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INTEROPERABILITY REPORT

Ascom Myco

Meru Networks AP320, 332, 822, 832 and AP1000 series

System manager version 6.1-4-2

Ascom Myco version 2.1.0

Ascom, Gothenburg

July 2015

TABLE OF CONTENT:

INTRODUCTION

This document describes necessary steps and guidelines to optimally configure the Meru Networks WLAN platform with Ascom Myco VoWiFi handsets.

The guide should be used in conjunction with both Meru Networks and Ascoms configuration guide(s).

About Ascom

Ascom Wireless Solutions (www.ascom.com/ws) is a leading provider of on-site wireless communications for key segments such as hospitals, manufacturing industries, retail and hotels. More than 75,000 systems are installed at major companies all over the world. The company offers a broad range of voice and professional messaging solutions, creating value for customers by supporting and optimizing their Mission-Critical processes. The solutions are based on VoWiFi, IP-DECT, DECT, Nurse Call and paging technologies, smartly integrated into existing enterprise systems. The company has subsidiaries in 10 countries and 1,200 employees worldwide. Founded in the 1950s and based in Göteborg, Sweden, Ascom Wireless Solutions is part of the Ascom Group, listed on the Swiss Stock Exchange.

About Meru Networks

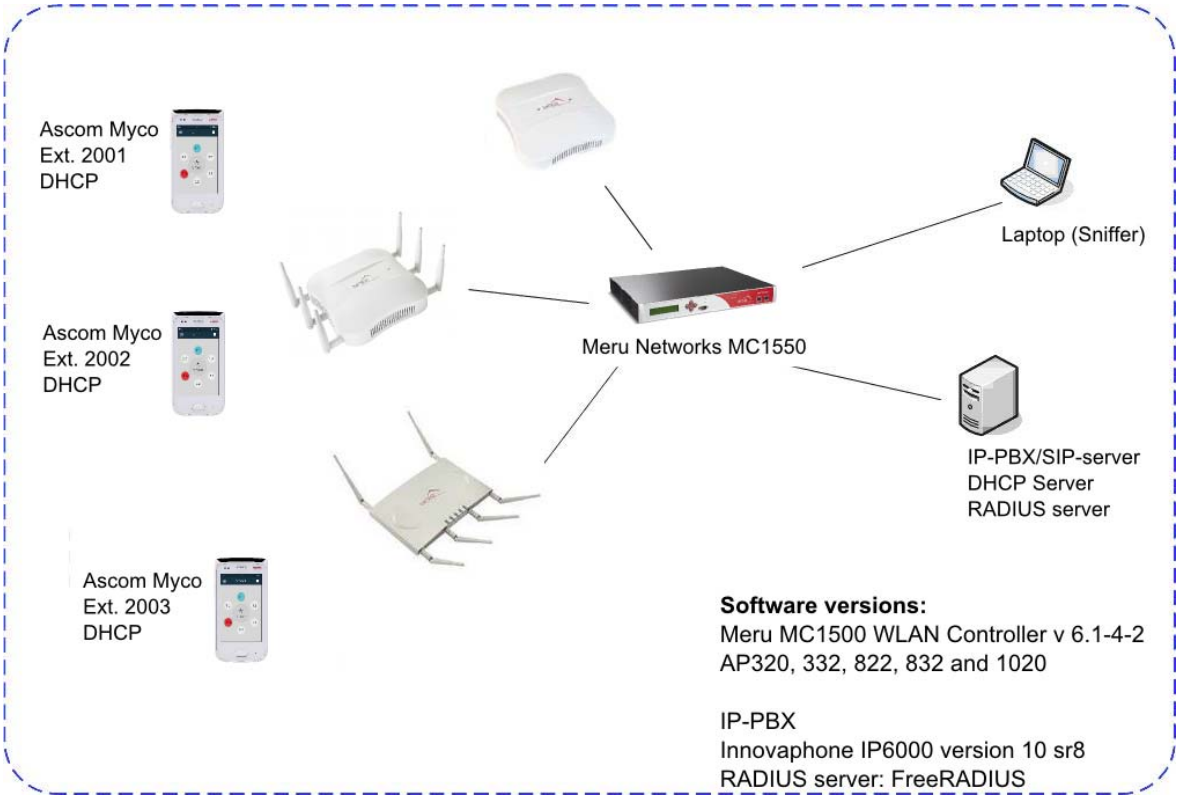
Founded in 2002, Meru Networks provides a virtualized wireless LAN solution that cost-effectively optimizes the enterprise network to deliver the performance, reliability, predictability and operational simplicity of a wired network, with the advantages of mobility. Meru's solution represents an innovative approach to wireless networking that utilizes virtualization technology to create an intelligent and self-monitoring wireless network, and enables enterprises to migrate their business-critical applications from wired networks to wireless networks, and become all-wireless enterprises. Meru's solutions have been adopted in all major industry vertical markets, including Fortune 500 enterprises, healthcare, education, retail, manufacturing, hospitality and government. Meru is headquartered in Sunnyvale, Calif., and has operations in the Americas, Europe, the Middle East and Asia Pacific. For more information, visit www.merunetworks.com or call (408) 215-5300.

SITE INFORMATION

Test Site:
Morrisville
300 Perimeter park drive, NC 27560
USA

Participants:
Karl-Magnus Olsson, Ascom HQ

TEST TOPOLOGY



SUMMARY

Please refer to Appendix B for detailed results.

WLAN Controller Features

High Level Functionality	Result
Association, Open with No Encryption	OK
Association, WPA2-PSK, AES Encryption	OK
Association, PEAP-MSCHAPv2 Auth., AES Encryption	OK
Association, Multiple ESSIDs	OK
Beacon Interval and DTIM Period	OK
PMKSA Caching	Roam transparent to handset*
WPA2-opportunistic/proactive Key Caching	Roam transparent to handset*
WMM Prioritization	OK
Load test	OK
802.11 Power-save mode	OK
802.11 Power-save mode (load test)	OK
802.11e U-APSD	OK
802.11e U-APSD (load test)	OK

*) Not applicable due to the Meru system architecture (Virtual Cell).

Roaming

High Level Functionality	Result
Roaming, Open with No Encryption	OK*
Roaming, WPA2-PSK, AES Encryption	OK*
Roaming, PEAP-MSCHAPv2 Auth, AES Encryption	OK*

*) Roaming is transparent to the handset. Therefore no roaming times presented.

Known issues and limitations

- **Important. Handset loose SIP registration and experience voice disturbances when associated in .11n mode.**

  Solution/workaround: Set Ascom Myco network parameter "Enable 802.11n" to No. (see chapter Ascom Myco network settings)

  Investigation is ongoing. See Ascom ticket MYCO-3250 for reference.

For additional information regarding known issues please contact support@ascom.se or interop@ascom.se

Compatibility information

All tests were performed on a MC1550 controller running version 6.1-4-2 but we guarantee interoperability with all below listed controllers running software version 6.1-4-2. Analogously, all tests were performed with AP320, AP332, AP832and AP1020 but variants of these access points stated below are also supported.

Supported controllers.
MC1550
MC3200
MC4200
MC6000

Compatible access points
AP 301/302/310/311/320
AP 332 (i/e variants)
AP 822 and AP832 (i/e variants)
AP1010/1014/1020 (i/e variants)

General Conclusions

The result of the verified test areas, such as authentication, association, handover and call stability tests, produced in general decent test result. Due to Meru's single channel architecture, no traditional roaming is made which makes the roaming seamless.

Note. For appropriate mapping in the "air" (Access Category 6) the parameter "Expedited Forwarding Override" has to be enabled for the used ESS profile.

Please refer to Meru's documentation for information regarding co-existence and between different access point models within the same wireless network.

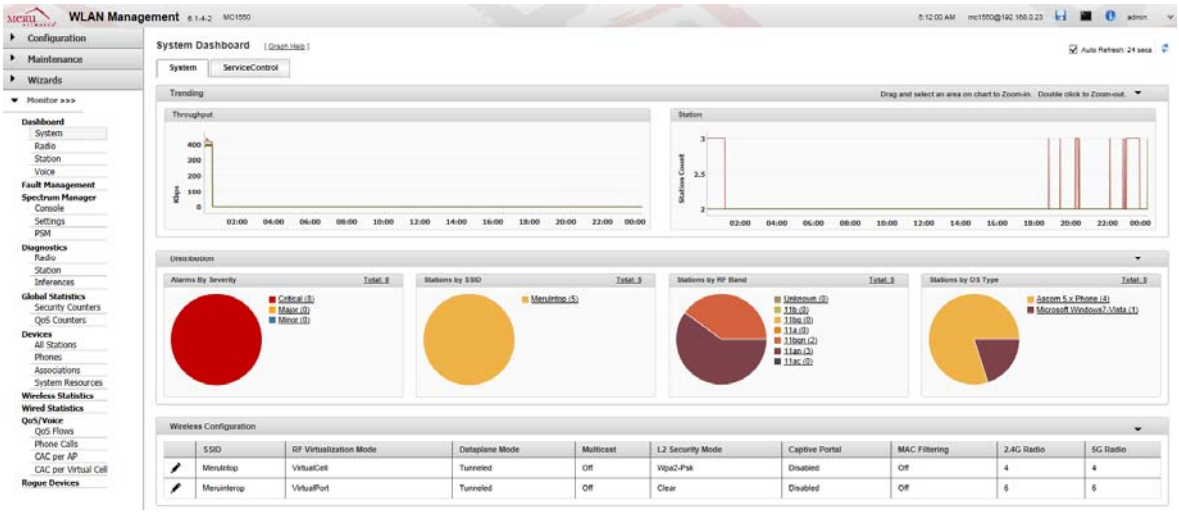
APPENDIX A: TEST CONFIGURATIONS

Meru Networks MC1550 WLAN Controller and AP320/332/8x2/10xx Access Points. Version 6.1-4-2

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

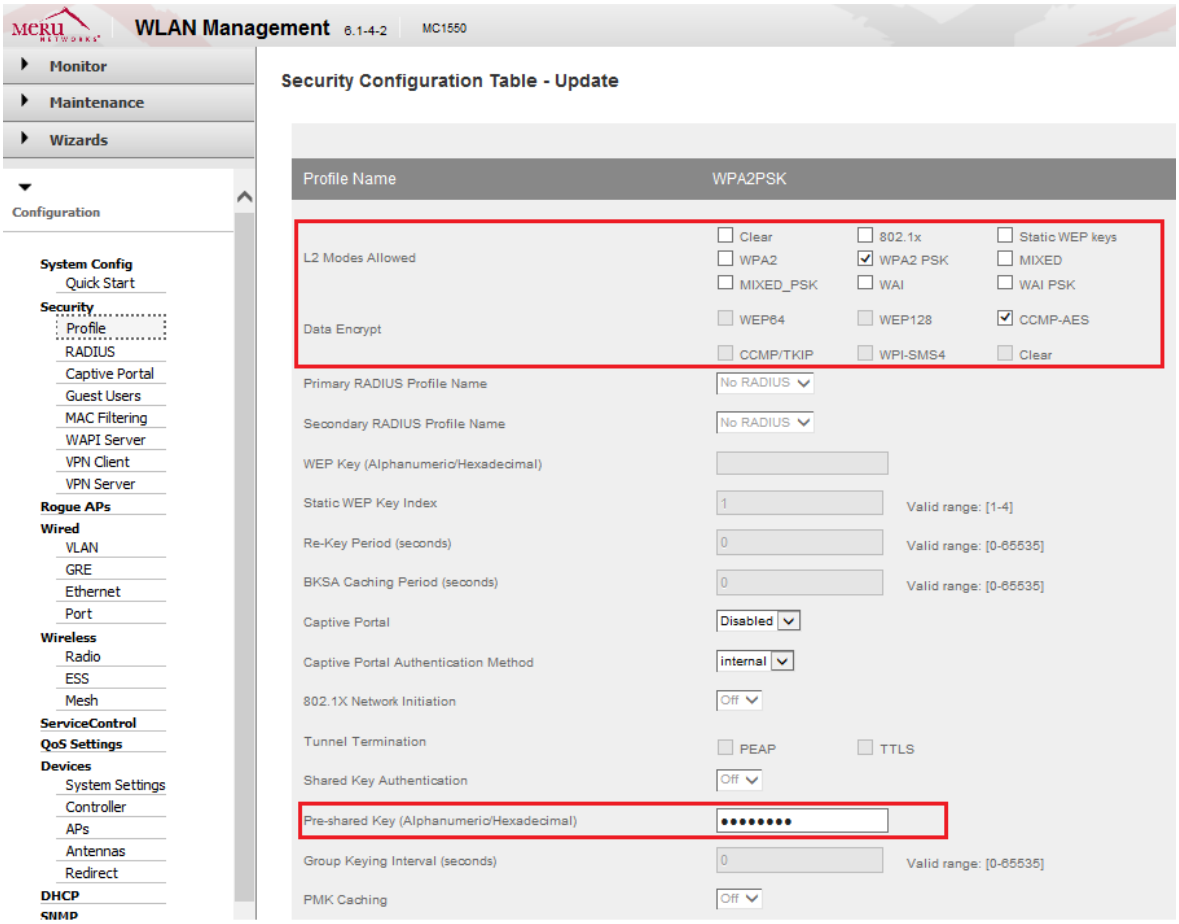
The configuration file is found at the bottom of this chapter.

General settings

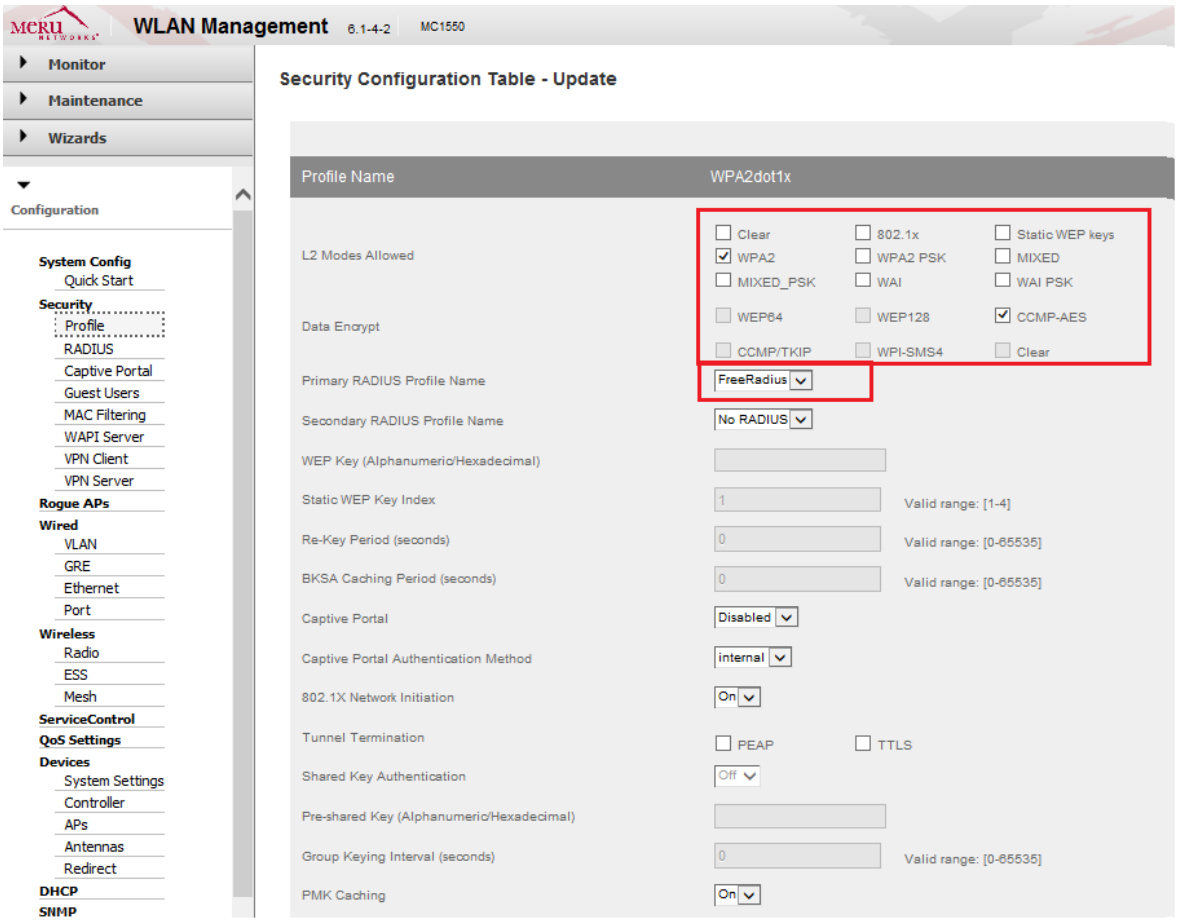


System overview

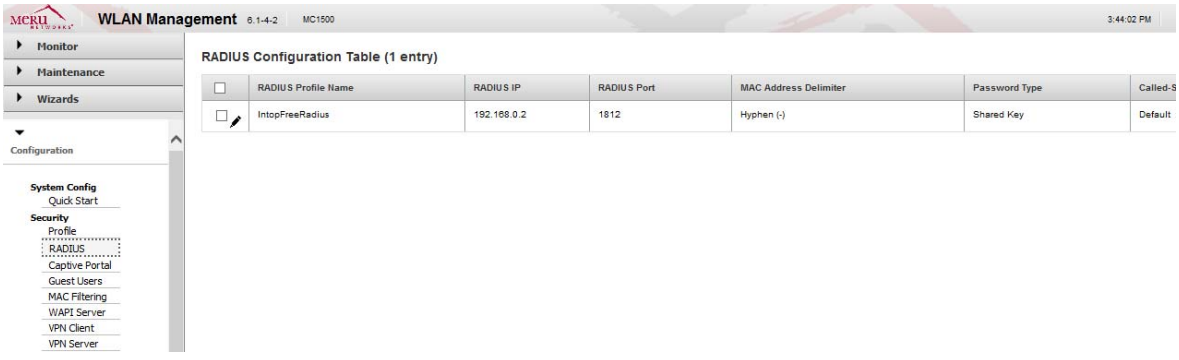
Security settings



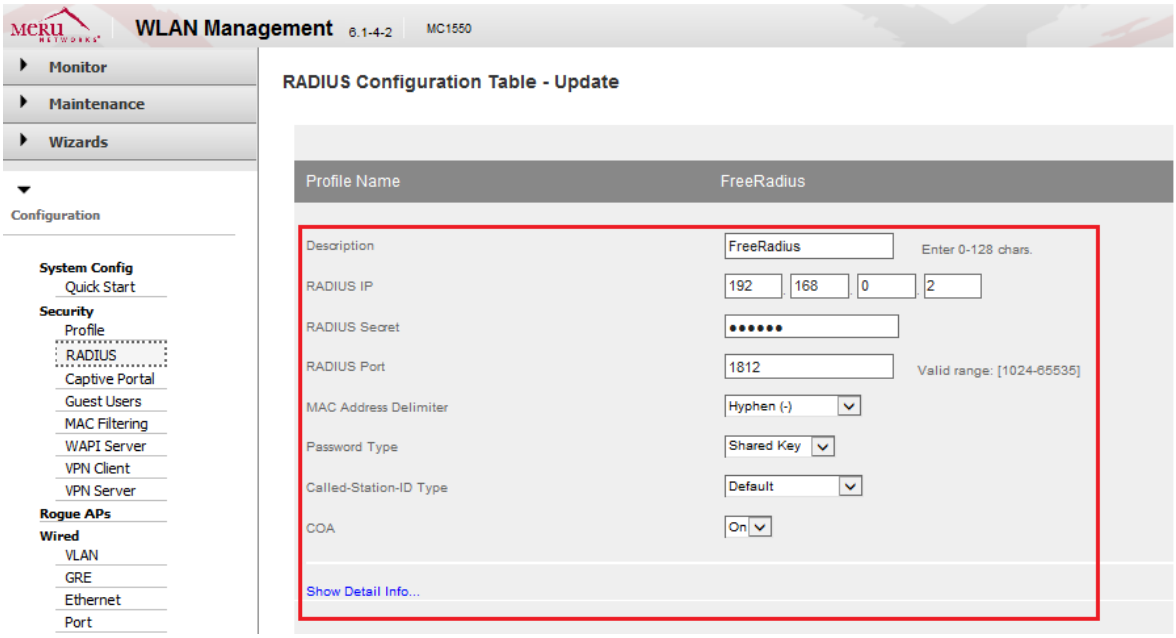
Security profile WPA2-PSK, CCMP-AES encryption.



Security profile WPA2-Enterprise, AES-CCMP encryption Primary RADIUS Profile Name “FreeRadius” refers to the RADIUS profile set up in the controller. See radius profile below for additional details.

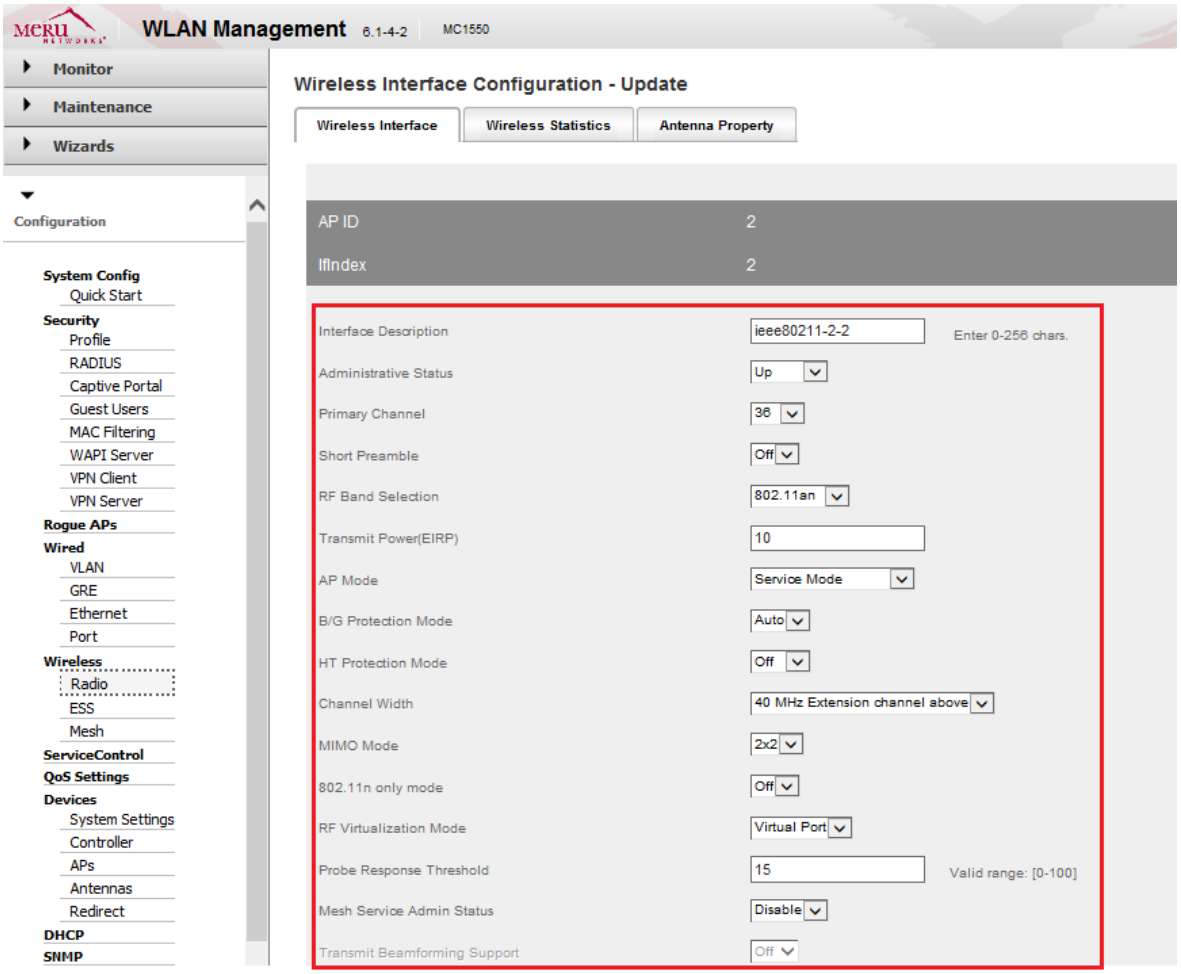


Configuration of Radius profile.



Radius profile configuration. Note that the profile “FreeRadius”, the RADIUS IP and the secret must correspond to the authentication server running in the network.

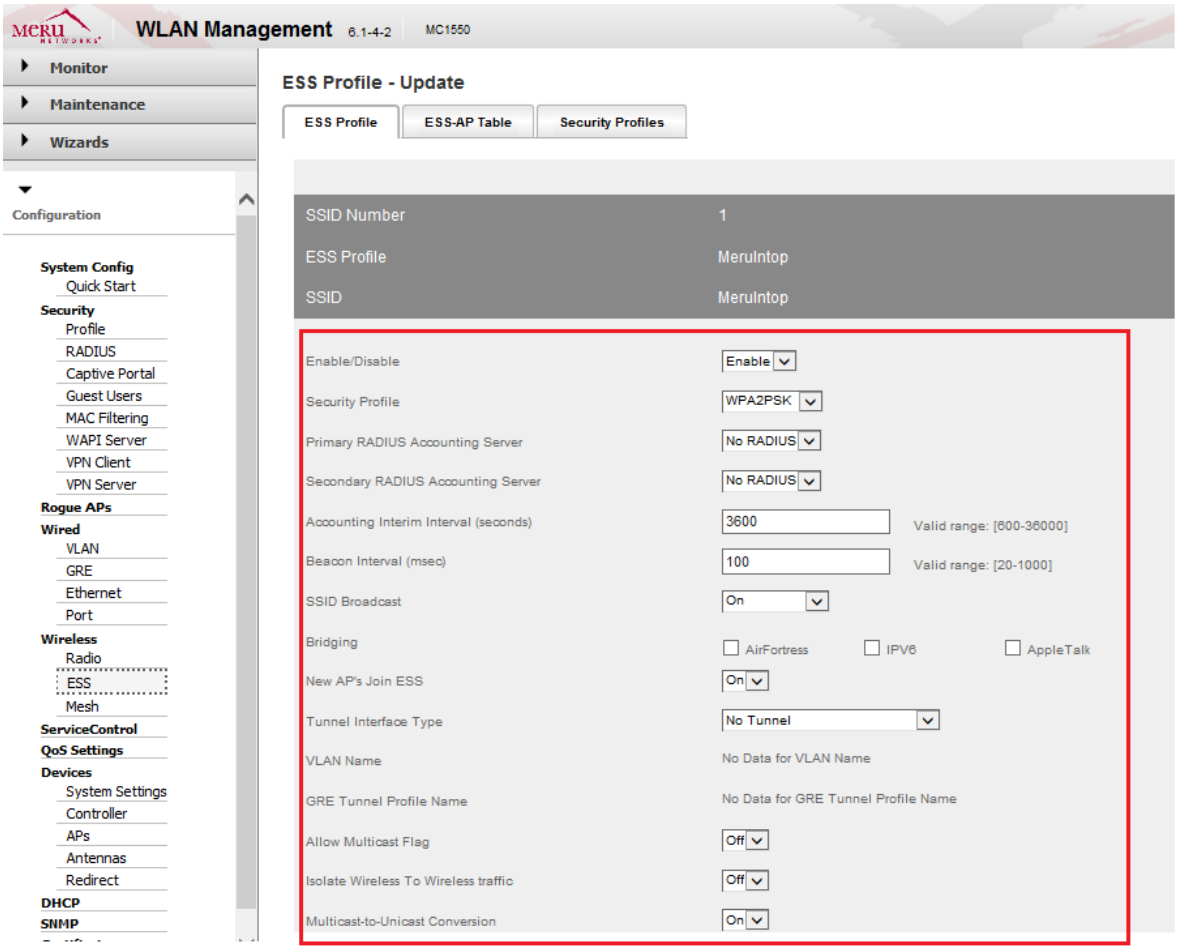
ESS, Radio and QoS settings



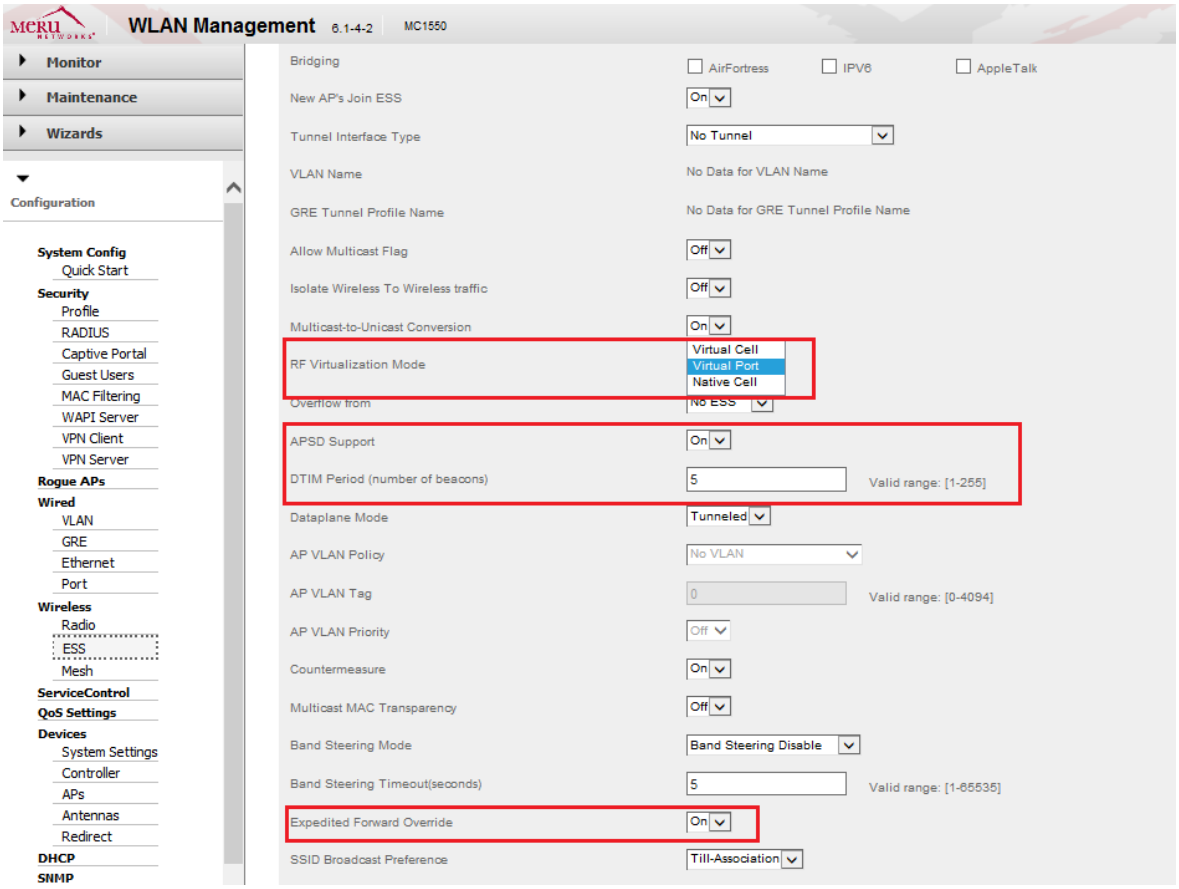
Ascom recommended settings for 802.11b/g/n are to only use channel 1, 6 or 11. For 802.11a/n/ac, use channels according to the infrastructure manufacturer and country regulations.

Note that power level was adjusted for test purpose

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.



ESS settings. Since multicast applications are usually not expected in WLANs, where Ascom VoWIFI handsets are deployed, the “Allow Multicast Flag” should be set to “OFF”.



ESS settings (continued).

Make sure APSD support is enabled. Utilizing U-APSD will significantly improve the Myco talk time. Set DTIM Period of 5 and a DTIM interval of 100ms. These values are recommended in order to allow maximum battery conservation without impacting the quality. Lower DTIM values are possible but will decrease the standby time.

Expedited Forward Override needs to be set to On. Expedited Forwarding Override will map DSCP 46 (EF) to the AC_VO.

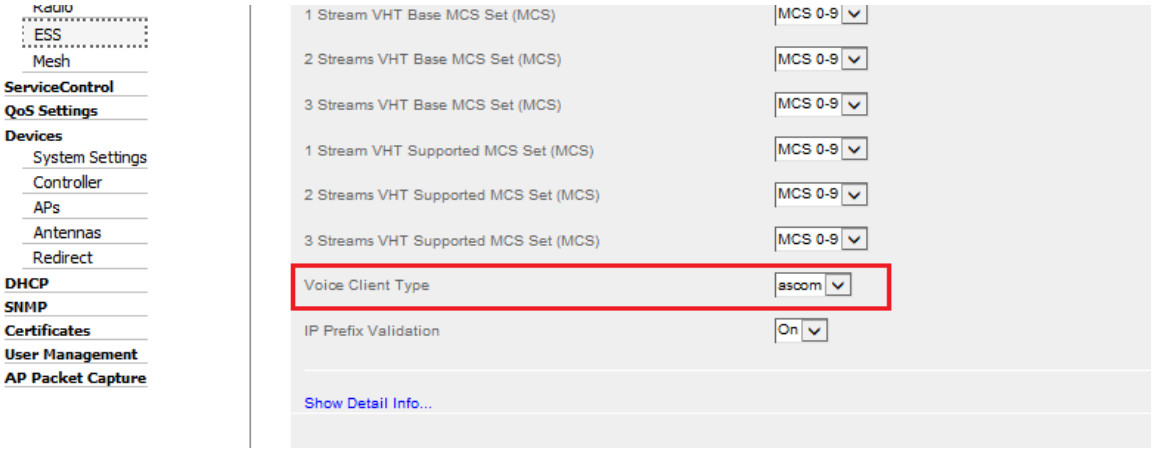
Note. Ascom and Meru recommend Virtual Cell for AP332/822/832/10xx. For AP320 Deployments use Virtual Port.

AN Supported Transmit Rates (Mbps)	☐ 6 Mbps	☐ 9 Mbps	☑ 12 Mbps
	☑ 18 Mbps	☑ 24 Mbps	☑ 36 Mbps
	☑ 48 Mbps	☑ 54 Mbps	
AN Base Transmit Rates (Mbps)	☐ 6 Mbps	☐ 9 Mbps	☑ 12 Mbps
	☐ 18 Mbps	☑ 24 Mbps	☐ 36 Mbps
	☐ 48 Mbps	☐ 54 Mbps	
AN Supported HT Transmit Rates (MCS)	☑ MCS 0	☑ MCS 1	☑ MCS 2
	☑ MCS 3	☑ MCS 4	☑ MCS 5
	☑ MCS 6	☑ MCS 7	☑ MCS 8
	☑ MCS 9	☑ MCS 10	☑ MCS 11
	☑ MCS 12	☑ MCS 13	☑ MCS 14
	☑ MCS 15	☑ MCS 16	☑ MCS 17
	☑ MCS 18	☑ MCS 19	☑ MCS 20
	☑ MCS 21	☑ MCS 22	☑ MCS 23

In a Meru environment, we recommended that the data rates are advertised within the ESS per above for 802.11a/n/ac.

BGN Supported Transmit Rates (Mbps)	☐ 1 Mbps	☐ 2 Mbps	☐ 5.5 Mbps
	☑ 11 Mbps	☐ 6 Mbps	☐ 9 Mbps
	☑ 12 Mbps	☑ 18 Mbps	☑ 24 Mbps
	☑ 36 Mbps	☑ 48 Mbps	☑ 54 Mbps
BGN Base Transmit Rates (Mbps)	☐ 1 Mbps	☐ 2 Mbps	☐ 5.5 Mbps
	☑ 11 Mbps	☐ 6 Mbps	☐ 9 Mbps
	☑ 12 Mbps	☐ 18 Mbps	☐ 24 Mbps
	☐ 36 Mbps	☐ 48 Mbps	☐ 54 Mbps
BGN Supported HT Transmit Rates (MCS)	☑ MCS 0	☑ MCS 1	☑ MCS 2
	☑ MCS 3	☑ MCS 4	☑ MCS 5
	☑ MCS 6	☑ MCS 7	☑ MCS 8
	☑ MCS 9	☑ MCS 10	☑ MCS 11
	☑ MCS 12	☑ MCS 13	☑ MCS 14
	☑ MCS 15	☑ MCS 16	☑ MCS 17
	☑ MCS 18	☑ MCS 19	☑ MCS 20
	☑ MCS 21	☑ MCS 22	☑ MCS 23

In a Meru environment, it is recommended that the data rates are advertised within the ESS per above (802.11b/g/n). To further optimize performance it is recommended to disallow 802.11b clients to associate by setting 12Mbps rate to mandatory in the 802.11bgn data rate set.

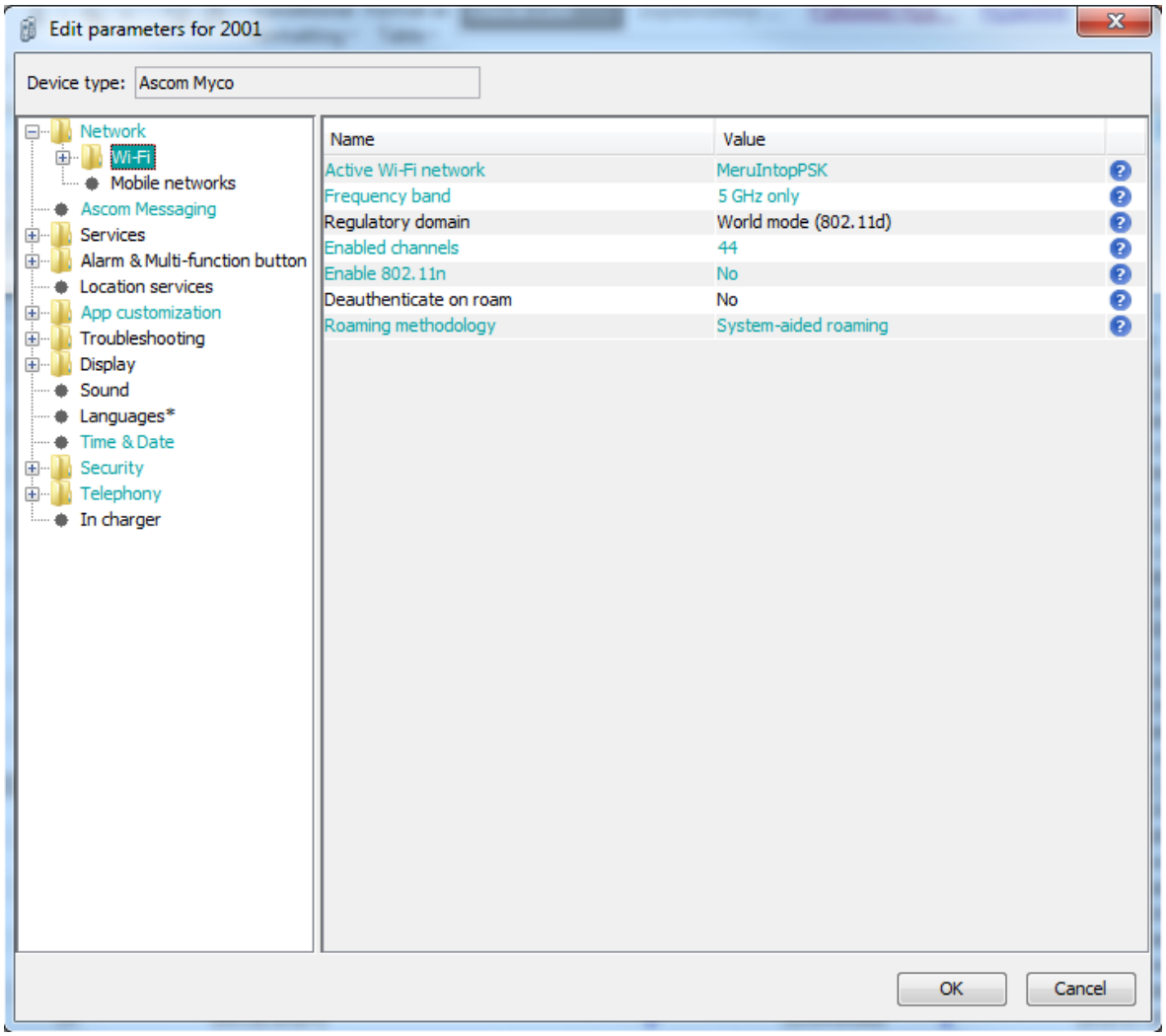


Select Voice Client Type - ascom

Configuration:

See attached file (merucfg.txt) for Meru MC1550 configuration.

Ascom Myco network settings

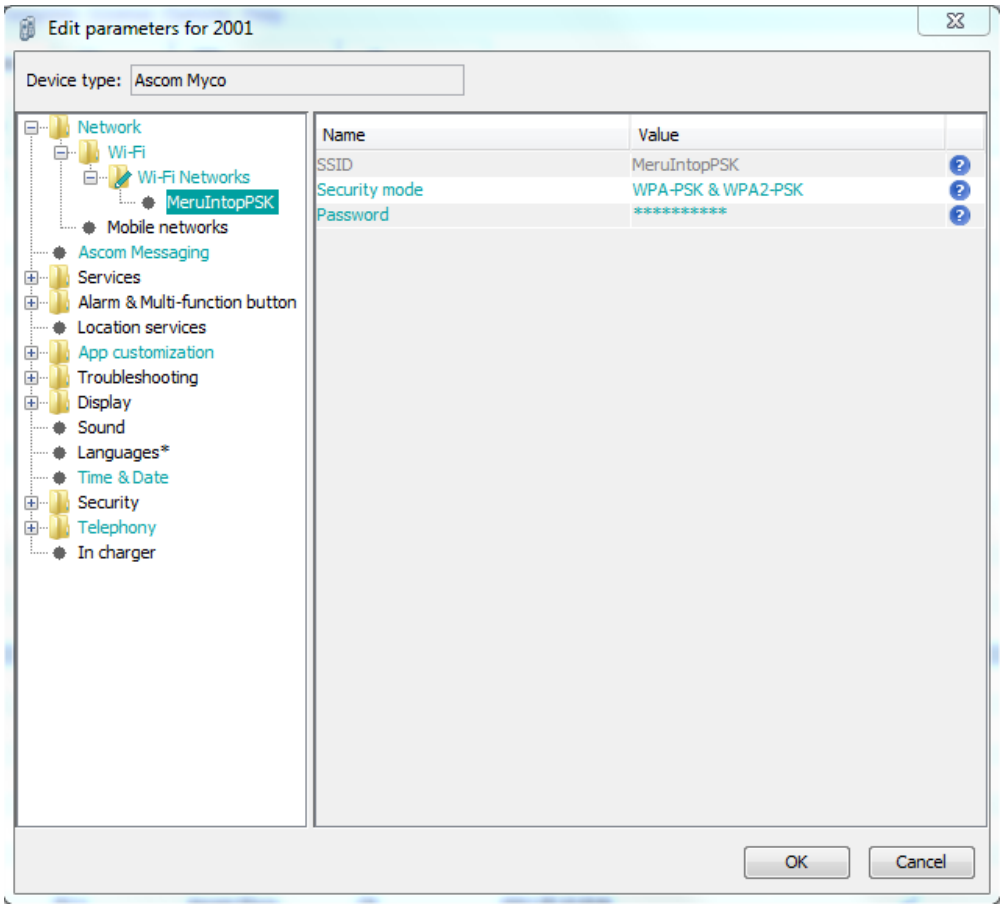


General network settings.

- Select Network to be active (In this example “MeruIntopPSK” created in step below)
- Select frequency band according to system setup (here 5GHz)
- Select only the channels used in the system (In this example ch 44)
- **Set Enable 802.11n to No**
- Set Roaming methodology to System-aided roaming.

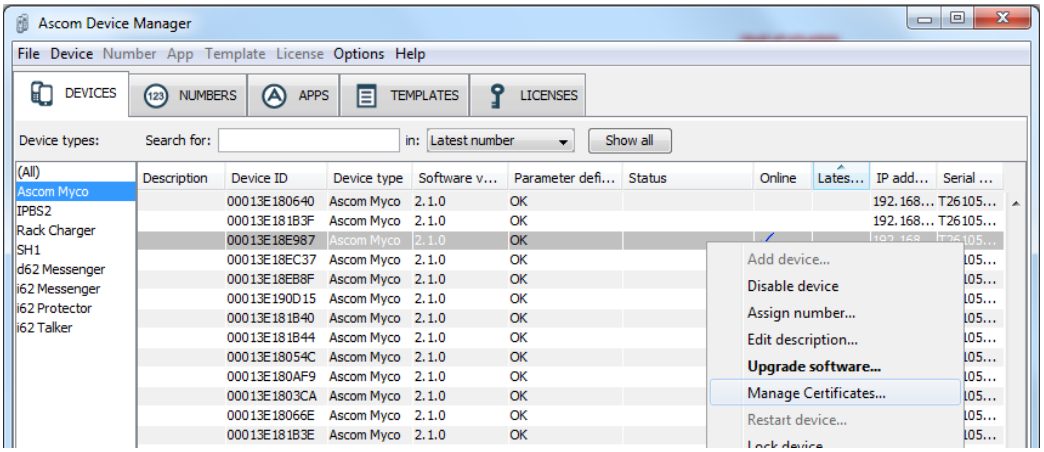
Note. FCC is no longer allowing 802.11d to determine regulatory domain. Devices deployed in USA must set *Regulatory domain* to “USA”.

Pre-shared key authetication

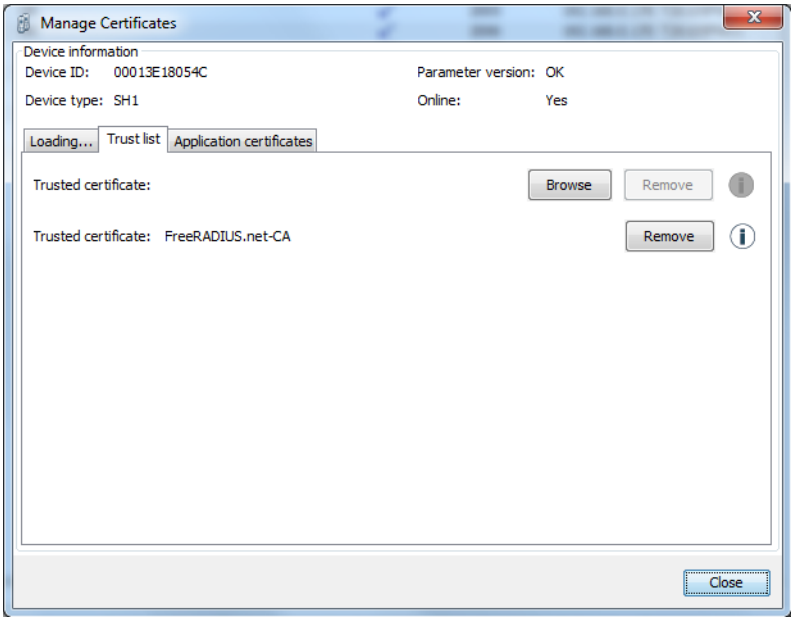


Network settings for WPA2-PSK.

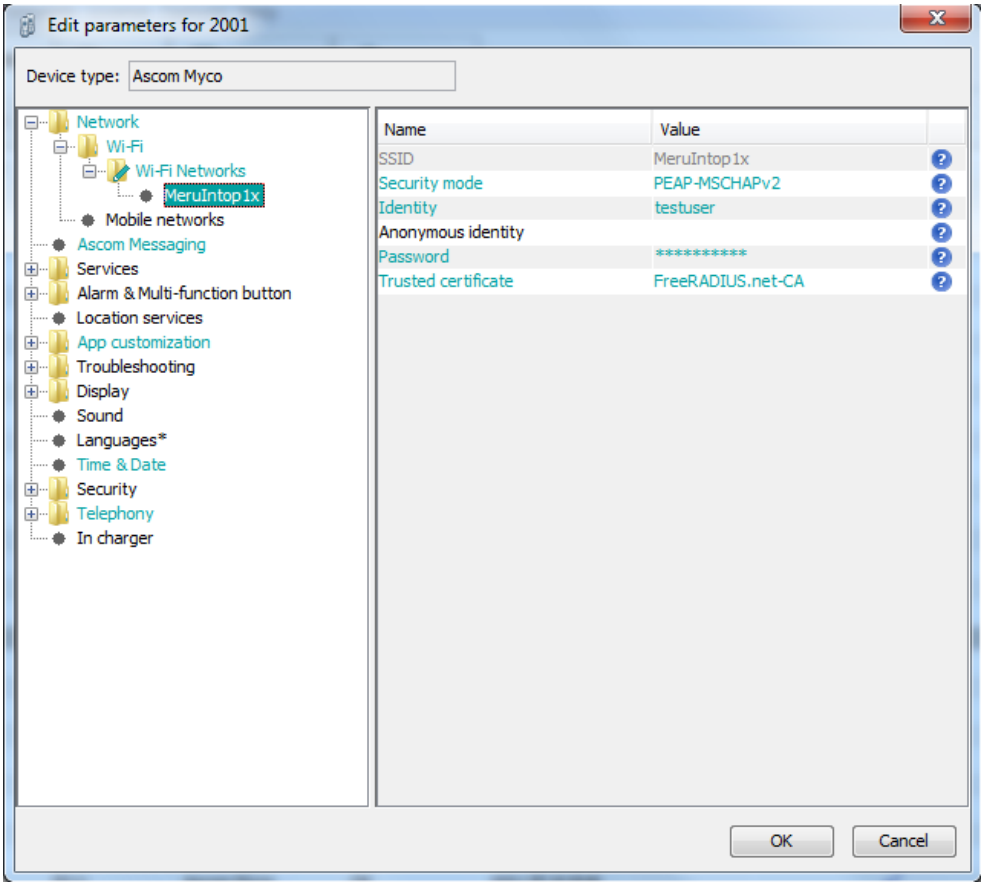
Authentication with dot1X (PEAP-MSCHAPv2)



802.1X Authentication requires a root certificate to be uploaded to the device by “right clicking” - > Manage Certificates.



Upload the required root CA under Trust list.



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

- Select security mode PEAP-MSCHAPv2
- Enter User identity and password
- Select your trusted certificate uploaded to the device in previous step.

Innovaphone IP6000 (IP PBX & DHCP server)

The Innovaphone IP6000 was configured with a static IP address. Signaling is less relevant here since testing homes in on interoperability in relation to the WLAN infrastructure and not features of the IP PBX. During the tests the IP6000 also was used as DHCP server.

IP6000 configuration:

See attached file (complete-IP6000-08-03-a6.txt) for IP6000 configuration.

APPENDIX B: DETAILED TEST RECORDS

AP832 were fully tested while AP320, 332 AP822 and AP1000 series were given a spot check including a less extensive number of tests.

Pass	16
Fail	0
Comments	1
Untested	2
Total	19

See attached file “WLANinteroperabilityTestReport_Meru.xls”

MISCELLANEOUS

Please refer to the test specification for WLAN systems on Ascom’s interoperability web page for explicit information regarding each test case.

See URL (requires login):
https://www.ascom-ws.com/AscomPartnerWeb/en/startpage/Sales-tools/Interoperability

Document History

Rev	Date	Author	Description
P1	2015-07-13	SEKMO	Revision P1 Meru version 6.1-x-x for Ascom Myco
R1	2015-07-29	SEKMO	Minor corrections. Revision R1