BCM 3.6/SRG 1.0 WLAN IP Telephony Patch Release Notes

Issue Date: September 29th, 2004
Version: Issue 1.1
Document Status: Release
Security Status: Proprietary
Document Author: Robert Joly

Abstract: This document describes the content changes in BCM 3.6/SRG 1.0 WLAN IP Telephony Patch.

Document Author: _____   Date: Sept. 22, 2004
                    Robert Joly

NORTEL NETWORKS™

Table of Content

Executive Summary

In general, the objective of BCM 3.6/SRG 1.0 WLAN IP Telephony patch is to provide Unified Manager and DHCP Server support for Wireless IP Handset 2210 and 2211. This patch will be rolled into the factory build as at the next BCM release, BCM 3.7.

This document contains release notes that describe the new behaviors introduced by BCM 3.6/SRG 1.0 WLAN IP Telephony patch as well as the limitations that apply to the proposed solution. It is not an up-issue of the BCM 3.6 release. For the known issues of BCM 3.6 GA release, please refer to the BCM 3.6 GA release notes document.

Notice
If the BCM Cumulative Patch 1.0 must be applied, it is recommended to apply it first then apply the WLAN IP Telephony patch.

Behavior Changes

Wireless LAN IP Handsets 2210 and 2211 will be reflected as i2210 and i2211 set types in Unified Manager's 'IP Terminal Status' table and BCM Monitor vs. i2004 without the patch.

The DHCP Server configuration page in Unified Manager provides two new fields reserved for specifying the TFTP server and SVP IP addresses required by the 2210/2211 handsets.

Required Components

In order to access the WLAN IP Telephony capability on a BCM/SRG, the following components are required:
- A BCM with version 3.6 Build 2.2C (GA version of BCM 3.6) or higher with the BCM 3.6/SRG 1.0 WLAN IP Telephony patch applied (BCM Patch #38).
- 2210 and 2211 running f/w version 97.037
- 2245 running f/w load 2.007
- Spectralink-approved Wireless Access Point (see appendix 1)
- IP Client key codes applied

Software location
- 2210 firmware for SRG: Go to http://www130.nortelnetworks.com/cgi-bin/eserv/cs/main.jsp .
  In box 1, select Succession->Succession Enterprise
  In box 2, select WLAN Handset 2210
  In box 3, select Software
  Hit Go.

- 2211 firmware for SRG: Go to http://www130.nortelnetworks.com/cgi-bin/eserv/cs/main.jsp .
 In box 1, select Succession->Succession Enterprise

In box 2, select WLAN Handset 2211
In box 3, select Software
Hit Go.

- 2245 firmware for SRG: Go to http://www130.nortelnetworks.com/cgi-bin/eserv/cs/main.jsp .
  In box 1, select Succession->Succession Enterprise
  In box 2, select WLAN IP Telephony Manager 2245
  In box 3, select Software
  Hit Go.

- SRG 1.0 WLAN IP Telephony patch: Go to http://www130.nortelnetworks.com/cgi-bin/eserv/cs/main.jsp .
  In box 1, select Succession->Succession Enterprise.
  In box 2, Survivable Remote Gateway (SRG)
  In box 3, select Software
  Hit Go.

- 2210 firmware for BCM: Go to http://www130.nortelnetworks.com/cgi-bin/eserv/cs/main.jsp .
  In box 1, select Business Series
  In box 2, select WLAN - Handset 2210
  In box 3, select Software
  Hit Go.

- 2211 firmware for BCM: Go to http://www130.nortelnetworks.com/cgi-bin/eserv/cs/main.jsp .
  In box 1, select Business Series.
  In box 2, select WLAN - Handset 2211
  In box 3, select Software
  Hit Go.

- 2245 firmware for BCM: Go to http://www130.nortelnetworks.com/cgi-bin/eserv/cs/main.jsp .
  In box 1, select Business Series
  In box 2, select WLAN – IP Telephony Manager 2245
  In box 3, select Software
  Hit Go.

- BCM 3.6 WLAN IP Telephony Patch: Go to http://www130.nortelnetworks.com/cgi-bin/eserv/cs/main.jsp .
  In box 1, select Business Series
  In box 2, select Business Communications Manager (BCM)
  In box 3, select Software
  Hit Go.

Enhancements by component

1. Unified Manager

GUI 1:
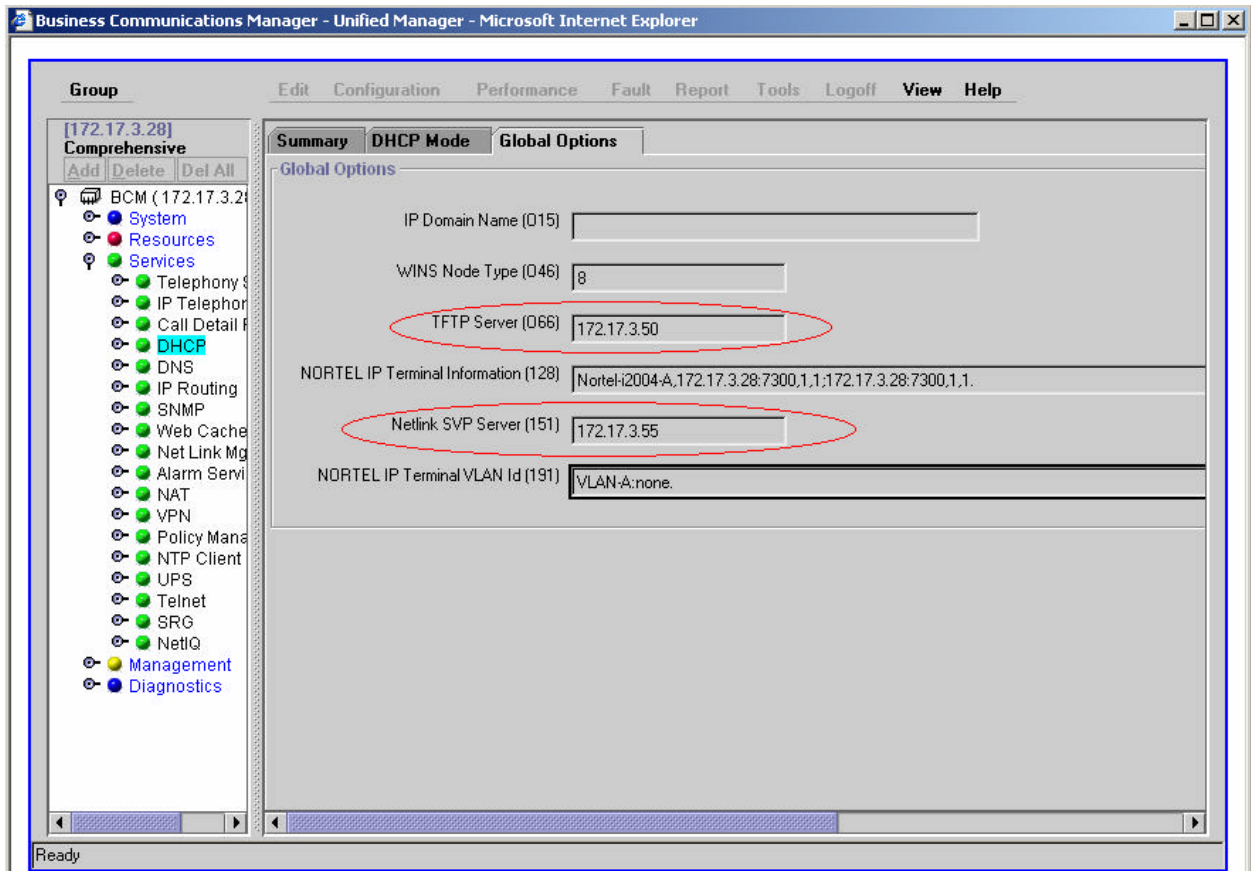
To input the TFTP and SVP server IP addresses, in Unified Manager, navigate to Services>>DHCP and click on the Global Options tab. Two new prompts, "TFTP server" and "Netlink SVP server" (a.k.a. WLAN IP Telephony Manager 2245) will be displayed. These prompts are used to input the TFTP and SVP server IP addresses. Please refer to GUI 1. The configured IP addresses are sent in DHCP.

The i2210 or i2211 are represented as such in Unified Manager under BCM>>Services>>IP Telephony>> IP Terminals>>Nortel IP Terminals under IP Terminal Status (see limitation #6 in Limitations section). Please refer to GUI2.

GUI 2:
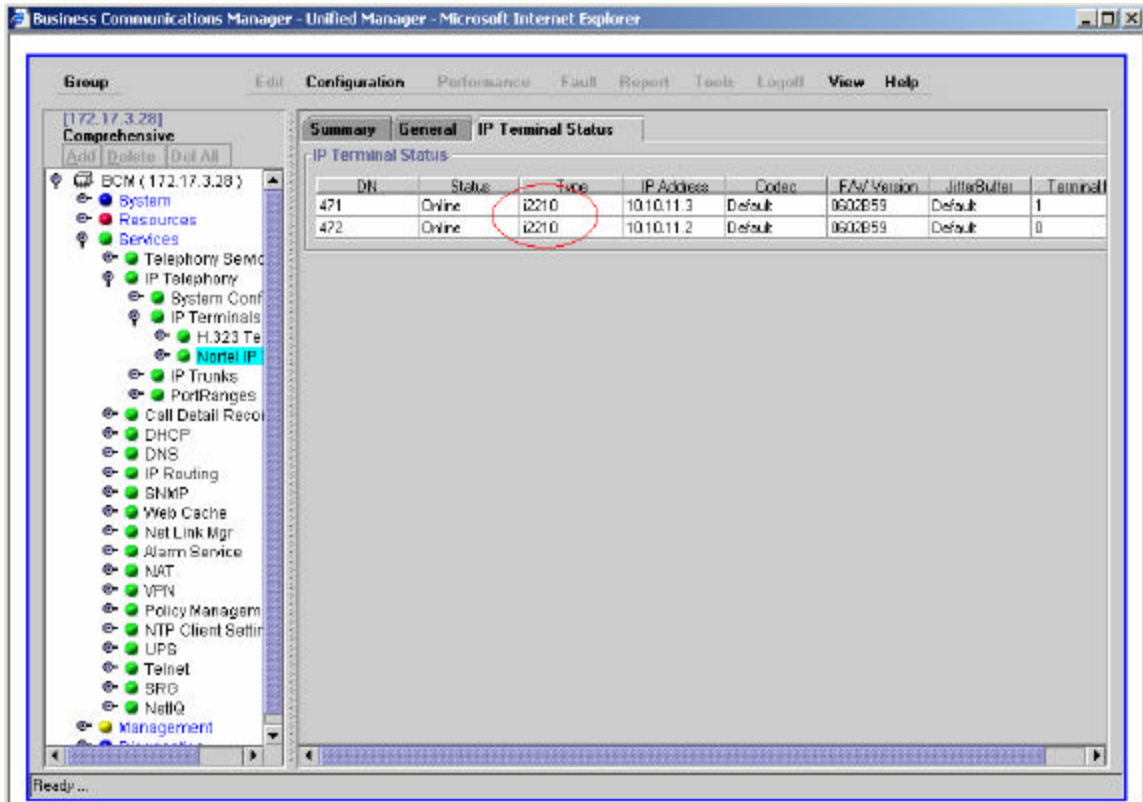
2. Telephony Services

There are two modes in which the i2210/i2211 wireless telephone can operate: DHCP enabled or Static IP. DHCP will use Dynamic Host Configuration Protocol to assign an IP address each time the wireless telephone is turned on. If DHCP is enabled, the wireless telephone also receives all other IP address configurations from the DHCP server.

This feature adds two prompts to input the SVP and TFTP server IP address in Unified Manager under Services/DHCP/Global options so that this information is passed to the i2210/i2211 handsets in DHCP offer and ACK messages.

The DHCP server resides in BCM/SRG and is configured to supply the TFTP and SVP server IP addresses to the i2210/i2211 handsets.
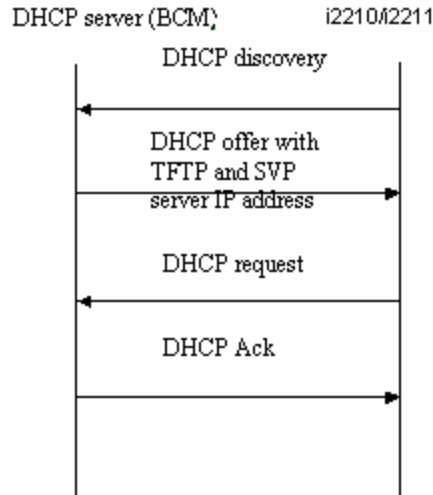
The DHCP server can be on either side of the firewall according to the site administrator's preference. The DHCP server is optional if the administrator wants to statically configure the handsets and SVP server.

The 2210 and 2211 can have their IP related parameters configured manually or via a DHCP server (RFC1541 and RFC 1533). Any DHCP server can be used but it must support the following capabilities.

- Provide Client IP Address
- DHCP Option 1 – Subnet Mask
- DHCP Option 3 – Default Gateway
- DHCP Option 60 – Class Identifier – The 2210/11 uses the Class Identifier of "Nortel-i221x-A". The DHCP server can use the string in the Class Identifier to uniquely identify a wireless handset.
- DHCP Option 66 – This can be used to specify the address of the TFTP server. If this Option is not present the phone will look at the Next server/ Boot server (siaddr) option for the address of the TFTP server
- Vendor Specific Option 43, 128, 144, 157, 191or 251. Only one of these options is required. The DHCP server encodes the Server 1 information using the same format as the i2004. If the Server 2 information is also present in the option it is ignored.
- DHCP Option 151 – The option contains the IP address of the 2245 Server. If option 151 is not present the wireless phone will perform a DNS lookup of the name "SLNKSVP2" if options 6 (DNS Server) and 15 (Domain Name) are configured.

Note: there is no partial DHCP mode as there is with an i2004. Therefore the DHCP server must support the options above.

Each wireless handset effectively uses two IP addresses in the wireless subnet, one for the physical set and second alias IP address that is used on the 2245 Server. When allocating addresses in a subnet scope on the DHCP server a contiguous block of

addresses as big as the number of phones supported must be marked as unavailable for distribution by the DHCP server.

When multiple WLAN's are connected to a single WSS, the DHCP server may require specific configuration modifications. Please refer to the documentation for the specific WSS being used for any special DHCP configuration requirements.

3. QoS

The i2210/i2211 wireless sets operate on 802.11b protocol. The 802.11b doesn't differentiate the voice and data packets. In order to implement the QOS SpectraLink came up with SpectraLink Voice Priority (SVP) to implement the QOS in the Wireless Telephone and AP to enhance voice quality over the wireless network. SVP gives preference to voice packets over data packets on the wireless medium, increasing the probability that all voice packets are transmitted efficiently and with minimum or no delay. SVP is fully compliant with the IEEE 802.11 and 802.11b standards.

The i2210/i2211 wireless set uses TFTP to update the wireless set software over the 802.11b wireless LAN. The TFTP server on the network holds software images for updating the wireless sets. The wireless set will check for newer software each time it is powered ON or comes back into range of network. This check takes only a second and ensures that all wireless sets on the network are kept up to date with the same version of software. Note that due to limitations of some TFTP servers, problems may be experienced when multiple i2210/i2211s simultaneously try to download firmware from the same TFTP server. When a firmware download fails, simply power-cycle the handset to re-attempt the download.

The 2245 provide the following services to the handsets:

- It acts as a proxy for every handset, that is all UNIStim signalling and RTP media to / from the wireless handset pass through the 2245 server. Except for the initial DHCP and TFTP sessions the handsets only communicate with the 2245 server.

  Each 2245 server is configured with an IP address which all of the handsets communicate with. In addition, each 2245 is configured with a pool of addresses. When a handset registers with a 2245, it is assigned one of the addresses from the pool. All communication between this 2245 and other devices (TPS, IP Sets and gateways, and other wireless sets) are always done via its pool address. In this sense the 2245 acts as a NAT.

  Note that the 2245 have a single physical Ethernet interface and MAC address so all of the IP addresses are mapped to a single MAC address.

- The 2245 server tags / untags packets with the SVP header. SVP packets have the protocol byte of the IP header set to 0x77. SVP compliant APs use this proprietary tagging to give priority on the RF link to tagged packets. For UDP (UNIStim and RTP) packets going from the handset to the network the 2245

replaces the SVP protocol number, 0x77, with the UDP number, 0x11. For packets going from the network to the handset the protocol number is changed from 0x11 to 0x77.

SVP is required for QoS because the current IEEE 802.11b wireless LAN standard provides no mechanism for differentiating audio packets from data packets. This standard is undergoing revision to version 802.11e to provide functionality similar to SVP in an industry standard thus ensuring high-quality voice in a mixed client environment.

Because packets which traverse the network between the handset and the 2245 are not standard IP packets, i.e. they use a non-standard protocol number, there can not be any layer 3 routing in the path. Therefore the handsets and 2245 server must be in the same logical subnet.

- The RTP packets between the handset and the 2245 server always contain 30 msec worth of voice no matter what has been configured on the call server. The 2245 repackage the RTP packets to conform to the size which has been configured in the call server. This provides more efficient use of the available RF bandwidth at the expense of slightly increased jitter and latency.

- The 2245 is configured with a maximum allowable number of simultaneous media streams on a single access point. The 2245 keeps track of the number of media streams on each AP and blocks calls to / from a set which would exceed the configured capacity.

- There is also a keep alive packet exchange which runs between the handset and the 2245 every 30 seconds. If the handsets detects the 2245 is unreachable it will reset and attempt to re-establish a connection with the Master 2245 server.

MAC Address Based QoS

The existing Nortel wireless Access Points, the 2220 and 2221, are not SVP compliant. However beginning with firmware release 1.3 they support MAC address based filtering. The APs can be configured such that packets that are destined for specific MAC addresses are given priority on the radio link. The MAC address for the family of 2210 and 2211 phones have been pre-configured in the APs.

End to End QoS

The 2210/11 does not support any Layer 2 or Layer 3 QoS mechanisms such as 802.1p or DiffServ. Any UNIStim messages which are sent to the handset to adjust the Layer 2 or Layer 3 QoS settings are ignored. In addition, the 2245 server does not support any Layer 2 or Layer 3 QoS mechanisms.

4. Documentation

The following documents will be introduced with the release of the Wireless IP Handsets 2210 and 2211. They will be posted for download from the Helmsman website for the

initial release. At the next BCM release they will be included as part of the online BCM core documentation:

BCM Wireless LAN IP Telephony Installation & Configuration Guide

BCM Wireless LAN Handset 2210/2211 User Guide.

5. 2210/2211 limitations

- i2210/i2211 jitter buffer size cannot be adjusted. Any changes in unified manager will not be enforced by the handset.
- i2210/i2211 does not support RTCP
- i2210/i2211 does not support G.723 codec
- i2210/i2211 can upgrade firmware only through TFTP server
- i2210/i2211 does not support services key
- i2210/i2211 does not support paging and voice call

6. Known issues

- Dash appears in extension ("Ext." when the handset is in standby mode) digit string after the fourth digit (Q00940611)
- 22xx sets when "Charge Completed" seen on LCD cannot make call until the melody stops (Q00960559)
- Letters Q and Z missing from numeric key pad (Q00946372)
- i2210 & i2211 DNs not seen in UM DN Registration>IP Wireless DN's reg'd – instead they are found under DN Registration>IP Set DN reg'd (Q00951225)
- 2210 and 2211 will appear as i2004 in Unified Manager under Services>Telephony Services>Telephony Services>System DNs>Active Set DNs>DN xxxx>General>Model
- i2210/i2211 handsets will appear as i2004 in the Unified Manager under Services>IP Telephony>> IP Terminals>Nortel IP Terminals when 'offline'
- Group Listen feature (F802) activated on i2210 & i2211 shows "Pick up Handset" on the screen (Q00940283)
- i2211 & i2210 cannot scroll when using Feature * 900(Q00940234)
- i2211 & i2210 F*7 does not do anything to LCD Display (Q00940265)
- i2211 & i2210 can access Set-Based Administration but cannot navigate menus (Q00940267)
- When the WLAN Application Gateway 2246 has been deployed in a BCM/SRG network, the built-in BCM/SRG DHCP Server cannot be used to assign IP addresses to the WLAN Handsets 2210 and 2211. For this scenario, the two alternatives available are as follows:
    - Configure the WLAN Handsets 2210 and 2211 using static IP addresses
    - Deploy a 3rd party DHCP Server
- In rare instances, the message "*Speed or Duplex mismatch error*" may occur during the boot-up sequence of the IP Telephony Manager 2245. Workaround: If this situation occurs, complete the following steps:

- o Verify all devices connected to the IP Telephony Manager 2245 are configured correctly (no duplex mismatch found)
- o If all configurations are correct, re-boot the IP Telephony Manager 2245. The error message should be cleared
- Q00953132 - Display does not show "Local Mode" when Spectralink under control of SRG
- Q00992252 – When using the Hotline feature on 2210/2211, pressing the release key shortly after the ringback tone starts will have no effect.
- The application of the BCM cumulative patch 1.0 will cause the 2210/2211 to be identified as i2004s in Unified Manager under Services>IP Telephony>> IP Terminals>Nortel IP Terminals and in the BCM Monitor. If the BCM Cumulative Patch 1.0 must be applied, it is recommended to apply it first then apply the WLAN IP Telephony patch.

Appendix 1 – Spectralink-approved Wireless Access Points

The table below details the types of access points (APs) that have been lab tested or field verified in specific installations.

Manufacturer	Make/Model	Radio Technology	Software Version	Lab Tested	Field Verified
Airespace	Wireless Enterprise Platform	802.11b	1.2.59	√	√
Alvarion	BreezeNET Pro.11 Series[1]	802.11-FH	4.4.2 or 5.0.103	√	
Avaya	Wireless Access Point AP-1, AP-2	802.11b	3.83 or later		√
Avaya	Wireless Access Point AP-3	802.11b	2.2.4 or later		√
Avaya	Wireless Access Point AP-4, AP-6	802.11b	2.2.4 or later		√
Cisco	Aironet 3500	802.11-FH	8.12 or later	√	√
Cisco	Aironet 4500	802.11b	8.12 or later	√	√
Cisco	Aironet 4800	802.11b	8.24 or later	√	√
Cisco	Aironet 340	802.11b	11.10T, 12.01T1 or later	√	√
Cisco	Aironet 350 [2]	802.11b	VxWorks : 11.10T, 12.01T1 or later IOS : 12.2.13-JA1	√	√
Cisco	Aironet 1100	802.11b	12.2.13-JA1	√	√
Cisco	Aironet 1200	802.11b	VxWorks : 12.01T1 or later IOS : 12.2.13-JA1	√	√
Enterasys	RoamAbout Access Point 2000	802.11b	V6.02		√
Enterasys	RoamAbout R2	802.11b	V4.01.09 or later		√
HP	ProCurve Wireless Access Point 520wl [3]	802.11b	2.3.1 or later		√
Intermec	MobileLAN access 2100, 2101, 2102	802.11b	1.91 or later		√
Intermec	MobileLAN access WA21, WA22	802.11b	1.91 or later		√
LXE	6520 Access Point	802.11b	3.83 or later		√
Proxim	Orinoco AP-500, AP-1000	802.11b	3.83 or later	√	√
Proxim	Orinoco AP-600b	802.11b	2.3.1 or later		√
Proxim	Orinoco AP-2000	802.11b	2.3.1 or later		√
Symbol	Spectrum 24 FH	802.11-FH	4.02-12	√	√
Symbol	Spectrum 24 DS	802.11b	3.50-18		√
Symbol	Wireless Switch System (WS5000 & AP100) [4]	802.11b	1.2.0.39T		√
Teklogix	9150 Wireless Gateway	802.11b	K112p or later		√
Telxon	Air-I/O 802FH UAP	802.11-FH	8.24	√	√
Telxon	Air-I/O 802DS UAP, Air-I/O 802DS11 UAP	802.11b	8.12 or 8.24	√	√

1 Alvarion BreezeNET Pro.11 Series software version 4.4.5 is not compatible with the NetLink Wireless Telephones
2 Cisco Aironet 350 software version 11.21 is not compatible with the NetLink Wireless Telephones
3 For detailed setup instructions for the HP Procurve Wireless Access Point 520wl use the Proxim AP 2000 Configuration Note
4 The 'No PBX response' message may be seen on 2210/2211 when using WS5000 access point running a firmware release earlier than release 1.2.0.39t. Customers should contact their Symbol account prime or Symbol technical support to get the latest firmware release. Note: As of October 2004 Symbol will include this release in manufactured units.
Lab Tested- The AP software has been fully tested and approved by SpectraLink Engineering
Field Verified- The AP softw are has been verified in field installations
Notes:
Calls per Access Point: 802.11b APs generally support up to 12 simultaneous calls per AP. Calls per Access Point can vary
depending upon the codec being used by the host telephone and by AP manufacturer.
Security: Wired Equivalent Privacy (WEP) encryption has been tested and is compatible with all APs listed above. Some APs support
other security types; check the AP configuration note for details.

Appendix 2 – Recommended AP settings for Nortel 2210/Symbol 4121-1050

- Make sure the AP is running the latest f/w version
- Data Beacon Rate (DTIM period) should be set to 2
- Max Retries (v) should be set to 5
- Beacon Interval should be set to 100
- Enable broadcast of SSID
- Rate Control 1.0 Mbps - Required
-       2.0 Mbps - Required
-       5.5 Mbps - Optional
-       11.0 Mbps - Optional
- RTS threshold should be set to a minimum of 600 (more is better)
- Short preamble should be disabled.

Placement of access points is critical. 60 to 90 feet separation in a typical office environment using 802.11b radio channels 1, 6, and 11. Use of 802.11g devices in the environment may impact the voice service.