Hillrom™

Welch Allyn RetinaVue® 700 Imager
Welch Allyn Connex® Spot Monitor, and
Welch Allyn Connex® Vital Signs Monitor

Wireless Best Practices Overview

For patent information, please visit welchallyn.com/patents.

For information about any Welch Allyn product, or to contact your nearest Welch Allyn representative, visit welchallyn.com/about/company/locations.html.

DIR 80023689 Ver. B
Revised 2019-07

Welch Allyn, Inc.
4341 State Street Road
Skaneateles Falls, NY 13153 USA

www.welchallyn.com
hillrom.com

EC REP
Regulatory Affairs Representative
Welch Allyn Limited
Navan Business Park
Dublin Road, Navan
County Meath, Republic of Ireland

Contents

1 Introduction

About this Document

This document provides wireless configuration requirements and supported settings for the Welch Allyn radio installed in the Vital Signs medical devices and ophthalmic camera listed in Section 2. Please refer to product specific documentation for configuration and setup information.

Implementation and maintenance of a stable and usable integrated network is the sole responsibility of the customer. Welch Allyn recommends that an analysis per IEC 80001-1:2010 be conducted to determine if any issues exist that should be mitigated to ensure patient safety.

Welch Allyn wireless connected devices utilize 2.4GHz and 5GHz, 802.11a/b/g/n standards-based communications protocols.

2 Supported Devices and Radio Versions

Supported Devices Overview

This document is intended for the following medical devices using the Wi-Fi Laird WB45NBT Qualcomm Atheros AR6003 chipset, Linux kernel 4.4.97 and later, and Welch Allyn radio software versions 2.00.01 and later.

- RetinaVue 700 Imager (RV700) version 1.00.00, radio version 2.00.02 and later
- Connex Spot Monitor (CSM) version 1.41.00, radio version 2.00.02 and later
- Connex Vital Signs Monitor (CVSM) version 2.40.01, radio version 2.00.01 and later

Note For devices using older radio hardware and software versions, please visit the following link: welchallyn.com/networkbestpractices
Click on **Welch Allyn Connex Network Installation Best Practices Overview**.

Supported Wireless Specifications

Security: Supported Authentication/Encryption

RetinaVue 700 Imager Authentication/Encryption

- WPA2 Personal - 64 hex-digit key / 8-63 character ASCII passphrase
- WPA2 Enterprise 802.1x Extensible Authentication Protocol (EAP) –TKIP not supported by default. Mixed mode may be configured.
  - Types: PEAP-MSCHAPv2, EAP-TLS

Connex Spot Monitor Authentication/Encryption

- Open
- WEP (Wireless Equivalent Privacy) – 64 or 128 Key lengths (40-bit or 104-bit)
- WPA/WPA2 (Wi-Fi Protected Access) – Temporal Key Integrity Protocol [TKIP, RC4 Algorithm and/or Advanced Encryption Standard (AES) CCMP Protocol]
- WPA Personal – 64 hex-digit key / 8-63 character ASCII passphrase
- WPA Enterprise 802.1x Extensible Authentication Protocol (EAP)
  - Types: EAP-TLS, EAP-TTLS, PEAP-MSCHAPv2, PEAP-GTC, PEAP-TLS, EAP-FAST
- WPA2 Personal – 64 hex-digit key / 8-63 character ASCII passphrase
- WPA2 Enterprise 802.1x Extensible Authentication Protocol (EAP)*
  - Types: EAP-TLS, EAP-TTLS, PEAP-MSCHAPv2, PEAP-GTC, PEAP-TLS, EAP-FAS

Connex Vital Signs Monitor Authentication/Encryption

- Open
- WEP (Wireless Equivalent Privacy) – 64 or 128 Key lengths (40-bit or 104-bit)
- WPA/WPA2 (Wi-Fi Protected Access) – Temporal Key Integrity Protocol [TKIP, RC4 Algorithm and/or Advanced Encryption Standard (AES) CCMP Protocol]
- WPA Personal – 64 hex-digit key / 8-63 character ASCII passphrase
- WPA Enterprise 802.1x Extensible Authentication Protocol (EAP)
- Types: EAP-TLS, EAP-TTLS, PEAP-MSCHAPv2, PEAP-GTC, PEAP-TLS, EAP-FAST
- WPA2 Personal – 64 hex-digit key / 8-63 character ASCII passphrase
- WPA2 Enterprise 802.1x Extensible Authentication Protocol (EAP)*
  - Types: EAP-TTLS, PEAP-MSCHAPv2, PEAP-GTC, PEAP-TLS, EAP-FAST

Note

- 802.1x Authentication – Set EAPOL-Key-timeout from 1000 to 3000 (msec): This is a recommended setting due to possible latency or failure to authentication during key exchanges in some environments.
- Fast roaming type supported: OKC (default), PMK caching, CCKM

Federal Information Processing Standard (FIPS) 140-2

- FIPS 140-2 Level 1 validation of the OpenSSL FIPS Object Module v2.0 (validation certificate #1747)
  - FIPS 140 is a US government and Canadian government standard that defines a minimum set of the security requirements for products that implement cryptography. This standard is designed for cryptographic modules that are used to secure sensitive but unclassified information. Testing against the FIPS 140 standard is maintained by the Cryptographic Module Validation Program (CMVP), a joint effort between the US National Institute of Standards and

Technology (NIST) and the Communications Security Establishment of Canada (CSEC).

- FIPS mode enabled only supports the following Authentication types:
  - WPA2 - Personal
  - WPA2-AES with EAP-TLS

Note

- CCKM roaming type and TKIP/AES Mixed mode are not supported with FIPS enabled

802.11 Radio Band Modes

802.11a 5 GHz Frequency Bands U-NII-1, DFS U-NII-2A, 2C and U-NII-3

- 5.15 GHz to 5.35 GHz (Ch 36/40/44/48/52/56/60/64)
- 5.47 GHz to 5.725 GHz (Ch 100/104/108/112/116/120/124/128/ 132/136/140)
- 5.725 GHz to 5.85 GHz (Ch 149/153/157/161/165)

RetinaVue® 700 Imager

- 802.11 a/b/g/n default

The following Band modes can be configured:

- 802.11 a/b/g/n
- 802.11 a/b/g
- 802.11 a/n
- 802.11 a

Connex Spot Monitor and Connex Vital Signs Monitor

- 802.11 a only
- 802.11 a/n
- 802.11 a/b/g
- 802.11 a/b/g/n
- 802.11 b/g/n

Wi-Fi Standards Current

IEEE 802.11a, 802.11b, 802.11d, 802.11e, 802.11g, 802.11h, 802.11i, 802.11n

Parameter Length Limits

SSID Length: Maximum length of 32 characters

PEAP Password Length: Maximum length of 64 characters

3 General Recommendations

The following are general best practice **recommendations** for establishing durable wireless connections between the Welch Allyn Radio and the customer's wireless network:

Received Signal Strength Indication (RSSI)
For redundancy, Welch Allyn highly recommends a primary RSSI Value of better than or equal to -67dBm and a secondary wireless signal of -70dBm or better over the coverage area. For proper Tx/Rx balance, RSSI readings should apply when APs are transmitting at 25mW or less. The device radio transmits at up to 25mW power, limited by Regulatory Domain restrictions. The AP signal strength and radio signal strength must be balanced, if not, dropped packets and loss of connectivity can result.

Signal to Noise Ratio (SNR)
≥15dB. Wireless High noise level may cause dropped packets.

Jitter
Packet-to-Packet jitter shall be ≤ 400ms.

DTIM
Set DTIM value to 1 (Wireless Controller default) for best performance.

SSID/WLAN Settings

- Enable Session Timeout = Disabled
- Client Load Balancing = Disabled
- Client Band Select = Disabled

Spanning Tree Protocol (STP)
STP should be turned off for the Welch Allyn specific wireless VLAN/SSI