



NORTEL

Nortel Communication Server 1000

WLAN Handsets Fundamentals

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New in this release

Features

No new feature content has been added to this document for Communication Server 1000 Release 7.0.

Other

Revision history

June 2010

Standard 05.01. This document is up-issued to support Communication Server 1000 Release 7.0.

June 2009

Standard 04.02. This document is up-issued to support Communication Server 1000 Release 6.0. This document contains an update to technical content for the WLAN Handset 6120/6140.

May 2009

Standard 04.01. This document is up-issued to support Nortel Communication Server 1000 Release 6.0.

December 2007

Standard 03.01. This document is issued to support Nortel Communication Server 1000 Release 5.5.

December 2007

Standard 02.01. This document is issued to support Nortel Communication Server 1000 Release 5.0.

September 2007

Standard 01.04. This document is up-issued to support Communication Server 1000 Release 5.0. This document includes an update to WLAN Handset Standby menu and WLAN Handset Configuration menu sections.

June 2007

Standard 01.03. This document is up-issued to support Communication Server 1000 Release 5.0. This document includes a table of factory default settings for the WLAN Handsets 6120/6140.

June 2007

Standard 01.02. This document is up-issued to reflect changes in technical content.

May 2007

Standard 01.01. This document is issued to support Nortel Communication Server 1000 Release 5.0. This document contains information previously contained in the following legacy document, now retired: *WLAN IP Telephony: Installation and Configuration (553-3001-304)*.

How to get help

This chapter explains how to get help for Nortel products and services.

Getting help from the Nortel Web site

The best way to get technical support for Nortel products is from the Nortel Technical Support Web site:

www.nortel.com/support

This site provides access to software, documentation, bulletins, and tools to address issues with Nortel products. From this site, you can:

- download software, documentation, and product bulletins
- search the Technical Support Web site and the Nortel Knowledge Base for answers to technical issues
- arrange for automatic notification of new software and documentation for Nortel equipment
- open and manage technical support cases

Getting help over the phone from a Nortel Solutions Center

If you do not find the information you require on the Nortel Technical Support Web site, and you have a Nortel support contract, you can also get help over the telephone from a Nortel Solutions Center.

In North America, call 1-800-4NORTEL (1-800-466-7835).

Outside North America, go to the following Web site to obtain the telephone number for your region:

www.nortel.com/callus

Getting help from a specialist by using an Express Routing Code

To access some Nortel Technical Solutions Centers, you can use an Express Routing Code (ERC) to quickly route your call to a specialist in your Nortel product or service. To locate the current ERC for your product or service, go to:

www.nortel.com/erc

Getting help through a Nortel distributor or reseller

If you purchased a service contract for your Nortel product from a distributor or authorized reseller, contact the technical support staff for that distributor or reseller.

Regulatory and safety information

This chapter includes regulatory and safety information about the following topics:

- “European Union Directives Conformance Statement” (page 13)
- “FCC Rules - Part 15” (page 13)
- “Industry Canada Notice” (page 14)
- “Nortel WLAN Handset 6100 Series Dual Slot Charger information” (page 15)
- “Operational warnings” (page 15)
- “Electromagnetic interference and compatibility” (page 16)
- “Handset operation normal position” (page 18)
- “Handset operation body-worn position” (page 18)

European Union Directives Conformance Statement

The WLAN Handsets 2210/2211/2212/6120/6140 comply with the essential requirements and other relevant provisions of R&TTE directive 1999/5/EC. You can obtain a copy of the Declaration from Nortel GmbH address: Ingolstaedter Strasse 14-18, 80807 Munich Germany or from www.nortel.com/corporate/community/environment/life_cycle/declarations.html.

FCC Rules - Part 15

The WLAN Handsets 2210/2211/2212/6120/6140 comply with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Radiation Exposure Statement: This portable device with its antenna complies with FCC's RF radiation exposure limits set forth for an uncontrolled environment. To maintain compliance this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Industry Canada Notice

This device complies with RSS-210 of Industry Canada (IC). Operation is subject to the following two conditions: 1) This device may not cause interference, and 2) this device must accept any interference, including interference that may cause undesired operation of the device.

Privacy of communications may not be ensured when using this telephone.



WARNING

Changes or modifications to this equipment not approved by Nortel can cause this equipment to not comply with Part 15 of the FCC rules and void the user's authority to operate this equipment.



CAUTION

This equipment contains no user-serviceable parts inside. Refer servicing to qualified service personnel.



WARNING

- Follow standard acceptance procedures before operating the WLAN Handsets 2210/2211/2212/6120/6140 near life-support systems.
- To minimize risk of interference, pacemaker users should not carry the WLAN Handsets 2210/2211/2212/6120/6140 next to the pacemaker.
- Avoid placing the handset near small metallic objects. The handset earpiece attracts magnetic objects.
- The WLAN Handset 6120 and 6140 produce noise noticeable to hearing aid users. Use a headset compatible with hearing aids.
- The WLAN Handsets 2210/2211/2212/6120/6140 comply with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
- Privacy of communications cannot be ensured when using the WLAN Handsets 2210/2211/2212/6120/6140.

- To prevent radio interference to the licensed service, the WLAN Handsets 2210/2211/2212/6120/6140 must be operated only indoors and kept away from windows to provide maximum shielding.

Nortel WLAN Handset 6100 Series Dual Slot Charger information

This equipment has been tested and complies with the limits for a Class A digital device, pursuant to Part 15 of FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, can cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This Class A digital apparatus complies with Canadian ICES-003.

Operational warnings

This section contains operational warnings.



WARNING

For vehicles equipped with an air bag: Do not place a portable radio product in the area over the air bag or in the air bag deployment area. An air bag inflates with great force. If a portable radio is placed in the air bag deployment area and the air bag inflates, the radio product can be propelled with great force and cause serious injury to occupants of the vehicle.



WARNING

Potentially explosive atmospheres: Turn off your radio product prior to entering any area with a potentially explosive atmosphere, unless it is a radio product type especially qualified for use in such areas (for example, Factory Mutual Approved). Do not remove, install, or charge batteries in such areas. Sparks in a potentially explosive atmosphere can cause an explosion or fire resulting in bodily injury or even death.

Areas with potentially explosive atmospheres include fueling areas such as below decks on boats, fuel or chemical transfer or storage facilities, areas where the air contains chemicals or particles such as grain, dust, or metal powders, and any other area where you are normally advised to turn off your vehicle engine. Areas with potentially explosive atmospheres are often but not always posted.



CAUTION

Loud noise environment: The WLAN Handsets 2210/2211/2212/6120/6140 are designed to produce optimal voice quality. However, when used in extremely loud noise environments (for example, close to working heavy machinery), users can experience degradation in call quality performance due to echo. Avoid using the handset when traversing these types of environments.

Batteries

All batteries can cause property damage and bodily injury, such as burns, if a conductive material such as jewelry, keys, or beaded chains touch exposed terminals. The conductive material can complete an electrical circuit (short circuit) and become quite hot. Exercise care in handling any charged battery, particularly when placing it inside a pocket, purse, or other container with metal objects.

Cleaning and drying considerations

A leather carrying case can help to protect the surfaces of the radio product and help prevent liquids (for example, rain) from entering into its interior. This product is not waterproof and exposing it to liquids can result in permanent damage.

If your handset interior gets wet, do not try to accelerate drying with the use of an oven or a blow dryer, as this will damage the handset and void the warranty. Instead, do the following: 1. Immediately turn off the handset. 2. Remove the battery pack from handset. 3. Shake excess liquid from the handset. 4. Place the handset and battery pack in an area that is at room temperature with good airflow. 5. Let the handset and battery pack dry for 72 hours before you reconnect the battery pack and turn on the handset. If the handset does not work after following the steps listed above, contact your dealer for servicing information.

Electromagnetic interference and compatibility

This section provides information about electromagnetic interference and compatibility.

ATTENTION

Nearly every electronic device is susceptible to electromagnetic interference (EMI) if inadequately shielded, designed, or otherwise configured for electromagnetic compatibility.

Facilities

To avoid electromagnetic interference and compatibility conflicts, turn off your radio product in any facility where posted notices instruct you to do so. Hospitals or health care facilities can be using equipment that is sensitive to external RF energy.

Medical devices

This section provides information about EMI and some medical devices.

Pacemakers

The Health Industry Manufacturers Association recommends that you maintain a minimum separation of 6 inches (15 cm) between a handheld wireless radio product and a pacemaker. These recommendations are consistent with the independent research by, and recommendations of Wireless Technology Research.



WARNING

Persons with pacemakers should:

- always keep the radio product more than 6 inches (15 cm) from their pacemakers when the radio product is turned on
- not carry the radio product in a breast pocket
- use the ear opposite the pacemaker to minimize the potential for interference
- turn the radio product off immediately if they suspect the occurrence of interference

Hearing aids

Some digital wireless radio products can interfere with some hearing aids. In the event of such interference, consult your hearing aid manufacturer to discuss alternatives.

Hearing Aid Compatibility (HAC) as per FCC Part 68

Other medical devices

If you use any other personal medical device, consult the manufacturer of your device to determine if it is adequately shielded from external RF energy. Your physician can assist you in obtaining this information.

Use while driving

Check the laws and regulations on the use of radio products in the area where you drive. Always obey them. When using the radio product while driving:

- Give full attention to driving and to the road.
- Use handsfree operation, if available.
- Pull off the road and park before making or answering a call, if driving conditions so require.

Handset operation normal position

Hold the handset as you would any other telephone, with the earpiece to your ear and speak into the microphone. The internal antenna is then positioned properly.

Handset operation body-worn position

To maintain compliance with RF energy exposure guidelines, if you wear a handset on your body when transmitting, always use the handset with a Nortel-supplied accessory as described in the user guide for the handset. Nortel supplies belt clips, holsters, and lanyards for body-worn operation. Use of accessories not supplied by Nortel can cause the handset emissions to exceed RF energy exposure guidelines.

Overview

This chapter contains information about the following topics:

- [“Subject” \(page 19\)](#)
- [“Terminology” \(page 20\)](#)
- [“Resources” \(page 20\)](#)
- [“WLAN Handset 2210/2211/2212 and WLAN Handset 6120/6140” \(page 21\)](#)
- [“DHCP options” \(page 37\)](#)
- [“Handset switchover” \(page 37\)](#)
- [“Virtual Office” \(page 38\)](#)
- [“Branch Office” \(page 38\)](#)
- [“Survivable Remote Gateway” \(page 39\)](#)
- [“External Applications Server” \(page 39\)](#)

Subject

This document describes configuration, maintenance, and troubleshooting for the Nortel WLAN Handsets:

- Nortel WLAN Handset 2210
- Nortel WLAN Handset 2211
- Nortel WLAN Handset 2212
- Nortel WLAN Handset 6120
- Nortel WLAN Handset 6140

For information about planning, or installation, see WLAN IP Telephony Installation and Commissioning (NN43001-504)

Note on legacy products and releases

This document contains information about systems, components, and features that are compatible with Nortel Communication Server 1000 Release 7.0 software. For more information about legacy products and releases, click the **Technical Documentation** link under **Support & Training** on the Nortel home page:

www.nortel.com

Terminology

In this document, the following systems are referred to generically as system:

- Communication Server 1000M (CS 1000M)
- Communication Server 1000E (CS 1000E)

Resources

This section lists information sources that relate to this document.

- *WLAN Handset 2210 User Guide* (NN43150-110)
- *WLAN Handset 2211 User Guide* (NN43150-120)
- *WLAN Handset 2212 User Guide* (NN43120-130)
- *WLAN Handset 6120/6140 User Guide* (NN43120-100)
- *Features and Services Fundamentals* (NN43001-106)
- *Main Office Configuration Guide for the Survivable Remote Gateway 50* (NN43001-307)
- *Branch Office Installation and Commissioning* (NN43001-314)
- *Signaling Server IP Line Applications* (NN43001-125.)
- *WLAN IP Telephony Installation and Commissioning* (NN43001-504)

Online

To access Nortel documentation online, click the **Technical Documentation** link under **Support & Training** on the Nortel home page:

www.nortel.com

CD-ROM

To obtain Nortel documentation on CD-ROM, contact your Nortel customer representative.

WLAN Handset 2210/2211/2212 and WLAN Handset 6120/6140

The WLAN Handsets 2210/2211/2212 and WLAN Handsets 6120/6140 use Voice over IP (VoIP) technology on IEEE 802.11-compliant Wireless Local Area Networks (WLANs). Access points (AP) use radio frequencies to transmit signals to and from the wireless handsets.

In this document, handsets means the WLAN Handset 2210/2211/2212, and WLAN Handset 6120/6140. Where the feature refers only to a specific handset, the full handset name is used.

Employees carry wireless handsets to make and receive calls as they move throughout the building. The handsets are used only on the premises; they are not cellular phones. The handsets communicate with the Communication Server (CS) 1000 system and with the WLAN IP Telephony Manager 2245. Just like wired telephones, the wireless handsets receive calls directly, receive transferred calls, transfer calls to other extensions, and make outside and long-distance calls (subject to corporate restrictions).

The frequencies that are allocated are governed by regulatory agencies for WLANs and are part of the free spectrum. The WLAN Handset 6120/6140 use a, b, and g frequencies, and the WLAN Handset 2210/2211/2212 use the b frequency.

The handsets work only in a Nortel Succession Release 3.0 (and later) environment (Communication Server 1000 Release 4.5 and later for the WLAN Handset 6120/6140), coordinated with a Communication Server (CS) 1000. These handsets communicate with the Nortel call server through the Unified Network IP Stimulus (UNISim) protocol. The media path of the voice call goes from the handset directly to the destination device (through the WLAN Telephony Manager 2245). In addition, the handset encapsulates all traffic in the SpectraLink Voice Priority (SVP) protocol. The WLAN Telephony Manager 2245 de-encapsulates the VoIP traffic from SVP and passes it onto the network—it does not translate between UNISim and SVP. Therefore, the WLAN Telephony Manager 2245 is in the path of all communication to and from the handset. Likewise, signaling goes from the handset to the WLAN Telephony Manager 2245 to the call server.

The WLAN Handset 2211 and the WLAN Handset 6140 are the most durable and they are the only handsets that support Push-to-talk (PTT).

Components

The WLAN Handset 2200 Series offers the following components for local configuration:

- Nortel WLAN Handset 2200 Series Configuration Cradle
Software—software only
- Nortel WLAN Handset 2200 Series Configuration Cradle—required hardware (serial cable included)

The WLAN Handset 6100 Series offers the following components for local configuration:

- Nortel WLAN Handset 6100 Series Administration Tool Software—software only
- Nortel WLAN Handset 6100 Series Dual Slot Handset Charger—required hardware (USB cable not included)
- USB Cable for the Nortel WLAN Handset 6100 Series Dual Slot Handset Charger

ATTENTION

For the purposes of this document

- Configuration Cradle refers to the Nortel WLAN Handset 2200 Series Configuration Cradle.
- Handset Administration Tool refers to the Nortel WLAN Handset 6100 Series Administration Tool Software.
- Dual Slot Handset Charger or Handset Charger refers to the Nortel WLAN Handset 6100 Series Dual Slot Handset Charger.

WLAN IP Telephony Manager 2245 (used with SpectraLink Voice Priority QoS method)

The WLAN IP Telephony Manager 2245 is a wired LAN device that is required when using SpectraLink Voice Priority for QoS (this is not required for the 6100 series).

Nortel VoIP System

The handset operates as a wireless extension of the Nortel BCM, Meridian 1, and Communication Server 1000 call server, using the UNISTim voice protocol.

WiFi Access Points (APs)

Enterprise-grade WiFi access points provide the connection between the wired LAN and the wireless LAN. 802.11a/b/g/n APs must be positioned in all areas where wireless telephones will be used to ensure seamless radio coverage. The number, type and placement of access points affect the coverage area and capacity of the wireless system. Careful planning of the

WLAN is necessary to ensure good voice quality. See the *Best Practices Guide for Deploying WLAN Handset 6120/6140 Wireless Telephones* for additional guidance.

Access points can use SpectraLink Voice Priority (SVP) in conjunction with an WLAN IP Telephony Manager 2245, CCXv4 (Cisco APs only) or WiFi Standard QoS (including WMM, WMM-Power Save and WMM-Admission Control).

ATTENTION

Ensure that all your APs are attached to the same subnet for proper operation. The handset can change subnets if DHCP is enabled and the handset is powered off then back on when within range of APs on the new subnet. Note that the wireless telephones cannot roam across subnets, since they cannot change IP addresses while operational from one subnet to another, unless assisted by a WLAN controller.

Note: APs must be properly configured to support the corresponding QoS and security methods selected for the handset.

Ethernet Switch

One or more Ethernet switches interconnect multiple wired devices, including the WLAN IP Telephony Manager 2245 (if used for QoS), the Nortel IP telephony system, Nortel IP phones, TFTP Server, RADIUS authentication server and WLAN access points. Enterprise Ethernet switches provide the highest performance networks, which can handle combined voice and data traffic, and are required when using the Wireless Telephones.

Although a single Ethernet switch network is recommended, the Wireless Telephones and the WLAN IP Telephony Manager 2245 can operate in larger, more complex networks, including networks with multiple Ethernet switches, routers, VLANs, and multiple subnets, as long as the WLAN IP Telephony Manager 2245 and handsets are on the same subnet. However, in such networks, it is possible for the quality of service (QoS) features of the WLAN IP Telephony Manager 2245 to be compromised, and consequently voice quality may suffer. Any network that consists of more than a single Ethernet switch should be thoroughly tested to ensure any quality issues are addressed. See the *Best Practices Guide for Deploying WLAN Handset 6120/6140 Wireless Telephones* for additional guidance.

ATTENTION

Wireless handsets cannot roam with uninterrupted service between subnets unless specific LAN components are present. Certain AP/Ethernet switch combinations establish a Layer 2 tunnel across subnets that enable the handsets to roam. Without this capability, any call in progress is dropped when the user moves out of range and the handset must be power cycled in order to resume functionality in the new subnet area.

TFTP (Trivial File Transfer Protocol) Server

A TFTP server is required in the system to distribute software to the Wireless Telephones and WLAN IP Telephony Manager 2245. It can be on a different subnet than the supported Nortel IP telephony device and APs.

NTP (Network Time Protocol) Server

If WPA Enterprise security is used, the handset validates that the PEAP certificate has a valid date and time with the NTP Server on the network, if one is available. If an NTP Server is not available, the certificate is deemed valid and operates accordingly.

Authentication Server (if using WPA2 Enterprise)

A RADIUS authentication server must be used to provide user name/password based authentication using RSA certificates for PEAPv0/MSCHAPv2 or PAC files for EAP-FAST.

Language

The handset menus and screens that originate from the Call Server are displayed in the languages supported on the Call Server. The administration and configuration menus, and all other local handset prompts are English-only.

Licenses

The handset appears to the Call Server as a standard IP Phone 2004. Therefore, each wireless handset requires one IP User License and is subject to the same feature packaging requirements as the existing IP Phone 2004.

Wi-Fi Multimedia

The handsets support basic WiFi Multimedia (WMM), WMM Power Save and WMM Admission Control - all QoS standards from the WiFi Alliance based on IEEE 802.11e. The AP must support and enable all three of these QoS mechanisms in order for the handset to work properly. If the handset is configured for this option and the AP does not advertise all of these features, it will fail to operate. The combination of these three standards provides enterprise-class QoS in terms of voice quality, battery life and call capacity. This option does not require the WLAN IP Telephony Manager 2245.

WMM provides prioritized QoS capability when concurrent applications, each with unique latency requirements, are competing for network resources.

When WMM is used, all voice traffic originating from the wireless handset is assigned the WMM Voice Access Category, making it the highest priority application. If the wireless network supports WMM, the handsets enable WMM support automatically; otherwise, SpectraLink Voice Prioritization (SVP) is used.

Wired Equivalent Privacy

The handsets support Wired Equivalent Privacy (WEP) as defined by the 802.11a, b, and g specification. Nortel offers the product with both 40-bit and 128-bit encryption. WEP increases the security of the wireless LAN to a level similar to a wired Ethernet LAN.

Wi-Fi Protected Access

The handsets support Wi-Fi Protected Access (WPA) using Preshared Key (PSK), as defined by the 802.11i specification. WPA increases the security of the wireless LAN, using key encryption, key rotation, authentication and message integrity checking.

Wi-Fi Protected Access2

The handsets support Wi-Fi Protected Access2 (WPA2) using Preshared Key (PSK) and Advanced Encryption Standard (AES), as defined by the 802.11i specification. WPA2 increases the security of the wireless LAN, using key encryption, key rotation, data encryption, authentication and message integrity checking.

Virtual Private Network

The WLAN Handset 2212 supports Virtual Private Network (VPN) security. VPN security provides a secure tunnel for the transfer of unencrypted information. A two-phase approach is used to negotiate the tunnel, with Phase 1 protecting Phase 2. Phase 1 uses preshared keys, Diffie-Hellman group, hashing, and encryption. Phase 2 uses hashing and encryption. Both phases have limited, configurable lifetimes.

Specifications

Table 1
WLAN Handset 6120/6140 Specifications

Radio frequency (selectable)	(802.11b, 802.11g) (802.11a)	2.4-2.48385 GHz
Transmission type	Direct-sequence spread spectrum (DSSS)	
Transmit data rate	Up to 54 Mb/s (802.11a/g), up to 11 Mb/s (802.11b)	

Table 1
WLAN Handset 6120/6140 Specifications (cont'd.)

WLAN QoS	SpectraLink Voice Priority (SVP)
	WiFi Standard QoS (using WMM, WMM-Power Save and WMM-Admission Control)
	CCXv4
WLAN security	WEP (Wired Equivalent Privacy)
	Cisco FSR (Fast Secure Roaming)
	WPA Personal
	WPA2 Personal
	WPA2 Enterprise: 802.1X Authentication - EAP-FAST - PEAPv0/MSCHAPv2 - PEAP certificate sizes: 512, 1024, 2048, 4096 bit - Encryption Ciphers: AES, RSA, RC4 - Data Integrity: Hashed Message - Authentication Code MD5 (HMAC-MD5) (RFC 2403, 2104) and Secure Hash Algorithm-1 SHA (HMAC-SHA-1) (RFC2404) - Fast AP Handoff - Opportunistic Key Caching (OKC) - Cisco Client Key Management (CCKM)
FCC certification	Part 15.247
Other certifications	IP 53 certified for resistance to dust and liquid resistance
	MIL 810F Proc IV 516.5 for shock resistance
	Cisco Client Extensions (CCX) v4
Voice encoding	G.711, G.729a/ab
Voice Signaling Protocols	UNISTIM
Transmit power	Up to 100mW Transmit Power Control (formerly 802.11h), see Appendix A for details.
Display	LCD. Up to five lines of text plus two icon status rows and one row for softkey labels.
8020 Dimensions	5.4" x 2.0" x 0.9" (13.7 x 5.1 x 2.3 cm)

Table 1
WLAN Handset 6120/6140 Specifications (cont'd.)

8030 Dimensions	5.7" x 2.0" x 0.9" (14.5 x 5.1 x 2.3 cm)
8020 Weight*	3.9 oz. (110.6 g) with Standard Battery Pack
8030 Weight*	4.2 oz. (119.1 g) with Standard Battery Pack
Standard Battery Pack capacity	4 hours talk, 80 hours standby
Extended Battery Pack capacity	6 hours talk, 120 hours standby
Ultra-Extended Battery Pack capacity	8 hours talk, 160 hours standby

Handset Display

When the WLAN Handset is off-hook, display information is provided by the Nortel call server. The handset displays the first 18 characters of each line of text provided. Certain characters supported by the Nortel call server are not implemented in the WLAN Handset, such as definable and special characters.

Table 2
WLAN Handset 6120/6140 Display Information

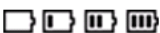
Indicator	Function
	The signal-strength icon indicates the strength of the signal and can assist the user in determining if the handset is moving out-of-range.
	The voicemail icon is activated when a new voicemail message is received if the feature is supported by the phone emulation.
	The battery icon indicates the amount of charge remaining in the Battery Pack. When only one level remains, the Battery Pack needs to be charged.
	The speakerphone icon displays when the speakerphone is active.
1 • • • • •	The line indicators are associated with telephone line status and access.

Table 2
WLAN Handset 6120/6140 Display Information (cont'd.)

Indicator	Function
↑↑↑↑	Up and down arrows are displayed when the menu has additional options above or below. Left or right arrows are displayed during editing when the cursor may be moved left or right.
	PBX ring icon. A regular telephone call is coming in.
	OAI ring icon. A call is coming in from the OAI application.
	The Push-to-talk (PTT) ring icon. A PTT call is coming in.
↑↑	The priority PTT ring icon. A call is coming in on the priority PTT channel. This call will override any other.
	The Ekahau Real-Time Location System (RTLS) is enabled.
Muted	The muted indicator displays after the Mute softkey has been pressed. It indicates that the microphone is not transmitting sound. Press the Mute softkey again to unmute the microphone.
Locked	Locked indicates that the keypad is locked to prevent accidental activation. Use the Unlk softkey plus the # key to unlock it.
[No Service message]	If warning tones are not disabled, an alarm sounds and a descriptive message displays when the handset cannot receive or place calls. You might be outside of the covered area. Walk back into the covered area. The in-service tone indicates that service is re-established.

Table 2
WLAN Handset 6120/6140 Display Information (cont'd.)

Indicator	Function
	The download icon indicates that the handset is downloading code. This icon only appears while the handset is running the over-the-air downloader. It appears to the right of the Signal Strength icon in the same location as the Voicemail icon.
	The download failure icon indicates that the handset has failed to download code because the code is incompatible with the handset software. The system will also create a system log with the message: "Download aborted, code incompatible". When this icon appears, the handset code in the TFTP server should be updated.

Startup sequence

The WLAN Handset goes through an initialization sequence at startup. The line icons 1-9 appear and count down as the handset cycles through this sequence. If there is a problem at any step that prevents initialization from continuing, an error message displays and the related icons stay on. Refer to the error table at the end of this document for instructions on how to handle error messages that occur during initialization.

Table 3
WLAN Handset 6120/6140 Startup Sequence

Icon	The icon shown in bold turns off when:
123 5678 9	The WLAN Handset has located, authenticated and associated with an AP, and is proceeding to higher-layer networking functions. Note 1: 4 is not used for the UNISim protocol Note 2: 6 is not used when QoS is set to WiFi Standard
123 567 8	The WLAN Handset is either configured for Static IP, or if configured for DHCP the DHCP discovery process has started.
123 56 7	If DHCP is configured, a DHCP response was received which contains a good DNS server configuration.

Table 3
WLAN Handset 6120/6140 Startup Sequence (cont'd.)

Icon	The icon shown in bold turns off when:
123 56	Note: Used for SVP QoS only and not present when using WiFi Standard QoS. Indicates one of the following possibilities: • Static IP configuration • WLAN IP Telephony Manager 2245 address found in DHCP option 151 response • WLAN IP Telephony Manager 2245 address found via DNS lookup
123 5	All networking functions are complete (notably, DHCP) and the WLAN Handset is proceeding with establishing the SRP link to either the Gateway or <u>WLAN IP Telephony Manager 2245</u> .
123	The UNISim application has started.
12	At least one IP address for a PBX (DHCP Option 128) has been identified.
1	The WLAN Handset has successfully registered with the PBX.
Ext. XXXXX	Initialization is complete. The WLAN Handset is in standby mode ready to receive and place calls.

WLAN Handset modes

Following are descriptions of the WLAN Handset modes.

Standby (on-hook)

In standby mode, the WLAN Handset is waiting for an incoming call or for the user to place an outgoing call. The extension number is shown on the display and there is no dial tone. In this mode, the handset is conserving battery power and wireless LAN bandwidth.

When an incoming call occurs, the WLAN Handset rings until the call is answered by pressing the Start key, or the End key is pressed to silence the ringing.

Active (off-hook)

To place or receive a call, press the **start** key. This transitions the WLAN Handset to active off-hook mode. When there is a dial tone, the WLAN Handset is in communication with the PBX, and the display shows information as it is received from the PBX. The user may place a call, or press a softkey or the Fcn or Line key, to access additional operations.

When an incoming call occurs during an active call, the WLAN Handset plays the second call ringing sound in the earpiece until the call is answered by pressing the Start key, the caller hangs up, or the call transfers to voicemail. If End is pressed, the first call is terminated and the WLAN Handset reverts to a full ring.

The active mode uses the most bandwidth and battery power. To conserve battery resources and allow the WLAN Handset to receive new calls, return the WLAN Handset to the standby mode when a call is completed by pressing the End key.

Active Idle mode

Active idle occurs when the soft key display area is active but there is no dial tone. From the standby mode, press the Actv softkey to enter the active idle mode and display available softkeys.

Configuration Menu mode

When user preferences are being configured in the Configuration menu, the WLAN Handset is on but is not active. The WLAN Handset cannot receive calls while in the Configuration menu.

ATTENTION

If the WLAN Handset is idle after 15 seconds while in the Configuration menu, it returns to the standby state. If a call was trying to be established while in the Configuration menu, it rings as soon as it is returned to the standby state.

Messaging mode

If text messaging functions have been programmed, such as with a nurse call system, the WLAN Handset is able to receive text messages. While these messages are being accessed, the WLAN Handset is in Messaging mode. Incoming calls ring with the second call ringing sound.

WLAN Handset displays

Status display area

Call server information is displayed in first two lines of text and available soft keys are displayed on the third line.

LINE display

There are 6 programmable keys that may be allocated to line appearances or features in any combination. Pressing the Line key from the active mode displays the list of line appearances extracted from the programmable keys list. The line appearances are also mapped to corresponding line icons across the top of the WLAN Handset display.

FCN display

Pressing the Fcn key from the active mode displays the list of programmable keys that are not on the Line list. OAI features, if assigned, are also displayed with their shortcuts. The programmable key items that appear on this list each have a state indicator in the second column of the display that shows a plus sign if the associated feature is active. This second column is blank if the associated feature is not active. The plus sign emulates a lit or blinking LED on a Nortel IP Telephone.

Push-to-talk feature

With the Push-to-talk (PTT) feature, the WLAN Handset 2211 and the WLAN Handset 6140 can operate in a PTT group-broadcast mode like a two-way radio, in addition to the standard telephone operation.

For more information, see [“Push-to-talk” \(page 87\)](#).

Text-messaging feature

All WLAN handsets support text messaging applications through the WLAN Application Gateway 2246. The application server communicates to the WLAN Application Gateway 2246 through a proprietary Open Application Interface (OAI) messaging protocol. The WLAN Application Gateway 2246 forwards the messages to the WLAN IP Telephony Manager, which encapsulates the message for delivery to the handset.

If text messaging functions are programmed, the handset can receive text messages. While you access text messages, the handset is in messaging mode. Incoming calls ring with the second call ringing sound.

Feature programming

The button mapping from the IP Phone 2004 to the WLAN Handset was designed to preserve nearly all of the functionality of the IP Phone 2004 within a small, mobile device. All telephone functions and messaging features are supported, if possible. The FCN-labeled buttons above are hard-coded to key sequences on the WLAN Handset. View the feature labels by pressing the Fcn button to display the Feature List.

For the sake of clarity, when Line keys 1-6 in the above diagram have been programmed to lines, they are called Line Appearances. When these numbers are programmed to features, they are called Line Features. Both are activated on the WLAN Handset through the Line key plus a number key.

Soft key assignment**Standby mode-CS1000**

In the CS 1000, call server features include redial, speed-dial and phonebook. These features are therefore disabled in the handset. Access these CS 1000 features through the Directory Services option on the Feature List. Press Fcn to display the Feature List.

Active idle mode and Active mode (CS 1000)

When the Actv soft key is pressed, the handset enters the active idle mode and the soft keys that are programmed from the PBX replace the standby mode soft keys. This enables you to access features while still on hook. The active idle mode times out if no keys are pressed.

This same set of soft keys also appears when off hook or in a call.

While in active idle or active mode, press Fcn to display the Feature List and soft keys that activate WLAN Handset features.

Standby mode-BCM

With the BCM server, redial, speed-dial and phonebook are available in the handset and appear in the second set of soft keys. Universal Serial Bus (USB) appears only when the handset is being configured.

When more than four soft keys are available, < and > appear as illustrated below. Use Nav < and Nav > to toggle between sets.

Active idle mode (BCM)

From standby, press Actv to enter the active idle mode. The Ftre (Feature) softkey provides access to programmed BCM system features while off hook. Press keypad numbers to activate features just as you would on the IP Phone 2004.

Active mode (BCM)

While in a call, press Fcn to display the Feature List and soft keys that activate handset features.

Feature assignment

The table below shows how the keys of the IP Phone 2004 are mapped to key sequences on the WLAN Handset.

IP Phone 2004 key	Feature	WLAN Handset key sequence	Display location
1	Line 1 (usually)	Line + 1	Line menu
2	Programmable	Line + 2	Line menu
3	Programmable	Line + 3	Line menu

IP Phone 2004 key	Feature	WLAN Handset key sequence	Display location
4	Programmable	Line + 4	Line menu
5	Programmable	Line + 5	Line menu
6	Programmable	Line + 6	Line menu
Goodbye		FCN +	Feature list
Directory		FCN +	Feature list
Inbox		FCN +	Feature list
Outbox		FCN +	Feature list
Services		FCN +	Feature list
Quit		FCN +	Feature list
Copy		FCN +	Feature list
	[OIA]	FCN +	Feature list

Note: If an Open Application Interface (OAI) is operational, up to four function key sequences will be assigned in the OAI configuration and will override any function sequence established here. Use unassigned key sequences (e.g. Fcn + 8, 9, #, *) for OAI access.

Programming memory keys in the WLAN Handset

In certain IP environments, the Line keys 1-6 are programmable by the end user. These keys can be programmed in the handset just like they are programmed in the IP Phone 2004. Press Start and then press Fcn+1 a (Goodbye). The WLAN Handset is in the idle state where the soft key display area is active but there is no dial tone. The handset does not time out and revert to standby mode until the process is completed by the user. This is equivalent to the on-hook idle state of the IP Phone 2004. Follow the instructions provided with the IP Phone 2004 for your IP system to program or to change the programming for the Line 1-6 keys.

Feature access

Soft keys

Some features can be accessed and activated by pressing a soft key. Examples are Hold, Mute, Park, and Conference. Others are only available through the Line Menu or the Feature List.

Line menu

While off hook, press the Line key to view the key labels for line appearances and line features. This list is updated whenever the PBX updates the programmable key labels. To activate a line or a line feature, press the corresponding number key. Use the Nav buttons to scroll and select, use the Line button to page between screens. Press the End key or the Cncl soft key to exit the Line menu.

Feature List

The IP Phone 2004 has several fixed feature keys. The CS1000 (and BCM) implementation supports the features that are suitable to a mobile user through the Function (Fcn) key on the WLAN Handset. When Fcn is pressed, the display lists the features and the assigned key. Press the End key or the Exit soft key to exit the list.

Activate the fixed features on the off-hook WLAN Handset by pressing Fcn+ the assigned number key. You can also use the Nav keys to scroll through the items and activate the features on this list.

If an OAI application has been assigned to a key, OAI information appears on the Feature List.

See the table on the previous page for features supported on the WLAN Handset. Features that are not listed are not supported.

Lock and Unlock the keypad

Because there is no Lock soft key, the keypad must be locked through the Cfg softkey. Cfg+1 locks the keypad and displays the Unlk soft key. Press Unlk+# (the # key) to unlock the keypad.

Loud noise environments

The WLAN Handsets are designed to provide optimal voice quality. However, when used in extremely loud noise environments, (for example, close to working heavy machinery), degradation in call quality can be experienced due to echo. Avoid using the handsets in loud noise environments

Quality of Service (QoS)

Quality of Service is provided by using SpectraLink Voice Priority (SVP), WiFi Standard QoS, or Cisco Client Extensions (CCX) version 4. These QoS modes can not be mixed within the same WLAN; all Wireless Telephones on the network must have the same QoS setting.

SVP

SpectraLink Voice Priority is a proprietary method of WLAN QoS, developed by Polycom, to ensure enterprise-grade voice quality, battery life and call capacity for WLAN Handset 6120/6140. SVP requires the WLAN IP Telephony Manager 2245, which is an Ethernet LAN device that works in conjunction with WiFi APs to ensure QoS over the WLAN. Voice packets to and from the Wireless Telephones are forwarded through the WLAN IP Telephony Manager 2245 to ensure voice prioritization as they are routed between the handset and an IP telephony server. See the *WLAN IP Telephony Manager 2245: Administration Guide within IP Environments* document for detailed information about this device.

WiFi Standard QoS

WLAN Handset 6120/6140 supports WMM, WMM Power Save and WMM Admission Control - all QoS standards from the WiFi Alliance based on IEEE 802.11e. The AP must support and enable all three of these QoS mechanisms in order for the handset to work properly. If the handset is configured for this option and the AP does not advertise all of these features, it will fail to operate. The combination of these three standards provides enterprise-class QoS in terms of voice quality, battery life and call capacity. This option does not require the WLAN IP Telephony Manager 2245.

CCXv4

The CCX program allows WLAN client devices operating on Cisco APs to take advantage of Cisco-specific features. The WLAN Handset 6120/6140 has been certified by Cisco as CCXv4 compliant. When the CCXv4 operating mode is selected on the handset, it operates using the required set of Cisco-specific and industry standard QoS mechanisms. This option does not require the WLAN IP Telephony Manager 2245.

Real-Time Location System

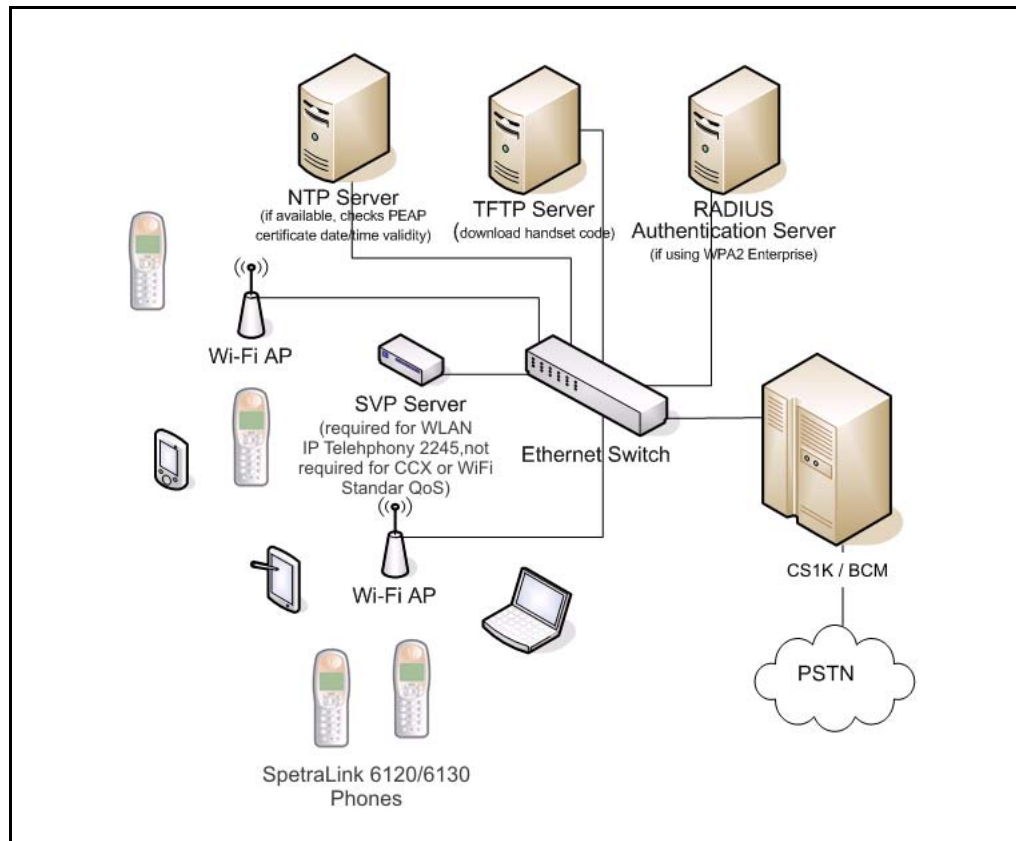
The WLAN Handset 6120/6140 supports Real-Time Location System (RTLS). RTLS monitors and reports real-time locations of tracked WLAN Handsets anywhere within the Wireless Fidelity (WiFi) network. RTLS uses a combination of client software, tags, APs, and system software to locate, track, and monitor wireless headsets within the coverage area.

If you activate RTLS, the following icon appears in the Ring Indicator location on the handset.

Figure 1
RTLS icon

**System diagram**

The following simplified diagram shows the components of a typical system.



DHCP options

If you use a DHCP Server, configure the following options:

- DHCP Option 3—the Default Gateway
- DHCP Option 7—the Syslog Server
- DHCP Option 42—the Time Server
- DHCP Option 60—the Class Identifier
- DHCP Option 66—the IP address of the TFTP Server
- DHCP Option 151—the IP address of the WLAN IP Telephony Manager 2245
- DHCP Option 152—the IP address for the optional WLAN Application Gateway 2246

For more information about DHCP options, see *WLAN IP Telephony Installation and Commissioning (NN43001-504)*.

Handset switchover

If a user on an active call is moving about, the call switches from AP to AP in the subnet. This changeover is transparent to the user.

Loss of signal

If a WLAN Handset is out of range of all APs, it waits 20 seconds for a signal to return. If a signal is not reacquired within 20 seconds, the WLAN Handset loses connection to the Call Server and any calls are dropped. When the WLAN Handset comes back into range of an AP, it reestablishes a connection to the Call Server and goes through the system registration process.

ATTENTION

If a WLAN Handset is out of contact with the system for four seconds (worst case scenario) during UNISTim messaging, a UNISTim failure could occur and cause the WLAN Handset to lose the UNISTim association with the Line Telephony Proxy Server (LTPS).

Virtual Office

The handsets support Virtual Office. For more information, see *Features and Services Fundamentals (NN43001-106)* and *Signaling Server IP Line Applications (NN43001-125)*.

Branch Office

The handsets are supported in a branch office location using the Branch Office feature. Branch Office refers to the Media Gateway (MG) 1000B and the Survivable Remote Gateway (SRG). A WLAN IP Telephony Manager 2245 and supported APs must be installed at the branch office location. Branch office WLAN Handsets do not require wireless handset infrastructure in the main office.

The WLAN Handsets in a branch office configuration behave like an IP Phone 2004 in the Branch Office feature. The WLAN Handsets are administered in the same manner as the IP Phone 2004. The display on the WLAN Handsets is almost the same as the display on the IP Phone 2004, with one exception—the Local mode display.

Local mode display

The default state of the WLAN Handset is Standby. To determine whether the WLAN Handset is in Local mode, press the off-hook (Green) or the MENU keys on the WLAN Handset 2210/2211/2212 or the soft keys and the Nav keys on the WLAN Handset 6120/6140. Pressing these keys changes the state of the WLAN Handset to Active Idle or Active Off-Hook, therefore putting the WLAN Handset in communication with the primary Signaling Server.

For the MG 1000B, if a WLAN Handset is registered in Local mode, the local-mode license information appears on the WLAN Handset on the second line of the display. Since the maximum number of display characters on the WLAN Handset is 19 characters, the local-mode license

information about the WLAN Handset display is truncated. See [Table 4 "IP Phone 2004 and handset Local mode license display \(MG 1000B only\)" \(page 39\)](#).

Table 4

IP Phone 2004 and handset Local mode license display (MG 1000B only)

IP Phone 2004	WLAN Handset
Licensed days left x	Licensed days lft x
Licensed days left xx	Licensed ds lft xx
Beyond licensed period	Beyond licensd prd

For more information about Branch Office, see *Branch Office Installation and Commissioning (NN43001-314)*.

Survivable Remote Gateway

The handset can be deployed in a Survivable Remote Gateway (SRG) configuration for both SRG 1.0 and SRG50.

The WLAN Handset supports Virtual Office in SRG for Normal mode. It is not supported in Local mode.

Test Local mode is not accessible because the Services key is not supported in Local mode.

The navigation keys are supported in Normal mode and not in Local mode.

Since the default state of the WLAN Handset is Standby, it is only possible to determine if the WLAN Handset is in Local mode by pressing the off-hook (Green) or MENU keys. Pressing these keys changes the state of the handset to Active Idle or Active Off-Hook, therefore putting it in communication with the primary Signaling Server in the Main office.

For more information, see *WLAN IP Telephony Installation and Commissioning (NN43001-504)*. For more information about SRG, see *Main Office Configuration Guide for the Survivable Remote Gateway 50 (NN43001-307)*.

External Applications Server

The External Applications Server (XAS) applications are not available on the WLAN Handsets.

CS 1000 features

Nearly all CS 1000 features are supported on the wireless telephone system and WLAN Handsets 2200 Series. For a list of partially supported features, see [Table 5 "Partially supported CS 1000 features" \(page 40\)](#). For a list of the features that are not supported, see [Table 6 "CS 1000 features not supported" \(page 40\)](#).

Table 5
Partially supported CS 1000 features

Feature	Feature full name	Description
DIG	Dial Intercom Group	Handsfree call option is not supported.
HOT I	Intercom Hotline	Voice Intercom Hotline (default) is not supported. The Ringing option is supported.
RGA	Ring Again	Since the WLAN Handsets cannot buzz, there is no Ring Again tone. The only way to use the Ring Again feature is to determine if the Ring Again indicator is flashing, which is possible only when the wireless handset is in the active state.

Table 6
CS 1000 features not supported

Feature	Feature full name	Description
AAB	Automatic Answerback	Cannot automatically enable Handsfree.
VCC	Voice Call	Cannot automatically enable Handsfree.
	Active Call Failover	Not supported.

IP Phone 2004 features

[Table 7 "IP Phone 2004 features" \(page 40\)](#) provides information about the IP Phone 2004 features for the WLAN Handsets 2200 Series.

Table 7
IP Phone 2004 features

Feature	Supported on the WLAN handsets	Description
Keypad	Yes	

Table 7
IP Phone 2004 features (cont'd.)

Feature	Supported on the WLAN handsets	Description
Navigation keys	Yes	Up—Volume Up button Down—Volume Down button Left button—  Right button— 
6 feature keys	Yes	
4 soft-labelled keys	Yes	
Display	Partially	IP phone 2004: 5x24 display Handsets: 4x19 display
Message Waiting Indicator	Yes	Small envelope icon in the top right of the handset LCD display 
Branch Office	Yes	
Survivable Remote Gateway	Yes	
Virtual Office	Partially	No Services key. Use FCN+7 for the Services key to support Virtual Office.
XAS	No	No Expand key.
Personal Directory Callers List Redial List	Yes	

Table 7
IP Phone 2004 features (cont'd.)

Feature	Supported on the WLAN handsets	Description
Password Admin	No	The WLAN Handsets can be password-protected, but this is different from the IP Phone 2004 password protection mechanism. The IP Phone 2004 password protection is supported, in addition to the handset password protection.
KEM	No	

WLAN Handset software

This chapter contains information about the following topics:

- [“WLAN Handset software” \(page 43\)](#)
- [“View the software version” \(page 47\)](#)
- [“Software updates” \(page 49\)](#)
- [“WLAN Handset download messages” \(page 51\)](#)

WLAN Handset software

All WLAN Handsets ship with a generic software load that allows them to associate to a wireless LAN and download the functional software from a TFTP Server. The WLAN Handsets do not function properly without the appropriate software.

Pre-download checklist

The following requirements must be met to download software by over-the-air file transfer:

- The wireless LAN must be properly configured and operational through the use of 802.11a, b, and g SVP-compliant wireless APs.
- The Nortel WLAN IP Telephony system must be connected to the network and completely operational.
- A TFTP Server must be available on the network in order to load the appropriate software into the WLAN Handsets.
- The battery pack on the WLAN Handsets must be fully charged.
- For the WLAN Handset 6120/6140, the Handset Administration Tool must be installed on the PC to which the Dual Charger is connected.

For more information, see [“Handset Administration Tool for the WLAN Handset 6120/6140” \(page 70\)](#).

To download the WLAN Handset software for the

- WLAN Handset 2210/2211/2212, follow the steps in [Procedure 1](#) “Downloading the software for the WLAN Handset 2210/2211/2212” (page 44)
- WLAN Handset 6120/6140, follow the steps in [Procedure 2](#) “Downloading the software for the WLAN Handset 6120/6140” (page 45).

ATTENTION

Without the appropriate software, the WLAN Handsets do not function properly. If you do not already know the Product Category, Product Name, and Content Type of the software that you must download, get them from your next level of support.

Procedure 1**Downloading the software for the WLAN Handset 2210/2211/2212**

Step	Action
1	Download the latest handset software from the Nortel Web site: www.nortel.com/support
2	Follow the instructions http://www.nortel.com/downloadingcontent at to download the following file: • Product Category: Wireless LAN • Product Name: WLAN Handset 2210, WLAN Handset 2211, or WLAN Handset 2212 • Content Type: Releases
3	Ensure the TFTP Server is started.
4	Load the latest version of the handset UNISim code software and place it on the TFTP Server. The five required files are: • slnk_cfg.cfg • pd11gl3.bin • pd11usd.bin • pd11usd3.bin • pi110006.bin
5	If you are assigning static IP addresses, ensure that the wireless handset IP address, TFTP Server IP address, Subnet Mask, and Default Gateway information are accurate in the wireless handset Admin menu.

OR

If you are using a DHCP server, ensure that the DHCP options are configured. For more information, see “DHCP options” (page 37).

- 6 Ensure the wireless handset has properly configured ESSID and Reg Domain Information within the Admin menu.

If broadcast ESSIDs are accepted at the APs, the handset automatically learns the ESSID information when powering on.

- 7 Using the Admin menu on the wireless handset, ensure that the License Management menu option is configured to 010.

This ensures the WLAN Handset checks for the proper UNiStim software files each time it powers on.

- 8 Turn on the WLAN Handset.

The software now downloads to the WLAN Handset. The status bar increments fully across the WLAN Handset display for each function that is performed in the download process.

Upon completion of the update process, the WLAN Handset reboots with the new software.

- 9 Register the WLAN Handset with the CS 1000 system as if it were an IP Phone 2004.

- 10 Properly label the WLAN Handset with the appropriate extension number.

For future software upgrades, update the software files that are stored on the TFTP Server. Each time the WLAN Handset is powered on, it checks with the TFTP Server to ensure that it has the proper software version, and downloads the new software if necessary.

--End--

Procedure 2

Downloading the software for the WLAN Handset 6120/6140

Step	Action
1	Download the latest handset software from the Nortel Web site: www.nortel.com/support .
2	Follow the instructions http://www.nortel.com/downloadingcontent at to download the following file: • Product Category: Wireless LAN • Product Name: WLAN Handset 6120 or WLAN Handset 6140 • Content Type: Releases
3	Ensure the TFTP Server is started.

- 4 Load the latest version of the WLAN Handset UNISim code software and place it on the TFTP Server.
The five required files are:
 - slink_cfg.cfg
 - pi1400us.bin
 - pd14cus.bin
 - pd14odus.bin
 - pd14udus.bin
- 5 If you are assigning static IP addresses, ensure that the WLAN Handset IP address, TFTP Server IP address, Subnet Mask, and Default Gateway information are accurate in the WLAN Handset Admin menu.
OR
If you are using a DHCP server, ensure that the DHCP options are configured. For more information, see [“DHCP options” \(page 37\)](#).
- 6 Ensure the WLAN Handset has properly configured SSID and Reg Domain Information within the Admin menu.
If broadcast SSIDs are accepted at the APs, the WLAN Handset automatically learns the SSID information when powering on.
- 7 Using the Admin menu on the WLAN Handset, ensure the Telephony Protocol menu option is configured to 032.
This ensures the WLAN Handset checks for the proper UNISim software files each time it powers on.
- 8 Turn on the WLAN Handset.
The software now downloads to the WLAN Handset. The status bar increments fully across the WLAN Handset display for each function that is performed in the download process, and the file name appears.
Upon completion of the update process, the WLAN Handset reboots with the new software.
- 9 Register the WLAN Handset with the CS 1000 system as if it were an IP Phone 2004.
- 10 Properly label the WLAN Handset with the appropriate extension number.
For future software upgrades, update the software files that are stored on the TFTP Server. Each time the WLAN Handset is powered on, it checks with the TFTP Server to ensure that it has

the proper software version, and downloads the new software if necessary.

--End--

View the software version

For the WLAN IP Telephony Manager 2245

To view the software versions for the WLAN IP Telephony Manager 2245, follow the steps in [Procedure 3 “Viewing the software version” \(page 47\)](#).

Procedure 3 Viewing the software version

Step	Action
1	From the WLAN IP Telephony Manager 2245 NetLink SVP-II System screen, select System Status and press Enter .
2	On the System Status Menu screen, scroll down to Software Versions and press Enter . The Software Version Numbers screen displays the software version for each WLAN system component.
--End--	

For a WLAN Handset

To display the software versions running on a WLAN Handset, turn on the WLAN Handset and hold down the **Power On/Start Call** key

For the WLAN Handset 6120/6140, the software Version is also an option on the Config menu.

Software maintenance

After software updates are obtained from Nortel, they must be transferred to the appropriate TFTP server located on the LAN to update the code used by the WLAN Handset.

The WLAN Handset allows over-the-air transfer of software updates from the designated TFTP server to the WLAN Handsets. The download function in the WLAN Handset checks its software version every time the WLAN Handset is powered on, when the TFTP server is active. If there is a different version available, the WLAN Handset immediately begins to download the update.

Upgrading WLAN Handsets

After software updates are obtained, they must be transferred to the appropriate location in the LAN to update the code used by the WLAN Handset.

WLAN Handsets allow over-the-air transfer of software updates from the designated TFTP server. The download function in the WLAN Handset checks its software version every time it is powered on. If there is a discrepancy with the newer version, the WLAN Handset immediately begins to download the update.

Normal download messages

When the WLAN Handset is powered on, it displays a series of messages indicating that it is searching for new software, checking the versions, and downloading. The normal message progression is:

Message	Description
Checking Code	The WLAN Handset is contacting the TFTP Server to determine if it has a newer version of software that should be downloaded.
Erasing Memory	The WLAN Handset has determined that a download should occur and is erasing the current software from memory. This message also displays a progress bar. When the progress bar fills the display line the erase operation is complete.
Updating Code	The WLAN Handset is downloading new software into memory. The number icons at the bottom of the display indicate which file number is currently being downloaded. This message also displays a progress bar. When the progress bar fills the display line, the update operation is complete on that file.

When the update is complete, the WLAN Handset displays the extension number and is ready for use.

Download failure or recovery messages

The following display messages indicate a failure or recovery situation during the download process.

Message	Description
Server Busy	WLAN Handset is attempting to download from a TFTP Server that is busy downloading other handsets and refusing additional downloads. The WLAN Handset automatically retries the download every few seconds.

Message	Description
TFTP Error(x):yy	A failure has occurred during the TFTP download of one of the files. (x) = The file number which was being downloaded; yy is an error code describing the particular failure. Possible error codes are: • 01 = TFTP server did not find the requested file. • 02 = Access violation (reported from TFTP server). • 07 = TFTP server reported "No such user" error. Check the TFTP server configuration. • 81 = File put into memory did not CRC. The Wireless Telephone will attempt to download the file again. • FF = Timeout error. TFTP server did not respond within a specified period of time.
Erase Failed	Download process failed to erase the memory in the WLAN Handset. This operation retries.

Software updates

Nortel provides information about software updates. Download the software updates from www.nortel.com/support. If you do not already know the Product Category, Product Name, and Content Type of the software that you must download, get them from your next level of support. Otherwise, follow the instructions at <http://www.nortel.com/downloadingcontent> to download the software.

After obtaining the software updates from Nortel, transfer them to the TFTP Server accessed by the WLAN IP Telephony Manager 2245.

Over-the-air transfer of software updates

With the WLAN system, you can perform over-the-air transfer of software updates from the designated TFTP Server to the WLAN Handsets.

The download function in the WLAN Handset checks the software version every time the WLAN Handset is turned on. If there is any difference in the software version, the WLAN Handset immediately begins to download the update.

On a clear 802.11a, b, or g channel, the download process takes one minute or less to complete.

If the TFTP Server cannot be reached at the time the WLAN Handset is powered on, resets, or comes back into a WLAN service area, the WLAN Handset tries a few times to contact the TFTP Server, and then gives up and uses the existing software.

If more WLAN Handsets are requesting TFTP service than the TFTP Server has ports available, or if the TFTP Server is unreachable or unavailable, the WLAN Handsets try a few times to reach the TFTP Server, and then continues to use the existing software. In other words, it is not possible to guarantee that a WLAN Handset is using the latest software. For example, it is not possible to guarantee that all WLAN Handsets are upgraded as a result of an `isetResetAll` command. To verify that a WLAN Handset is running the intended version of software, use the `isetShow` command to determine the software version.

From the Signaling Server or Voice Gateway Media Card, use the `oam>` or `IPL> isetGet` command to display a list of all currently registered wireless handsets that are running the old software version. Use this command on all LTPS Signaling Servers or Voice Gateway Media Cards that have IP Phones and WLAN Handsets currently registered:

```
oam> isetGet fwvsn==<old 221022112212 software version>
```

Software update (version 97.071) WLAN Handsets 2210/2211/2212

To download version 97.071 of the software for the WLAN Handsets 2210/2211/ 2212, follow the steps in [Procedure 4 "Updating software for the WLAN Handsets 2210/ 2211/ 2212"](#) (page 50). Version 97.070 1 is compatible with new or existing wireless handsets.

Procedure 4

Updating software for the WLAN Handsets 2210/ 2211/ 2212

Step	Action
1	Go to www.nortel.com .
2	Follow the instructions http://www.nortel.com/downloadingcontent at to download the following file: • Product Category: Wireless LAN • Product Name: WLAN Handset 2210, WLAN Handset 2211, or WLAN Handset 2212 • Content Type: Releases
3	Select Find Products > A-Z .
4	Select W .
5	Scroll to WLAN Handset 2210/2211/2212 and select Software .
6	Select WLAN – Handsets 2210/2211 software version 97.070 .
--End--	

Displays

When the WLAN Handset is powered on, it displays a series of messages indicating that it is searching for new software, checking the versions, and downloading the software. During the download, a progress bar on the WLAN Handset display screen displays the progress of the download.

ATTENTION

While the WLAN Handset is updating the software, the NO SVC message displays, and the WLAN Handset should not be powered off. For approximately 10 seconds, the WLAN Handset cannot be powered off. A warning message appears during that time. If the warning message is not displayed, the WLAN Handset can be powered off without damage.

When the update is complete, the WLAN Handset displays the extension number, and is ready for use.

WLAN Handset download messages

The following sections describe WLAN Handset download messages.

Normal download messages

When the WLAN Handset is powered on, it displays a series of messages indicating that it is searching for new software, checking the software versions, and downloading. The normal message progression is listed in [Table 8 "Normal download messages" \(page 51\)](#).

Table 8
Normal download messages

Message	Description
Checking Code	WLAN Handset is contacting the TFTP Server to determine if the server has a newer version of software that should be downloaded.
Erasing Memory	WLAN Handset has determined that a download should occur and is erasing the current software from memory. This message also displays a progress bar. When the progress bar fills the display line, the erase operation is complete.
Updating Code	WLAN Handset is downloading new software into memory. This message also displays a progress bar. When the progress bar fills the display line, the update operation is complete on that file.

When the update is complete, the WLAN Handset displays the extension number, and is ready for use.

Download failure or recovery messages

[Table 9 "Failure and recovery messages" \(page 52\)](#) lists the display messages for the WLAN Handset that indicate a failure or recovery situation during the software download process.

Table 9
Failure and recovery messages

Message	Description
Server Busy	WLAN Handset is attempting to download from a TFTP Server that is busy downloading other handsets and refusing additional downloads. The WLAN Handset automatically retries the download every few seconds.
TFTP Error (x):yy	A failure occurred during the TFTP download of one of the files. (x) = the file number that was being downloaded. yy = an error code describing the particular failure. Possible error codes are: • 01 = TFTP Server did not find the requested file. • 02 = Access violation (reported from TFTP Server). • 07 = TFTP Server reported No such user error. Check the TFTP Server configuration. • 81 = File put into memory did not CRC. The wireless handset attempts to download the file again. • FF = Timeout error. TFTP Server did not respond within a specified period of time.
Erase Failed	Download process failed to erase the memory in the wireless handset. This operation retries.
Waiting	WLAN Handset has attempted an operation several times and failed, and is now waiting for a period of time before attempting that operation again.
Internal Error OE	OE = Error while writing the Flash (return wireless handset to Nortel).

WLAN Handset configuration

This chapter contains information about the following topics:

- “System provisioning” (page 53)
- “Configuration tasks” (page 53)
- “WLAN Handset configuration” (page 54)
- “Toggle options for the WLAN Handset 6120/6140” (page 59)
- “Partial DHCP configuration” (page 59)
- “Configuration Cradle for the WLAN Handset 2210/2211/2212” (page 59)
- “Configuration Cradle worksheet” (page 70)
- “Handset Administration Tool for the WLAN Handset 6120/6140” (page 70)
- “Language configuration” (page 82)
- “IP Phone 2004 mapping” (page 83)
- “Site certification” (page 84)
- “Push-to-talk” (page 87)
- “WLAN Handset 2210/2211/2212 Standby menu” (page 90)
- “Default configuration” (page 103)

System provisioning

Provision the WLAN Handset on the CS 1000 system in the same manner as an IP Phone 2004. For detailed information, see *IP Line Fundamentals* (NN43001-500).

Configuration tasks

Perform WLAN Handset configuration after the WLAN IP Telephony Manager 2245 is installed and configured. The steps to configure a WLAN Handset must be performed for each WLAN Handset.

To enable the WLAN Handsets to operate on the WLAN system, perform the following tasks:

1. Configure the WLAN Handset. For more information, see [“WLAN Handset configuration” \(page 54\)](#) and [“Configuration Cradle for the WLAN Handset 2210/2211/2212” \(page 59\)](#) and [“Handset Administration Tool for the WLAN Handset 6120/6140” \(page 70\)](#).
2. Program the features on the WLAN Handset. For more information, see [“WLAN Handset 2210/2211/2212” \(page 133\)](#) and [“WLAN Handset 6120/6140” \(page 137\)](#).
3. Test the WLAN Handset. For more information, see [“Wireless handset testing” \(page 148\)](#).

The WLAN Handsets require special configuration to enable them to communicate with the optional WLAN Application Gateway 2246. Ensure that these settings are correct. See [“Open and use the Admin menu on the WLAN Handset” \(page 55\)](#).

The Configuration Cradle is an accessory to the WLAN Handsets. Use the Configuration Cradle to create and save configuration snapshots, save the configuration from an already-programmed WLAN Handset, and write a saved configuration to a WLAN Handset. For more information, see [“Configuration Cradle for the WLAN Handset 2210/2211/2212” \(page 59\)](#).

The Handset Administration Tool is a software utility for the WLAN Handsets 6120/6140. Use the Handset Administration Tool to configure options on the Admin Menu and the Config Menu, to assist with troubleshooting, and to upgrade the handset software. For more information, see [“Handset Administration Tool for the WLAN Handset 6120/6140” \(page 70\)](#).

WLAN Handset configuration

Use the following tools to configure the WLAN Handsets:

- Configuration Cradle for the WLAN Handset 2210/2211/2212
- Handset Administration Tool for the WLAN Handset 6120/6140
- Administration Menu on the WLAN Handset

Configure the WLAN Handset 2210/2211/2212 using the Configuration Cradle

The Configuration Cradle and its software provide an automated method to configure multiple WLAN Handsets. For a full description, see [“Configuration Cradle for the WLAN Handset 2210/2211/2212” \(page 59\)](#).

Configure the WLAN Handset 6120/6140 using the Handset Administration Tool

The Handset Administration Tool is a software utility designed for rapid administration and configuration of a number of WLAN Handsets. For a full description, see [“Handset Administration Tool for the WLAN Handset 6120/6140” \(page 70\)](#).

Open and use the Admin menu on the WLAN Handset

The Admin menu contains configuration options that are stored locally on each WLAN Handset. Every WLAN Handset is independent. If the default settings are not desired, the Admin options must be configured in each separate WLAN Handset that requires different settings.

To open and use the Admin menu

- on the WLAN Handset 2210/2211/2212, follow the steps in [Procedure 5 “Opening and using the Admin menu on the WLAN Handset 2210/2211/2212” \(page 55\)](#).
- on the WLAN Handset 6120/6140, follow the steps in [Procedure 6 “Opening and using the Admin menu on the WLAN Handset 6120/6140” \(page 56\)](#).

Procedure 5

Opening and using the Admin menu on the WLAN Handset 2210/2211/2212

Step	Action
1	With the WLAN Handset powered off, simultaneously press and hold the Power On/Start Call and Power Off/End Call keys.
2	Release the Power On/Start Call key, and then release the Power Off/End Call key. The first option on the Admin menu displays. If an Admin password is configured, you must enter the password to open the Admin menu. If no password is configured, the display proceeds directly to the Admin menu.
3	Press the Up , Down , and Select side buttons, and the soft keys on the WLAN Handset to scroll through the menu options. An asterisk (*) next to an option indicates that it is selected. • Press the Up/Down buttons to display the previous/next menu items. • Press the Select button to select the menu option or item. Alternatively, press the OK soft key to select the menu option or item. • Press the Save soft key to save the entry. • Press the Bksp key to backspace when editing the entry.

- Press the **Up** soft key to return to the previous menu level.
- Press **Cncl** to cancel the entry and return to the previous menu level.
- Press the **Exit** soft key to exit the menus.

--End--

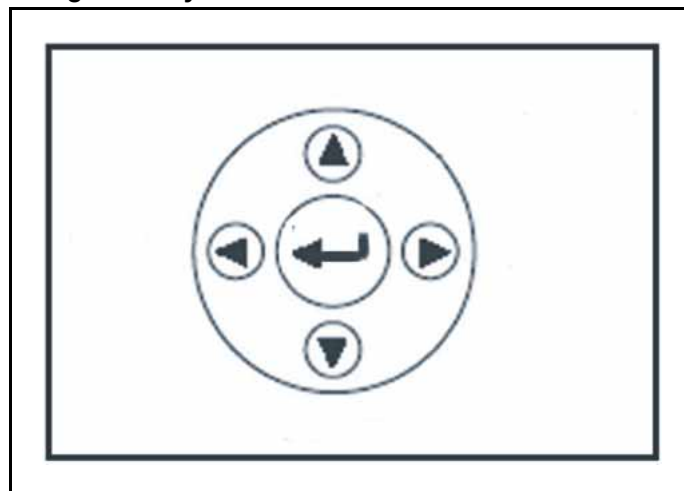
Procedure 6
Opening and using the Admin menu on the WLAN Handset 6120/6140

Step	Action
1	With the WLAN Handset powered OFF, press and hold the Start key.
2	While you press the Start key, press the End key.
3	Release the End key, and then release the Start key. The first option on the Admin menu appears. If an Admin password is configured, you must enter the password to open the Admin menu. The default password is 123456. If no password is configured, the display proceeds directly into the Admin menu.
4	Press the navigation keys and the soft keys on the WLAN Handset to scroll through the menu options.

Figure 2 "Navigation keys on the WLAN Handset 6120/6140" (page 56) illustrates the navigation keys.

Figure 2

Navigation keys on the WLAN Handset 6120/6140



An asterisk (*) beside an option indicates that it is selected.

- Press **Nav** up or down, to display the previous and next menu options.
- Press **Enter** to select a menu option or item.
- Press **Nav <** to backspace when editing an entry.
- Press **Back** soft key to return to the previous menu level.
- Press the **Clr** soft key to delete an entry and then enter new data.
- Press the **Del** soft key to cancel the entry and return to the previous menu level.
- Press the **Exit** soft key to exit the menus.

--End--

Alphanumeric string entry

To make an alphanumeric string entry

- on the WLAN Handset 2210/2211/2212, follow the steps in [Procedure 7 "Making an alphanumeric entry on the WLAN Handset 2210/2211/2212" \(page 57\)](#).
- on the WLAN 6120/6140 Handset, follow the steps in [Procedure 8 "Making an alphanumeric entry on the WLAN Handset 6120/6140" \(page 58\)](#).

Procedure 7

Making an alphanumeric entry on the WLAN Handset 2210/2211/2212

Step	Action				
1	On the keypad, press the Select button to change the entry.				
2	Press the number key of the desired letter. The number appears on the display.				
3	Press the number key again to display the first letter associated with that key.				
4	Press the key again to scroll through the letters associated with that key. Example: if 2 is pressed repeatedly, 2, A, B, C, a, b, and c are displayed. The following table shows which keys to use to enter nonnumeric characters or other characters not represented on the keypad.				
<table border="1"> <thead> <tr> <th>To enter</th><th>Press</th></tr> </thead> <tbody> <tr> <td>. - _ ! # \$ % & ' () , : ; \ = @ ~</td><td>1</td></tr> </tbody> </table>		To enter	Press	. - _ ! # \$ % & ' () , : ; \ = @ ~	1
To enter	Press				
. - _ ! # \$ % & ' () , : ; \ = @ ~	1				

To enter	Press
Space	0
Q q	7
Z z	9

- 5 When the correct entry displays, press the right arrow to move to the next character, and repeat for each digit and letter of the entry.
- 6 Press the **Save** soft key to save the entry and return to the menu. Press the **Exit** soft key to abort and return to the menu without saving any changes.

--End--

Procedure 8 Making an alphanumeric entry on the WLAN Handset 6120/6140

Step	Action						
1	Enter a number by pressing any keypad button.						
2	Press the number key again to display the first letter associated with that key.						
3	Press the CAPS/caps soft key to toggle the case.						
4	Press the key again to scroll through the letters associated with that key. Example: if you press 2 repeatedly, 2, A, B, C (CAPS on) or 2,a, b, c (CAPS off) appear on the display. Use the following keys to enter nonnumeric characters or other characters that are not represented on the keypad.						
<table> <tr> <th>To enter</th><th>Press</th></tr> <tr> <td>. - _ ! # \$ % & ' () , : ; \ = @ ~</td><td>*</td></tr> <tr> <td>Space</td><td>#</td></tr> </table>		To enter	Press	. - _ ! # \$ % & ' () , : ; \ = @ ~	*	Space	#
To enter	Press						
. - _ ! # \$ % & ' () , : ; \ = @ ~	*						
Space	#						

- 5 After the correct entry appears, press **Nav >** to move to the next character, and repeat for each digit and letter of the entry.
- 6 Press the **Save** soft key to save the entry and return to the menu.

OR

Press the **Exit** soft key to abort and return to the menu without saving any changes.

--End--

Toggle options for the WLAN Handset 6120/6140

Some menu options on the WLAN Handset 6120/6140 have only two possible selections and operate on a toggle basis. The current setting appears on the second row of the display; this is called the info line. Press Enter to toggle between the selections. For example, when Enable PTT is the menu option, PTT Disabled appears on the info line. If Enable PTT is selected, PTT Enabled appears on the info line and the menu option toggles to Disable PTT.

Partial DHCP configuration

You can use the standard DHCP requirements for Nortel. The handsets that are configured for partial DHCP ignore the Call Server information from the DHCP server.

To configure partial DHCP, open the Admin menu on the WLAN Handset and enter the following information:

- Call server 1 IP addr
- Call server 1 port
- Call server 2 IP addr
- Call server 2 port

For more information, see [Table 17 "Admin menu options for the WLAN Handset 2210/2211/2212" \(page 105\)](#) and [Table 20 "Admin menu options for the WLAN Handset 6120/6140" \(page 120\)](#).

Configuration Cradle for the WLAN Handset 2210/2211/2212

The Configuration Cradle is an optional accessory. It is designed to automate the configuration of the WLAN Handsets.

The cradle is connected to a personal computer (PC) through one of the communication (COM) ports. You can download the software for the PC from www.nortel.com/support Product Category: Wireless LAN, Product Name: WLAN Configuration Cradle for WLAN Handset 2210, 2211, 2212, Content Type: Releases. Obtain the precise Release, Status, and Title of the file from your next level of support. See <http://www.nortel.com/downloadingcontent> for download instructions. The software is installed on the PC and configured to read from the COM port.

You can configure only one WLAN Handset at a time.

ATTENTION

Nortel does not recommend the use of adapters or port replicators because they do not properly handle the communications between the cradle and the PC.

Personal computer requirements

The software runs on Windows NT, Windows 2000, and Windows XP.

Configuration Cradle safety notes

- Do not expose to freezing temperatures or sunlight. The Configuration Cradle operating environment is between 50 to 85 degrees F (10 to 30 degrees C) .
- Use only the original Nortel plug-in power adapter.
- Place only one WLAN Handset in the cradle at a time.
- Do not place a WLAN Handset in the cradle with a battery installed.
- Do not immerse the cradle in water or other liquid.
- Do not pour liquids into the telephone slots.
- Only use Nortel WLAN Handsets in the Configuration Cradle. Do not place anything in the cradle other than the WLAN Handsets 2210/2211/2212, or you can damage the contacts. The cradle cannot work correctly with damaged contacts.

Install and configure the Configuration Cradle

Follow the steps in [Procedure 9 "Installing and configuring the Configuration Cradle" \(page 60\)](#) to install and configure the Configuration Cradle on the PC.

Procedure 9**Installing and configuring the Configuration Cradle**

Step	Action
1	On the PC, create a folder for the software.
2	Using a Web browser, connect to www.nortel.com/support .
3	Follow the instructions http://www.nortel.com/downloadingcontent to download the following file to your local terminal: • Product Category: Wireless LAN • Product Name: WLAN Configuration Cradle for WLAN Handset 2210, 2211, 2212 • Content Type: Releases Obtain the precise Release, Status, and Title of the file from your next level of support.
4	Locate the entry for the NetLink Configuration Cradle.
5	Click the product link and save the Configuration Cradle.exe file to the folder created in Step 1 .

- 6 (Optional) Copy the release notes to the folder created in [Step 1](#).
- 7 Double-click on the Configuration Cradle.exe file to install the software, putting the files into the folder created in [Step 1](#).
The tool does not require any additional installation and does not show up in the Programs menu or in the Windows registry.
- 8 (Optional) To aid in locating the tool quickly, create a shortcut on the computer desktop to the PhoneConfig.exe file.
- 9 Place the cradle on a flat horizontal surface and plug the power supply into the cradle and into an appropriate power outlet.
- 10 Connect the cradle, using a serial cable with a DB-9 connector, to one of the COM ports of the PC.
- 11 Double-click the PhoneConfig.exe file or the shortcut created in [Step 7](#).
- 12 From the menu at the top of the Config Cradle screen, select **Settings > COM port**.
- 13 Enter the port number of the COM port that the cradle is uses.
- 14 Press **OK**.

--End--

If software updates are required, overwrite the installed files with the new files. The existing configuration files are retained.

Use the Configuration Cradle and software

The cradle contains two slots, one for the WLAN Handset 2210 and WLAN Handset 2212 and the other for the WLAN Handset 2211. For more information, see [Figure 3 "Configuration Cradle" \(page 62\)](#). After a WLAN Handset is placed in the appropriate slot in the cradle, its configuration can be read using the software, and stored as a file on the personal computer. WLAN Handset profiles that are saved on the PC can be downloaded to the WLAN Handset. Profiles can also be created independent of the WLAN Handset.

Figure 3
Configuration Cradle



A series of master configuration files can be planned and created using the software. See [“Plan the configuration files” \(page 63\)](#) for a description of files. Planning should be done before any handsets are configured.

After the planning is complete, use the following procedures to:

- Read and save a WLAN Handset configuration—see [“Read and save a handset configuration” \(page 65\)](#).
- Create a new master configuration file—see [“Create a new master configuration file” \(page 66\)](#).
- Create a new configuration file using the master files—see [“Create a new configuration using the master files” \(page 67\)](#).
- Change an existing configuration file—see [“Change an existing configuration file” \(page 68\)](#).
- Change a configuration from a WLAN Handset—see [“Change a configuration obtained from a WLAN Handset” \(page 68\)](#)
- Download a configuration to a WLAN Handset—see [“Download a configuration to a WLAN Handset” \(page 69\)](#).

Plan the configuration files

Careful planning of the configuration files reduces the number of custom changes that have to be done on the individual WLAN Handsets. The software for the Configuration Cradle allows any number of files to be saved.

Settings can be categorized into four types:

- **System (Sys)**—options that are stable across the system. Typically, these include:
 - **License Option**
 - **Network Config**
 - **IP Addressing**
 - **ESSID**
 - **Security**
- **Group (Grp)**—options that are common to groups of users. Typically, these include:
 - **Push-to-talk Allow/Disallow**
 - **Push-to-talk Channel**
 - **Zones**
- **User (Usr)**—options that are default values or can be changed later by the user. Typically, these include:
 - **Ring Options**
 - **Phone Options**
- Custom user options—options that vary on an individual WLAN Handset basis. Typically, these include:
 - **Static IP Address**
 - **Extension**

Use the available options listed in [Table 17 "Admin menu options for the WLAN Handset 2210/2211/2212" \(page 105\)](#) to determine which options belong in each master category (Sys, Grp or Usr). Each option should be in only one category. Custom user options do not require any additional planning.

After the different categories are determined, each category should have a separate copy of the worksheet, located in ["Configuration Cradle worksheet" \(page 70\)](#). Assign a different descriptive file name to each worksheet.

After the category worksheets are created, use ["Create a new master configuration file"](#) (page 66) to create each of the required master configuration files. Create the master files in the following order:

1. System options
2. Group options
3. User options

Finally, when the planning and master files are completed, use the ["Create a new configuration using the master files"](#) (page 67) to create the profile for each individual handset and use the cradle to download the profile to the handset.

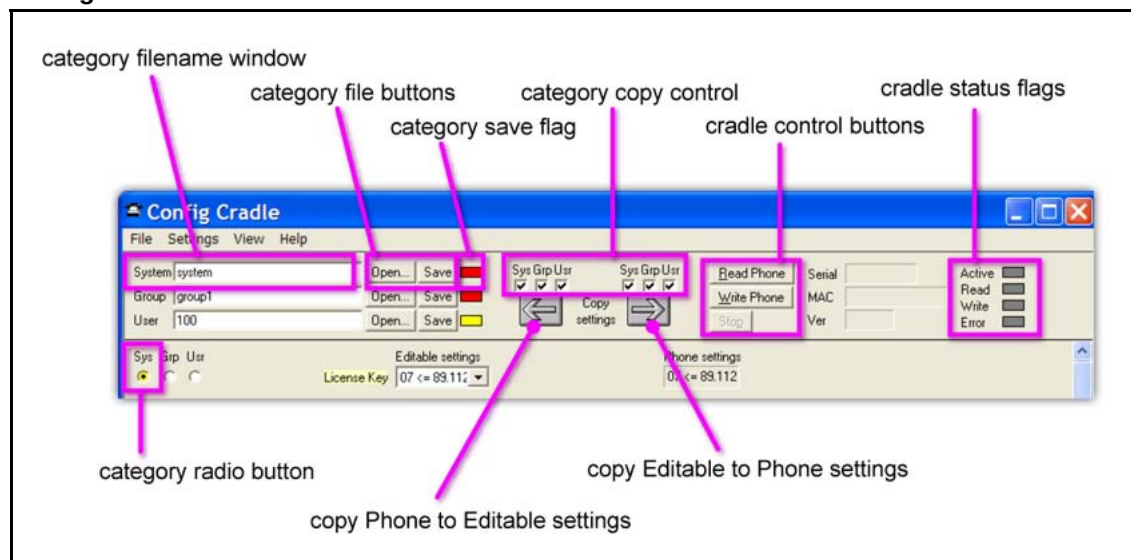
Configuration Cradle software

Using the software, you can

- name, open and save configuration files
- download and upload configuration settings to and from the handset in the cradle.
- configure options in the Sys, Grp and Usr categories.

The top of the screen is shown in [Figure 4 "Configuration Cradle software toolbar"](#) (page 64).

Figure 4
Configuration Cradle software toolbar



The top portion of the screen is the toolbar, and the bottom portion is the configuration area. Only part of the configuration area is shown in [Figure 4 "Configuration Cradle software toolbar"](#) (page 64).

On the left side of the screen is the category file control area. Each category (System, Group and User) has a file name window, file buttons (Open and Save) and a save flag. Each save flag displays different colors, depending on the status of the file:

- Red—file does not exist. The file name in the window is not yet created.
- Yellow—file not loaded. The file name in the window exists in the ConfigData folder but is not loaded into the Editable settings.
- Green—unsaved edits. After you make changes in the Editable settings fields, the green indicator indicates the changes are not saved.
- Gray—file up-to-date. The settings are saved.

To the right of the category file control area is the copy control area, made up of the category copy control boxes and the arrow buttons. The left arrow is used to copy the information in the Phone settings column to the Editable settings column. The right arrow is used to copy the information from the Editable settings column to the Phone settings column. The check boxes above these arrows control which categories are copied.

Next to the copy control area is the cradle control area, made up of the control buttons, flags and information area. The cradle control buttons (Read Phone, Write Phone and Stop) control the communication between the software and the cradle. If no handset is in the cradle when the buttons are pressed, an error message appears. When the WLAN Handset is read, its information (Serial number, MAC address and software version) are displayed in the boxes. The status flags display the action in progress with the cradle (Active, Read, Write, Error).

Below the toolbar is the configuration area. Each configurable option appears, with a set of category radio buttons. The category radio buttons are used to indicate which category the option is assigned to. An option can exist in only one category. The option box in the Editable settings column is where changes can be made. The option box in the Phone settings column is read-only.

When entering security keys, the cradle displays the key as entered. This is different from the way the WLAN Handset handles the display through the Admin menu (key is not displayed).

Read and save a handset configuration

Follow the steps in [Procedure 10 "Reading and saving the configuration of an existing WLAN Handset"](#) (page 66) to read and save the configuration of an already-configured handset. Before performing the following

procedure, the Configuration Cradle must be installed. For more information, see [Procedure 9 "Installing and configuring the Configuration Cradle" \(page 60\)](#).

Procedure 10**Reading and saving the configuration of an existing WLAN Handset**

Step	Action								
1	Start the Config Cradle software by double-clicking the PhoneConfig.exe file of the tool.								
2	Remove the battery from the WLAN Handset.								
3	Place the handset in the proper slot in the cradle. See Figure 3 "Configuration Cradle" (page 62) .								
4	Press the Read Phone soft key in the Config Cradle screen. The configuration of the WLAN Handset is read and appears in the right hand column, labeled Phone settings .								
5	Press the left arrow button: 								
	The configuration data is copied from the Phone settings column to the Editable settings column.								
6	(Optional) Press the radio button associated with each item to designate in which category (Sys , Grp , Usr) the item belongs. <table><tr><th>Category</th><th>Description</th></tr><tr><td>System (Sys)</td><td>System-wide settings</td></tr><tr><td>Group (Grp)</td><td>Settings for a particular group</td></tr><tr><td>User (Usr)</td><td>Unique settings for a particular user</td></tr></table>	Category	Description	System (Sys)	System-wide settings	Group (Grp)	Settings for a particular group	User (Usr)	Unique settings for a particular user
Category	Description								
System (Sys)	System-wide settings								
Group (Grp)	Settings for a particular group								
User (Usr)	Unique settings for a particular user								
7	Enter a file name in the name box beside the category.								
8	Press the Save button for the appropriate category to save the settings. The red box beside the Save button changes to green after the save is complete.								

--End--

Create a new master configuration file

Use [Procedure 11 "Creating a new master configuration file" \(page 67\)](#) to create a new master configuration file, starting from a worksheet.

Procedure 11
Creating a new master configuration file

Step	Action
1	Start the Config Cradle software by double-clicking the PhoneConfig.exe file of the tool.
2	Using the worksheet, enter the options for the category and press the appropriate category radio button.
3	After you enter all of the options, change the name beside the file buttons to match the name entered in the worksheet. For example, if the options are for a group, enter the name of the group in the box beside Group.
4	Press the Save button associated with the category.
5	The configuration is saved to the named file.

--End--

Create a new configuration using the master files

Use [Procedure 12 "Creating a new configuration using the master files" \(page 67\)](#) to create a new configuration file using the master files.

Procedure 12
Creating a new configuration using the master files

Step	Action
1	Start the Config Cradle software by double-clicking the PhoneConfig.exe file of the tool.
2	Press the Open button for the System options and select the name of the master system file.
3	Press the Open button for the Group options and select the name of the master group file.
4	Press the Open button for the User options and select the name of the master user file.
5	Configure any custom user options.
6	Enter a name in the User box and press the associated Save button.
7	(Optional) Download the configuration to a WLAN Handset.

For more information, see [Step 3](#) from [Procedure 15](#) "Downloading a configuration to a WLAN Handset" (page 69).

--End--

Change an existing configuration file

Use [Procedure 13](#) "Changing an existing configuration" (page 68) to change an existing configuration file.

Procedure 13 Changing an existing configuration

Step	Action
1	Start the Config Cradle software by double-clicking the PhoneConfig.exe file of the tool.
2	Press the Open button associated with the category required and select the name of the file to be opened. The file is read and the settings appear in the Editable settings column.
3	Make the changes necessary.
4	Press the Save button to update the configuration file.

--End--

Change a configuration obtained from a WLAN Handset

Use [Procedure 14](#) "Changing a configuration obtained from a WLAN Handset" (page 68) to change a configuration uploaded from a handset to the PC.

Procedure 14 Changing a configuration obtained from a WLAN Handset

Step	Action
1	Start the Config Cradle software by double-clicking the PhoneConfig.exe file of the tool.
2	Remove the battery from the WLAN Handset.
3	Place the WLAN Handset in the proper slot in the cradle. See Figure 3 "Configuration Cradle" (page 62).
4	Press the Read Phone soft key in the Config Cradle screen. The configuration of the WLAN Handset is read and appears in the right-hand column, labeled Phone settings .

- 5 Press the left arrow button.



The configuration data is copied from the **Phone settings** column to the **Editable settings** column.

- 6 Change the data as required.
- 7 (Optional) Save the configuration to a file.
- 8 (Optional) Download the configuration to a WLAN Handset.

For more information, see [Step 3](#) from [Procedure 15](#) "Downloading a configuration to a WLAN Handset" (page 69).

--End--

Download a configuration to a WLAN Handset

Use [Procedure 15](#) "Downloading a configuration to a WLAN Handset" (page 69) to download a configuration file to a WLAN Handset.

Procedure 15

Downloading a configuration to a WLAN Handset

Step	Action
1	Start the Config Cradle software by double-clicking the PhoneConfig.exe file of the tool.
2	Open the files required for the WLAN Handset.
3	Remove the battery from the WLAN Handset.
4	Place the WLAN Handset in the proper slot in the cradle. See Figure 3 "Configuration Cradle" (page 62).
5	Press the right arrow button.  The configuration data is copied from the Editable settings column to the Phone settings column.
6	Press the Write Phone button.
7	After the download is complete, remove the WLAN Handset from the cradle, replace the battery, and test the WLAN Handset configuration.

For more information, see [Procedure 28 “Testing the WLAN Handset 2210/2211/2212” \(page 148\)](#).

--End--

Configuration Cradle worksheet

Complete one copy of this worksheet for each category in the configuration plan before using the Configuration Cradle for the WLAN Handset 2210/2211/2212. Label each worksheet with the plan category and file name.

Table 10

Plan category: _____ File name: _____

Sys	Grp	Usr	Label	Editable Setting

Handset Administration Tool for the WLAN Handset 6120/6140

The Handset Administration Tool for the WLAN Handset 6120/6140 is a software utility that you install on a PC that has a USB port that can be cabled to the USB port of the Dual Charger. Configuration options include:

- configuring all options on the Admin Menu
- configuring all options on the Config Menu
- assisting with troubleshooting by recording error information
- upgrading the WLAN Handset software

To install the Handset Administration Tool, perform the following tasks:

1. Install the USB driver as described in [Procedure 16 “Installing the USB driver” \(page 71\)](#).
2. Install the software utility as described in [Procedure 17 “Installing the Handset Administration Tool” \(page 73\)](#).

Personal computer and hardware requirements

- Personal computer (PC) running Windows 2000 or Windows XP with a USB port
- Dual Charger for the WLAN Handset 6120/6140
- Power supply for the appropriate country or region
- Dual Slot Handset Charger USB Cable or comparable cable (with 5-pin mini-B connector)

ATTENTION

USB cables vary in the ability to make a proper connection to the Dual Charger USB port. Use the USB cable recommended by Nortel to ensure compatibility.

USB driver

To install the USB driver, follow the steps in [Procedure 16 “Installing the USB driver” \(page 71\)](#).

Procedure 16 Installing the USB driver

Step	Action
1	On the PC, create a folder for WLAN Handset 6120/6140 configuration.
2	Use a Web browser to connect to: www.nortel.com/support
3	Use the Product Finder to locate the Handset Administration Tool software: • Wireless LAN—Adapters, Phones & Applications • WLAN Handset 6120 or WLAN Handset 6140 • Software
4	Follow the instructions http://www.nortel.com/downloadingcontent to download the following file to your local terminal: • Product Category: Wireless LAN • Product Name: WLAN Handset 6120 or WLAN Handset 6140 • Content Type: Supporting Software Obtain the precise Release, Status, and Title of the file from your next level of support.
5	Download the USB .zip file to the folder you created in Step 1 .

- 6 Create a folder for the USB files and extract the two files from the zip file into the folder.
The two files are named slnkusb.sys and slnkusb.inf.
- 7 Place the Dual Charger on a flat, horizontal surface and plug the power supply into the Dual Charger and into an appropriate wall outlet.
- 8 Plug the USB cable into the Dual Charger and into an available USB port on the PC.
- 9 Turn off a WLAN Handset 6120/6140 and place it into the charger.
The handset automatically powers on in USB mode.
The Microsoft Found New Hardware Wizard opens and asks if it can connect to Windows Update to search for software.
- 10 Select the **No, not at this time** radio button and click **Next**.
- 11 On the next dialog box, which prompts you for information about installing the USB device, select **Install from a list or specific location (Advanced)** and click **Next**.
- 12 On the next dialog box, which prompts you for the location, select **Search for the best driver in these locations**, clear the **Search removable media** check box, select the **Include this location in the search** check box and browse to the location of the USB driver files.
- 13 Click **Next**.
The Microsoft Wizard displays a warning message that states that the software you are installing has not passed Windows Logo testing. The USB software has been fully tested and will not harm your system.
- 14 Click **Continue Anyway**.
- 15 After the USB driver is installed, click **Finish** to close the wizard, and then proceed with WLAN Handset configuration.

--End--

Handset Administration Tool installation

To install the Handset Administration Tool for the WLAN Handset 6120/6140, follow the steps in [Procedure 17 "Installing the Handset Administration Tool"](#) (page 73).

ATTENTION

You cannot uninstall the Handset Administration Tool because it runs from its current location and stores its settings locally. It does not modify your system or registry.

Procedure 17
Installing the Handset Administration Tool

Step	Action
1	Use a Web browser to connect to: www.nortel.com/support
2	Use the Product Finder to locate the Handset Administration Tool software: • Wireless LAN—Adapters, Phones & Applications • WLAN Handset 6120 or WLAN Handset 6140 • Software
3	Follow the instructions http://www.nortel.com/downloadingcontent to download the following file to your local terminal: • Product Category: Wireless LAN • Product Name: WLAN Handset 6120 or WLAN Handset 6140 • Content Type: Supporting Software Obtain the precise Release, Status, and Title of the file from your next level of support.
4	Download the Handset Administration Tool software .zip file to the folder you created in Step 1 of Procedure 16 “Installing the USB driver” (page 71) for WLAN Handset 6120/6140 configuration.
5	Extract the individual files from the .zip file to the same folder.
6	Double-click the HandsetAdminXyy_yy_yy_yy.exe file to run the utility.
7	Read and accept the Nortel WLAN Handset 6120/6140 Software License Agreement .
8	In the HandsetAdmin Setup window, select one of the following buttons: • Update Application—click to check for and download updates to the Handset Administration Tool. You must be running the tool from a writable location.

For more information, see [“Update application” \(page 74\)](#).

- **Setup Instructions**—click to display instructions to help you to create Start Menu shortcuts, or to copy HandsetAdmin.exe to another location.
- **Run From Current Location**—click to start the Handset Administration Tool.

--End--

Update application

Use the Update Application button to retrieve a more recent version of the Handset Administration Tool from a local folder or from an FTP server. Nortel recommends that you download the updated versions after you install the program.

Package (.pkg) files are bundled versions of the Handset Admin Tool .exe. Nortel WLAN Handset 6120/6140 makes package files available for download from an anonymous FTP site. Users must have a valid HandsetAdmin.exe installed on the connecting PC to unpack and install the upgrade.

Package files are located under the /pub/nortel folder on the Nortel WLAN Handset 6120/6140 FTP server. The files have a version number with a .pkg extension in this format:

HandsetAdminXxyy_yy_yy_yy.pkg

You can specify the folder to which the update .pkg is saved; you can then copy the file to the network or other media for use on other PCs.

Procedure 18

Updating the Handset Administration Tool

Step	Action
1	In the HandsetAdmin Setup window, select Update Application .
2	In the Select Upgrade method dialog box, select Update from FTP server and click Continue .
3	In the FTP upgrade configuration window, verify the configuration and click Connect to Server . After the connection is established, a list of available files appears.

- 4 Select a file and click **Update application**.

--End--

Local file update

If you select the Update from local file option, you can browse to the location of the update file. Before you can use this option, you must ensure that the file is downloaded or copied to the local PC.

Use the Handset Administration Tool

The Handset Administration Tool has two separate functional areas: the Administration Console and the Handset Settings Editor.

With the Administration Console, you can connect to the WLAN Handset, configure and change the password, retrieve error messages, update handset software, and update the Handset Administration Tool software.

With the Handset Settings Editor, you can configure WLAN Handsets and create, save and copy Admin menu options. For more information about using the Handset Settings Editor, see [“Admin menu settings” \(page 78\)](#).

The Handset Administration Tool uses indicators to alert you to the status of the action being performed:

- Green—the adjacent label is true and this state is desirable or required.
- Yellow—the adjacent label is true and this state requires caution or attention. For example, a yellow New folder indicator cautions that the file path is to be created. A yellow File exists indicator cautions that the file is to be overwritten.
- Red—the adjacent label is true and this state is undesirable or is accompanied by an error. A message, on the prompt line or in a dialog box, describes the nature of the error.
- Gray—the adjacent label is not true, for example, the handset is not connected.
- Blinking—file status indicators blink yellow when the file status is being queried but is not yet known (for example: when attempting to access slow drives or unresponsive network devices). File status indicators blink red when the path is invalid (mistyped). The Handset indicator blinks when the handset password must be entered.

A prompt line at the bottom of the window provides information about what action to take or the status of the utility.

To connect the handset, follow the steps in [Procedure 19 “Connecting to the WLAN Handset 6120/6140 or WLAN Handset 6140” \(page 76\)](#).

Procedure 19**Connecting to the WLAN Handset 6120/6140 or WLAN Handset 6140**

Step	Action
1	In the Handset Administration Tool, select the Connect tab.
2	Turn off the handset and insert it into the Dual Charger.
3	Type the password. You must enter a password the first time you insert the WLAN Handset. The default password is 123456. ATTENTION If you check the Remember password box, the password is retained as the default password for all handsets. Unique passwords for each WLAN Handset are not remembered.
4	Click Submit . After a connection is established between the program and the WLAN Handset, the Handset connected indicator turns green and <i>Connected</i> appears on the prompt line. The WLAN Handset is now ready for configuration.
--End--	

Password configuration

Use the Handset Administration Tool to enable or disable the password requirement, or to change a current password. Connect to the WLAN Handset and select the Password tab. If the Enable password check box is unchecked, no password is required to access Admin Settings in the WLAN Handset Standby menu.

Procedure 20**Changing the password**

Step	Action
1	In the Handset Administration Tool, select the Password tab.
2	Type the current password.
3	Type the new password.
4	Retype the new password.

5 Click **Change password.**

--End--

Error information

Use the Error info tab of the Handset Administration Tool to assist the customer service team in troubleshooting handset errors. Use this utility, as directed by customer service, to save any errors as a file that you can send to customer service for handling.

Use the Browse button to establish the path and then enter a file name. Future save operations point to this same location as the default; the same file can be overwritten if desired. A list box displays the most recently used file names. The File time window displays the modification timestamp of the file in the Save as window.

To save a file, click the Get file button. The file is copied from the handset to the location. The Read/Write indicators indicate each action as it occurs. A progress indicator above the prompt line shows file transfer progress.

software updates

Select the software tab and update the software in the handset by copying it from a location on your computer to the handset memory.

Each file must be individually downloaded into the WLAN Handset. This is not an efficient method of updating any quantity of handsets, but it works for testing new code and in extremely small installations. If there is a TFTP server that is broadcasting older code, the WLAN Handsets continue to download code over the air and revert to the older code after you power cycle them.

Procedure 21**Updating the WLAN Handset 6120/6140 software**

Step	Action
1	Download the software update from www.nortel.com/support .
2	Follow the instructions http://www.nortel.com/downloadingcontent to download the following file to your local terminal: - Product Category: Wireless LAN - Product Name: WLAN Handset 6120 or WLAN Handset 6140 - Content Type: Releases Obtain the precise Release, Status, and Title of the file from your next level of support.

- 3 Create a new folder for the software update.
- 4 From the .zip file, extract the bin files to the folder that you created in [Step 2](#).
- 5 Use the Handset Administration Tool to connect to the WLAN Handset.
- 6 In the Handset Administration Tool, select the **software** tab.
- 7 Click **Browse** to locate and select the software files.

A list box displays the most recently used filenames. The File time indicator displays the modification timestamp of the selected file. The file version and handset version indicators display the version of the selected file and the version of the WLAN Handset software for comparison.
- 8 Verify that the correct software update file is selected and click **Update**.

The file is copied from the location to the WLAN Handset. The Read/Write indicators indicate each action as it occurs.

During a software update, you can open other tabs. The handset indicators on the tabs indicate the status of the update.
- 9 Repeat [Step 6](#) and [Step 7](#) for each of the .bin files.

--End--

If an Error indication occurs, ensure that the WLAN Handset is properly seated and that the USB cable is in good condition and connected securely, and then retry the update. Contact Customer Service if an error persists.

Version

To view the serial number of the WLAN Handset and the current software version, select the Version tab.

To update the Handset Administration Tool, click the Update Application button.

For more information, see [“Update application” \(page 74\)](#).

Admin menu settings

Select the Settings tab in the Handset Administration Tool to configure required and optional settings in the Admin Menu. You can also assign end user Config Menu options such as user name. Which options are available depends on the software used by the WLAN Handsets. For specific configuration requirements, see the Configuration and Administration document that pertains to the protocol used by the system at your site.

The handset serial number and software version appear on the Settings tab. To display the version of the Handset Administration Tool, click Show Tool Version.

To enter and modify menu settings, click Show Settings Editor. After the Handset Settings Editor appears, to close the Settings tab window, click Close this window. To reopen the Settings tab window from the Handset Settings Editor, select View>Admin functions.

Handset Settings Editor toolbar

With the Handset Settings Editor toolbar you can name, open, and save configuration files. You can also download and upload configuration settings to and from the WLAN Handset in the charger.

Figure 5
Handset Settings Editor toolbar



Use the three file name windows to open and save settings by System, Group or User type as separate files. To assign a file name, type it into the field and click Save. By default, the files are saved in a new folder named ConfigData in the folder where the program is stored. The new folder is created automatically the first time a file is saved. To open an existing file, click Open and browse to the file. Use the File menu to customize the file structure.

The file indicators beside the Save buttons use four colors to indicate the status of the file displayed in the window:

- Red—file does not exist. The file name in the window is not yet created.
- Yellow—file not loaded. The file name in the window exists in the ConfigData folder but is not loaded into the Editable settings.
- Green—unsaved edits. After you make changes in the Editable settings fields, the green indicator indicates the changes are not saved.
- Gray—file up-to-date. The settings are saved.

There are two columns of configuration options. The Editable settings column shows settings that you can save as files. The Handset settings column shows settings that you can copy from or copy to the handset in

the cradle. By using the Copy settings arrows and boxes, you can copy settings to the handset column and then write the settings to the WLAN Handset in the charger.

You can also copy the configuration from a handset to the Editable settings area and then edit or save it. Use the Sys, Grp, and Usr check boxes to specify and copy only the settings that you require.

Use the Read Handset and Write Handset buttons to initiate the transfer of configuration data from or to the WLAN Handset in the charger.

Four indicators (labeled Handset, Read, Write, and Error) indicate the status of the configuration transfer.

Create a configuration plan

When you first create a configuration plan, you enter information into the Editable settings fields, indicate which of the three categories each option belongs to, and save as System, Group, or User files.

ATTENTION

Do not create a plan that saves an option in two different categories. Be sure to establish option categories that do not overlap. For example, Speakerphone and Push-to-talk settings are typically tagged as Grp options and saved in Group files.

After you establish which options are categorized as System, Group, or User, enter the configuration information into the Editable settings fields. Begin with the System options and enter all system-level field values. Click the Sys category button on the left side of the window for each option. To save these settings as a System file, enter the file name in the System file name field and click Save.

To create each Group plan, enter the values in the fields designated as Group types. Click the Grp category button on the left side of the window for each option. Save each plan under a different name in the Group file name field.

Create one basic User file for default (or desired) values for each User field. Click the Usr category button on the left side of the window for each option.

ATTENTION

Although you need not save user settings for each WLAN Handset, it is useful to do so. For example, you can save a user's ring preferences from a WLAN Handset being replaced so that the new WLAN Handset can be configured the same way. If you decide to save the configuration for each WLAN Handset, it is easiest to do this during the configuration process. For more information, see ["Downloading a configuration plan to a WLAN Handset 6120/6140" \(page 81\)](#).

Configuration planning worksheet

Use a worksheet similar to the one shown in [Figure 6 "Sample planning worksheet"](#) (page 81) to design your configuration plan.

Figure 6
Sample planning worksheet

Sys	Grp	Usr	Label	Editable Setting

Download or upload a configuration plan

After you establish your configuration plans, the settings can easily be downloaded to the WLAN Handsets.

Perform the following steps to download a configuration plan to a WLAN Handset.

Downloading a configuration plan to a WLAN Handset 6120/6140

Step	Action
1	Use the Handset Settings Editor toolbar to open the System, Group, and User plans for this v.
2	Enter information unique to the WLAN Handset, for example, the Extension and User Name fields. The Extension field has a Next button that is useful for configuring a quantity of WLAN Handsets.
3	Copy the settings to the Handset settings fields.
4	Click Write Handset to begin the download. After the Handset indicator turns off, the download is finished and you can remove the WLAN Handset from the charger.
5	(Optional) To save the settings unique to this WLAN Handset, ensure that the correct extension number or other file name exists in the User file name field and then click Save . You can also load files or edit settings for the next WLAN Handset—Step 1 and Step 2 during the download.

- 6 Remove the WLAN Handset from the charger.

--End--

Perform the following steps to upload a configuration plan from a WLAN Handset.

Uploading a configuration plan from a WLAN Handset 6120/6140

Step	Action
1	On the Handset Settings Editor toolbar, click Read Handset . After the Handset indicator turns off, the upload is complete and the handset settings appear in the Handset settings fields.
2	(Optional) Copy settings to Editable settings fields.
3	(Optional) Create configuration plans.
	OR
	Save the settings by user or extension. For more information, see “Create a configuration plan” (page 80).
--End--	

Language configuration

To configure the language of the WLAN Handset, you must make a configuration change while the handset is in the Idle state and another configuration change while it is in the Busy state.

Idle state

With the WLAN Handset in the Idle state, press the FCN key and select Language. Choose a language from the list. This configuration controls the language in which the display information that is provided locally by the WLAN Handset appears.

Busy state

With the WLAN Handset in the Busy state, press the Menu key and then the FCN key. Choose Services > Telephone options > Language and choose a language from the list. This configuration controls the language that the CS 1000 uses to send display information to the WLAN Handset.

ATTENTION

The WLAN Handset does not translate display information received from the call server.

Trans, Conf, Frwr, and More are soft key labels that the WLAN Handset receives from the Call Server. These labels appear in the language in which the Call Server sends them.

IP Phone 2004 mapping

This section describes the mapping between the emulated IP Phone 2004 and the WLAN Handsets.

Voice Messaging Access

Voice mail access is obtained through the Inbox key. Voice mail is accessed on the WLAN Handset as FCN+ a digit that corresponds to the assigned key.

Codecs

The WLAN Handsets are compatible with the G.711 and G.729A/AB codecs. No configuration is required on the WLAN Handset.

DHCP

Dynamic Host Configuration Protocol (DHCP) is a standardized protocol that enables clients to be dynamically assigned with various configuration parameters, such as an IP address, Subnet Mask, Default Gateway, and other critical network configuration information. DHCP servers centrally manage such configuration data, and are configured by network administrators with settings that are appropriate for a given network environment.

The WLAN Handset searches for server configuration in the options listed in [Table 11 "DHCP options" \(page 83\)](#). The WLAN Handset uses the DHCP options listed if DHCP use is enabled.

Table 11
DHCP options

Option	Meaning
1	Subnet Mask
3	Default Gateway
6	DNS Server
7	Syslog Server
15	Domain Name
42	Time Server
* Could be used to find the CS 1000 device.	

Table 11
DHCP options (cont'd.)

Option	Meaning
43	Vendor specific*
60	Class identifier
66	TFTP Server
128	Site specific *
144	Site specific *
151	WLAN IP Telephony Manager 2245
152	WLAN Application Gateway 2246
157	Site specific *
191	Site specific *
251	Site specific *
siaddr	Boot server or next server
* Could be used to find the CS 1000 device.	

TFTP

The WLAN Handsets use TFTP to update the WLAN Handset software over the 802.11a, b, or g wireless LAN.

DNS

Domain Name System (DNS), an industry-standard protocol, locates computers on an IP-based network. IP networks rely on number-based addresses to move information about the network. However, it is easier to remember names than number-based addresses. DNS translates user-friendly names into IP addresses that the network can recognize. The WLAN Handsets can use DNS to automatically translate names into IP addresses for the TFTP Server and the WLAN IP Telephony Manager 2245.

Site certification

Certification is essential to ensure that the WLAN Handsets are adequately supported by the site.

Conduct a Site Survey of the installation. Note any areas where coverage is conflicting or inadequate. Note any system difficulties and work with the system administrator to determine the cause and possible remedy. For information about conducting a Site Survey, see [“Diagnostic Tools” \(page 149\)](#). For clues to possible sources of difficulties, see [“Troubleshooting the handset” \(page 162\)](#).

The testing must be performed in typical operating conditions, especially if heavy loads occur. Generally, organize the test according to area and volume, placing numerous calls to others who can listen while coverage tests are performed. Note any areas with excessive static or clarity problems and report it.

Testing signal strength with the WLAN Handset

This test can be performed only if the Nortel WLAN IP Telephony system is installed and configured.

Follow the steps in [Procedure 22 "Testing signal strength using the WLAN Handset 2210/2211/2212" \(page 85\)](#) to test AP signal strength using the wireless handsets. For more information about the different WLAN Handsets, see:

- ["Run Site Survey for the WLAN Handset 2210/2211/2212" \(page 149\)](#)
- ["Run Site Survey for the WLAN Handset 6120/6140" \(page 151\)](#)

Procedure 22

Testing signal strength using the WLAN Handset 2210/2211/2212

Step	Action
1	Test signal strength in the covered area by putting a handset in Site Survey mode, using Any/Smry ESSID. For more information, see "Run Site Survey for the WLAN Handset 2210/2211/2212" (page 149). The WLAN Handset remains in Site Survey mode until it is powered off.
2	Walk the entire coverage area while viewing the display, checking for any expected APs or other ESSIDs. For more information, see "Detect overlap or conflicts" (page 87).
3	Change the WLAN Handset to MyID/Smry ESSID mode, and walk the site again, checking that every location has adequate coverage and good channel allocation. For more information, see "Detect radio signal coverage" (page 87).
4	Change the WLAN Handset to MyID/Detl (single AP mode) and walk the site again, checking each AP to ensure that it is configured for the correct data rates, beacon interval, 802.11 options enable, QoS method and security method. For more information, see "Confirm supported data rates" (page 87).
5	Make any necessary adjustments to the AP locations and configuration, and then repeat this procedure, starting at Step 1,

until the Site Survey shows adequate coverage and the correct configuration at every location.

- 6 After the testing is complete, press **Power Off/End Call** to turn off the WLAN Handset.

--End--

Procedure 23

Testing signal strength using the WLAN Handset 6120/6140

Step	Action
1	Test signal strength in the covered area by putting a WLAN Handset in Site Survey mode, using Any/Smry SSID. For more information, see “Run Site Survey for the WLAN Handset 6120/6140” (page 151). The WLAN Handset remains in Site Survey mode until it is powered off.
2	Walk the entire coverage area while viewing the display, checking for any expected APs or other SSIDs. For more information, see “Detect overlap or conflicts” (page 87).
3	Change the WLAN Handset to MyID/Smry SSID mode, and walk the site again, checking that every location has adequate coverage and good channel allocation. For more information, see “Detect radio signal coverage” (page 87).
4	Change the WLAN Handset to MyID/Detl (single AP mode) and walk the site again, checking each AP to ensure that it is configured for the correct data rates, beacon interval, 802.11 options enable, QoS method, and security method. For more information, see “Confirm supported data rates” (page 87).
5	Make any necessary adjustments to the AP locations and configuration, and then repeat this procedure, starting at Step 1, until the Site Survey shows adequate coverage and the correct configuration at every location.
6	After the testing is complete, press Power Off/End Call to turn off the WLAN Handset.

--End--

Detect radio signal coverage

Use the multiple ESSID mode in the Site Survey function to show the top four APs. Walk the perimeter of the site. The display on the WLAN Handset shows the top four APs that the wireless handset can contact.

Note any areas that have inadequate dBm readings.

Adequate coverage is when there is one AP with a stronger signal (more than 70dBm) in all areas.

Good channel allocation is when, at any point, the strongest AP shown is on a different channel than the next best choice.

Detect overlap or conflicts

Use the single ESSID mode in the Site Survey function. Use this information to detect overlaps or conflicts in AP signaling

Make note of any areas that have APs that are in contention for the same channel.

It is preferable that no overlaps exist anywhere in the site. If the Site Survey mode indicates two APs using the same channel, at least one other AP must be indicated that is at least 10dBm stronger than the other two APs to prevent channel conflicts.

Confirm supported data rates

Use the **Detl** soft key to displays details of the specific AP. Use this information to confirm signal strength and supported data rates.

Site Survey notes

Numbers racing across the WLAN Handset display indicate AP information is being obtained. A Waiting message indicates the system is not configured properly and the WLAN Handset cannot find any APs.

Walk around the site to determine supported data rates, one AP at a time.

Each data rate (1, 2, 5.5, or 11 Mb/s) supported by the AP is shown. The rates that are in the Basic Rate set (sometimes referred to as required rates) are indicated by a b following the rate number. The Supported and Basic data rates should be the same on all APs for the site.

Push-to-talk

With the Push-to-talk (PTT) feature, the WLAN Handset 2211 and the WLAN Handset 6140 can operate in a PTT group-broadcast mode like a two-way radio, in addition to the standard telephone operation. The WLAN Handset 2211 supports eight multicast channels with the current channel

saved in memory on the wireless handset. The WLAN Handset 6140 supports 24 multicast channels with the current channel saved in memory on the WLAN Handset.

ATTENTION

Push-to-talk is not supported on the WLAN Handset 2210, the WLAN Handset 2212, or the WLAN Handset 6120.

To initiate a PTT call, press the Talk button. All handsets that are monitoring the channel hear the transmission.

The two-way radio mode operates on the concept of a PTT session or call period. The PTT call period begins with the first transmission and ends when there is no two-way radio traffic on the channel for 10 seconds. The PTT mode controls the keypad during a PTT call period. Therefore, you cannot use the keypad for any other function such as accessing the on-hook menus or accessing an OAI application. However, you can place a PBX call.

The WLAN Handset 2211 and WLAN Handset 6140 join the IP multicast stream through Internet Group Management Protocol (IGMP) v1 reports. Each WLAN Handset continues to send IGMP reports as long as PTT is enabled, so the IP multicast state is maintained in the network, even when there is no active use of the PTT feature. The multicast address used to support PTT is 224.0.1.116, and the port is 5001.

PTT operation

To use the PTT feature

- with the WLAN Handset 2211, follow the steps in [Procedure 24 “Initiating a PTT call with the WLAN Handset 2211”](#) (page 88)
- with the WLAN Handset 6140, follow the steps in [Procedure 25 “Initiating a PTT call with the WLAN Handset 6140”](#) (page 89)

Procedure 24**Initiating a PTT call with the WLAN Handset 2211**

Step	Action
1	To initiate a PTT call, press and hold the Talk button.
2	Wait two seconds to activate the channel before talking.
3	Speak after you hear the start transmit sound. After you release the Talk button, you hear the end transmit sound. The WLAN Handset 2211 then enters the waiting state where it monitors the channel for up to 10 seconds.
4	Initiate subsequent transmissions by pressing the Talk button on any WLAN Handset 2211 that uses the same channel.

The start transmit sound is played immediately and speech can begin. The display screen shows the current active channel. Because all phones on that channel are already in the receive state, there is no two-second delay.

If no transmission occurs during the 10-second countdown period, the WLAN Handset 2211 plays the end call sound and reverts to the idle state.

--End--

Procedure 25
Initiating a PTT call with the WLAN Handset 6140

Step	Action
1	To initiate a PTT call, press and hold the Talk button.
2	Wait until the Transmitting message appears on the display.
3	Speak into the microphone. After you release the Talk button, you hear the end transmit sound. The WLAN Handset 6120 then enters the waiting state where it monitors the channel for up to 10 seconds.
4	Initiate subsequent transmissions by pressing the Talk button on any WLAN Handset 6120 that uses the same channel. The Transmitting message immediately appears on the display and speech can begin. The display screen shows the current active channel. Because all phones on that channel are already in the receive state, there is no two-second delay. If no transmission occurs during the 10-second countdown period, the WLAN Handset 6120 plays the end call sound and reverts to the idle state.
--End--	

Receiving a PTT transmission

Upon receiving a PTT transmission, the WLAN Handset 2211 plays the receiving alert sound and enters the receive state. In this state, the WLAN Handset 2211 receives all conversations on the selected channel. The WLAN Handset 2211 ignores the Talk key while in the receive state.

The WLAN Handset 2211 screen displays the current active channel, the Caller ID information of the current transmitter, and an indication that the WLAN Handset 2211 is receiving a broadcast transmission. At the end of a transmission, the WLAN Handset 2211 enters the waiting state, where it monitors the channel for up to 10 seconds and displays the Waiting

message on the screen. If no other transmission occurs within 10 seconds, the WLAN Handset 2211 plays the end call sound and reverts to the idle state.

The user can push the Up and Down buttons to raise or lower the volume of the PTT transmission. A separate volume is maintained for PTT calls with the current volume selection retained in memory.

To exit a PTT broadcast, press the Terminate soft key and answer Yes to the confirmation prompt. PTT audio is immediately stopped and the WLAN Handset 2211 exits the PTT session. No other WLAN Handset 2211 is affected. Only the current PTT call is terminated for this WLAN Handset 2211. When another PTT call starts, the WLAN Handset 2211 is again in the receive state. A still-active session can be rejoined by initiating a PTT call. See [Procedure 24 "Initiating a PTT call with the WLAN Handset 2211" \(page 88\)](#).

Disable the PTT feature in the on-hook User Menu to prevent receiving any further PTT calls.

PTT dialog is interrupted when you answer an incoming telephone call. After the telephone call ends, PTT dialog resumes if an active PTT call is still transmitting. For more information, see ["Interaction with telephone calls" \(page 90\)](#).

Interaction with telephone calls

You can answer an incoming telephone call during a PTT call session. To announce an incoming call, the WLAN Handset 2211 rings with a low-volume ring and displays the system message. To answer the call, press **Power On/Start Call**. The PTT call session is preempted and no PTT audio is heard. After the telephone call ends, press **Power Off/End Call** to go back on-hook, at which time PTT becomes active again. If an already active PTT call is ongoing, the PTT audio starts playing again.

If the user does not answer the telephone call by pressing **Power On/Start Call**, the PTT display appears again after the ring stops.

To start a telephone call during a PTT call session, press the **Power On/Start Call** key. This causes the two-way radio to be preempted until the telephone call is ended.

WLAN Handset 2210/2211/2212 Standby menu

You can configure user-defined preferences from the Standby menu. The WLAN Handset must be in contact with the system, no error messages displayed, and in Standby mode. For more information, see [Table 12 "Standby menu" \(page 91\)](#). An asterisk (*) indicates the default value.

With the WLAN Handset in the standby state, press and hold FCN briefly to open the standby menu. Use the following keys to display and select options:

- **Up/Down** buttons: display previous or next menu item
- **Select** button: selects the menu item or option
- **OK** soft key: selects the menu item or option
- **Save** soft key: saves the entry
- **Bksp** soft key: backspaces to allow editing of entry
- **Cncl** soft key: cancels edit and returns to previous menu level
- **Up** soft key: returns to previous menu level
- **Exit** soft key: exits the menu (at the top level)
- **End Call** key: exits to standby state (from any level)

Table 12
Standby menu

Menu item	2nd level	3rd level	4th level
Lock Keys			
Language	*English Français Deutsch Español Português Norsk		
Ring Options	Telephone Ring	Ring Cadence	Off *PBX Continuous Long Pulse Short Pulse
		Ring Tone	*Tone 1 Tone 2 Tone 3 Tone 4 Tone 5
		Ring Volume (WLAN Handset 2211 only)	Bars
		Vibrate Cadence	Off *PBX Continuous Long Pulse Short Pulse

Menu item	2nd level	3rd level	4th level
		Ring Delay (appears if Ring Cadence and Vibrate Cadence are both set to a value other than Off)	*No Delay 5 Second Delay 10 Second Delay
	Auxiliary Ring 1		
	Auxiliary Ring 2		
Phone Options	Noise Mode	*Normal High Severe	
	Key Tones	*Enable Tones Disable Tones	
	Warning Tones	*Enable Warnings Disable Warnings	
	Display Contrast	Contrast %	
	Keypad Autolock	*Disable 5 seconds 10 seconds 20 seconds	
System Info	Phone IP Addr		
	Server IP Addr		
	software Version		
Extension			
Current Call Svr			
Terminal Type	i2004 3rd Party		
Push-to-Talk (WLAN Handset 2211 only)	Channel	Current Channel: X 1 2 3 4 5 6 7 8 New Channel = ?	
	Enable/Disable	PTT Enabled * PTT Disabled	
	Audio Volume		
	Tone Volume		

Lock Keys

If you enable the Keypad Lock option, the keypad locks immediately. To unlock the keypad, press FCN and then the # key.

Language

Select **Language** to view the available languages and select a language from the list.

Ring Options

Select **Ring** to configure the ring for three separate functions. Use **Telephone Ring** for usual telephony functions. Use the **Auxiliary Rings** to configure different ringing patterns for OAI applications.

Telephone Ring

Select Telephone Ring to configure a distinctive ring style, volume and sequence. Select from an audible ring or a vibrate-only ring or a vibrate ring along with, or followed by an audible ring.

Ring Cadence

Select Ring Cadence to configure the rhythm of the ring. You can select a preprogrammed ring cadence or opt to obtain the cadence from the PBX. The PBX option utilizes any distinctive rings sent by the PBX while allowing you to configure unique rings for auxiliary applications.

- Off: silent
- PBX: PBX determines ring cadence
(For example, the PBX can send rings that differentiate between internal and external calls.)
- Continuous: rings continually until answered
- Short Pulse: rings in short bursts
- Long Pulse: rings in long bursts

Ring Tone

Select Ring Tone to select from five available tones. You can use the **Play** soft key to preview the tones before selection. If you configure Ring Cadence to off, the Ring Tone option does not appear on the menu.

Ring Volume

(WLAN Handset 2211 only) Select Ring Volume to adjust the volume level. The graduated volume bar indicates the levels. This setting can be overridden by adjusting volume while the handset is ringing.

Vibrate Cadence

Select Ring Cadence to configure the rhythm of the ring. You can select a preprogrammed vibrate cadence or opt to obtain the cadence from the PBX. The PBX option utilizes any distinctive vibrate cadence sent by the PBX while allowing you to configure unique vibrate cadence for auxiliary applications.

- Off: silent
- PBX: PBX determines vibrate cadence
(For example, the PBX can send vibrate cadences that differentiate between internal and external calls.)
- Continuous: vibrates continually until answered
- Short Pulse: vibrates in short bursts
- Long Pulse: vibrates in long bursts

Ring Delay

Select Ring Delay to specify how long the vibrate cadence plays before the audible ring begins. The Ring Delay option appears if both ring cadence and vibrate cadence are configured to PBX, Continuous, Short Pulse or Long Pulse. If Ring Cadence or Vibrate Cadence is turned off, the Ring Delay option does not appear on the menu.

Auxiliary Ring 1 and Ring 2

The Auxiliary rings are designed to be utilized by OAI applications. With Auxiliary Ring 1 and Ring 2 you can configure a distinctive ring for these applications.

Phone Options

The following sections describe the Phone Options menu options.

Noise Mode

Select Noise Mode to specify the noise level in your environment. Select Normal for most office environments; High: for moderate background noise; or Severe: for extremely noisy conditions. The High and Severe modes adjust the microphone and in-ear speaker volume of the handset to account for background noise. If you use High or Severe mode in a quiet environment, the person on the other end of the line can find it difficult to hear your voice.

Key Tones

Select Key Tones to specify whether tones play when keys are pressed. Key Tones are enabled by default.

Warning Tones

Select Warning Tones to specify whether warning tones (such as system up or down, or out of range) play. Warning Tones are enabled by default.

Display Contrast

Select Display Contrast to adjust the display for different lighting conditions.

Keypad Autolock

Select Keypad Autolock to configure the keypad to lock automatically when the WLAN Handset enters standby mode. You can disable the automatic locking function (the default) or adjust the autolock for a 5, 10, or 20 second delay before locking.

System Info

The following sections describe the System Info menu options.

Phone IP Addr

Select Phone IP Addr to view the IP address currently assigned to the WLAN Handset.

Server IP Addr

Select Server IP Addr to view the IP address of the WLAN IP Telephony Manager 2245 and the OAI Server (if installed).

Software Version

Select Software Version to view the current software version of the WLAN Handset—the MAC address (the software identification number configured at the factory) and the three files used by each version:

- Downloader: pd11gl3.bin
- Functional: pd11xxx3.bin
- Phintl: phintl24.bin or pi11xxx.bin

Extension

Select Extension to view the extension currently assigned to the WLAN Handset. You cannot configure the extension with this option.

Current Call Svr

Select Current Call Svr to view the current Call Server IP address and port number.

Terminal Type

Select Terminal Type to view the type of PBX in use.

Push-to-Talk

From the Push-to-Talk menu, you can enable or disable the PTT feature locally. You can also configure the channel, tone volume and audio volume. The menu for Push-to-Talk does not appear if PTT is disallowed on the Admin menu or if no channel is enabled on the Admin menu.

ATTENTION

The Nortel WLAN Handset 6120/6140 uses channels for incoming and outgoing radio communication. While PTT is active, the WLAN Handset is in PTT mode. It can receive regular phone calls while in this mode. When a regular phone call is answered, the WLAN Handset enters active mode.

For detailed information about the user-defined preferences in the Standby menu and how to configure them, see *WLAN Handset 2210 User Guide (NN10300-077)*, *WLAN Handset 2211 User Guide (NN10300-078)*, and *WLAN Handset 2212 User Guide (NN10300-071)*.

WLAN Handset 6120/6140 Configuration menu

You can configure user-defined preferences from the Configuration menu. The WLAN Handset must be in contact with the system, no error messages displayed, and in Standby mode. For more information, see [Table 13 "Configuration menu" \(page 96\)](#). An asterisk (*) indicates the default value.

With the handset in the standby state, press the Cfg softkey to open the standby menu.

Table 13
Configuration menu

Config menu	2nd level	3rd level	4th level	5th level	6th level
Lock Keys					
User Profiles	Silent Vibrate Loud Soft Custom				
		Set as Active			
		Ring Settings	Telephone	Ring Cadence	Off PBX Continuous Short Pulse Long Pulse

Config menu	2nd level	3rd level	4th level	5th level	6th level
				Ring Tone	Tones 1–10
				Ring Volume	Volume (bars)
				Vibrate Cadence	Off PBX Continuous Short Pulse Long Pulse
				Ring Delay	No Delay 5 Second Delay 10 Second Delay
			Auxiliary Ring 1		
			Auxiliary Ring 2		
		Noise Mode	Normal High Severe		
		Ring in Headset Ring in Speaker			
		Warning Tones Disable/Enable			
		Key Tones Disable/Enable			
Phone Settings	Keypad Autolock	Disable 5 seconds 10 seconds 20 seconds			
	Language	*English Français Deutsch Español Português Norsk			
	Display Contrast	Set Contrast			

Config menu	2nd level	3rd level	4th level	5th level	6th level
	Use Hearing Aid Use No Hearing Aid				
	Startup Song Play/Inhibit				
	Predial Disable/Enable				
Push to Talk (WLAN Handset 6140 only)	Default Channel	Channel 1 Channel 24			
	Subscribed Channels	Channel 1 Channel 2 Channel 3 Channel 4 Channel 24			
	PTT Audio Volume	Audio Volume (bars)			
	PTT Tone Volume	Tone Volume (bars)			
System Info	Phone IP Address				
	Alias IP Address				
	SVP IP Address				
	Curr Call Server				
	Terminal Type				
	Software Version				
Extension	Enter Number **				
User Name	Enter User Name				
** CS 1000 —The extension number cannot be edited. The WLAN Handset obtains the extension from the server and it appears on the info line when you select this option. BCM —You must configure the extension number here in the Config Menu for it to appear on the WLAN Handset in standby mode and in Caller ID					

Lock Keys

If you enable the Keypad Lock option, the keypad locks immediately. To unlock the keypad, press FCN and then the # key.

User Profiles

Select and configure your user profile.

Ring Settings

From the Ring Settings menu, you can configure the ring for three separate functions. Use Telephone Ring for usual telephony functions. Use the Auxiliary Rings to configure different ringing patterns for OAI applications.

Telephone Ring

Select Telephone Ring to configure a distinctive ring style, volume and sequence. Select from an audible ring or a vibrate-only ring or a vibrate ring along with or followed by an audible ring.

Ring Cadence

Select Ring Cadence to configure the rhythm of the ring. You can select a preprogrammed ring cadence or opt to obtain the cadence from the PBX. The PBX option utilizes any distinctive rings sent by the PBX while allowing you to configure unique rings for auxiliary applications.

- Off: silent
- PBX: PBX determines ring cadence
(For example, the PBX can send rings that differentiate between internal and external calls.)
- Continuous: rings continually until answered
- Short Pulse: rings in short bursts
- Long Pulse: rings in long bursts

Ring Tone

Select Ring Tone to choose from five available tones. You can use the Play softkey to preview the tones before selection. If you configure Ring Cadence to off, the Ring Tone option does not appear on the menu.

Ring Volume

(WLAN Handset 2211 only) Select Ring Volume to adjust the volume level. The graduated volume bar indicates the levels. This setting can be overridden by adjusting volume while the handset is ringing.

Vibrate Cadence

Select Ring Cadence to configure the rhythm of the ring. You can select a preprogrammed vibrate cadence or opt to obtain the cadence from the PBX. The PBX option utilizes any distinctive vibrate cadence sent by the PBX while allowing you to configure unique vibrate cadence for auxiliary applications.

- Off: silent
- PBX: PBX determines vibrate cadence
(For example, the PBX can send vibrate cadences that differentiate between internal and external calls.)
- Continuous: vibrates continually until answered
- Short Pulse: vibrates in short bursts
- Long Pulse: vibrates in long bursts

Ring Delay

Select Ring Delay to specify how long the vibrate cadence plays before the audible ring begins. The Ring Delay option appears if both ring cadence and vibrate cadence are configured to PBX, Continuous, Short Pulse or Long Pulse. If Ring Cadence or Vibrate Cadence is turned off, the Ring Delay option does not appear on the menu.

Auxiliary Ring 1 and Ring 2

The Auxiliary rings are designed to be utilized by OAI applications. With Auxiliary Ring 1 and Ring 2 you can configure a distinctive ring for these applications.

Noise Mode

Select Noise Mode to specify the noise level in your environment. Select Normal for most office environments; High: for moderate background noise; or Severe: for extremely noisy conditions. The High and Severe modes adjust the microphone and in-ear speaker volume of the handset to account for background noise. If you use High or Severe mode in a quiet environment, the person on the other end of the line can find it difficult to hear your voice.

Ring in Headset Ring in Speaker

You can select to have the WLAN Handset ring in the headset or the handset speaker.

Warning Tones

You can specify whether warning tones (such as system up or down, or out of range) play. Warning Tones are enabled by default.

Key Tones

You can specify whether tones play when keys are pressed. Key Tones are enabled by default.

Push-to-talk Disable/Enable

You can enable or disable the PTT feature locally.

Phone Settings

The following sections describe the Phone Settings menu options.

Keypad Autolock

You can configure the keypad to lock automatically when in standby mode. You can disable the automatic locking function (the default) or adjust the autolock for a 5, 10, or 20 second delay before locking.

Language

Select Language to view the available languages and select a language from the list.

Display Contrast

You can adjust the display for different lighting conditions.

Use Hearing Aid/Use No Hearing Aid

You can select whether you use a hearing aid.

Startup Song Play/Inhibit

You can select whether the startup song plays.

Predial Disable/Enable

Predial allows you to enter the number you want to predial, while the WLAN Handset is in standby mode. You can select whether to enable the Predial feature.

Push-to-Talk

From the Push-to-Talk menu, you can configure the default channel, subscribed channels, tone volume and audio volume. The menu for Push-to-Talk does not appear if PTT is disallowed on the Admin menu or if no channel is enabled on the Admin menu.

System Info

The following sections describe the System Info menu options.

Phone IP Address

Select Phone IP Address to view the IP address currently assigned to the WLAN Handset.

Server IP Address

Select Server IP Address to view the IP address of the WLAN IP Telephony Manager 2245 and the OAI Server (if installed).

Alias IP Address

Select Alias IP Address to view the alias IP address of the WLAN Handset (provided by the WLAN IP Telephony Manager 2245).

SVP IP Address

Select SVP IP Address to view the IP address of the SpectraLink Voice Priority (SVP) Server.

Current Call Svr

Select Current Call Svr to view the current Call Server IP address and port number.

Terminal Type

Select Terminal Type to view the type of PBX in use.

For detailed information about the user-defined preferences in the Configuration menu and how to configure them, see *WLAN Handset 6120/6140 User Guide* (NN43150-100).

Software Version

Select software Version to view the current software version of the WLAN Handset.

Extension

Select Extension to view the extension currently assigned to the WLAN Handset.

- CS1000 —The extension number cannot be edited. The WLAN Handset obtains the extension from the server and it appears on the info line when you select this option.
- BCM —You must configure the extension number here in the Config Menu for it to appear on the handset in standby mode and in Caller ID.

User Name

Select User Name to enter or change the name that appears on the WLAN Handset display, next to the extension, in standby mode.

Default configuration

Restore Defaults is an option available on the Admin Settings menu. For a list of the default configurations, see the following tables:

- [Table 14 "User profiles" \(page 103\)](#)
- [Table 15 "Phone settings" \(page 103\)](#)
- [Table 16 "Admin settings" \(page 103\)](#)

Table 14
User profiles

Profile	Loud	Soft	Vibrate	Silent	Custom
Ring Cadence	PBX	PBX	OFF	OFF	PBX
Ring Tone	Tone 1	Tone 1	Tone 1	Tone 1	Tone 1
Ring Volume	7	3	1	1	5
Vibrate Cadence	OFF	OFF	PBX	OFF	PBX
Ring Delay	none	none	none	none	5 seconds
Noise Mode	Normal	Normal	Normal	Normal	Normal
Headset or Speaker Ring	Speaker	Speaker	Speaker	Speaker	Speaker
Key Tones	Enabled	Enabled	Disabled	Disabled	Enabled

Table 15
Phone settings

Keypad Autolock	Disabled
Language	English
Set Extension	[blank]
Set User Name	[blank]
Display Contrast	Medium
Use Hearing Aid	No
Startup Song	Play

Table 16
Admin settings

Disable Password	123456
Change Password	123456

Table 16
Admin settings (cont'd.)

Restore Defaults	not applicable
Speakerphone	Enabled

Admin menu options

This chapter describes the options that are available from the Admin menu of the handsets:

- [“WLAN Handset 2210/2211/2212” \(page 105\)](#)
- [“WLAN Handset 6120/6140” \(page 120\)](#)

WLAN Handset 2210/2211/2212

[Table 17 “Admin menu options for the WLAN Handset 2210/2211/2212” \(page 105\)](#) lists the Admin menu options for the WLAN Handset 2210/2211/2212. Detailed descriptions of each item follow the table.

The default settings are indicated with an asterisk (*).

Table 17
Admin menu options for the WLAN Handset 2210/2211/2212

Admin menu option	2nd level	3rd level	4th level	5th level
Phone Config	Language	*English French German Spanish Portuguese Norwegian		
	License Option	Set Current	[List per download]	
	Terminal Type	i2004 3rd Party		
	OAI On/Off	Enable OAI Disable OAI		
	Push-to-talk	Allowed Channels	*Channel 1 *Channel 2 *Channel 3 *Channel 4 *Channel 5	

Admin menu option	2nd level	3rd level	4th level	5th level
			*Channel 6 *Channel 7 *Channel 8	
		Allow/Disallow	*Allow PTT Disallow PTT	
	Admin Password	Enter PW	Reenter Password	
	Startup Keylock			
	Location Services	On * Off	Set transmission interval:	1 5 10
			IP address	* _ _ _ . _ _ _ . _ _ _ _ . _ _ _
Network Config	IP Addresses	*Use DHCP		
		Static IP	Phone IP TFTP Server IP Default Gateway Subnet Mask Syslog Server IP SVP IP Addr	
		Svr1	Svr 1 IP Addr Svr 1 Port Svr 2 IP Addr Svr 2 Port OIA Server IP	
	ESSID	*Learn Once Learn Always Static		
	Security	*None		
		WEP	Authentication	Open System Shared Key
			WEP On/Off	

Admin menu option	2nd level	3rd level	4th level	5th level
			Key Information	Default Key Key Length Key 1-4
			Rotation Secret	
		Cisco FSR	User name Password	
		WPA-PSK	Passphrase Direct Entry	
		WPA2-PSK	Passphrase Direct Entry	
		VPN	VPN Server IP	
			VPN Client IP	Static IP IKE Mode Config
			Phase 1—ISAK MP	Mode Authentication Diffie-Hellman Auth. Hash Encryption Local ID Lifetime (sec) Options
			Phase 2—ESP	Auth. Hash ESP Encryption Remote Network Lifetime (sec)
	Reg. Domain: none			
	Transmit Power	*Maximum 50 mW 30 mW 20 mW 15 mW 10 mW 5 mW (See Note)		

Admin menu option	2nd level	3rd level	4th level	5th level
Diagnostics	Run Site Survey			
	Diagnostics Mode	Diagnostics On *Diagnostics Off		
	Syslog Mode	*Disabled Errors Events Full		
Restore Defaults				

In the Transmit Power section, the 50 mW and 30 mW settings only appear if the Regulatory Domain is configured to None or 01.

Language

Choose a language from those on the list.

License Option

License Option enables selection of the VoIP protocol that the site is licensed to download and run. The UNISTim Protocol to use for the WLAN Handsets is 010. Any other protocol causes the WLAN Handset to malfunction.

After selecting the correct protocol for the site, Nortel recommends upgrading the software for the WLAN Handsets. See [“Over-the-air transfer of software updates” \(page 49\)](#).

Terminal Type

Select 2004P2. The Terminal type configures the WLAN Handset for the type of PBX in use. The CS 1000 requires the 2004P2 setting; the BCM requires the 3rd-party setting.

OAI On/Off

The Nortel Open Application Interface (OAI) enables the WLAN Handset to connect with the optional WLAN Application Gateway 2246. With this device, third-party computer applications can display alphanumeric messages on the WLAN Handset display and take input from the WLAN Handset keypad. For more information, see WLAN IP Telephony Installation and Commissioning (NN43001-504).

If a WLAN Application Gateway 2246 is installed in the system, OAI can be optionally enabled in each wireless handset. Select whether the wireless handset should attempt to connect to the WLAN Application Gateway 2246 by choosing either the **Enable** or Disable options in this menu.

If OAI is enabled, and a WLAN Application Gateway 2246 IP address is available to the WLAN Handset (either through DHCP or Static IP configuration), the WLAN Handset communicates with the WLAN Application Gateway 2246 at power-on, and then periodically during the time the WLAN Handset is powered on.

If a WLAN Application Gateway 2246 is not installed at the site, disable the OAI feature to preserve network bandwidth and battery life.

Push-to-talk

All eight Push-to-talk channels are allowed by default. The Push-to-talk menu contains the following options:

- **Allowed Channels**—toggle the status of any allowed channel, by scrolling to the channel to be disallowed and pressing the Select button. Allowed channels are displayed with a star (*) in the left column. Only the allowed channels appears on the Standby menu, where they can be enabled or disabled by the user.
- **Allow/Disallow**—enables or disables Push-to-talk. Scroll to Disallow PPT and press the Select button to disable Push-to-talk.

Push-to-talk is available on the WLAN Handset 2211 and the WLAN Handset 6140. It is not available on the WLAN Handset 2210/2212 and the WLAN Handset 6120.

Admin Password

The optional Admin Password controls access to the administration functions in the Admin menu of the WLAN Handset. Configure the password in each WLAN Handset for which controlled access is desired. WLAN Handsets are shipped without any Admin password.

Data entry for the password uses the alphanumeric string entry technique. Type the password and press the Save soft key. A confirmation prompt appears. Type the password again and press the Save soft key. If the passwords match, the Admin password is configured.

If this option is selected on a WLAN Handset that already has a configured password, and the Exit soft key is pressed with no entry, the password is erased. This means that the WLAN Handset does not require an Admin password to access the Admin menu.

ATTENTION

Record the WLAN Handset Admin password and store it in a safe place. If the password is lost or forgotten, contact Nortel Technical Support.

Startup Keylock

Startup Keylock deactivates the keypad during startup so that initialization cannot be interrupted. This is a toggle option; the info line displays whether the option is enabled or disabled. Select No Startup Keylock to disable and select Startup Keylock On to enable.

Location Services

You can configure Location Services to on or off, configure the standby transmission Interval to 1, 5, or 10 minutes, and configure the IP Address of the Location Services engine. Location Services transmits the Access points (AP) information at one of the intervals listed in [Table 18 "Transmission intervals" \(page 110\)](#).

Table 18
Transmission intervals

Mode	Transmission interval
Standby—stationary	1, 5, and 10 minutes
Standby—roaming	On roaming detection, and then revert back to Standby-stationary mode until next roaming detect.
In-call—stationary	2 to 6 seconds for normal in-call mode
In-call—roaming	On roaming detect, and then revert back to In-call-stationary mode until next roaming detect.

IP Addresses menu

There are three modes in which the wireless handset can operate: DHCP-enabled, Static IP or Svr1 (Server 1). Select the mode for operation from the IP Address menu:

- *** Use DHCP**—use Dynamic Host Configuration Protocol (DHCP) to assign an IP address each time the WLAN Handset is turned on. If DHCP is enabled, the WLAN Handset also receives all other IP address configurations from DHCP.
- **Static IP**—a fixed IP address can be manually configured. If this option is selected, the WLAN Handset prompts for the IP addresses of each configurable network component. When entering IP addresses, enter the digits only, including leading zeroes. No periods are required.
- **Server1 (Svr1)**—the IP addresses and ports of the primary and secondary servers and OIA server can be configured either statically or through DHCP.

Regardless of the mode in which the WLAN Handset is operating, the following components must be configured:

- **Phone IP**—the IP address of the WLAN Handset. This is automatically assigned if DHCP is used. If using Static IP configuration, obtain

a unique IP address for each WLAN Handset from the network administrator.

- **WLAN IP Telephony Manager 2245 IP**—the IP address of the master of the WLAN IP Telephony Manager 2245 group. If using Static IP configuration, this is simply the IP address of the WLAN IP Telephony Manager 2245. The WLAN IP Telephony Manager 2245 must be statically configured to have a permanent IP address. If DHCP is being used, the WLAN Handset tries the following, in order: the DHCP option 151, and then a DNS lookup of SLNKSVP2 if the DHCP options 6 (DNS Server) and 15 (Domain Name) are configured.
- **Server 1 IP**—the TLAN node IP address of the LTPS IP Telephony Node on the Call Server. If the WLAN Handset is using static IP address configuration, enter the TLAN node IP address of the LTPS IP Telephony Node on the Call Server. If the WLAN Handset is using DHCP, the DHCP server must be configured to provide the TLAN node IP address (and UDP port number) of the LTPS IP Telephony Node on the Call Server using one of the following DHCP options: 46, 128, 144, 157, 191, and 251.
- **Server 1 Port**—the UDP port number used by the WLAN Handset to contact the LTPS Node Connect Service to request registration with the LTPS and the Call Server. If the WLAN Handset is using static IP address configuration, enter port number 4100. If the WLAN Handset is using DHCP, the DHCP server must be configured to provide the TLAN node IP address and UDP port number of the LTPS IP Telephony Node on the Call Server using one of the following DHCP options: 46, 128, 144, 157, 191, and 251.

The following components can be configured optionally:

- **TFTP Server IP**—the IP address of the TFTP Server on the network that holds software images for updating the WLAN Handsets. If this feature is configured (not configured to 0.0.0.0 or 255.255.255.255), either through Static IP configuration, through using DHCP option 66 (TFTP Server), or the Boot server/next server (siaddr) field, the WLAN Handset checks for different software each time it is powered on or comes back into range of the network. This check takes only five to seven seconds and ensures that all WLAN Handsets in the network are kept up-to-date with the same version of software.

It does not matter if the software version on the TFTP Server is newer or older; if the versions are different, the WLAN Handsets download the software from the TFTP Server.

- **OAI Server IP**—the IP address of the WLAN Application Gateway 2246 (if using). If using Static IP configuration, this is simply the IP

address of the WLAN Application Gateway 2246. If DHCP is being used, the WLAN Handset tries DHCP option 152.

- **Default Gateway and Subnet Mask**—used to identify subnets when using a complex network that includes routers. Both of these fields must be configured (not configured to 0.0.0.0 or 255.255.255.255) to enable the wireless handset to contact any network components on a different subnet. They can be configured using Static IP configuration or through DHCP options 3 (Default Gateway) and 1 (Subnet Mask) respectively. Contact the network administrator for the proper settings for the network.

The WLAN Handsets cannot roam across subnets, because the WLAN Handsets cannot change their IP address while operational. Ensure that all the APs are attached to the same subnet for proper operation. The WLAN Handset can change subnets if DHCP is enabled, and the WLAN Handset is powered off, and then back on, when within range of APs on the new subnet.

- **Server 2 IP**—the IP address of the secondary Nortel device a WLAN Telephony Manager 2245 unit. Currently, the WLAN Handset does not make use of this information. If using Static IP configuration, this is simply the IP address of the device. If DHCP is being used, the WLAN Handset tries to obtain the IP address and port information of the device using the following DHCP options: 46, 128, 144, 157, 191, and 251.
- **Server 2 Port**—the port number used by the secondary Nortel device a WLAN Telephony Manager 2245 device to communicate with IP Phones. Currently, the WLAN Handset does not make use of this information. If you use Static IP configuration, consult the device documentation for port numbers. If you use DHCP, the WLAN Handset tries to obtain the IP address and port information of the device using the following DHCP options: 43, 128, 144, 157, 191, and 251.
- **Syslog Server IP**—the address of the Syslog Server. See [“Diagnostic Tools” \(page 149\)](#) for more information.

ESSID

Select the option that enables the WLAN Handset to acquire APs with the correct ESSID (Extended Service Set ID, or Extended SSID) each time it is turned on.

For Automatic Learn options, Broadcast ESSID must be enabled in the APs for ESSID learning to function (or contact the AP vendor for specifics). Overlapping wireless systems complicate the use of ESSID learning,

as the wireless handset in an overlapping area could receive conflicting signals. If this is the situation at the site, use Static Entry or Learn Once in an area without overlapping ESSIDs.

- *** Learn Once**—the WLAN Handset to scan all ESSIDs for a DHCP server and TFTP Server. After either is found, the WLAN Handset retains the ESSID from whichever AP it associates with at that point. When overlapping wireless systems exist, the Learn Once feature allows the WLAN Handset to use only the ESSID established the first time at all subsequent power-ons. This ESSID is retained by the WLAN Handset until the ESSID option is reselected.
- **Learn Always**—the WLAN Handset to automatically learn the ESSID at each power-on or loss of contact with the wireless LAN (out of range). This can be useful if the WLAN Handset is used at more than one site.
- **Static Entry**—if the APs do not accept broadcast ESSID, or if there are overlapping wireless systems in use at the site, enter the correct ESSID manually.

Security

For authentication, the WLAN Handsets 2210/2211/2212 and WLAN Handsets 6120/6140 support open, WEP shared key, or WPA/WPA2 Preshared Key (PSK) mechanisms. The WLAN Handset 2212, in addition, also supports IPsec VPN.

For data encryption, the WLAN Handsets 2210/2211/2212 and WLAN Handsets 6120/ 6140 support 40-bit and 128-bit WEP, WPA, and WPA2 . In addition, the WLAN Handset 2212 supports 3DES for VPN encryption. If you use WEP, Nortel recommends that you configure the authentication type to open, because of a known weakness of the 802.11 shared key authentication algorithm.

For WPA and WPA2, the use of PSK does not pose the same security risk that WEP shared key authentication does. The choice of a WPA2 pass phrase is important; however, weak pass phrases can be broken through dictionary attacks. The Configuration Cradle for the WLAN Handsets 2210/2211/2212 and the Handset Administration Tool for the WLAN Handsets 6120/6140 are especially valuable for configuring complex and secure pass phrases.

Because the WEP encryption algorithm is compromised, it does not thwart determined attackers and eavesdroppers. Even 128-bit WEP is only roughly twice as secure as 40-bit WEP. Therefore, the effort to program many handsets with 128-bit keys may not be worth the effort put into it.

For the best security on the WLAN Handsets 2210/2211/6120/6140, use WPA2-PSK; for best handset security on the WLAN Handset 2212, use IPsec VPN.

The following are the security options:

- *** None**—disables any 802.11 encryption or security authentication mechanisms.
- **WEP** (Wired Equivalent Privacy)—a wireless encryption protocol that encrypts data frames on the wireless medium, providing greater security in the wireless network. If WEP Encryption is required at this site, each wireless handset must be configured to correspond with the encryption protocol configured up in the APs. Select the entries from the following options to enable the WLAN Handset to acquire the system.

By default, WEP options are off. If WEP is desired, options must be configured in the WLAN Handset that match those configured in the APs.

Encryption codes are displayed as they are entered. For security reasons, codes are not displayed when a user returns to the Admin menu Encryption options.

WEP can be configured to optional at the AP if there are wireless devices in use that do not have WEP capability. All wireless devices must be upgraded to WEP capability for a fully secured WEP environment.

WEP settings must match the AP settings.

Configure each of the following options to match exactly the settings in the APs:

- **Authentication**—select either Open System or Shared Key.
- **WEP**—select either WEP Off or WEP On.
- **Key Information**—scroll through the options.
 - **Default Key**—enter the preshared key number specified for use by the wireless handsets. This is 1 through 4.
 - **Key Length**—select either 40-bit or 128-bit depending on the key length specified for use at this site.
 - **Key 1-4**—scroll to the key option that corresponds to the Default Key that was entered above. Press Select and enter the encryption key as a sequence of hexadecimal characters. Use the 2 and 3 keys to access hexadecimal digits A-F; use soft keys to advance to the next digit and backspace. For 40-bit

keys, enter 10 digits; for 128-bit keys, enter 26 digits. The display scrolls as needed.

- **Rotation Secret**—used for proprietary WEP key rotation if this feature is supported in the system.
- **Cisco FSR**—to provide the highest level of security without compromising voice quality on Cisco Aironet WLAN APs, the Fast Secure Roaming (FSR) mechanism is implemented. FSR is designed to minimize call interruptions for WLAN Handset users as they roam throughout a facility. Existing Aironet 350, 1100, and 1200 APs can require a software upgrade to support FSR. Cisco FSR requires advanced configuration of the Cisco APs in the site. See the Cisco representative for detailed documentation on configuring the APs and other required security services on the wired network. To configure Cisco FSR in the wireless handset, enter a Radius Server user name and password into each WLAN Handset.
 - **User name**—enter a user name that matches an entry on the Radius server. User names are alphanumeric strings, and can be entered using the alphanumeric string entry technique.
 - **Password**—enter the password that corresponds to this user name.
- **WPA-PSK** —Wi-Fi Protected Access (WPA) using Preshared Key (PSK) provides enhanced security and can be used, if supported by the APs. Select one of the following options:
 - **Passphrase**—enter a passphrase. The passphrase can be from 1 to 63 ASCII characters or 64 hexadecimal digits. Use a strong passphrase that cannot be discovered using password-cracking programs. A 20 to 30 character passphrase is recommended. For more information, see “[Choosing a passphrase](#)” (page 117).
 - Example: why2fear4WPA-is-DEPLOYED_HERE
 - **Direct Entry**—enter a preshared key code (hexadecimal number).

For information about whether WPA-PSK is recommended for the AP, consult the Configuration Note for the installed APs, available from www.spectralink.com. Configure the recommended version on the AP and configure the corresponding option on the Admin menu.

WPA-PSK settings must match the AP settings.
- **WPA2-PSK** —WPA2 with PSK provides enhanced security over WPA-PSK and can be used, if supported by the APs. Select one of the following options:
 - **Passphrase**—enter a passphrase. The passphrase can be from 1 to 63 ASCII characters or 64 hexadecimal digits. Use a strong passphrase that cannot be discovered using password-cracking

programs. A 20 to 30 character passphrase is recommended. For more information, see [“Choosing a passphrase” \(page 117\)](#).

- Example: why2fear4WPA2-is-DEPLOYED_HERE

- **Direct Entry**—enter a preshared key code (hexadecimal number).

Consult the Configuration Note for the installed APs for information about whether WPA2-PSK is recommended for the AP. Configure the recommended version on the AP and configure the corresponding option on the Admin menu.

- **VPN**—the selection of VPN for security requires that a secure tunnel be established for the transfer of information. The data itself no longer must be encrypted because the VPN tunnel is already encrypted. VPN security requires a number of configuration steps, and is easily configured using the Configuration Cradle. For more information, see [“Configuration Cradle for the WLAN Handset 2210/2211/2212” \(page 59\)](#). VPN security is also closely tied with the VPN server configuration. Only the WLAN Handset 2212 supports VPN security.

The VPN server must support the handset configuration.

- **VPN Server IP**—the IP address of the VPN server on the public (unsecure) side of the network.

- **VPN Client IP**—the IP address that appears to be part of the private (or secure) network

- **Static IP**—the address can be statically programmed in the WLAN Handset, in which case it must match the address assigned to the WLAN Handset in the VPN server.

- **IKE Mode Config**—if the VPN server supports the ISAKMP Mode Configuration, it can assign the IP address automatically.

- **Phase 1—ISAKMP**—this is the first phase of the tunnel negotiation process. It establishes a set of security parameters (the ISAKMP Security Association) that is used to encrypt the negotiation of the actual tunnel parameters in Phase 2. In essence, Phase 1 protects Phase 2.

- **Mode**—VPNs can negotiate their parameters using two different modes. These are called Main Mode and Aggressive Mode. Aggressive Mode is the most flexible of the two and is the only one currently supported by the handsets.

- **Authentication**—enter a preshared key, which must match the shared secret key entered for the handset in the VPN server. The key can be an ASCII string or a hexadecimal string.

- **Diffie-Hellman**—choose Group 1, Group 2 or Group 5, depending on the level of security required and the level supported by the VPN server.

- **Auth. Hash**—choose either MD5 or SHA, depending on the VPN server setting.
- **Encryption**—chooses DES or 3DES, depending on the VPN server setting.
- **Local ID**—identifies the VPN user who is trying to connect to the server. The Local ID must match the VPN server setting.
- **Lifetime (sec)**—gives the lifetime, in seconds, of the ISAKMP security association. When the lifetime expires, the tunnel must be closed and a new one created. Nortel recommends a minimum of 12 to 24 hours (43 200 to 86 400 seconds). The maximum value for the lifetime setting is 31 days (2 778 400 seconds).
- **Options**—each of the options can be enabled individually.
 - Init Contact**—by enabling this option, the handset sends an initial contact request message to notify the VPN server that the WLAN Handset has relinquished the old tunnel and wants to open a new one.
 - Nortel features**—enabling this option makes the handset use Nortel-specific extensions to the standard IKE negotiation. The WLAN Handset advertises itself as a Contivity-compatible client and hashes the Key ID before passing the information to the Contivity.
- **Phase 2—ESP**—this is the second phase of the tunnel, and is encrypted by the parameters established in Phase 1. Phase 2 negotiates the parameters used by Encapsulated Security Payload (ESP) to encrypt the actual traffic in the tunnel.
 - **Auth. Hash**—choose either MD5 or SHA1 to match the settings in the VPN server.
 - **ESP Encryption**—select DES or 3DES for the encryption algorithm for the tunnel traffic.
 - **Remote Network**—enter an IP address and a network mask to specify the private (secure) network address range.
 - **Lifetime (sec)**—configure a lifetime in seconds for ESP security associations. Typically, this setting is a few hours and must be no greater than the Phase 2 lifetime configured in the VPN server.

Choosing a passphrase

The choice of a strong passphrase ensures the privacy of the WLAN Handset data and messages.

A good passphrase is:

- Known only to the administrator.
- Long enough so that it is difficult to guess or crack. For example, search programs often contain dictionary words and famous phrases. Some passphrase character lengths are
 - 8-character passphrase—weak
 - 20-character passphrase—minimum
 - 20 to 30-character passphrase—recommended
 - 63-character passphrase—very strong
- Difficult to guess by intuition—even by someone who knows the administrator well. Birth dates, for example, are a poor choice.
- Easy for the administrator to remember and type. Nortel does not recommend writing the password down.

Reg. (Regulatory) Domain

The Regulatory Domain defaults to None on the WLAN Handset display. FCC requirements dictate that the menu for changing the domain be available by password, which in this case is the LINE button. To change the domain, press LINE and then enter the digits that represent the domain for the site. You must enter both digits.

The following are domain digits:

- **01**—North America
- **02**—Europe (except Spain and France) and Japan
- **04**—Spain
- **05**—France
- **06**—Korea

As of this writing, Spain and France are adopting the general European Regulatory rules. Check with the wireless LAN administrator or supplier for the correct domain to enter in these countries.

Transmit Power

The Transmit Power selected must match the installed APs and all WLAN Handsets and is regulated by the domain. The maximum for North America is 100 mW, while other domains have a maximum of 30 mW. The following power settings are available:

- **Maximum** (default)
- **50 mW** (only available in the North American domain)

- **30 mW** (only available in the North American domain)
- **20 mW**
- **15 mW**
- **10 mW**
- **5 mW**

If the default is not used, ensure that the Transmit Power setting is the same for all WLAN Handsets and all APs.

Run Site Survey

Run Site Survey is used to check the signal strength from APs. When Run Site Survey is selected, the WLAN Handset remains in this mode until it is powered off. During configuration, press the right arrow to skip this mode. For more information about using this mode, see WLAN IP Telephony Installation and Commissioning (NN43001-504). For a detailed description of the survey results, see ["Run Site Survey for the WLAN Handset 2210/2211/2212" \(page 149\)](#) and ["Run Site Survey for the WLAN Handset 6120/6140" \(page 151\)](#).

Diagnostics Mode

After you select Diagnostics Mode from the menu, the WLAN Handset enters the diagnostics function immediately. For more information, see ["Diagnostics Mode" \(page 153\)](#) for more information.

Syslog Mode

You can enable or disable Syslog Mode.

Configure Syslog Mode to one of the following:

- *** Disabled**—turns syslog off.
- **Errors**—causes the handset to only log events that are considered errors.
- **Events**—logs all errors, plus some events of interest.
- **Full**—logs all errors and all other events of interest.

[Table 19 "Syslog message levels for the WLAN Handset 2210/2211/2212" \(page 119\)](#) lists the syslog messages and which level of logging produces each message.

Table 19
Syslog message levels for the WLAN Handset 2210/2211/2212

Message Type	Errors	Events	Full
Failed Handoff	Yes	Yes	Yes

Table 19
Syslog message levels for the WLAN Handset 2210/2211/2212 (cont'd.)

Message Type	Errors	Events	Full
Successful Handoff	No	Yes	Yes
Security Error	Yes	Yes	Yes
Call Start/End	No	Yes	Yes
Audio error threshold exceeded	Yes	Yes	Yes
Audio stats	No	No	Yes (every 5s)
Radio error threshold exceeded	Yes	Yes	Yes
Radio stats	No	No	Yes (every 5s)

Restore Defaults

The Restore Defaults option resets all user and administrative parameters (other than Telephony Protocol) to their factory defaults. During configuration, press the right arrow to skip this mode.

WLAN Handset 6120/6140

[Table 20 "Admin menu options for the WLAN Handset 6120/6140" \(page 120\)](#) lists the Admin menu options for the WLAN Handset 6120/6140.

Detailed descriptions of each item follow the table. An asterisk (*) beside a setting indicates the default setting.

Table 20
Admin menu options for the WLAN Handset 6120/6140

Admin menu option	2nd level	3rd level	4th Level	5th Level
Phone Config	Language	*English Française Deutsch Español Português Norsk		
	Telephony Protocol	*Type 032		
	Push-to-Talk	PTT Enable/Disable		
		Allowed Channels	*Channel 1 *Channel 2 *** *Channel 24	

Admin menu option	2nd level	3rd level	4th Level	5th Level
		Name Channels	*Channel 1 *Channel 2 *** *Channel 24	
		Priority Channel On/Off	Name Channel	
	Time Zone	[list] *GMT		
	Daylight Saving	*DST No Adjust DST Auto <USA> DST Auto <Euro> DST Auto <AUS>		
	Protected Spd Dial	Enter Number	Enter Name	Assign Speed-dial
	Password [Disable/Enable]			
	Change Password			
	Set Terminal Type [2004/3rd Party]			
	Startup Keylock			
	Speakerphone [Disable/Enable]			
	OAI [Disable/Enable]			
	Location Services	On * Off	Set transmission interval:	1 5 10
			IP address	* ____:____:____:____

Admin menu option	2nd level	3rd level	4th Level	5th Level
Network Config	IP Addresses	*Use DHCP	*Full DHCP	
			Partial DHCP	Server1 IP Address Server1 Port Server2 IP Address Server2 Port
		Static IP	Phone IP	
			Default Gateway	
			TFTP Server IP	
			Subnet Mask	
			Syslog Server IP	
			Time Server IP	
			SVP IP	
			Call Server Info	Server1 IP Address Server1 Port Server2 IP Address Server2 Port
			OAI Server IP	
	SSID	[Enter]		
	Security	*None		
		WEP	Authentication	Open System Shared Key
			WEP On/*Off	*WEP Off WEP On
			Key Information	Default Key Key Length Key 1-4
			Rotation Secret	
		WPA2-PSK	Passphrase Pre-Shared Key	
		Cisco FSR	User name Password	
		WPA-PSK	Passphrase Pre-Shared Key	

Admin menu option	2nd level	3rd level	4th Level	5th Level
	Reg. Domain: *none	01-02		
			[802.11 Config]	
			a →	802.11a 5.150-5.250 5.250-5.350 DFS 5.470-5.725 DFS 5.275-5.825 DFS
			*b and b/g mixed → g only →	[Transmit Power] *Maximum 5 mW <7dBm> 10 mW <10dBm> 20 mW <20dBm> 40 mW <40dBm> 50 mW <17dBm> 100 mW <20dbm >
Diagnostics	Run Site Survey			
	Diagnostics Mode [Disable/Enable]			
	Syslog Mode	*Disabled Errors Events Full		
	Error Handling Mode Halt on Error Restart on Error			
Restore Defaults				

Language

Choose a language from those on the list.

Telephony Protocol

Use Telephony Protocol to select the VoIP protocol that your site is licensed to download and run. The UNISTIM Protocol to use for the WLAN Handset 6120/6140 is 032. Any other protocol causes the WLAN Handset to malfunction.

Push-to-talk

All 24 Push-to-talk channels are allowed by default. The Push-to-talk menu provides the following options:

- Allowed Channels

Toggle the allowed status of any allowed channel by scrolling to the channel to be disallowed and pressing Enter. Allowed channels are displayed with an asterisk (*) in the left column. Only those channels allowed in the Admin menu appear on the Config menu, where they can be subscribed to by the user.

- Named Channels

You can name allowed channels. The name appears instead of the channel number when channel information appears on the WLAN Handset. The name appears on the local WLAN Handset only; it does not appear on target WLAN Handsets.

- Priority Channel

You can configure the priority channel, also referred to as channel 25, which makes it available to all Push-to-talk WLAN Handsets. When you make a Push-to-talk broadcast on the priority channel, it overrides any active Push-to-talk transmission on all other channels. You can name the priority channel.

Time zone

Worldwide time zone options are available. Select your time zone from the list. Greenwich Mean Time (GMT) is the default.

Daylight Saving

You can adjust the handset for daylight savings time. The following are the Daylight Savings Time menu options:

- DST No Adjust (Default)
- DST Auto (USA)
- DST Auto (AUS)
- DST Auto (EURO)

Protected Spd Dial

The protected speed-dial number appears as the first item on the speed-dial list and is specially marked with an asterisk (*) as the first character in its name. It is usually programmed to a number to be called in emergency situations.

If the Call Server offers directory services, Redial, Speed-dial, and Phonebook features in the handset are disabled, including the protected speed-dial number feature. Any entry here is overridden by the Call Server.

Password (Disable/Enable) and Change Password

The password option controls access to the administrative functions in the Admin menu of the WLAN Handset. Configure the password in each WLAN Handset for which controlled access is desired. By default, the password is disabled when the WLAN Handset is shipped.

To modify the password requirement, enter the default or previously configured password to verify the change. The Password option operates as a toggle between Enabled and Disabled. Press Enter to change the password protection state. Change Password appears only if the password is enabled.

ATTENTION

Record the WLAN Handset Admin password and store it in a safe place. Do not lose the Admin password! If the Admin password is lost or forgotten, you can be required to return the handset to Nortel to have the password reset.

Set Terminal Type

The terminal type configures the WLAN Handset 6120/6140 for the type of PBX in use. The CS 1000 system requires the 2004P1 or 2004P2 setting, the BCM system requires the 3rd-Party setting. The current Terminal Type is shown on the information line. Press Enter to toggle to the alternate setting.

Startup Keylock

Startup Keylock deactivates the keypad during startup so that initialization cannot be interrupted. This is a toggle option; the info line displays whether the option is enabled or disabled. Select No Startup Keylock to disable and select Startup Keylock On to enable.

Speakerphone

You can disable the speakerphone when quiet WLAN Handset operation is required. Disabling the speakerphone removes the speakerphone soft key from the active mode display. The current speakerphone setting is shown on the information line. Press Enter to toggle to the alternate setting.

OAI (Disable/Enable)

With the Nortel Open Application Interface (OAI), the WLAN Handsets can connect with the optional WLAN Application Gateway 2246. This device allows third-party computer applications to display alphanumeric messages on the WLAN Handset display and take input from the WLAN Handset keypad.

If a WLAN Application Gateway 2246 is installed in the system, OAI can be optionally enabled in the WLAN Handset. Select whether the WLAN Handset can attempt to connect to the WLAN Application Gateway 2246 by pressing Enter to toggle to the alternate setting.

If OAI is enabled, and a WLAN Application Gateway 2246 IP address is available to the WLAN Handset (either through DHCP or Static IP configuration), the WLAN Handset communicates with the WLAN Application Gateway 2246 at power-on, and then periodically during the time the WLAN Handset is powered on.

If a WLAN Application Gateway 2246 is not installed at the site, disable the OAI feature to preserve network bandwidth and battery life.

IP addresses

The WLAN IP 6120 handset can operate in three modes: DHCP enabled, either Full DHCP or Partial DHCP, and Static IP. Select the mode for operation from the IP Address menu:

- Use DHCP—uses Dynamic Host Configuration Protocol to assign an IP address each time the handset is turned on. If DHCP is enabled, the handset also receives all other IP address configurations from the DHCP server.
 - Full DHCP—enables DHCP for all IP addresses.
 - Partial DHCP—enables static IP address configuration for Server 1, Server 1 Port, Server 2, and Server 2 Port. All other IP addresses are assigned by DHCP.

Server 1 (2) IP address—the IP addresses of the primary and secondary Nortel device. If using Static IP configuration, this is the IP address of the device. If DHCP is used, the WLAN Handset tries to obtain the IP address and port information by using the following DHCP options: 43, 128, 144, 157, 191, and 251.

Server 1 (2) Port—the port number used by the primary and secondary Nortel device to communicate with IP telephones. If using Static IP configuration consult your Nortel documentation for port numbers. If DHCP is used, the WLAN Handset tries to obtain

the IP address and port information by using the following DHCP options: 43, 128, 144, 157, 191, and 251.

- Static IP—allows you to manually set a fixed IP address. If selected, the WLAN Handset prompts for the IP Addresses of each configurable network component. When entering addresses, enter the digits only, including leading zeroes. No periods are required.

Regardless of the mode in which the WLAN Handset is operating, you must configure the following components:

- Phone IP—the IP address of the WLAN Handset. This is automatically assigned if DHCP is used. If using Static IP configuration, you must obtain a unique IP address for each WLAN Handset from your network administrator.
- Default Gateway and Subnet Mask—used to identify subnets, when using a complex network that includes routers. Both of these must be configured either with an IP address under Static IP (not configured to 000.000.000.000 or 255.255.255.255) or with DHCP for the WLAN Handset to contact any network components on a different subnet. If configured on the DHCP server, use option 3 for the Default Gateway and option 1 for the Subnet Mask. Contact your network administrator for the proper settings for your network.

ATTENTION

A WLAN Handset 6120/6140 cannot roam across subnets because it cannot change its IP address while it is operational. Ensure that all your access points are attached to the same subnet for proper operation. If DHCP is enabled, you can change the subnet of the WLAN Handset by powering off the handset, and then powering it back on when it is within range of access points on the new subnet.

- TFTP Server IP—the IP address of a TFTP server on your network that holds software images for updating the handsets. If this feature is configured (not configured to 0.0.0.0 or 255.255.255.255), either by using Static IP configuration or by using DHCP option 66 (TFTP Server), or the Boot server/next server (siaddr) field, the WLAN Handset checks for newer software each time it is powered on or comes back into range of your network. This check takes only a second and ensures that all WLAN Handsets in your network are kept up-to-date with the same version of software.
- Syslog Server IP—the IP address of the Syslog Server. See the Diagnostics section for more information.
- Time Server IP—the IP address of the time server.
- SVP IP address—the IP address of the WLAN IP Telephony Manager 2245. If using Static IP configuration, this is simply the IP address of the WLAN IP Telephony Manager 2245. To have a permanent IP

address, the WLAN IP Telephony Manager 2245 must be statically configured. If DHCP is used, the WLAN Handset tries the following, in this order:

- DHCP option 151
- a DNS lookup of SLNKSVP2 if the DHCP options 6 (DNS Server) and 15 (Domain Name) are configured.
- Call Server Info—the IP addresses of the CS 1000 server. When setting static IP addresses, the IP addresses and Port addresses must be configured for Svr1 and Svr 2. For more information, see "[Partial DHCP](#)" (page 126) .
- OAI Server IP—the IP address of the NetLink (NL) OAI Gateway (if applicable). If using Static IP configuration, this is simply the IP address of the NL OAI Gateway. If DHCP is being used, the WLAN Handset tries the DHCP option 152.

SSID

Enter the SSID.

Security

The following are the security options:

ATTENTION

For Wired Equivalent Privacy (WEP), WiFi Protected Access using PSK Preshared Key (WPA-PSK), and WPA2-PSK configure each of the following options to match exactly the settings in your APs. Encryption codes appear as they are entered. For security reasons, codes do not appear on the display when a user returns to the Admin menu, Encryption options.

- *NONE—disables any 802.11 encryption or security authentication mechanisms.
- WEP—a wireless encryption protocol that encrypts data frames on the wireless medium, allowing for greater security in the wireless network. If WEP is used, you must configure each WLAN Handset to correspond with the encryption protocol configured in the access points. Select the entries from the options below to enable the WLAN Handset to acquire the system.
 - Authentication—Select either Open System or Shared Key.
 - WEP Enable/Disable—Select either Enable WEP or Disable WEP.
 - Key Information—Configure the following:

- Default Key—Enter the key # specified for use by the handsets. This is 1 through 4.
- Key Length—Select either 40-bit or 128-bit depending on the key length specified for use at this location.
- Key 1-4—Scroll to the key option that corresponds to the Default Key that you entered above. Enter the encryption key as a sequence of hexadecimal characters. (Use the 2 and 3 keys to access hexadecimal digits A-F.)
- Rotation Secret—This is used for proprietary WEP key rotation. To determine whether this feature is supported in your system, see your custom document.
- WPA2-PSK—The security features of WPA2-PSK are available and can be used if supported by the access points in the facility. Select one of the following:
 - Passphrase—enter a passphrase between 8 and 63 characters in length.
 - Direct Entry—enter the 256-bit key code.

ATTENTION

For information about whether WPA2-PSK is recommended for an AP, consult the Configuration Note for the installed APs. Configure the recommended version on the AP and select the corresponding option on the Admin menu.

- Cisco FSR—To provide the highest level of security without compromising voice quality on Cisco Aironet WLAN APs, the Fast Secure Roaming (FSR) mechanism is implemented. FSR is designed to minimize call interruptions for wireless handset users as they roam throughout a facility. Existing Aironet 350, 1100, and 1200 APs can require a software upgrade to support FSR. Cisco FSR requires advanced configuration of the Cisco access points at your site. See the Cisco representative for detailed documentation about configuring your access points and other required security services on your wired network. To configure Cisco FSR in the wireless handset, you must enter a Radius Server user name and password into each WLAN Handset.
 - User name—Enter a user name that matches an entry on your Radius server. User names are alphanumeric strings, and can be entered using the alphanumeric string entry technique.
 - Password—Enter the password that corresponds to this User name.
- WPA-PSK—The security features of WPA-PSK are available and can be used if supported by the access points in the facility. Select one of the following:

- Passphrase—enter a passphrase between 8 and 63 characters in length.
 - 8-character passphrase—weak
 - 20-character passphrase—minimum
 - 20 to 30-character passphrase—recommended
 - 63-character passphrase—very strong
- Direct Entry—enter the 256-bit key code.

Regulatory domain, 802.11 configuration, and transmit power

Regulatory domain, 802.11 configuration, and transmit power are interdependent settings. After the domain and 802.11 type are established, you can configure the transmit power.

ATTENTION

The 802.11 options and the transmit power options, must be configured to match the corresponding settings used by the APs in the facility.

The FCC requirements dictate that the menu for changing the domain be available by password, which in this case is the LINE key. To configure the domain, press LINE and then select the domain:

- 01 North America
- 02 Europe

After you establish the regulatory domain, the 802.11 Config options appear on the display. You can choose only one option; 802.11 (b and b/g mixed) is the default. If 802.11 (a) is selected, another menu opens so that you can select the 802.11a transmission frequency. Only those ranges that are allowed in the selected domain appear. You can select multiple ranges. The selected mode and ranges are marked with an asterisk (*). Press the Done soft key after you finish specifying the 802.11 mode.

After you press the Done soft key, the Transmit Power menu opens. Only those power levels that apply to the domain and 802.11 mode are listed. You can select only one level. The default varies with the domain and 802.11 mode. The selected level is marked with an asterisk (*).

Run Site Survey

Select this option to activate the Site Survey mode. Site Survey runs immediately upon selecting this option. For more information about Site Survey, see [“Run Site Survey for the WLAN Handset 2210/2211/2212” \(page 149\)](#) and [“Run Site Survey for the WLAN Handset 6120/6140” \(page 151\)](#).

Diagnostics Mode

For a detailed explanation of the Diagnostics Mode options, see [“Diagnostics Mode” \(page 153\)](#).

Syslog Mode

Configure Syslog Mode to one of the following options:

- Disabled—turns syslog off
- Errors—logs events that are considered errors
- Events—logs all errors, plus some events of interest
- Full—logs all errors and all other events of interest

[Table 21 “Syslog message levels for the WLAN Handset 6120/6140” \(page 131\)](#) lists the syslog messages and the level of logging produces each message.

Table 21
Syslog message levels for the WLAN Handset 6120/6140

Message type	Errors	Events	Full
Failed handoff	Yes	Yes	Yes
Successful handoff	No	Yes	Yes
Security error	Yes	Yes	Yes
Call start or end	No	Yes	Yes
Audio error threshold exceeded	Yes	Yes	Yes
Audio stats	No	No	Yes (every 5 s)
Radio error threshold exceeded	Yes	Yes	Yes
Radio stats	No	No	Yes (every 5 s)

For more information, see [“Syslog Mode” \(page 156\)](#).

Error Handling mode

The Halt on Error option causes the WLAN Handset to stop operating if an error message is received. Unless the error is a fatal one, normal operation can be resumed by power cycling the WLAN Handset. Press START or remove and replace the Battery Pack. The Restart On Error option causes the WLAN Handset to make every effort to reboot quietly and quickly to standby mode. In either scenario, a call in progress is lost.

Error detail can be captured by the Syslog Server and can also be available for downloading with the Handset Administration Tool.

Restore Defaults

The Restore Defaults option restores all user and administrative parameters, except Telephony Protocol, to the factory default configurations. For more information, see [“Factory Defaults” \(page 195\)](#).

Feature programming

This chapter contains information about feature programming for the handsets:

- [“WLAN Handset 2210/2211/2212” \(page 133\)](#)
- [“WLAN Handset 6120/6140” \(page 137\)](#)

WLAN Handset 2210/2211/2212

The WLAN Handset 2210/2211/2212 emulates the IP Phone 2004. All IP Phone 2004 functions and messaging features are supported where possible. Functions that require use of the volume keys and the speakerphone function are not supported.

The large screen area of the IP Phone 2004 and its numerous keys are mapped onto the smaller screen and fewer buttons of the WLAN Handsets. The button mapping from the IP Phone 2004 to the WLAN Handsets was designed to preserve nearly all of the functionality of the IP Phone 2004 within a small, mobile device.

Feature and key assignment

The line keys, numbered 1, 2, 3, 4, 5, and 6, to the left and right of the display screen of the IP Phone 2004 are mapped to the LINE buttons on the WLAN Handsets. See [Figure 7 “WLAN Handset 2210” \(page 135\)](#).

The IP Phone 2004 has several fixed feature keys. The handsets support the six features that are suitable to a mobile user through the Function (FCN) key on the wireless handset. After FCN is pressed, a screen that lists the features and the assigned keys appear. Press FCN again to display a second screen that lists more features and their assigned keys.

If a third-party application is assigned to a key, that information appears on the Feature list. For fixed feature keys supported by the handsets, see [Table 22 “Supported fixed feature keys” \(page 134\)](#). Keys not indicated are not supported.

Table 22
Supported fixed feature keys

Screen	Fixed feature key
First screen	1 Mute
	2 Hold
	3 Goodbye
	4 Directory
Second screen	5 Inbox
	6 Outbox
	7 Optional third-party application
	8 Optional third-party application
	9 Optional third-party application

If an OAI application is operational, a function key sequence is assigned in the OAI application configuration and overrides any function sequence established here. Therefore, FCN+7, FCN+8, or FCN+9 is a good choice for the OAI sequence.

Figure 7
WLAN Handset 2210



The WLAN Handset 2210/2211/2212 have the same button and screen layout.

Table 23 "IP Phone 2004 mapping to the WLAN Handset 2210/2211/2212" (page 136) lists how the keys of the IP Phone 2004 are mapped to key sequences on the wireless handsets.

Table 23
IP Phone 2004 mapping to the WLAN Handset 2210/2211/2212

IP Phone 2004 key	Feature	Wireless handset key sequence
1	Programmable	Line + 1
2	Programmable	Line + 2
3	Programmable	Line + 3
4	Programmable	Line + 4
5	Programmable	Line + 5
6	Programmable	Line + 6
Mute	Mute	Fcn + 1
Hold	Hold	Fcn + 2
Goodbye	Goodbye	Fcn + 3
Directory	Directory	Fcn + 4
Inbox	Inbox	Fcn + 5
Outbox	Outbox	Fcn + 6
Soft key	Programmable	Softkey A
Soft key	Programmable	Softkey B
Soft key	Programmable	Softkey C
Soft key	Programmable	Softkey D

WLAN Handset 2210/2211/2212 programming keys

The Line keys 1 to 6 on the WLAN Handsets are programmable by the end user. These Line keys can be programmed in the WLAN Handset in the same manner they are programmed on the IP Phone 2004.

Follow the steps in [Procedure 26 "Programming the keys on the WLAN Handset 2210/2211/2212" \(page 136\)](#) to program keys on the wireless handset.

Procedure 26 **Programming the keys on the WLAN Handset 2210/2211/2212**

Step	Action
1	Place the WLAN Handset in the idle state by pressing Power On/Start Call .
2	Press FCN + 3 . The WLAN Handset is in the Active (idle) state. The soft key display area is active but there is no dial tone.
3	Select the Line key to be programmed.

- 4 Enter the number and save the entry.

--End--

For information about using the wireless handset features, see *WLAN Handset 2210 User Guide* (NN43150-110), *WLAN Handset 2211 User Guide* (NN43150-120), *WLAN Handset 2212 User Guide* (NN43150-130), and *WLAN Handset 6120/6140 User Guide* (NN43150-100).

WLAN Handset 6120/6140

The WLAN Handset 6120/6140 emulates the IP Phone 2004. All IP Phone 2004 functions and messaging features are supported where possible.

The large screen area of the IP Phone 2004 and its numerous keys are mapped onto the smaller screen and fewer buttons of the WLAN Handsets. The button mapping from the IP Phone 2004 to the WLAN Handset was designed to preserve nearly all of the functionality of the IP Phone 2004 within a small, mobile device.

The line keys, numbered 1, 2, 3, 4, 5, and 6, to the left and right of the display screen of the IP Phone 2004 are mapped to the LINE button on the WLAN Handset. See [Figure 8 "WLAN Handset 6120" \(page 138\)](#) and [Figure 9 "WLAN Handset 6140" \(page 139\)](#).

Figure 8
WLAN Handset 6120

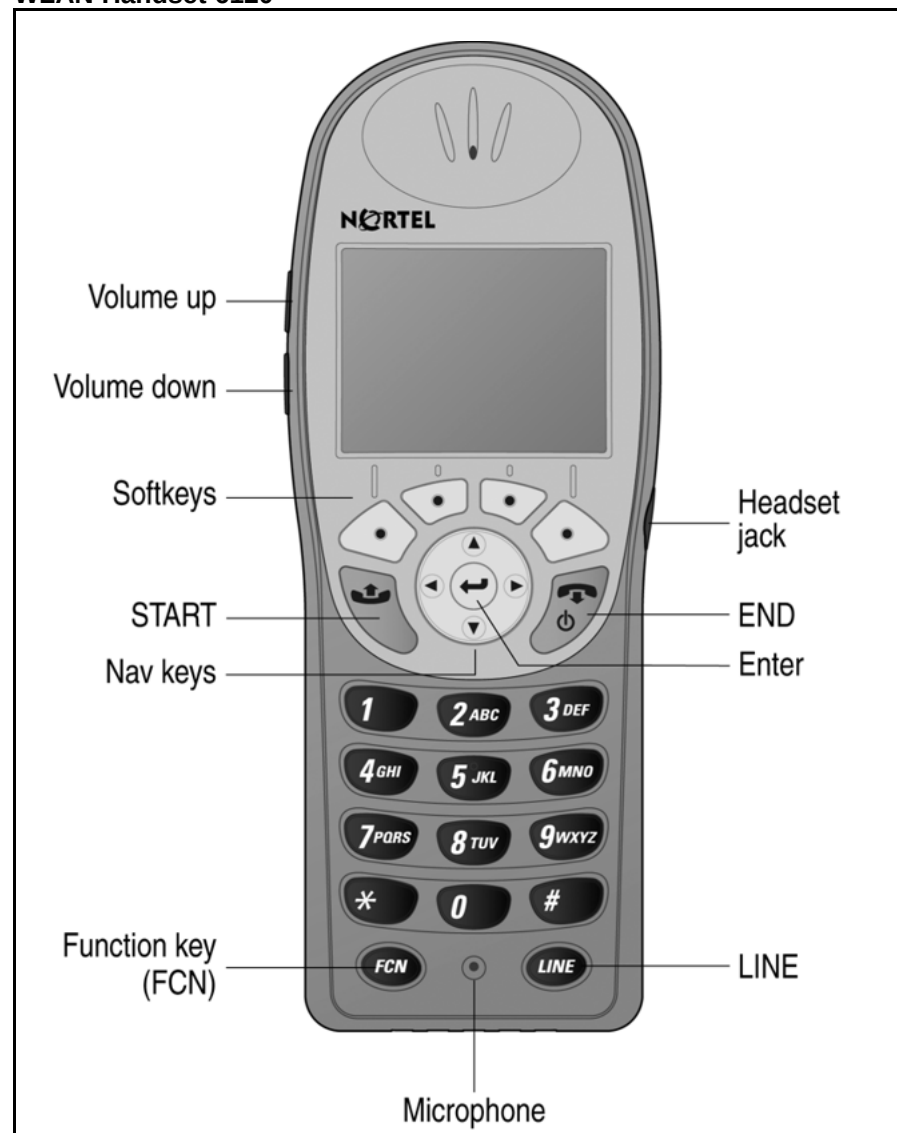
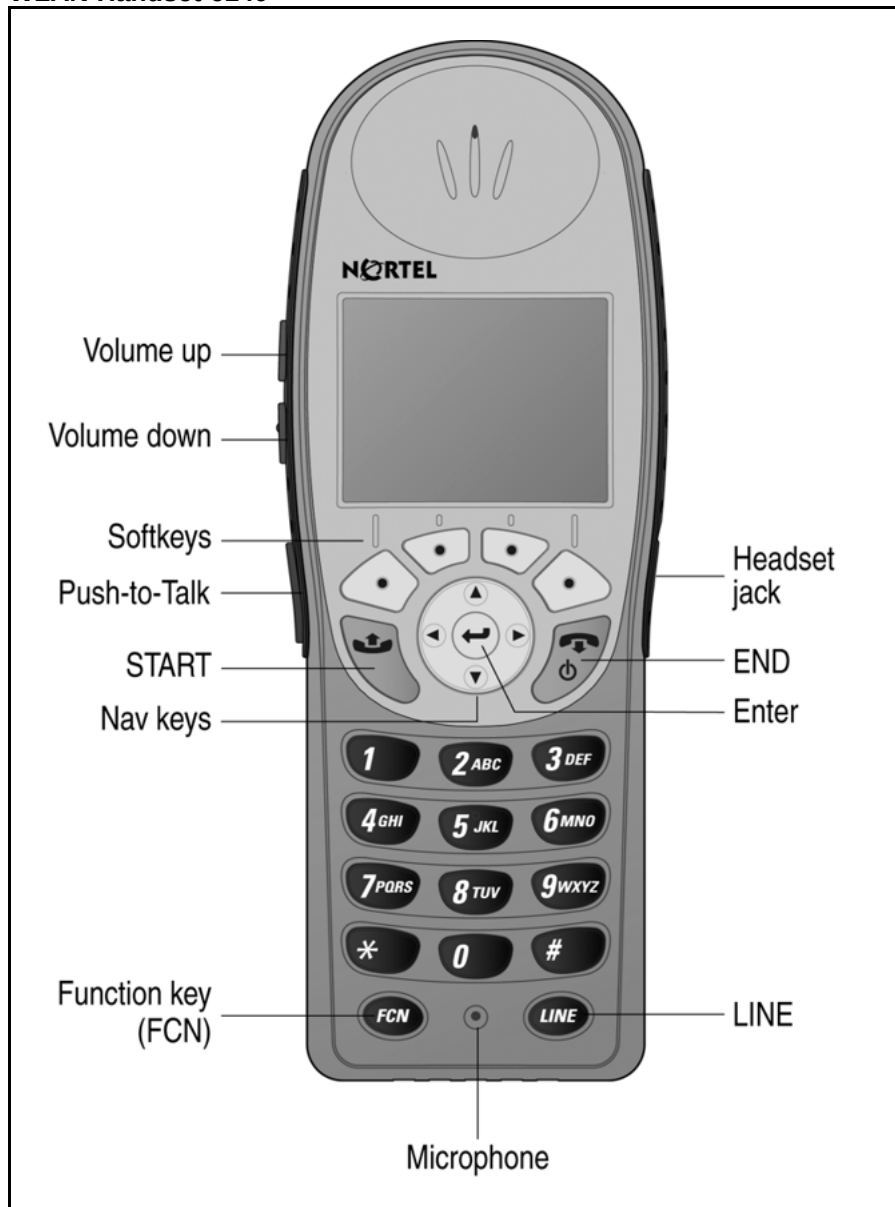


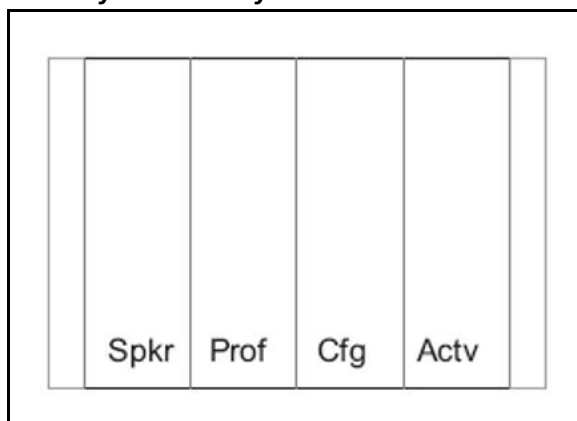
Figure 9
WLAN Handset 6140



Soft key assignment

Figure 10 "Soft keys in standby mode" (page 140) shows the soft keys that appear in standby mode.

Figure 10
Soft keys in standby mode



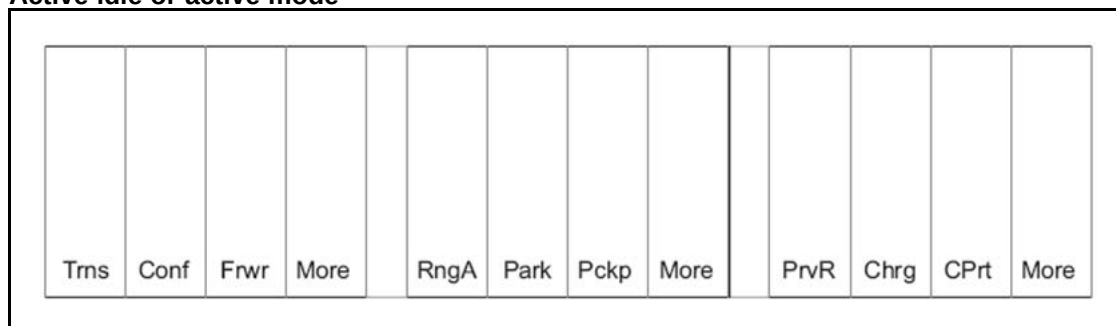
In the CS 1000, Call Server features include redial, speed-dial, and phonebook. These features are disabled in the WLAN Handset. Access such CS 1000 features through the Directory Services option on the Feature List. Press FCN on the WLAN Handset to display the Feature List.

Active idle mode and active mode

After you press the Actv soft key, the WLAN Handset enters the active idle mode. The soft keys that are programmed from the CS 1000 replace the standby-mode soft keys so you can access features while the WLAN Handset is still on-hook. The active idle mode times out if no keys are pressed. This same set of soft keys also appears when the WLAN Handset is off-hook or in a call.

[Figure 11 "Active idle or active mode" \(page 140\)](#) illustrates the active idle mode or active mode soft keys.

Figure 11
Active idle or active mode



When in active idle or active mode, press **FCN** to display the Feature List and soft keys that activate the following WLAN Handset features:

- **Spkr** (speaker)
- **Hold**

- **Mute**
- **Exit**

BCM standby mode

With the Business Communications Manager (BCM) Server, redial, speed-dial and phonebook are available in the handset and appear in the second set of soft keys. USB appears only during WLAN Handset configuration.

When more than four soft keys are available, left and right arrows appear, as illustrated by [Figure 12 "Soft key sets" \(page 141\)](#). Use the **NAV >** and **NAV <** keys to toggle between sets.

Figure 12
Soft key sets



BCM active idle mode

From standby, press Actv to enter the active idle mode. The Ftre (Feature) soft key provides access to programmed BCM system features while off-hook. Press keypad numbers to activate features just as you do on the IP Phone 2004.

BCM active mode

During a call, press FCN to display the Feature List and soft keys that activate the following WLAN Handset features:

- **Spkr** (Speaker)
- **Hold**
- **Mute**
- **Exit**

Feature assignment

Table 24 "IP Phone 2004 mapping to the WLAN Handset 6120/6140" (page 142) describes how the keys of the IP Phone 2004 are mapped to key sequences on the WLAN IP 6120 handset.

Table 24
IP Phone 2004 mapping to the WLAN Handset 6120/6140

IP Phone 2004 key	Feature	Handset key sequence	Display location
1	Line 1 (usually)	Line +1	Line menu
2	Programmable	Line +2	Line menu
3	Programmable	Line +3	Line menu
4	Programmable	Line +4	Line menu
5	Programmable	Line +5	Line menu
6	Programmable	Line +6	Line menu
Goodbye		Fcn +1	Feature list
Directory		Fcn +2	Feature list
Inbox		Fcn +3	Feature list
Outbox		Fcn +4	Feature list
Services		Fcn +5	Feature list
Quit		Fcn +6	Feature list
Copy		Fcn +7	Feature list
	[OAI]	Fcn +8	Feature list

ATTENTION

If an OAI is operational, up to four function key sequences are assigned in the OAI configuration and override any function sequence established here. Use unassigned key sequences (for example, FCN + 8, 9, #, *) for OAI access.

Accessing features on the WLAN Handset 6120/6140

Some features can be accessed and activated by pressing a soft key. Examples are Hold, Mute, Park, and Conference. Others are only available through the Line Menu or the Feature List.

If the IP environment permits, you can program the line keys 1 to 6 to

- lines—called line appearances
- features—called line features

Line Menu

While off-hook, press the LINE key to view the key labels for line appearances and line features. This list is updated whenever the CS 1000 Call Server updates the programmable key labels. To activate a line or a line feature, press the corresponding number key. Use the Nav buttons to scroll and select, use the LINE button to page between screens. Press the END key or the Cncl soft key to exit the Line menu.

Feature List

The IP Phone 2004 has several fixed feature keys. The CS 1000 implementation supports the features that are suitable to a mobile user through the Function (FCN) key on the WLAN Handset. After you press FCN, the display lists the features and the assigned key. Press the END key or the Exit soft key to exit the list.

Activate the fixed features on the off-hook WLAN Handset by pressing FCN + the assigned number key. You can also use the Nav keys to scroll through the items and activate the features on this list.

If an OAI application is assigned to a key, OAI information appears on the Feature List. For more information or for a list of features supported on the WLAN Handset, see [Table 24 "IP Phone 2004 mapping to the WLAN Handset 6120/6140" \(page 142\)](#).

Lock and unlock the keypad

Because there is no Lock soft key, you must lock the keypad with the Cfg soft key. Cfg + 1 locks the keypad and displays the Unlk soft key. Press Unlk+ # to unlock the keypad.

Programmable keys on the WLAN Handset 6120/6140

In certain IP environments, the Line keys 1 to 6 on the handsets are programmable by the end user. Program the Line keys on the WLAN Handset 6120/6140 in the same manner they are programmed on the IP Phone 2004. Follow the steps in [Procedure 27 "Programming the keys on the WLAN Handset 6120/6140" \(page 143\)](#) to program keys on the handset.

Procedure 27

Programming the keys on the WLAN Handset 6120/6140

Step	Action
1	From the Standby state, press the Actv soft key. The WLAN Handset is in the Active (idle) state. The soft key display area is active but there is no dial tone.
2	Press the Servcs soft key.
3	Choose the Program Key option and press the Select soft key.

The display lists the unused line buttons that are available to program. Use the up and down navigation buttons to scroll through this list.

- 4 Choose the line button that you want to program and press the **Set** soft key.
- 5 Follow the prompts to enter the information to program this button.

--End--

For information about using the WLAN Handset features, see *WLAN Handset 6120/6140 User Guide* (NN43150-100).

To record the function assigned to each programmed key, use a template similar to [Figure 13 "Programmed key map" \(page 145\)](#).

Figure 13
Programmed key map

<u>Feature</u>	<u>Key Press</u>
Transfer	FCN + _____
Forward	FCN + _____
Conference	FCN + _____
Camp on	FCN + _____
Redial	FCN + _____
Voicemail	FCN + _____
Flash	FCN + _____
Application mode	FCN + _____
_____	FCN + _____
_____	FCN + _____
_____	FCN + _____
_____	FCN + _____
_____	FCN + _____
_____	FCN + _____

Troubleshooting

This chapter contains information about the following topics:

- [“Access Point Problems” \(page 147\)](#)
- [“Wireless handset testing” \(page 148\)](#)
- [“Diagnostic Tools” \(page 149\)](#)
- [“Troubleshooting the handset” \(page 162\)](#)
- [“Dropped calls” \(page 163\)](#)
- [“Handset error messages” \(page 183\)](#)
- [“Before calling Nortel Technical Support” \(page 185\)](#)

Access Point Problems

Most, but not all, WLAN Handset audio problems have to do with AP range, positioning and capacity. Performing a site can isolate the AP causing these types of problems. If the WLAN Handset itself is suspected, conduct a parallel site survey with a WLAN Handset that is known to be properly functioning.

In-range/Out-of-range

Service is disrupted if a user moves outside the area covered by the WLAN. Service is restored if the user moves back within range. If the user moves out of the RF coverage area for a few seconds, audio will stop and an error message may be displayed (No SVP Response). The call can continue if the user moves back into coverage quickly.

Capacity

In areas of heavy use, the call capacity of a particular AP may be filled. If this happens, the user hears three chirps from the WLAN Handset. The user can wait until another user terminates a call, or move within range of another AP and try the call again. If a user is on a call and moves into an area where capacity is full, the system attempts to find another AP. Due to range limitations, this may be the same as moving out of range.

Transmission Obstructions

Before system installation, the best location for APs for optimum transmission coverage was determined. However, small pockets of obstruction might still be present, or obstructions could be introduced into the facility after system installation. This loss of service can be restored by moving out of the obstructed area or by adding APs.

Wireless handset testing

Verify proper registration and operation of each WLAN Handset by performing the following tests on each WLAN Handset in an active wireless area, as follows:

- To test the WLAN Handset 2210/2211/2212, follow the steps in [Procedure 28 "Testing the WLAN Handset 2210/2211/2212" \(page 148\)](#).
- To test the WLAN Handset 6120/6140, follow the steps in [Procedure 29 "Testing the WLAN Handset 6120/6140" \(page 148\)](#).

Procedure 28

Testing the WLAN Handset 2210/2211/2212

Step	Action
1	Turn on the WLAN Handset by pressing Power On/Start Call . A series of messages display as the WLAN Handset acquires the system. The WLAN Handset displays the user extension or displays dashes if no extension is programmed. Any error messages clear.
2	Press the Power On/Start Call key. The extension number is replaced by information from the Call Server and a dial tone is heard.
3	Place a call and listen to the audio quality.
4	End the call by pressing the Power Off/End Call key.
5	Place a call to the WLAN Handset and verify that ring, answer, clear transmit, and clear receive audio.
6	Use the FCN key to verify all programmed features on the WLAN Handset.
7	Press the Power On/Start Call key. Any line indicators turn off and the extension number display returns.
--End--	

Procedure 29

Testing the WLAN Handset 6120/6140

Step	Action
1	Turn on the wireless handset by pressing End . A series of messages display as the WLAN Handset acquires the system. The WLAN Handset displays the user extension or displays dashes if no extension is programmed. Any error messages clear.
2	Press the Start key. The extension number is replaced by information from the Call Server and dial tone is heard.
3	Place a call and listen to the audio quality.
4	End the call by pressing the End key.
5	Place a call to the WLAN Handset and verify that ring, answer, clear transmit, and clear receive audio.
6	Use the FCN key to verify the Features list.
7	Use the Line key to verify the Line appearances and Line Features list.
8	Press the End key. Any line indicators turn off and the extension number display returns.
--End--	

Diagnostic Tools

Run Site Survey, Diagnostics Mode, and Syslog Mode are provided to assist the WLAN administrator to evaluate the functioning of the WLAN Handset and the VoWLAN system. You enable these tools from the WLAN Handset Admin menu.

Run Site Survey for the WLAN Handset 2210/2211/2212

Site Survey is used to evaluate the facility coverage before certifying that an installation is complete. It can also be used at any time to evaluate coverage by testing signal strength, to gain information about an AP, and to scan an area to look for all APs regardless of ESSID. The information available through Site Survey includes:

- ESSID
- beacon interval
- information regarding support of various protocols and standards, as required
- current security configuration

When Run Site Survey begins, it is in single ESSID mode. Press the Any soft key to switch to all APs (regardless of ESSID) mode; the Any soft key changes to MyID. The display looks like the following in multiple AP mode:

111111 -22 33	444
111111 -22 33	444
111111 -22 33	444
111111 -22 33	444
MyID	Detl

where

111111 = last three octets of the ESSID for the discovered AP

22 = signal strength of the specified AP

33 = channel number of the specified AP

4444 = DTIM interval configured for the specified AP

MyID = soft key to toggle between single and any ESSID mode

Detl = soft key to toggle between summary and detail screens

Press the **Detl** soft key to view the details, as follows:

i:bbbb	sn	ch	bcn
eeeeeeeeeeee	DGHI		
rrrrrrrrrrrrrr	xxxx		
mmm	G:gggg	P:pppp	
Any			Smry

where

i = index of selected AP (range: 0-3)

bbbb = last three octets of the ESSID for a discovered AP

sn = signal strength in -dBm

ch = channel

bcn = beacon interval

eeeeeeeeeeee = ESSID (up to first 11 characters)

DGHI = standards supported

rrrrr = rates supported (example: 1b2b5b11b)

+ = more rates supported than displayed
 xxxx = WMM or UPSD if supported
 mmmm = security mode
 G:gggg = group key security
 P:pppp = pair-wise key security
 Any = soft key to toggle between single and multiple
 ESSID mode
 Smry = soft key to return to summary display

Run Site Survey for the WLAN Handset 6120/6140

Site Survey is used to evaluate the facility coverage before certifying that an installation is complete. It can also be used at any time to evaluate coverage by testing signal strength, to gain information about an AP, and to scan an area to look for all APs, regardless of SSID. The information available through Site Survey includes:

- SSID
- beacon interval
- information regarding support of various protocols and standards, as required
- current security configuration

When Run Site Survey begins, it is in single SSID mode. Press the Any soft key to switch to all APs (regardless of SSID) mode; the Any soft key changes to MyID. The display looks like the following in multiple AP mode:

111111 -22 33	444
111111 -22 33	444
111111 -22 33	444
111111 -22 33	444
MyID	Detl

where

111111 = last three octets of the SSID for the discovered AP

22 = signal strength of the specified AP

33 = channel number of the specified AP

4444 = DTIM interval configured for the specified AP

MyID = soft key to toggle between single and any SSID mode

Detl = soft key to toggle between summary and detail screens

The following display shows three APs configured with an SSID that matches that of the WLAN Handset. The first has a signal strength of -28dBm, and is configured on channel 2 with a beacon interval of 100 ms. The second has a signal strength of -48dBm, and is configured on channel 6 with a beacon interval of 200 ms. The third has a signal strength of -56dBm and is configured on channel 11 with a beacon interval of 100 ms.

ab7bc8 -28 02	100
2ae578 -48 06	200
2ae596 -56 11	100
Any	Detl

When you select any SSID mode, the summary display contains the first six characters of the APs SSID instead of the beacon interval, as shown in the following example.

ab7b -28 02	ALPHA
2ae5 -48 06	WSMTES
2ae5 -56 11	voice
Any	Detl

In detail mode, the display appears as follows. The left and right arrow keys move between AP indices.

i:bbbb sn ch bcn	
eeeeeeeeee DGHI	
rrrrrrrrrrrrrr+xxxx	
mmm G:gggg P:pppp	
Any	Smry

where

i = index of selected AP (value is from 0 to 3 inclusive)

bbbb = last three octets of the SSID for a discovered AP

sn = signal strength in -dBm

ch = channel

bcn = beacon interval

eeeeeeeeeeee = SSID (up to first 11 characters)
DGHI = standards supported
rrrrrr = rates supported—basic rates have a b following the rate
+ = more rates supported than displayed
xxxx = WMM or UPSD if supported
mmmm = security mode
G:gggg = group key security
P:pppp = pair-wise key security
Any/MyID = soft key to toggle between single SSID and multiple SSID mode
Detl/Smry = soft key to toggle between the multiple AP display (summary) and the single AP display (detail)

ATTENTION

Numbers racing across the WLAN Handset display indicate that AP information is being obtained. A Waiting message indicates that the system is not configured properly and the WLAN Handset cannot find any APs.

Diagnostics Mode

Diagnostics Mode evaluates the overall quality of the link between the handsets, the AP, and the infrastructure equipment (call server, WLAN IP Telephony Manager 2245, and gateways). Diagnostics Mode can be used when the handset is active.

When Diagnostics Mode is activated in the Admin menu, the WLAN Handset enters the diagnostic state. The WLAN Handset can display diagnostics any time it is on a call.

Pressing the Menu key displays a number of diagnostic counters. Five screens of counters can be displayed by pressing the Menu key to scroll through the following screens:

- Screen 1—displays counters for missed receive packets, missed transmit packets, receive retry count, and transmit retry count.
- Screen 2—displays jitter delta, last successful transmit data rate, and gateway type.
- Screen 3—displays a list of APs and some of their details.
- Screen 4—displays association and reassociation counts.
- Screen 5—displays security error count and sequence number for last security error.

After all the counters are displayed, the screen returns to the normal off-hook display.

The screen number appears on the top line of the screen.

Diagnostics Screen 1 displays the following information:

MissedRcvCnt	nnnnn
MissedXmtCnt	nnnnn
RxRetryCount	nnnnn
TxRetryCount	nnnnn

where

MissedRcvCnt is the missed receive packet count since power on.

MissedXmtCnt is the missed transmit packet count since power on.

RxRetryCount is the receive retry count since power on.

TxRetryCount is the transmit retry count since power on.

Diagnostics Screen 2 displays the following information:

Jitter	nnnnn
LastRate	nnnnn
GatewayType	mnemo

where

Jitter is the current delta from the desired jitter buffer depth, in microseconds.

LastRate is the last successful transmit data rate.

GatewayType is a mnemonic that indicates the gateway type. The mnemonic is one of the following.

SAWA2	All phones are rate limited to 2 Mb because an old 2 Mb handset is on the network (not applicable for the WLAN Handset 6120 and the WLAN Handset 6140)
2Mb	Old style 2 Mb (not applicable for the WLAN Handset 6120 and the WLAN Handset 6140)
11Mb	New style 11 Mb (for all WLAN Handsets)

Diagnostics Screen 3 displays a list of the APs that are heard, in the following format:

C : mmmm ch - ss	aid
1 : mmmm ch - ss	mnem

2 : mmmm ch - ss	mnem
3 : mmmm ch - ss	mnem

where

C is the AP currently in use.

1, 2, and 3 are the candidate APs.

mmmm is the hexadecimal number comprised of the last two octets of the AP MAC address.

ch is the channel number that the AP is configured on.

ss is the signal strength for the AP in dBm.

aid is the Association ID of the currently associated AP.

mnem is a mnemonic that indicates why the handset did not hand off. The mnemonic is one of the following.

Unkn	reason unknown
Weak	signal strength too weak
Rate	One or more basic rates not supported
Full	AP cannot handle bandwidth requirements
AthT	Authentication Timeout
AthF	Authentication Failure
AscT	Association Timeout
AscF	Association Failure
SecT	Security Timeout
SecF	Security Failure
Cnfg	Configuration error—AP is not configured correctly (check security, QoS mode, or network infrastructure)

Diagnostics Screen 4 displays the following information:

AssocCount	nnnnn
ReAssocCount	nnnnn
AsssocFailure	nnnnn
ReAssocFail	nnnnn

where

AssocCount is the association count since power on.

ReAssocCount is the reassociation count since power on.

AsssocFailure is the number of association failures since power on.

ReAssocFail is the number of reassociation failures since power on.

Diagnostics Screen 5 displays the following information:

Sec-ErrCount	nnnnn
LstSecErrSeq	nnnnn

where

Sec-ErrCount is the security error count since power on.

LstSecErrSeq is the MAC frame sequence number with the last security error.

Syslog Mode

A Syslog Server must be present on the network so that the WLAN Handset can send log messages and have them saved. The Syslog Server IP address can be configured using DHCP or statically configured.

If the Syslog Server address is blank (000.000.000.000 or 255.255.255.255) or the WLAN Handset is using DHCP and no option 7 is received from the DHCP server, the WLAN Handset cannot send any syslog messages.

Each syslog message includes the following:

- Date and time (to 1100th of a second) since the WLAN Handset was turned on (configured to January 1 00:0:00); requires an SNTP server
- WLAN Handset MAC address
- WLAN Handset IP address
- Sequence number
- plus, additional items, based on the message type, as shown in [Table 25 "Syslog message contents" \(page 157\)](#).

Message example:

Jan 1 00:01:26 0090.7a02.2a1b (172.16.0.46) [001a] RStat: AP 00:40:96:48:1D:0C (-56dBm), Sent 783523, Recvd 791342, MSnt 245, MRcd 5674, BSnt 43, BRcd 10783, TX drop 43 (0.0%), TX retry 578 (1.2%), RX retry 1217 (1.6%).

[Table 25 "Syslog message contents" \(page 157\)](#) contains the contents of the syslog messages.

Table 25
Syslog message contents

Syslog message	Contents
Failed Handoff (sent whenever the handset decided to hand off, but failed trying)	Failed AP MAC Failed AP signal strength Current AP MAC Current AP signal strength Failure reason
Successful Handoff	New AP MAC New AP signal strength Old AP MAC Old AP signal strength Reason for handoff Other candidate APs: • MAC • Signal strength • Reason not used
Security Error	AP MAC AP signal strength Security mode Error details (mode dependent)
Call Start	Call type (telephony, OAI, PTT) AP MAC AP signal strength
Call End	AP MAC AP signal strength

Table 25
Syslog message contents (cont'd.)

Syslog message	Contents
Audio stats	AP MAC AP signal strength Payload size (in ms) Payloads sent Payloads received Payloads missed (not received) Payloads missed rate (over last 5 seconds) Payloads late Payloads late rate (over last 5 seconds) Average jitter
Audio threshold exceeded (Sent if payloads missed rate or payloads late rate exceeds 2%, or if the average jitter is over 2 ms)	AP MAC AP signal strength Payload size (in ms) Payloads sent Payloads received Payloads missed (not received) Payloads missed rate (over last 5 seconds) Payloads late Payloads late rate (over last 5 seconds) Average jitter

Table 25
Syslog message contents (cont'd.)

Syslog message	Contents
Radio stats	AP MAC AP signal strength Directed packets sent Directed packets received Multicast packets sent Multicast packets received Broadcast packets sent Broadcast packets received TX dropped count TX drop rate (over last 5 seconds) TX retry count TX retry rate (over last 5 seconds) RX retry count RX retry rate (over last 5 seconds)
Radio threshold exceeded (Sent if TX drop rate exceeds 2%, or TX or RX retry rate exceeds 5%)	AP MAC AP signal strength Directed packets sent Directed packets received Multicast packets sent Multicast packets received Broadcast packets sent Broadcast packets received

Table 25
Syslog message contents (cont'd.)

Syslog message	Contents
	TX dropped count TX drop rate (over last 5 seconds) TX retry count TX retry rate (over last 5 seconds) RX retry count RX retry rate (over last 5 seconds)
VPN: Established IKE phase1 SA, renew in xs VPN: Established IKE phase2 SA yy:yy, renew in xs (a phase1 message follows the phase 2 message, sent whenever a phase 1 or phase 2 security association completes)	Expiration time and security association identifiers, if applicable. sx is the number of seconds yy:yy stands for the two eight-digit SA numbers for send and receive
VPN: phase2 Unexpected message VPN: phase2 Initiated by VN server VPN: phase2 INFO Delete payload	none

Table 26
Syslog reason codes

Reason code number	Meaning
0	OK
1	TOO FEW AVERAGE PROBES
2	WORSE SIGNAL
3	INVALID SSID
4	NO PARAMS FOUND
5	BAD RATES
6	OFF CHANNEL PROBE RESP
7	AP TOO BUSY
8	AUTH TIMEOUT
9	ASSOC TIMEOUT
10	FAILED AUTHENTICATION

Table 26
Syslog reason codes (cont'd.)

Reason code number	Meaning
11	FAILED ASSOCIATION
12	SOFT NEIGHBOR
13	NO SIG IMPROVEMENT
16	NO KEEPALIVE
17	LOST AUDIO
18	NO RESPONSE
19	NO PRIVACY
20	APP UNHAPPY
21	DISASSOCIATED
22	NO HANDOFF
23	HANDOFF
24	INITIAL ASSOC
25	LOST AP
26	TX FAILURES
27	CHANGING RATES
28	UNDEFINED
29	EAP START TIMEOUT
30	LEAP CHALLENGE TIMEOUT
31	EAP SUCCESS TIMEOUT
32	LEAP CHALLENGE RESPONSE TIMEOUT
33	NONCE CCKM TIMEOUT
34	RSNIE AP TIMEOUT
35	NONCE GTK TIMEOUT
36	EAPOL LOGOFF
37	EAPOL FAILURE
38	NO WPA ELEMENT
39	BAD MIC
40	BAD PROBE RESP
41	BAD CAP INFO AD HOC
42	ACTION TIMEOUT
43	FAILED ACTION

Table 26
Syslog reason codes (cont'd.)

Reason code number	Meaning
44	DELTS
45	QOS REQUIRED
46	CHANGED LISTEN INTERVAL

Troubleshooting the handset

WLAN Handsets can exhibit transmission problems in several ways. They can cease functioning properly, display error messages, or display incorrect data. When using and troubleshooting WLAN Handset, consider the following problem sources to determine the best method of approaching a specific situation.

Context

When troubleshooting a problem with a WLAN Handset, it is important to determine the context of when and where the problem occurred. Context includes the following:

- Was the WLAN Handset on an active call?
- Was the WLAN Handset moving or stationary?
- Was the WLAN Handset powering on or powering off?
- Was PTT being used?
- At what location did the problem occur?

Record this information and provide it to the system administrator or Nortel Technical Support.

No ring

It is possible in certain situations for a voice mail message to be left on a WLAN Handset without the WLAN Handset ever ringing. This situation could occur when a WLAN Handset is out of range of an AP for even a few seconds. If during the time the WLAN Handset were out of AP range and an incoming call was received, the incoming call receives the Call Forward No Answer (CFNA) treatment configured for that WLAN Handset, such as forwarding the incoming call to voice mail. To prevent this situation from occurring, ensure adequate AP coverage in all areas where a WLAN Handset can be used.

If you receive a call while you are in the Config menu, an icon flashes on the display screen but the WLAN Handset does not ring. To get the handset to ring, the WLAN Handset must be idle. Perform one of the following actions to return the WLAN Handset to the idle state

- Allow the Config menu to time out. The Config menu times out after 20 seconds of inactivity.
- Press End or Exit soft key to exit the Config menu.

Far-end echo

Sometimes, when using the G.711 codec, echo might be perceptible at the far end, and be more severe when the WLAN Handset is in an environment with extreme background noise and the WLAN Handset volume is configured to maximum volume.

To correct this problem, reduce the volume setting on the WLAN Handset. Alternatively, if experiencing this problem, consider using the G.729 codec.

Dropped calls

If calls are dropping, use the Site Survey mode of the WLAN Handset in the area where the problem occurred to determine if there is inadequate AP coverage in that area.

WLAN Handset status messages

WLAN Handset status messages provide information about the handset communication with the AP and Call Server. [Table 27 "WLAN Handset status messages" \(page 163\)](#) summarizes the status messages, in alphabetical order.

Table 27
WLAN Handset status messages

Message	Description	Action
3 chirps	WLAN Handset is not able to communicate with the best AP, probably because that AP has no bandwidth available.	None. This is only a warning. The call is handed-off to the best AP after it becomes available.
Address Mismatch	WLAN Handset software download files are incorrect or corrupted.	Download new software from the Nortel site. See "Software updates" (page 49) .

Table 27
WLAN Handset status messages (cont'd.)

Message	Description	Action
ASSERT xxx.c Line yyy (For WLAN Handsets 2210/2211/2212 only.)	The WLAN Handset has detected a fault from which it cannot recover.	Record the error information so that it can be reported. Turn the WLAN Handset off, and then on again. If the error persists, try registering a different WLAN Handset to this telephone port. If the error still persists, contact Nortel Technical Support and report the error.
Assoc Failed xxxxxxxxxxxx	x...x = AP MAC address Handset association was refused by the AP; displays the MAC of the failing AP.	Check the WLAN Handset and AP security settings. Ensure that the AP is configured per Configuration Note. Try another AP.
Assoc Timeout xxxxxxxxxxxx	x...x = AP MAC address Handset did not receive an association response from the AP; displays the MAC of the failing AP.	Check the WLAN Handset and AP security settings. Ensure that the AP is configured per Configuration Note. Try another AP.
Auth Failed xxxxxxxxxxxx	x...x = AP MAC address Handset authentication was refused by the AP; displays the MAC of the failing AP.	Check the WLAN Handset and AP security settings. Ensure that the AP is configured per Configuration Note. Try another AP.
Auth Timeout xxxxxxxxxxxx	x...x = AP MAC address Handset did not receive an authentication response from the AP; displays the MAC of the failing AP.	Check the handset and AP security settings. Ensure that the AP is configured per Configuration Note. Try another AP.
Bad Code Type xx Expected Code Type yy	xx, yy = software license types Handset software does not match the current handset license selection.	Download new software from the Nortel site. See "Software updates" (page 49) .

Table 27
WLAN Handset status messages (cont'd.)

Message	Description	Action
Bad Config	Some needed configuration parameter has not been configured.	Check all required WLAN Handset configuration parameters for valid settings.
Bad ESSID (For WLAN Handsets 2210/2211/2212 only.)	The WLAN Handset is configured for static ESSID (as opposed to Learn once or Learn always) and no ESSID is entered.	Enter an ESSID in the configuration settings or change to one of the Learn modes.
Bad SSID (For WLAN Handsets 6120/6140 only.)	The WLAN Handset is configured for static SSID (as opposed to Learn once or Learn always) and no SSID is entered.	Enter an SSID in the configuration settings or change to one of the Learn modes.
Bad Local ID	The value of the Phase 1 Local ID type entered in the handset through the menus or the Configuration Cradle is improperly configured.	Enter a valid ID value.
Bad Local ID Type	The Phase 1 Local ID type entered in the WLAN Handset through the menus or the Configuration Cradle is missing or invalid.	Enter a valid ID type. KEY ID is the only valid choice.
Bad Network IP	The value of the Remote Network IP address entered in the WLAN Handset through the menus or the Configuration Cradle is missing or invalid.	Enter a valid remote network IP address.
Bad Network Mask	The value of the network mask for the Remote Network entered in the handset through the menus or the Configuration Cradle is missing or invalid.	Enter a valid network mask.
Bad Payload Type	The VPN server is not accepting some of the parameters passed to it by the WLAN Handset. One common instance would be if two WLAN Handsets try to use the same Client IP address.	If the VPN Client IP address is statically configured, ensure that the address assigned to the WLAN Handset is unique. If using IKE Mode Config, ensure that the address entered in the VPN Server configuration for the WLAN Handset or user is unique.

Table 27
WLAN Handset status messages (cont'd.)

Message	Description	Action
Bad Phintl File	The WLAN Handset software download files are incorrect or corrupted.	Download new software from the Nortel site. See "Software updates" (page 49) .
Bad Program File	The WLAN Handset software download files are incorrect or corrupted.	Download new software from the Nortel site. See "Software updates" (page 49) .
Bad Preshared Key	The value of the preshared key entered in the WLAN Handset through the menus or Configuration Cradle is improperly configured.	Enter a valid preshared key value. For a Contivity VPN server, this is the password.
Bad Tunneled IP	The value of the VPN Client IP address entered in the WLAN Handset through the menus or the Configuration Cradle is configured for static IP and is missing.	Enter a valid client IP address.
Bad VPN Server IP	The VPN Server IP address entered in the WLAN Handset through the menus or the Configuration Cradle is invalid.	Enter the IP address of the VPN server.
(battery icon), Low Battery message, and beep Battery Low Battery Low	Low battery	In call: the battery icon displays and a soft beep is heard when the user is on the WLAN Handset and the battery charge is low. The Battery Low message indicates that the battery pack can be changed while the call is still in progress. For the WLAN Handsets 2210/2211/2212 only, do not press Power Off/End Call. Place the call on Hold or Park, quickly remove the discharged battery and replace with a charged battery, turn on the WLAN Handset and press Power On/Start Call to resume the call in progress.

Table 27
WLAN Handset status messages (cont'd.)

Message	Description	Action
		For the WLAN Handsets 6120/6140 only, do not press End. Place the call on Hold or Park, quickly remove the discharged battery and replace with a charged battery, turn on the WLAN Handset and press Start to resume the call in progress. Not in call: The battery icon displays whenever the battery charge is low. The message Low Battery and a beep indicate a critically low battery charge when the user is not on the WLAN Handset. The WLAN Handset does not work until the battery pack is charged.
Battery Failure	The battery pack is not functioning.	Replace the battery pack with a new or confirmed battery pack. Only the approved battery pack works.
Battery Failed	Battery pack is damaged or incompatible with the WLAN Handset.	Replace the battery pack with a new or confirmed battery pack. Only the approved battery pack works.
Can't renew DHCP yyy.yyy.yyy.yyy	y...y = DHCP server IP address DHCP server is not responding to the initial renewal attempt.	Configuration problem. Check the IP address configuration in the DHCP server.
Charging ...	The WLAN Handset is charging in the Desktop Charger.	No action needed.
Charge Complete	The WLAN Handset is now fully charged.	No action needed.
Checking Code	WLAN Handset is contacting the TFTP Server to determine if it has a newer version of software that should be downloaded.	None. This message should only last for approximately one second. If message remains displayed, turn off and contact Nortel Technical Support.
Checking DHCP IP	The WLAN Handset is retrieving DHCP information from the DHCP server.	None. This is for information only.

Table 27
WLAN Handset status messages (cont'd.)

Message	Description	Action
CRC Code Error	The software that is TFTP downloaded has a bad Cyclical Redundancy Code (CRC) check.	Try the download again. It is possible the software was corrupted during download. If the error repeats, check that the download image on the TFTP Server is not corrupted.
Code Mismatch!	The software loaded into the WLAN Handset is incorrect for this model of telephone.	Verify that the License Management value is correct. Replace the software image on the TFTP server with software that is correct for the WLAN Handset model.
DCA Timeout	The WLAN Handset has detected a fault from which it cannot recover, possibly due to a failure to acquire any network.	Turn the WLAN Handset off, and then on again. If the error persists, contact Nortel Technical Support and report the error.
DHCP Error (1-5)	DHCP Error 1	The WLAN Handset cannot locate a DHCP server. It tries every 4 seconds until a server is located.
	DHCP Error 2	The WLAN Handset has not received a response from the DHCP server to a request for an IP address. It retries until a DHCP server is found.
	DHCP Error 3	The server refuses to lease an IP address to the WLAN Handset . It keeps trying.
	DHCP Error 4	The DHCP server offered the WLAN Handset a lease that is too short. The minimum lease time is 10 minutes. One hour is the minimum recommended lease time. The WLAN Handset stops trying. Reconfigure the DHCP server and power-cycle the WLAN Handset.
	DHCP Error 5	Failure during WEP Key rotation process (proprietary failure).

Table 27
WLAN Handset status messages (cont'd.)

Message	Description	Action
DHCP Lease Exp yyy.yyy.yyy.yyy	y...y = DHCP Server IP address DHCP is not responding to renewal attempts. At least one renewal succeeded.	The WLAN Handset failed to renew its DHCP lease, either because the DHCP server is not running, or because the configuration is changed by the administrator. The WLAN Handset attempts to negotiate a new lease or display one of the DHCP errors (1-5).
DHCP NACK error yyy.yyy.yyy.yyy	y...y = DHCP Server IP address DHCP server explicitly refused renewal.	The DHCP lease currently in use by the WLAN Handset is no longer valid, which forces the WLAN Handset to restart. This problem should resolve itself on the restart. If it does not, the problem is in the DHCP server.
DL Not On Sector	The WLAN Handset software download files are incorrect or corrupted.	Download new software from the Nortel site. See “Software updates” (page 49).
DO NOT TURN OFF	The WLAN Handset is in a critical section of the software update.	None. Do not remove the battery or attempt to turn off the WLAN Handset while this message is displayed. Doing so can require the WLAN Handset to be returned to Nortel to be recovered.
Duplicate IP	The WLAN Handset has detected another device with its same IP address.	If using DHCP, check that the DHCP server is properly configured to avoid duplicate addresses. If using Static IP, check that the WLAN Handset was assigned a unique address.
Erase Failed	Download process failed to erase the memory in the WLAN Handset.	Operation retries but can eventually report the error int. error: 0F. Power cycle the WLAN Handset.

Table 27
WLAN Handset status messages (cont'd.)

Message	Description	Action
Erasing memory	The WLAN Handset has determined that a download should occur and is erasing the current software from memory.	None. When the progress bar fills the display line, the erase operation is complete. Do not turn the WLAN Handset off during this operation.
Error! [error details] (For the WLAN Handset 6120/6140 only)	A fatal software error is detected. All WLAN Handset operation is halted and any call is lost.	This message appears during the Halt on Error mode. To capture the error message, reboot the WLAN Handset and write down the information that is on the display.
Files Too Big	The WLAN Handset software download files are incorrect or corrupted.	Download new software from the Nortel site. See "Software updates" (page 49) .
Flash Config Error	WLAN Handset internal configuration is corrupt.	Perform the Restore Defaults operation from the administrator menu and reprogram, or reprogram using the Configuration Cradle.
Initializing	The WLAN Handset is performing a power-on initialization.	None. This is informational only.
Internal Err. # #	The WLAN Handset has detected a fault from which it cannot recover. OE=Error while writing the Flash (return handset to factory) OF = No functional code (contact Nortel Technical Support)	Record the error code so it can be reported. Turn the WLAN Handset off, and then on again. If error persists, try registering a different WLAN Handset to this telephone port. If error still persists, contact Nortel Technical Support and report the error.
Invalid ID Info	The VPN server did not recognize this user.	Make sure that the local ID (KEY ID) entered in the handset matches the key Id in the VPN server. For a Contivity VPN server, the local ID must match the user name.

Table 27
WLAN Handset status messages (cont'd.)

Message	Description	Action
Multiple SVP Svr yyy.yyy.yyy.yyy	y...y = WLAN IP Telephony Manager 2245 IP address Handset received responses from multiple WLAN IP Telephony Managers 2245; displays the IP address of one responding WLAN IP Telephony Manager 2245.	Happens if the WLAN Handset is reconfigured to use a different WLAN IP Telephony Manager 2245 and then powered-down before the previous server has had time to determine that the WLAN Handset is no longer connected to it. The problem should correct itself in about 30 seconds.
Must upgrade SW!	WLAN Handset software is incompatible with the software.	Download new software from the Nortel site. See "Software updates" (page 49) .
Net Busy xxxxxxxxxxxx	x...x = AP MAC address WLAN Handset cannot obtain sufficient bandwidth to support a call; displays the MAC of the failing AP.	Try call again later.
No DHCP Server	WLAN Handset is unable to contact the DHCP server.	Check that DHCP is operational and connected to the WLAN or use Static IP configuration in the handset.
No ESSID (For the WLAN Handsets 2210/2211/ 2212 only.)	Attempted to run the Site Survey application without an ESSID configured.	Let the WLAN Handset come completely up. Statically configure an ESSID in the Admin menu.
No SSID (For the WLAN Handsets 6120/6140 only.)	Attempted to run the Site Survey application without an SSID configured.	Let the WLAN Handset come completely up. Statically configure an SSID in the Admin menu.
No Func Code	WLAN Handset software download files are incorrect or corrupt.	Reconfigured the WLAN Handset to gain access to the WLAN and download new code.
No Host IP (Addr)	The WLAN Handset is configured for static IP (as opposed to use DHCP) and no valid host IP address (the wireless handset IP address) is entered.	Enter a valid IP address in the configuration settings or change to use DHCP.

Table 27
WLAN Handset status messages (cont'd.)

Message	Description	Action
No IP Address	Invalid IP address.	Check the IP address of the WLAN Handset and reconfigure if required.
No Net Access	Cannot authenticate/associate with AP.	Verify the AP configuration. Verify that all the WEP settings in the WLAN Handset match those in the APs.
No Net Found (For the WLAN Handsets 2210/2211/ 2212 only.)	This indicates any of the following:	
	No radio link	Verify that the AP is turned on.
	No ESSID—Autolearn not supported (or) incorrect ESSID	Verify the ESSID of the wireless LAN and enter or Autolearn it again, if required.
	AP does not support appropriate data ranges	Check the AP configuration against the AP Configuration Note.
	Out of Range	Try getting closer to an AP. Check to see if other WLAN Handsets are working within the same range of an AP. If so, check the ESSID of the handset.
	incorrect WEP settings	Verify that all the WEP settings in the WLAN Handset match those in the APs.
	Incorrect Security settings	Verify that all the Security setting in the AP.
No Net Found (For the WLAN Handsets 6120/6140 only.)	This indicates any of the following:	
	No radio link	Verify that the AP is turned on.
	No ESSID—Autolearn not supported (or) incorrect SSID	Verify the SSID of the wireless LAN and enter or Autolearn it again, if required.
	AP does not support appropriate data ranges	Check the AP configuration against the AP Configuration Note.

Table 27
WLAN Handset status messages (cont'd.)

Message	Description	Action
	Out of Range	Try getting closer to an AP. Check to see if other WLAN Handsets are working within the same range of an AP. If so, check the SSID of the handset.
	incorrect WEP settings	Verify that all the WEP settings in the WLAN Handset match those in the APs.
	Incorrect Security settings	Verify that all the Security setting in the AP.
No Net Found xxxxxxxxxxxx yy	x...x = AP MAC address yy = AP signal strength WLAN Handset cannot find a suitable AP; displays the MAC address and signal strength of the best nonsuitable AP found.	Check the AP and handset network settings, such as ESSID, (for the WLAN Handsets 2210/ 2211/2212), SSID (for WLAN Handsets 6120/6140), Security, Reg. domain, and Tx power. Ensure that the APs are configured per Configuration Note. Try Site Survey mode to determine a more specific cause.
No PBX Response	The WLAN Handset tried to send a message to the Call Server and failed to get a response.	Verify the Call Server is operational and connected to the network.
No Proposal	The WLAN Handset and the VPN server could not agree on a set of configuration parameters.	Check that the Diffie-Hellman group, phase 1 and phase 2 hashes, and the encryption algorithms configured on the WLAN Handset are acceptable to the VPN server.
No Reg Domain	Regulatory Domain not configured	Configure the Regulatory Domain of the handset.
No SVP IP	The WLAN Handset is configured for static IP (as opposed to use DHCP) and no valid WLAN IP Telephony Manager 2245 address is entered.	Enter a valid WLAN IP Telephony Manager 2245 IP address in the wireless handset configuration setting or change to use DHCP.

Table 27
WLAN Handset status messages (cont'd.)

Message	Description	Action
No SVP Response yyy.yyy.yyy.yyy	y...y = WLAN IP Telephony Manager 2245 IP address The WLAN Handset has lost contact with the WLAN IP Telephony Manager 2245.	This can be caused by bad radio reception or a problem with the WLAN IP Telephony Manager 2245. The WLAN Handset keeps trying to fix the problem for 20 seconds, and the message can clear by itself. If it does not, the WLAN Handset restarts. Report this problem to the system administrator if it keeps happening.
No SVP Server	WLAN Handset can't locate WLAN IP Telephony Manager 2245.	IP address configuration of WLAN IP Telephony Manager 2245 is wrong or missing.
	WLAN IP Telephony Manager 2245 is not working.	Check error status screen on WLAN IP Telephony Manager 2245.
	No LAN connection at the WLAN IP Telephony Manager 2245.	Verify WLAN IP Telephony Manager 2245 connection to LAN.
No SVP Server No DNS Entry	The WLAN Handset was unable to perform DNS lookup for the WLAN IP Telephony Manager 2245; server had no entry for WLAN IP Telephony Manager 2245.	The network administrator must verify that a proper IP address is entered for the WLAN IP Telephony Manager 2245 DHCP option.
No SVP Server No DNS IP	The WLAN Handset was unable to perform a DNS lookup for the WLAN IP Telephony Manager 2245; no IP address for DNS server.	The network administrator must verify proper DHCP server operation.
No SW Found	A required software component has not been properly identified.	Check that the WLAN Handset license type has a corresponding entry in the slink_cfg.cfg file. Check that the pd11ccc.bin and pi110003.bin entries exist under this type in the slnk_cfg.cfg.

Table 27
WLAN Handset status messages (cont'd.)

Message	Description	Action
No UNISlim DHCP	The WLAN Handset was unable to use DHCP to obtain the server information it requires to start up.	Verify the DHCP server configuration information. Verify network connectivity between the WLAN Handset and the DHCP server.
No VPN Server	The WLAN Handset could not find the VPN server.	Check that the value of the VPN Server IP address configured through the administration menu or the Configuration Cradle match the address of the VPN server.
Not Installed!	A required software component is missing.	Check that all required software files are on the TFTP Server, if over-the-air downloading is being used. If the error repeats, contact Nortel Technical Support.
Payload Malformed	The WLAN Handset could not understand an encrypted message from the VPN Server (or vice-versa). This is likely to be a mismatch in the security parameters such as preshared key, Diffie-Hellman group, hash and encryption algorithms.	Check the Diffie-Hellman group, the phase 1 and phase 2 hashes, and encryption configuration.
Press End Call	The call has ended.	Press the Power Off/End Call key to return to standby mode.
Restart Command	The WLAN Handset received a restart command from the Call Server.	None. The WLAN Handset automatically restarts in a few seconds.
RTP Open Failed	The handset was unable to open the requested RTP or RTCP socket.	Reboot the WLAN Handset. If the error repeats, contact Nortel Technical Support.
Select License	The correct protocol has not been selected from the license set.	Using the administrative menus, select one license from the license set to allow the WLAN Handset to download the appropriate software.
Server Busy	WLAN Handset is attempting to download from a TFTP Server that is busy downloading other devices and refusing additional downloads.	None. The WLAN Handset automatically retries the download every few seconds.

Table 27
WLAN Handset status messages (cont'd.)

Message	Description	Action
Server Unavailable. Restarting... (For the WLAN Handset 6120/6140 only)	An error caused the WLAN Handset to lose the call. It is trying to restart and return to standby mode.	Occurs during Restart on Error mode. The WLAN Handset is attempting to register with the PBX and resume normal operation. Error details are available through the Syslog Server and by download with the Handset Administration Tool.
SKT Open Failed	Socket open fail. Occurs when the WLAN Handset tries to connect to the call server, but there is not response. If resiliency is active, the WLAN Handset keeps trying.	If the call server is inoperative and resiliency is not active, or the WLAN Handset cannot locate a backup call server, turn off the WLAN Handset and repair the primary call server. Note that it is advisable to reconfigure the backup call server to be the primary call server if the repair is more time-consuming than the reconfiguration.
Storing Config	WLAN Handset is storing changes to WLAN Handset configuration.	None. Informational message only. The WLAN Handset can display this briefly following a configuration change or software download.
SVP Service Rej.	The WLAN IP Telephony Manager 2245 has rejected a request from the WLAN Handset.	The WLAN Handset restarts and attempts to reregister with the WLAN IP Telephony Manager 2245, which should fix the problem. Report this to the administrator if it keeps happening.
System Busy yyy.yyy.yyy.yyy (with busy tone)	y...y = SVP or GW IP Address Gateway or WLAN IP Telephony Manager has reached call capacity; displays the IP address of the gateway WLAN IP Telephony Manager 2245.	All call paths are in use; try call again in a few minutes.

Table 27
WLAN Handset status messages (cont'd.)

Message	Description	Action
System Locked (with busy tone)	WLAN IP Telephony Manager 2245 is locked. Gateway is locked.	Try call again later. System is locked for maintenance.
TFTP ERROR(x):yy	A failure has occurred during a TFTP software download. (x) = the file number that was being downloaded; yy = an error code describing the particular failure. Possible error codes are: • 01 = TFTP Server did not find the requested file. • 02 = Access violation (reported from TFTP Server). • 07 = TFTP Server reported No such user error. • 81 = File put into memory did not CRC. • FF = Timeout error. TFTP Server did not respond within a specified period of time.	Error code 01, 02 or 07—check the TFTP Server configuration. Error code 81—the WLAN Handset attempts to download the file again. For other messages, turn off the WLAN Handset, and then turn it on again to retry the download. If the error repeats, note it and contact Nortel Technical Support.
Too Many Errors	The WLAN Handset continues to reset and cannot be recovered.	Fatal error. Return WLAN Handset to Nortel.
Unknown xx:yy:zz	A phrase is missing from your phintl file.	Download new software from the Nortel site. See “Software updates” (page 49).

Table 27
WLAN Handset status messages (cont'd.)

Message	Description	Action
Updating Code	WLAN Handset is downloading new software into memory. The number icons at the bottom of the display indicate which file number is currently being downloaded. This message also displays a progress bar. When the progress bar fills the display line, the update operation is complete on that file.	None. When the progress bar fills the display line, the update operation is complete on that file. Do not turn off the WLAN Handset during this operation.
VPN Error: xxxx	The VPN server returned an information message with a code of xxx.	
Waiting	WLAN Handset has attempted some operation several times and failed. It is now waiting for a period of time before attempting that operation again.	None. The WLAN Handset is waiting for a specified period of time before attempting that operation again.
Watchdog Timeout	The WLAN Handset failed to hear from the Call Server within the watchdog timeout interval.	Verify the Call Server is operational and connected to the network.
Wrong Code Type	The software loaded into the WLAN Handset is incorrect for this model of WLAN Handset.	Verify that the license type is configured correctly. If the license type is correct, replace the software image on the TFTP server with the software that is correct for the WLAN Handset model.

Using Call Server overlay commands

The following sections provide information about Call Server overlay commands.

LD 32 IDU command

For the WLAN Handsets, the IDU command outputs the following specific information:

- Release code: RIs: 6 (2210), RIs: 7 (2211) or RIs: 8 (2212)
- NT Code: NTTQ4010 (2210), NTTQ5010 (2211) or NTTQ69AA (2212)

- Software Version has different format: <Version>.<Issue>
FWSW:097.059 (or later)
- The IP address is the alias IP address of the wireless handset that is provided by the WLAN IP Telephony Manager 2245. The MAC address is the MAC address of the WLAN Handset. In other words, the MAC address and the IP address are not related.

In the following example, 61 0 is an IP Phone 2004 and 62 2 is a WLAN Handset 2211.

```
.idu 61 0
I2004 TN: 061 0 00 00 V
TN ID CODE: i2004
ISET MAC ADR: 00:60:38:76:41:C7
ISET IP ADR: 192 .168 .010 .100
LTPS IP ADR: 047 .011 .214 .165
MANUFACTURER CODE: [NAME]
MODEL:
NT CODE: NT2K00GI
COLOR CODE: 66
RLS CODE: 0
SER NUM: 7641C7
FWSW VERSION: 0602B59
.idu 62 2
I2004 TN: 062 0 00 02 V
TN ID CODE: i2004
ISET MAC ADR: 00:90:7A:01:7E:47
ISET IP ADR: 192 .168 .010 .200
LTPS IP ADR: 047 .011 .214 .165
MANUFACTURER CODE: [NAME]
MODEL:
NT CODE: NTTQ5010
COLOR CODE: 66
RLS CODE: 7
SER NUM: 017E47
FWSW VERSION: 097.021
```

LD 32 STAT command

The WLAN Handsets are shown REGISTERED in the standby and active modes. In the following example, 61 0 is an IP Phone 2004 and 62 2 is a WLAN Handset 2211 in the standby mode.

```
.stat 61 0
IDLE REGISTERED 00
.stat 62 2
IDLE REGISTERED 00
```

LD 117 Inventory command

In the inventory report, the WLAN Handsets have a specific release code and NT code, similar to the IDU command output. In the following example, 61 0 is an IP Phone 2004 and 62 2 is a WLAN Handset 2211.

```
=> inv prt sets
Set inventory:
17 10 2003 8 17 21, 17 10 2003 8 17 22, 6
i2004, 61 00, i2004 NT2K00GI 66 0 7641C7, I2004 , 6000
i2004, 62 02, i2004 NTTQ5010 66 7 017E47, I2211 , 6502
```

LD 117 STIP command

The STIP command can be used for WLAN Handsets; however, the WLAN Handset alias IP address appears as the TERMIP in the command output, instead of physical IP address. In the following example, the 192.168.10.200 is an alias IP address assigned by the WLAN IP Telephony Manager 2245.

```
TN HWID STATUS HOSTIP TERMIP PORT
-----
0x600a 0000000000000003000907a017e476607 REG 47.11.214.165
192.168.10.200 0x1450
CAPS
-----
0x00000000
-----
codec bdwth(k) codecCaps desc
-----
4 190 0x00000000 1
3 190 0x00000000 1
17 47 0x00000001 1
value = 537232412 = 0x2005841C
```

For information about more CLI commands, see [“TPS CLI commands” \(page 180\)](#).

TPS CLI commands

The following sections describe TPS command line interface (CLI) commands.

dsetShow command

In the **dsetShow** command output, the WLAN Handsets have a specific Hardware ID. The alias IP address is output, not the physical wireless handset IP address.

In the following example, the IP Phone 2004 has an IP address of 192.168.10.100 and the WLAN Handset 2211 has an alias IP address of 192.168.10.200. The syntax of the Hardware ID is as follows:

- first two digits—Manufacturer Location. Manufacturer Location is 18 for the IP Phone 2004 and 30 for the WLAN Handset 2211.
- next six digits—Manufacturer Code. The Manufacturer Codes are defined as follows:
 - IP Phone 2004 Phase 1—006038
 - IP Phone 2004 Phase 2—000ae4
 - WLAN Handset 2210—00907a
 - WLAN Handset 2211—00907a
 - WLAN Handset 2212—00907a
- last two digits—Release Code. The Release Codes are defined as follows:
 - IP Phone 2004 Phase 1—0
 - IP Phone 2004 Phase 2—2
 - WLAN Handset 2210—0x06
 - WLAN Handset 2211—0x07
 - WLAN Handset 2212—0x08

```
-> dsetShow
TN IP Address Hardware ID TermType
-----
6004 192.168.10.100 180060387641c76600 i2004
600A 192.168.10.200 3000907a017e476607 i2004
value = 0 = 0x0
```

e2dsetShow command

The **e2dsetShow** command is used for the WLAN Handsets in the same manner as for the IP Phones.

isetCount and isetGet

Use the alias IP address of the WLAN Handsets in the expression string of the **isetCount** and **isetGet** commands, not the physical IP address. The following is an example of the **isetGet** output for the WLAN Handset 2211.

```
-> isetGet "IP == 192.168.10.200"
IP Address Type RegType State Up Time Set-TN Regd-TN HWID
FWVsn
-----
```

```
-----  
192.168.10.200 i2004 Regular online 0 00:12:00 062-02  
062-02 3000907a017e476607 097.021
```

```
UNIStimVsn SrcPort DstPort  
-----
```

```
2.6 5100 5000
```

isetReset and isetResetAll

The **isetReset** command can be used to reset the WLAN Handsets by specifying the WLAN Handset alias IP, not the physical IP address:

```
-> isetReset "192.168.10.200"  
value = 0 = 0x0
```

isetShow, isetShowByTN, and isetShowByIP

Similar to the **dsetShow** command, the WLAN Handset outputs its specific hardware ID (see **dsetShow**) and alias IP, not the physical IP address. The FW version has a different format <Version>.<Issue> in this output.

In the following example, the telephone with TN 062-02 is the WLAN Handset 2211.

```
-> isetShow  
Set Information  
-----  
IP Address Type RegType State Up Time Set-TN Regd-TN  
-----  
192.168.10.100 i2004 Regular online 4 22:59:22 061-00  
061-00
```

```
HWID FWVsn UNIStimVsn SrcPort DstPort  
-----  
180060387641c76600 0602B59 2.8 5100 5000
```

```
IP Address Type RegType State Up Time Set-TN Regd-TN  
-----  
192.168.10.200 i2004 Regular online 0 02:03:22 062-02  
062-02
```

```
HWID FWVsn UNIStimVsn SrcPort DstPort  
-----  
3000907a017e476607 097.021 2.6 5100 5000
```

umsKernalJobsShow and umsUpgradeAll

The umsKernalJobsShow and umsUpgradeAll commands cannot be used to monitor and originate hardware upgrades for WLAN Handsets since the WLAN Handsets are upgraded using a different mechanism without the help of the UMS subsystem. For information about how to monitor and originate the hardware upgrade, see the documentation for the TFTP server used by the WLAN Handsets.

umsPolicyShow and umsUpdatePolicy

The IP Phone 2004 policy used in these commands is not applicable to WLAN Handset, even though they are configured as IP Phones 2004 in the IP Line software. The WLAN Handsets are upgraded using a different mechanism without the help of the UMS subsystem.

usiLibTrace

The **usiLibTrace** utility can be used to monitor UNISlim messages from the WLAN Handsets by entering the alias IP address, not the WLAN Handset physical IP address.

```
-> usiLibTraceOn "192.168.10.200", 255, 255  
value = 0 = 0x0
```

Determining alias IP addresses

When diagnosing network problems, (for example, to ping the WLAN Handset), it is useful to know the mapping between the alias IP addresses as displayed by various Call Server commands and the physical IP address of the WLAN Handset. There is no single command that provides this information; however, the administrator can determine it in two ways:

1. If the wireless handset IP address is statically configured, the administrator can look at the IP address of the wireless handset using the Admin menu, which is available when the wireless handset is powered on. For more information, see ["WLAN Handset 2210/2211/2212" \(page 105\)](#).
2. After the WLAN Handset is operating and in standby mode, the administrator can look at the User Preferences menu to find the alias IP address of the WLAN Handset. For more information, see [Table 12 "Standby menu" \(page 91\)](#).

Handset error messages

[Table 28 "Handset error messages" \(page 184\)](#) shows error messages that appear on the liquid crystal diode (LCD) display of the WLAN Handsets.

Table 28
Handset error messages

Short	Error code	Description	Action
Assert	Assert Errors	The WLAN Handset detects possible network errors and cannot recover without configuration modification.	Verify the AP settings: data rates and fragmentation threshold. Use the Configuration Cradle to capture the assert error and then send the error to Nortel GNTS.
Code	Bad Code Type	The license management setting on WLAN Handset is incorrect.	Adjust the license management setting.
DHCP	DHCP Errors	A problem communicating with DHCP server exists.	Troubleshoot the DHCP server configuration and the network.
DHCP	Can't Renew DHCP	The DHCP server is not responding to a lease renewal attempt.	Troubleshoot the DHCP server configuration and the network.
Duplicate	Duplicate ID	Two WLAN Handsets are configured with the same IP address.	Configure a valid static IP address for the WLAN Handset. Check the DHCP configuration.
ESSID	Bad ESSID	The ESSID on the WLAN Handset does not match the SSID on the AP.	Configure the correct ESSID statically on the phone.
Flash Config	Flash Config Error	The internal configuration of the WLAN Handset is corrupt.	Restore the WLAN Handset defaults and enter the configuration information.
No Net	No Net Found	The ESSID on the WLAN Handset does not match the SSID on the AP.	Configure the correct ESSID statically on the WLAN Handset.
No Net	No Net Access	The security settings on the WLAN Handset do not match the security settings on the AP.	Check the AP security settings and configure the security settings for the WLAN Handset to match.
PBX	No PBX	The WLAN Handset is not communicating with the PBX.	Check the cross connects, bridge clips, punch downs on demarcation block, amphenol tail and PBX (see if the extension is built correctly).

Table 28
Handset error messages (cont'd.)

Short	Error code	Description	Action
SVP	No SVP Response	The WLAN Handset cannot communicate with the WLAN IP Telephony Manager 2245.	Configure the Ethernet switch port and SVP to 100/full. Forward the DHCP option 151 to the IP of the WLAN IP Telephony Manager 2245. Verify the settings on the AP. Verify that there is no 2.4Ghz interference of any kind.
SVP	No SVP IP	No static IP entered into the WLAN Handset for the WLAN IP Telephony Manager 2245.	Check for a valid IP in the WLAN Handset. Check the license management configuration. Compare a working WLAN Handset code to the nonworking phone code.
SW	No SW Found	No WLAN Handset code is found on the TFTP server.	Point the TFTP software to the correct directory that contains valid code.
System	System Locked	The WLAN IP Telephony Manager 2245 is locked.	Dial in and verify that system is locked. Soft reset the Nortel WLAN Handset 6120/6140 infrastructure through the menu system.
TFTP	TFTP Errors	A failure occurred during the TFTP hardware update.	Check the TFTP software (SolarWinds is not compatible). Check the TFTP configuration. Forward option 66 in the DHCP scope, to the IP address of the TFTP server.

Before calling Nortel Technical Support

To facilitate the handling of the call, obtain the following information and have it available when placing a call to Nortel Technical Support:

- hardware versions on the wireless infrastructure, such as the APs
- pre-installation Site Survey, including typical network information and the wireless Site Survey information from the Site Survey tool such as the Nortel Site Survey Tool
- paper-based layout of AP placement

- a more refined Site Survey of the area having issues using the wireless handset in Site Survey mode
- list of the PBX and LTPS software versions, including a list of patches
- WLAN IP Telephony Manager 2245 and handset hardware versions
- WLAN IP Telephony Manager 2245 configuration menu screen captures
- any error messages displayed in the Error Status screen of the System Status Menu of the WLAN IP Telephony Manager 2245
- any error messages displayed on the WLAN Handset display screen
- content of the Syslog Server (if using)
- log of the DHCP Server (if available), if using DHCP

For more information about troubleshooting WLAN Telephony installations, see *WLAN IP Telephony Installation and Commissioning (NN43001-504)*.

Appendix

QoS Migration

WMM Standards-Based and Cisco CCXv4 QoS support is now available for use instead of SVP-based QoS. To ensure quality voice over the WLAN several QoS mechanisms are used to prioritize voice audio and control packets:

- Voice & control packets prioritized, for prompt packet delivery to ensure low latency
- Admission control, which allows a set number of WLAN Handsets to use a single AP
- Timed packet transmissions, to ensure long battery life and quality audio

Currently, SVP QoS implements these three features in a proprietary manner with the WLAN IP Telephony Manager 2245 but can now be preformed through Wi-Fi Standards- Based QoS or Cisco CCX.

It is anticipated that many existing WLAN IP Telephony Manager 2245 wireless handset users will continue to use the proprietary SVP implementation; some customers may choose to migrate to WMM or CCX. This document articulates many issues to be aware when considering a migration from SVP to WMM or to CCX.

The number of WLAN Handset in call in each mode is shown for two Polycom VIEW certified WLAN infrastructures, in the following table:

Cisco 4400 VIEW WLAN	Trapeze VIEW WLAN
12 (802.11b/g with SVP) 12 (802.11b/g with WMM-AC) 8 (802.11b/g with CCX) 12* (802.11a with SVP) 12 (802.11a with WMM-AC) 9 (802.11a with CCX)	12 (802.11b/g with SVP) 10 (802.11b/g with WMM-AC) 12 (802.11a with SVP) 9 (802/11a with WMM-AC)

* = Maximum WLAN Handsets tested in call using 802.11a

The maximum number of supported WLAN Handsets in call on one AP, in the above table, indicates WLAN Handsets using the highest data rates for the technology (802.11b, 802.11g, 802.11a, SVP, WMM and CCX). The maximum number of WLAN Handsets per AP will vary by WLAN manufacturer and is affected by configuration parameters and software versions operating on the WLAN infrastructure. Refer to the Polycom VIEW Program for details on the particular AP model and software version being run at the site that is planned for migration.

New R3.0 features are available to implement, using the existing SVP QoS mechanism. These features include support for WPA2-Enterprise 802.1X authentication mechanisms PEAPv0 and EAP-FAST. These new authentication types require the use of a RADIUS authentication server to validate user specific credentials. Please be aware that WLAN SSID's can only support one security method each. Therefore, if an existing deployment is utilizing WPA-PSK authentication and it is desired to migrate to a deployment using WPA2-Enterprise 802.1X authentication it will be necessary to either migrate all handsets at once after reconfiguring the existing SSID or to create a new SSID that is configured for WPA2-Enterprise 802.1X that the handsets can be migrated onto. Be aware that security types will need to be considered in conjunction with the desired QoS method if they are both being changed during the migration period. Refer to the Migration Considerations section below for details on QoS migration options.

All PEAP implementations utilize certificates with the Polycom implementation supporting server side certificates. All handsets utilizing PEAP will need to have the server's certificate loaded on the handset to allow for server authentication by the client during the TLS (Transport Layer Security) tunnel setup. Certificates support range in size from 512 to 4096 with the recommended certificate size being 512 or 1024 only. Larger certificate sizes will result in significantly longer network acquisition times by the handset while it processes the certificate. Certificates must be loaded on the handset via the HAT (Handset Administration Tool) Software with the use of a dual charger configuration cradle.

All EAP-FAST implementations will utilize PAC files and provide similar functionality as PEAP certificates. User name and password credentials will be sent in an encrypted state after the negotiation of an authentication tunnel between the handset and the RADIUS server. PAC files can be loaded onto handsets in two different ways, either via the HAT (Handset Administration Tool) Software or via EAP-FAST phase 0 provisioning. Phase 0 provisioning is not a secure method for deploying EAP-FAST but does allow for the quick deployment of PAC files to handsets configured for EAP-FAST.

Migration considerations

SVP QoS controls how many WLAN Handsets can be in call on one AP. This parameter (WTs/AP) is adjustable and is often set to a lower value of 7 or 8 than what is indicated as actual maximums in the VIEW configuration guides. This allows some WLAN Handsets to be near the AP at the highest data rate and other WLAN Handsets to be at the fringe of coverage at lower data rates.

The WMM and CCX standards use a different strategy to define and limit the number of WLAN Handsets using one AP when in call only when WMM-AC (Wi-Fi Multi-Media Admission Control) is enabled on the WLAN supporting the WLAN Handsets. The WLAN Handset will generate a TSPEC (Traffic Specification) request to the AP that will reserve bandwidth for the WLAN Handset. Each AP will calculate the total amount of bandwidth available to determine whether a client TSPEC request will be accepted or rejected.

QoS methods for SVP and Standards-Based do not co-exist well. There is no way for the two QoS types to be aware of each other and will not take into account how many WLAN Handsets are using the other QoS mechanism for a same AP. A single AP can be over-subscribed with a number of SVP WLAN Handsets and WMM or CCX WLAN Handsets using the same AP. In this case, all WLAN Handsets on that particular AP may suffer with poor audio. It is important to consider capacity when designing a migration strategy. No two sites or locations are alike, so each will require investigations into system usage and validation of expected system usage in environments where mixed QoS methods will be used during migration. It is important to consider data traffic that may be present on the same 802.11 radio type as well, as this will also affect the overall available throughput for each WLAN Handset and may result in a significantly lower number of calls per AP.

The official position is that these different technologies (SVP and WMM or CCX) cannot co-exist on the same 802.11 radio nor is doing so supported. One of the major components of the migration strategy is to migrate from one QoS method to the chosen new method quickly (to minimize the issues that may occur when these two QoS methods co-exist) and may include implementation strategies which are designed to limit or further restrict the number of WLAN Handsets in call on a single AP.

It is likely that some or all WLAN Handsets will experience poor audio at times during the migration period because of the possibility of a single AP being over-subscribed by too many WLAN Handsets in call.

To minimize poor audio as a result of the migration in progress consider the following:

- Quickly migrate all WLAN Handsets in the facility to prevent overlapping QoS methods
- Migrate one half the WLAN Handsets assigned to each area
 - Then reduce the SVP WTs/AP value while the remaining WLAN Handsets are configured

Once the migration is complete and all WLAN Handsets use the new QoS method (WMM or CCX), the WLAN IP Telephony Manager 2245 can be powered off and removed from the network. Be aware that with the removal of the WLAN IP Telephony Manager 2245 it will no longer be necessary to utilize alias IP addressing, even for VoIP protocols that previously required alias IP addressing. By using standards-based QoS, the WLAN Handset no longer has to proxy its traffic through the WLAN IP Telephony Manager 2245 and can instead communicate directly with the Call Server.

Migration equipment requirements

The following system equipment and items may prove useful during the migration planning.

- A WLAN which is fully compliant with Wi-Fi Alliance interoperability testing and the IEEE 802.11-2007 standard for WMM
 - This includes full functionality for voice priority, admission control and power save packet transmissions for improved battery life as part of the WMM standard
 - Polycom VIEW WLAN certification guidelines help identify these WLANs and provide WLAN configuration details

For more information, see www.polycom.com.

- Configure a new WLAN SSID (WMM or CCX) for the current release WLAN Handsets to use
 - Use the same VLAN, if possible, as the existing voice VLAN, so that WLAN Handset packets have access to the PBX and any other required network resources
 - Depending on the WLAN vendor, it is often possible to configure a new SSID but continue utilizing the same voice VLAN for the WLAN Handsets.
- Compatible WLAN Handsets (6120/6140)

- Those which can use 802.11a/b/g technology are able to use SVP, WMM or CCX
- Load the latest software on the WLAN Handsets through TFTP or the configuration cradle
- Obtain and use the latest Handset Administration Tool (HAT) software and handset cradle to configure the WLAN Handsets, load security PAC or Certificate depending on security mechanism chosen, load WLAN Handset software, etc.
 - The WLAN Handset needs to be power-cycled to pick up its new parameters
- WLAN IP Telephony handset cradles are used to easily configure the WLAN Handset
 - Multiple handset cradles can be used to migrate more than one WLAN Handset at a time
 - Multiple handset cradles can be used to migrate more than one WLAN Handset at a time
 - With the correct model WLAN Handset it could be as simple as:
 - Placing the WLAN Handset in the cradle
 - Ensure the proper software code version is loaded on the WLAN Handset
 - It may be useful to load all WLAN Handsets with new code before the migration
 - Updating the TFTP server with new code will update all WLAN Handsets when they power cycle
 - Individual WLAN Handsets may be updated by using the cradle and HAT
 - Change the applicable parameters to the new QoS method (WMM or CCX)
 - Configure new SSID (if changing)
 - Choose WMM or CCX
 - Choose network DSCP values (these should match configured LAN DSCP tags)
 - Load security PAC file or Certificate file, if new security methods are being used
 - Note that certificates must be in the “.der” format in order to be read by the WLAN Handset
 - All other appropriate network parameters or individual phone configuration options such as PTT, OAI, or Syslog

- Write the parameters back to the WLAN Handset
 - Power cycle the WLAN Handset
 - Place the WLAN Handset back in service
- Once all WLAN Handsets are done, disable old WLAN SSID and turn off WLAN IP Telephony Manager 2245

Migration caveats

This section details many of the issues to be aware of and tasks to do during migration.

1. Replace any wireless handsets which do not support current release features.
2. Load new software to all wireless handsets before migration begins
 - a. Handsets configured for SVP will retain this configuration when upgraded software and will continue to operate normally in the SVP environment
3. Configure WLAN with new SSID for WMM or CCX QoS mechanism
 - a. Reference the appropriate WLAN configuration guide
 - b. Determine proper DSCP values to use for in call and voice control packets
 - i. Example: in call = 46; control = 26
4. Develop a migration plan before migration steps begin
 - a. Migration plans should include but are not limited to:
 - i. Expected maintenance windows
 - ii. Authentications requirements if changing to 802.1X authentication
 - Per user authentication (each user authenticates with their individual user credentials)
 - Handset specific user creation (each handset has its own unique user credentials)
 - Certificate or PAC file provisioning needs
 - iii. Impacts on other WLAN clients
 - If enabling WMM on a specific radio type all clients will need to checked for compatibility with the chosen QoS method
 - iv. Rollback requirements if impacts are undesirable
5. Decide how to implement the migration plan:
 - a. Migrate all wireless handsets at once, in the shortest possible time

- i. Have users bring their wireless handset to a common area for upgrade or
- ii. Gather several wireless handsets to upgrade then return them when done
- iii. Send several engineers, each with a configuration cradle and laptop, to different areas of the facility to do the upgrade
- iv. Once each wireless handset is done power it off so the AP near the cradle migration area is not over-subscribed
- v. Continue until all wireless handsets are done
- vi. Deliver handsets back to the user and turn on handset
- vii. Turn off and remove the WLAN IP Telephony Manager 2245
- viii. Disable and delete the old WLAN voice SSID
 - If other handsets (i640, e/h340) are to remain active in the environment do not disconnect the WLAN IP Telephony Manager 2245
- b. OR Reconfigure one half of all wireless handsets in each area
 - i. Once each wireless handset is done power it off so the AP near the cradle migration area is not over-subscribed
 - ii. When done with one half of all wireless handsets reduce the SVP calls per AP parameter to half its current value
 - iii. Reconfigure the remaining wireless handsets
 - iv. Deliver handsets back to the user and turn on handset
 - v. This may allow the migration to be staged over a few days
 - vi. Turn off and remove the WLAN IP Telephony Manager 2245
 - If other handsets (i640, e/h340) are to remain active in the environment do not disconnect the WLAN IP Telephony Manager 2245
 - vii. Disable and delete the old WLAN voice SSID

Summary

Migration from an SVP QoS solution to either standards-based QoS or Cisco CCXv4 has the potential to create undesirable behavior in a production environment unless careful planning is made for migrating handsets.

With the availability of different authentication methods and QoS types the wireless handsets have become considerable more complex in the number of different combinations for deployment that are possible.

For example, existing handsets can be upgraded and retain their SVP QoS and existing security configurations without any negative affect. Alternatively, an administrator may choose to implement WPA2-Enterprise 802.1X security authentication methods but retain the SVP QoS method. Or the QoS mechanism may be changed to standards based WMM and retain WPA-PSK security. Many different combinations and scenarios are possible and it would be impossible to test them all.

At this point it is possible to begin mixing and matching features to customize a deployment to meet the needs of the end users. The limitations for combinations are limited only to the business and end user needs an administrator must meet. But always keep in mind that it is not possible to mix security types within a specific SSID³ nor should QoS methods be mixed on a specific WLAN radio type.

Appendix

Factory Defaults

This appendix provides the factory default configuration that is restored if you select the Restore Defaults menu option.

Items with an asterisk (*) beside them are minimum requirements for functionality after selecting the Restore Defaults option:

- Configure the SSID to an available access point (AP).
- Configure the Reg Domain to 01.

Table 29
Factory default configuration for the WLAN Handset 6120/6140

Admin menu option	2nd level	3rd level	4th Level	Default
Phone Config	Language			English
	Telephony Protocol			Type 032
	Push-to-Talk			Enable
		Allowed Channels		[All]
		Priority Channels	Name Channel	Off
	Time Zone			GMT
	Daylight Saving			DST No Adjust
	Protected Spd Dial			[None set]
	Password			Enable
	Set Terminal Type			i2004
	Startup Keylock			Disable
	Speakerphone			Enable

Admin menu option	2nd level	3rd level	4th Level	Default
	OAI			Disable
Network Config	IP Addresses			Full DHCP
	SSID*			[None set]
	Security			None
		[If Security set]		
		WEP	Authentication	[If selected:] Open System
			WEP	Off
			Key Information	[None set]
			Rotation Secret	[None set]
		WPA2-PSK	Pre-Shared Key	[None set]
		WPA-PSK	Pre-Shared Key	[None set]
		Cisco FSR	User name Password	[None set]
	Reg. Domain*			[None set]
		[If set]		b and b/g mixed
		Transmit Power		30 mW <15dBm>
Diagnostics	Run Site Survey			[n/a]
	Diagnostics Mode			Disable
	Syslog Mode			Disabled
	Error Handling Mode			Restart on Error
Restore Defaults				

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