

# **Configuration Notes**

## **Cisco WLC Infrastructure in Ascom VoWiFi System**

## Contents

|                                      |          |
|--------------------------------------|----------|
| <b>1 Introduction</b> .....          | <b>1</b> |
| 1.1 Abbreviations and Glossary ..... | 1        |
| <b>2 Configuration</b> .....         | <b>2</b> |
| 2.1 Radio Settings .....             | 2        |
| 2.2 Quality of Service (QoS) .....   | 2        |
| 2.3 Security Settings .....          | 3        |
| 2.4 Miscellaneous .....              | 3        |
| <b>3 Call Capacity</b> .....         | <b>3</b> |
| <b>4 Handover Performance</b> .....  | <b>3</b> |
| <b>5 Related Documents</b> .....     | <b>4</b> |
| <b>6 Document History</b> .....      | <b>5</b> |

## 1 Introduction

This document is merely intended as a guide when using the Cisco WLC and Cisco access points in the Ascom VoWiFi system, and it does not by any means replace the documentation from Cisco. This document describes some of the settings needed to gain good performance when the Ascom VoWiFi handset is used with the Cisco WLC infrastructure. Performance parameters will also be stated.

For maximum performance in the VoWiFi system consider the recommendations in the document *Considerations for Ascom VoWiFi System Planning, TD 92408GB*.

The settings described in this document are extensions and apply for use with the Cisco WLC and access points. For more information refer to *Function Description VoWiFi System, TD 92314GB*.

**Note:** The performance measurements are made with a Cisco 2006 controller running software version 4.2.130.0 with AP1232 access points.

### 1.1 Abbreviations and Glossary

|        |  |
|--------|--|
| AP     | Access Point:<br>a radio transceiver providing LAN connection to wireless devices.                       |
| BSS    | Basic Service Set  |
| CoS    | Class of Service   |
| DSCP   | Differentiated Services Code Point   |
| EDCA   | Enhanced Distributed Channel Access  |
| IP     | Internet Protocol:<br>global standard that specifies the format of datagrams, and the addressing scheme. |
| QoS    | Quality of Service   |
| STA    | Station:<br>a mobile device in an IEEE802.11 WLAN system   |
| U-APSD | Unscheduled Automatic Power Save Delivery  |
| WLAN   | Wireless Local Area Network  |
| WLC    | Wireless LAN Controller  |
| WMM™   | Wi-Fi Multimedia™:<br>offers QoS functionality for WiFi networks.  |

## 2 Configuration

### 2.1 Radio Settings

#### 2.1.1 Aironet Extensions

Enable "Aironet IE" to let the Ascom VoWiFi handset make use of CCX for enhanced performance.

#### 2.1.2 Radio Channels

Use only channels 1, 6 and 11.

**Note:** Do not enable RF grouping or Dynamic Channel Assignment since these settings will create an inconsistent radio environment.

#### 2.1.3 Transmission Power

Avoid dynamic transmission power by settings Tx Power Level Assignment to Fixed.

#### 2.1.4 Data Rates

The default settings will work fine but to optimize it is recommended to disallow 802.11b clients to associate by setting the 6 MBit/s rate to mandatory in the 802.11g configuration.

It is also highly recommended to disable all lower 802.11b speeds in the Cisco WLC infrastructure to obtain even higher performance:

- Transmission rate 1, 2, 5.5 should be disabled
- Transmission rate 6 should be set as mandatory
- Other rates should be set as supported

#### 2.1.5 Beacon Period

The default beacon period is 100 ms and this is recommended to use. However, if there are access points of model 1252 in the system the beacon period should be set to 102 ms since the 1252 APs cannot use a 100 ms period

### 2.2 Quality of Service (QoS)

#### 2.2.1 If Layer 2 Priority is Used

In the QoS Profile for Platinum the Wired QoS Protocol shall be configured to not use 802.1p as Protocol Type but instead use "None". The use of Protocol Type 802.1p is an obsolete setting and is handled internally by the controller.

#### 2.2.2 WMM Power Save

If U-APSD shall be used in the handset it is very important that the WMM parameters in the Cisco WLC are set correctly since U-APSD handles a bi-directional data stream where the up- and downlink must be transmitted within the same EDCA Access Category.

To use U-APSD, make sure to set QoS to Platinum for the current WLAN profile and set WMM to Allowed. Also set EDCA profile for 802.11b/g to "Voice Optimized" and enable low latency MAC

## 2.3 Security Settings

### 2.3.1 Opportunistic Key Caching

Opportunistic Key Caching is enabled by default. This enables high security with fast roaming.

## 2.4 Miscellaneous

Session Timeout for the current WLAN profile must be disabled to avoid reoccurring deauthentications.

It is also highly recommended to disable Broadcast Forwarding since this will avoid unnecessary traffic on the WLAN used for voice.

## 3 Call Capacity

If voice power save mode "Active" is used the Cisco WLC infrastructure can handle up to 31 calls per AP. If voice power save mode "U-APSD" is used it can handle up to 35 calls per AP. This applies if no data traffic is present and no channel re-use is needed.

Depending on the data traffic load, cell coverage and co-channel interference, the capacity might be reduced to around 10 calls per AP.

If using 802.11bg (instead of a pure 802.11g system) the call capacity may decrease even more.

## 4 Handover Performance

The handover performance is heavily dependant on the chosen security scheme. The authentication process, as well as the exchange of fresh session encryption keys, affects the time needed to perform an inter-BSS transition before the transmission of speech frames can be resumed.

The table shows an average of handover times with different security settings. The stated times shall be seen as a guide and an assistance in the choice of security scheme and shall not be seen as absolute numbers. A number of factors such as external RADIUS server performance, channel usage etc. will affect the handover time.

| Authentication scheme | Encryption type | Handover time |
|-----------------------|-----------------|---------------|
| Open                  | NONE            | ~ 11 ms       |
| Open                  | WEP             | ~ 12 ms       |
| WPA-PSK               | TKIP            | ~ 35 ms       |
| WPA2-PSK              | AES-CCMP        | ~ 28 ms       |
| LEAP                  | WEP             | ~ 37 ms       |

|  |          |         |
|--|----------|---------|
| LEAP   | TKIP     | ~ 45 ms |
| LEAP with CCKM                               | TKIP     | ~ 12 ms |
| PEAP-MSCHAPv2 with opportunistic key caching | AES-CCMP | ~ 30 ms |

## 5 Related Documents

|  |            |
|--|------------|
| System Description VoWiFi System   | TD 92313GB |
| Function Description VoWiFi System   | TD 92314GB |
| Considerations for Ascom VoWiFi System Planning                            | TD 92408GB |
| Configuration Manual i75 VoWiFi Handset                                    | TD 92431GB |
| Installation and Operation Manual Integrated Message Server (IMS/IP-WiFi)  | TD 92322GB |
| Installation and Operation Manual Portable Device Manager, Windows version | TD 92325GB |
| Installation and Operation Manual Portable Device Manager, System version  | TD 92378GB |

## 6 Document History

For details in the latest version, see change bars in the document.

| Version | Date       | Description             |
|---------|------------|-------------------------|
| A       | 2008-10-14 | First released version. |
|         |            |                         |
|         |            |                         |