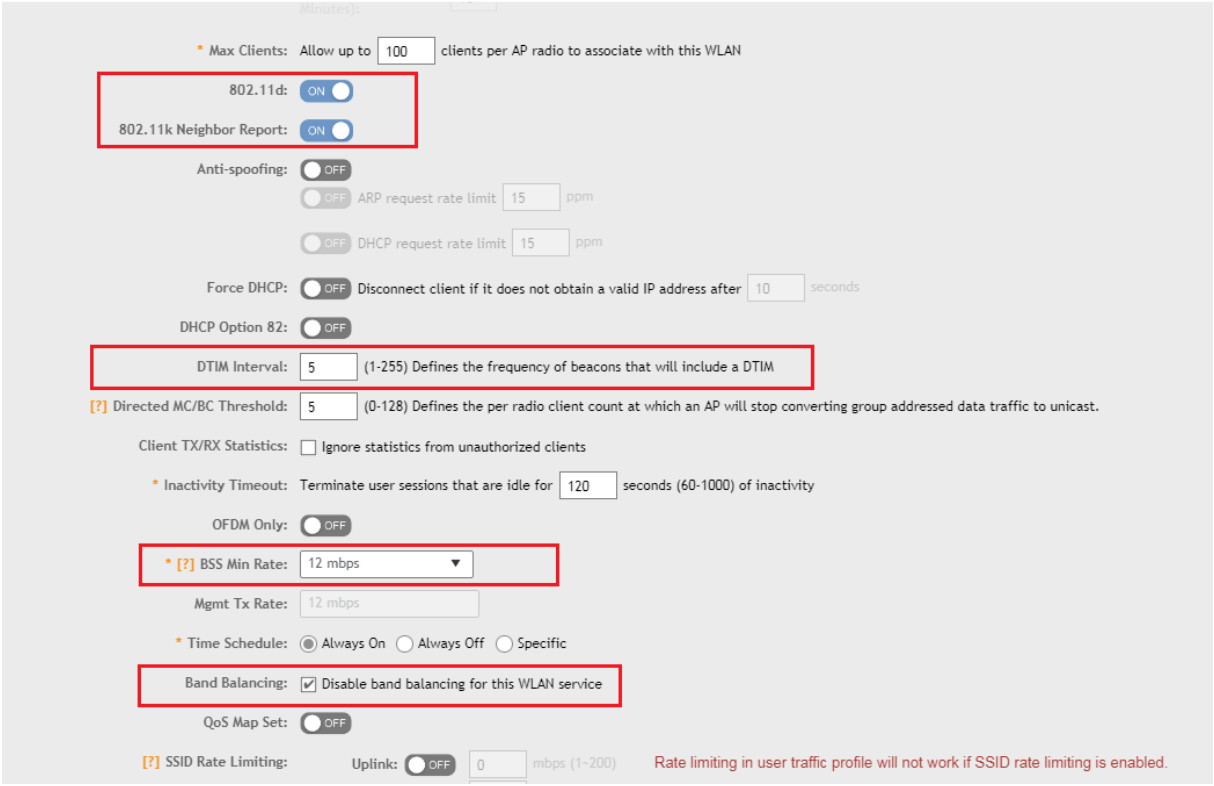
- Select open Authentication
- Select WPA2 and AES
- It is strongly recommended to use Fast Transition (802.11r) for enhanced roaming performance.
- Note. 802.11r is not supported by Ascom i62 and Myco 1 & 2 but the devices have no problem operating on a SSIDs were 802.11r (FT) is advertised in conjunction with a legacy method.



Advanced WLAN configuration

- Make sure Client Load Balancing is disabled
- Enable Proxy ARP

Edit WLAN Config: [RuckusIntopPSK]

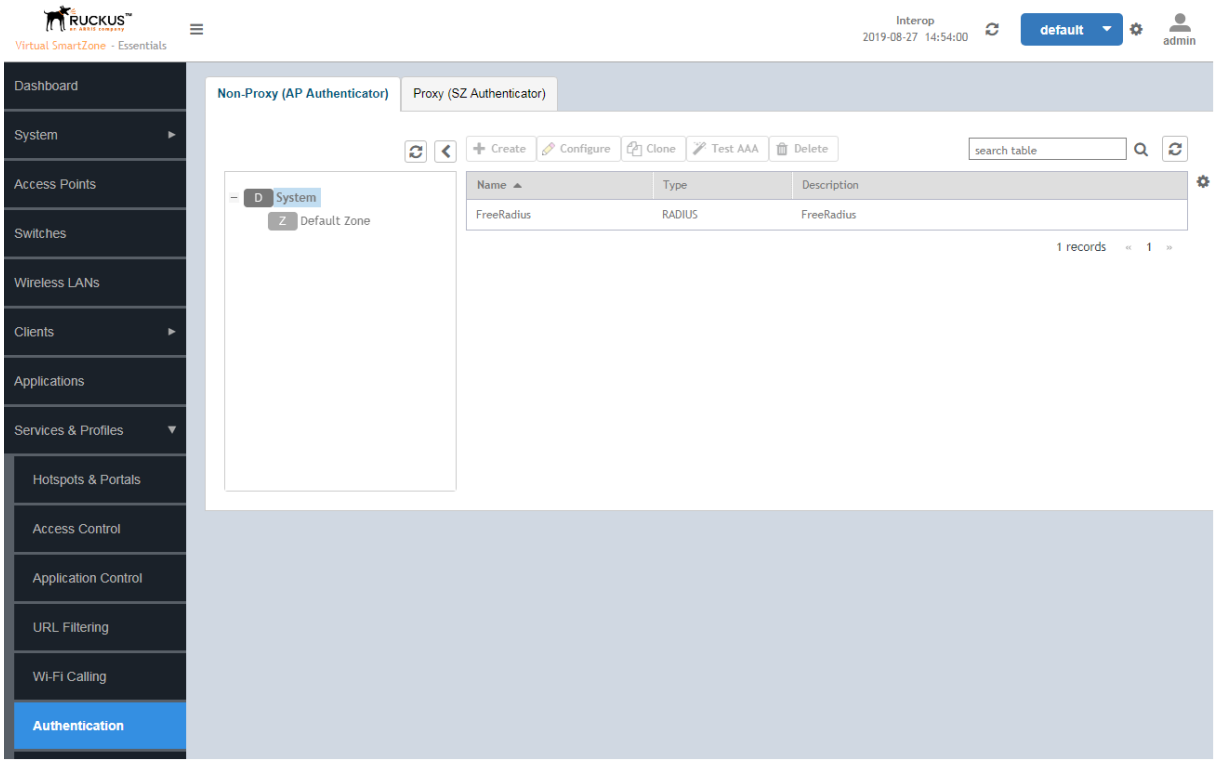


Advanced WLAN configuration (Continued)

- Enable 802.11d
- Enable 802.11k Neighbour report.
  Note that i62 Channels parameter needs to be set to enable 802.11k on handset side. See i63 configuration section below.
- Ascom recommends a DTIM period of at least 2 but no higher than 5.
- Set BSS Min Rate to 12mbps
- Make sure Band Balancing is disabled

Note. 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)

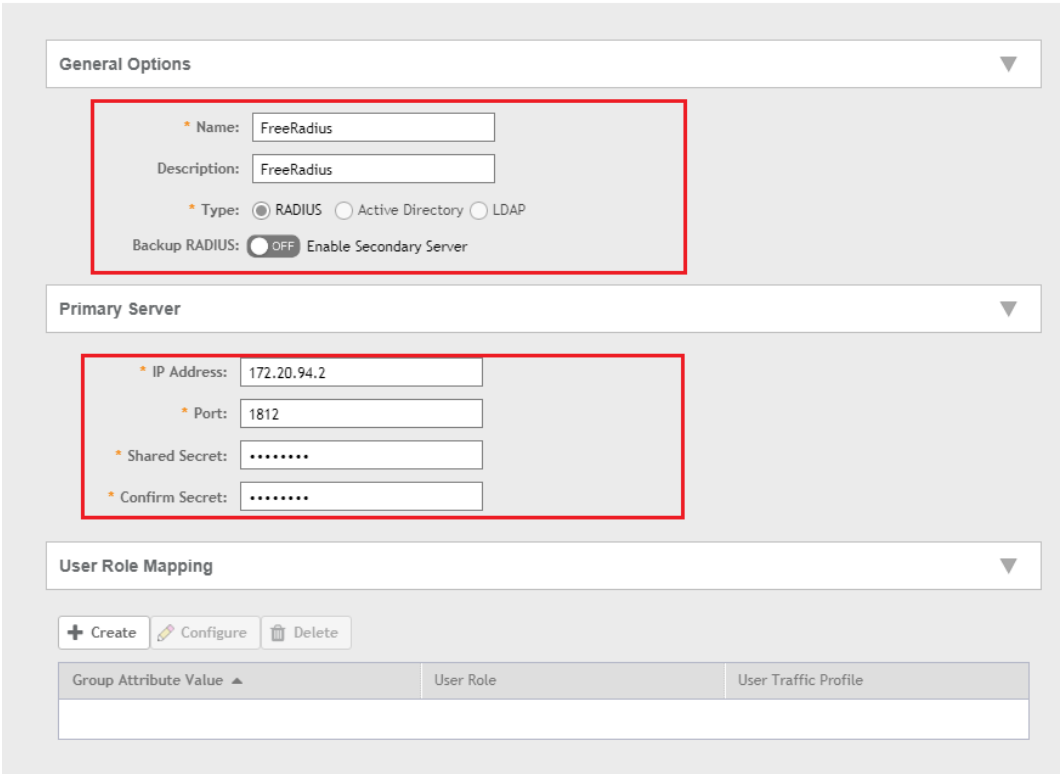
Security settings (802.1X / PEAP-MSCHAPv2)



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

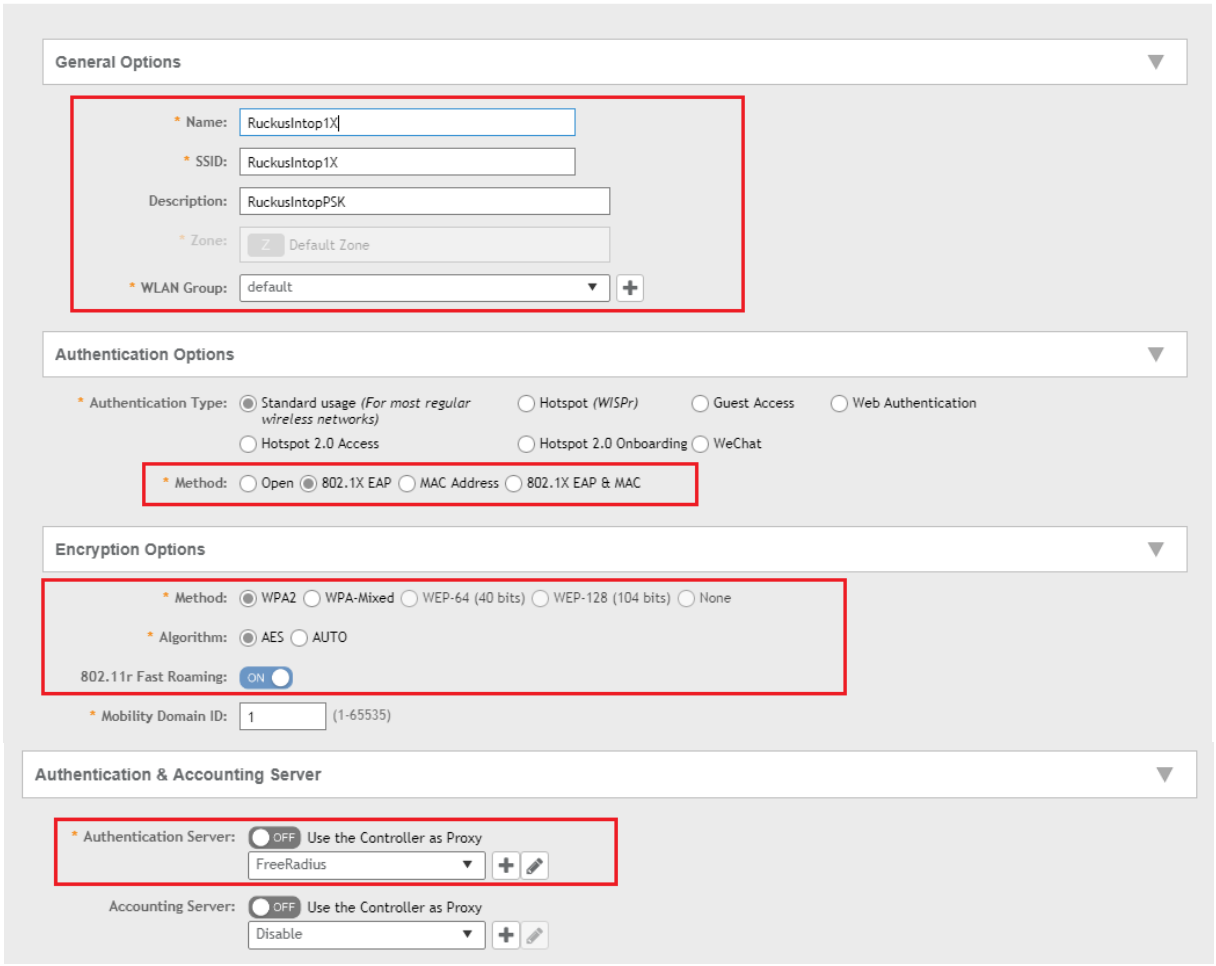
See next screen shot for configuration of the profile “InteropFreeRADIUS”.

Edit AAA Server: [FreeRadius]



The IP address and the secret must correspond to the IP and the credential used by the Radius server.

Edit WLAN Config: [RuckusIntop1X]

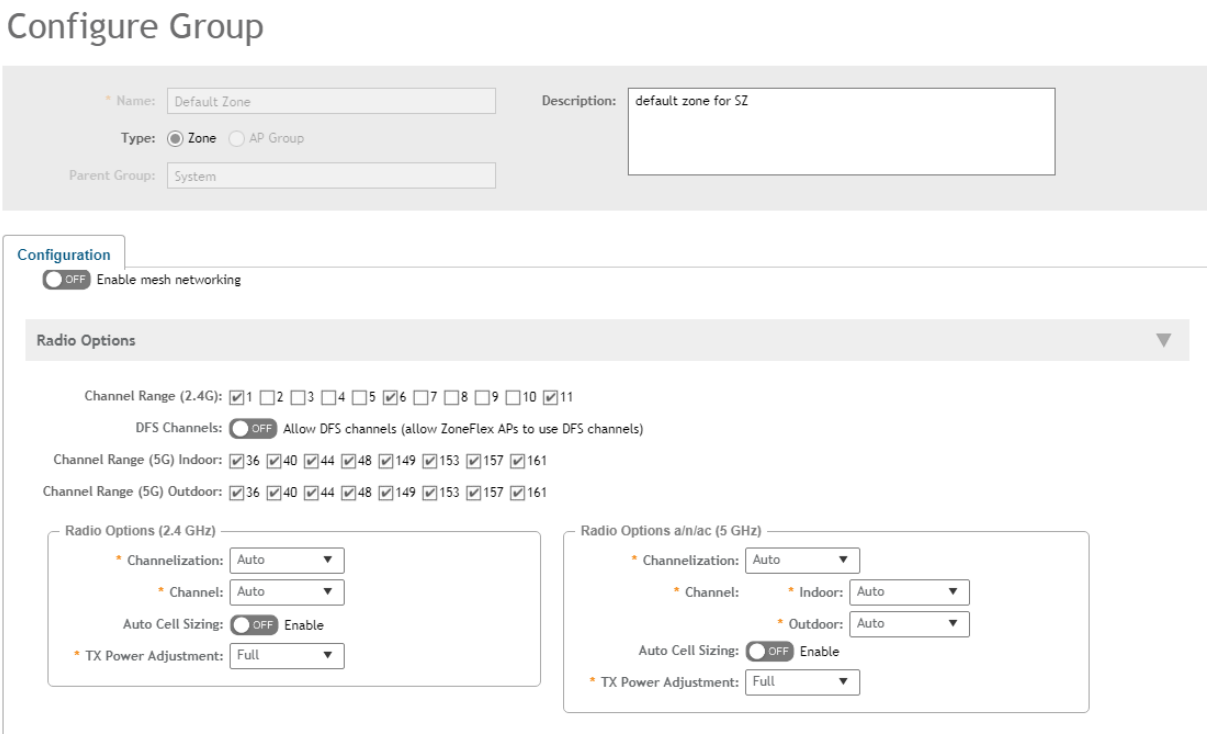


Configuration of ESS profile for utilization of 802.1X authentication.

- Select 802.1X EAP
- Select WPA2 and AES
- It is strongly recommended to use Fast Transition (802.11r) for enhanced roaming performance.
- Authentication server “InteropFreeRADIUS” corresponds to the server configured in previous step.

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.

General settings (QoS, Radio)



Access Points Common Settings per AP group.

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 and country regulations.

Note that Tx power level and channel was manually set for test purpose.

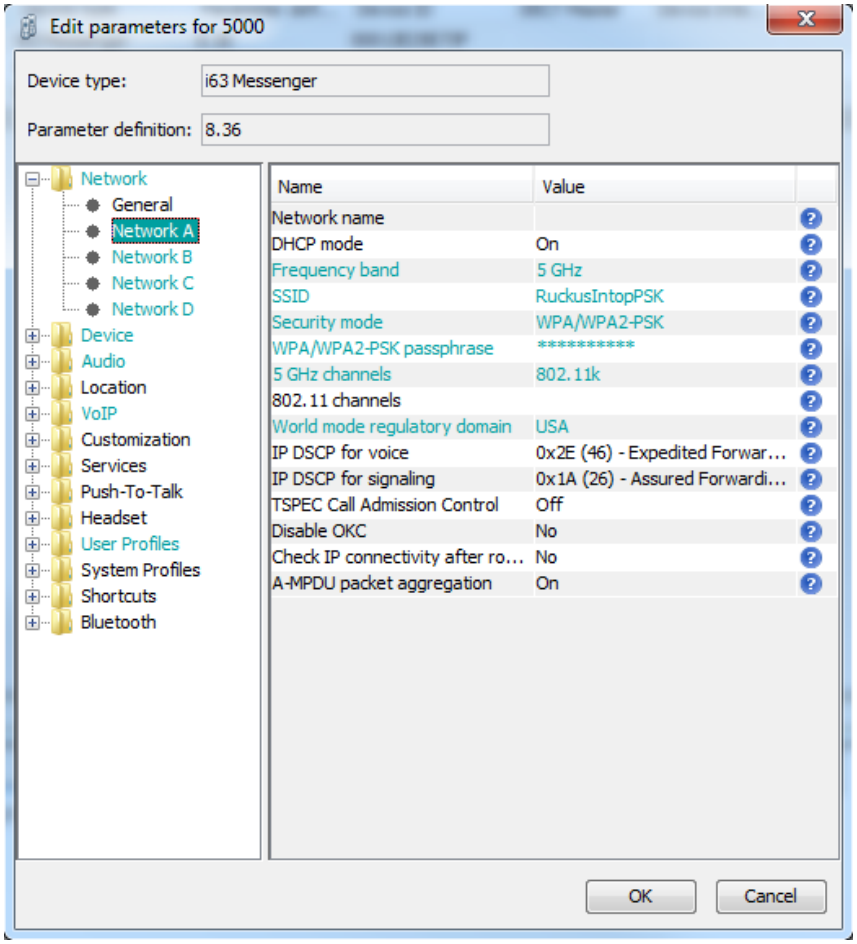
General guidelines when deploying Ascom i63 handsets in 802.11a/n/ac environments:

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.**

Individual AP configuration

Channel and Tx power override was used to create suitable cell overlap for test purposes.

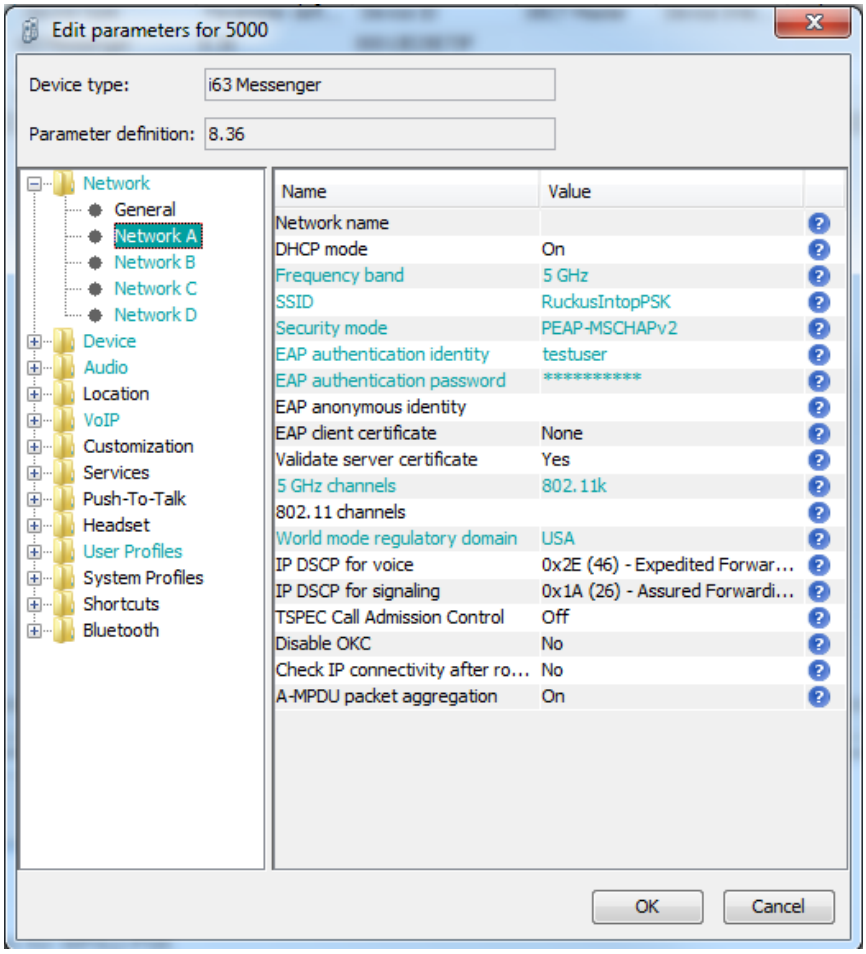
Ascom i63



Network settings for WPA2-PSK

Note. Make sure that the enabled channels in the i63 handset match the channel plan used in the system. If 802.11k is enabled in the system the parameter 5GHz Channels needs to be set for 802.11k accordingly.

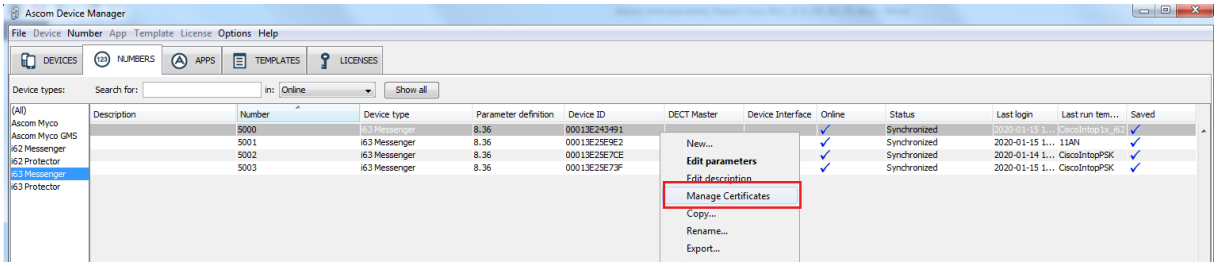
Note. FCC is no longer allowing 802.11d to determine regulatory domain. Devices deployed in USA must set Regulatory domain to “USA”.



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

Note. Make sure that the enabled channels in the i63 handset match the channel plan used in the system. If 802.11k is enabled in the system the parameter 5GHz Channels needs to be set for 802.11k accordingly.

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



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.

Appendix B: Detailed Verification Records

Pass	19
Fail	2
Comments	0
Not verified	5
Total	24

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	27-April-2020	SEKMO	Draft
R1	8-May-2020	SEKMO	Revision R1 after review.