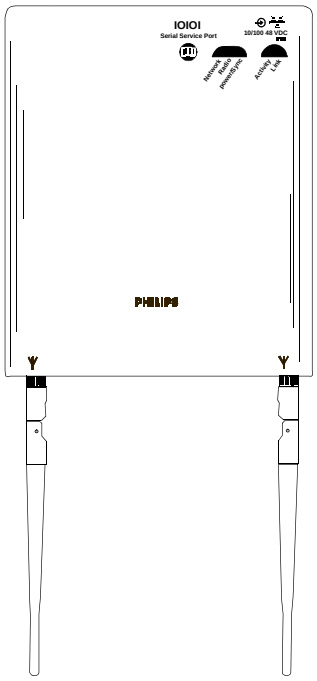
IntelliVue Smart-hopping 1.4 GHz Access Point Installation Guide



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Pursuant to Part 15.21 of the FCC Rules, any changes or modifications to this equipment not expressly approved by Philips Medical Systems may cause harmful radio frequency interference, and void your authority to operate this equipment.

This device has been designed to operate with the antenna having the part number 453564079561 and having a maximum gain of 3.2 dB. Antennas not included in this approved list or having a gain greater than 3.2 dB are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

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Printing History

New editions of this document will incorporate all material updated since the previous edition. The documentation printing date and part number indicate its current edition. The printing date and edition number change when a new edition is printed. The document part number changes when extensive technical changes are incorporated.

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Contents

About This Guide

This *IntelliVue Smart-hopping 1.4 GHz Access Point Installation Guide* provides complete instructions and procedures for installing the Philips IntelliVue Smart-hopping 1.4 GHz Core Access Point and Remote Antennas. This chapter describes the document and includes:

- Audience
- Document Organization
- Notational Conventions
- Related Documentation
- Terminology

Audience

The *IntelliVue Smart-hopping 1.4 GHz Access Point Installation Guide* is written for trained service personnel who will install the IntelliVue Smart-hopping 1.4 GHz Core Access Point as part of an overall IntelliVue Smart-hopping deployment.

Document Organization

The information in this guide is organized and presented as follows:

- *Chapter 1, Overview,* describes the IntelliVue Smart-hopping 1.4 GHz Core Access Point and how it is used to provide a bi-directional data flow between the IntelliVue Information Center and IntelliVue Patient Monitors.
- *Chapter 2, Mounting the IntelliVue Smart-hopping 1.4 GHz Core Access Point,* includes instructions for mounting the Core AP and Remote Antennas to a wall, above a ceiling tile, and below a ceiling tile.
- *Chapter 3, Installing the IntelliVue Smart-hopping 1.4 GHz Core Access Point,* provides procedures to physically install the Philips IntelliVue Smart-hopping 1.4 GHz Core Access Point.
- *Chapter 4, Maintaining the IntelliVue Smart-hopping 1.4 GHz Core Access Point,* provides procedures to maintain and troubleshoot operation of the Philips IntelliVue Smart-hopping 1.4 GHz Core Access Point.

Notational Conventions

This guide uses the following notational conventions to convey information:

Note Notes call attention to important information.

Caution Cautionary statements call attention to a condition that could result in loss of data or damage to equipment.

Warning Warnings call attention to a condition that could result in physical injury.

Related Documentation

Please refer to these other documents for additional installation service information about the IntelliVue Smart-hopping infrastructure:

- *IntelliVue Smart-hopping Access Point Controller Installation Guide* - provides procedures to physically install and power the IntelliVue Smart-hopping Access Point Controller at the clinical site.
- *IntelliVue Smart-hopping 2.4 GHz Access Point Installation Guide* - gives procedures to install the IntelliVue Smart-hopping 2.4 GHz AP at the clinical site to a wall, or above or below a ceiling tile.
- *IntelliVue Smart-hopping Infrastructure Installation and Service Guide* - provides complete information and procedures to install, configure, inter-connect, and deploy the IntelliVue Smart-hopping infrastructure at the clinical site. This document includes site planning guidelines, procedures for use of the APC command line and graphical user interfaces, AP configuration procedures, and APC and AP firmware deployment procedures.
- *IntelliVue Smart-hopping Sync Unit Installation Guide* - lists procedures to install the IntelliVue Smart-hopping Sync Unit at the clinical site.
- *Upgrading IntelliVue Smart-hopping Access Point Controllers and Access Points* - gives procedures to use the Philips IntelliVue Smart-hopping APC and AP Upgrade Tool to install and synchronize the firmware version on IntelliVue Smart-hopping APCs and APs.

Terminology

Please note the following terms, acronyms, and abbreviations used throughout this document and in related documentation:

- **Access Point (AP)** - An IntelliVue Smart-hopping component that provides bi-directional wireless access to the monitoring network for IntelliVue Patient Monitors.
- **Access Point Controller (APC)** - An IntelliVue Smart-hopping component used to manage the operation of the Access Points. One APC is elected the Primary (previously referred to as Master) APC. The Primary APC supports the web interface to the system and manages the master configuration.
- **Access Point Group/AP Group** - A logical grouping of APs. AP members of the same AP Group will inherit common configuration settings (defaults). AP groups will often map logically to the clinical units in which the IntelliVue Smart-hopping Infrastructure is being installed.
- **Database Domain (DBSD)** - This term is used to describe the "network" that contains the Standalone IntelliVue Information Center, or the IntelliVue Database Server and its connected Information Centers, Clients, bedsides, and infrastructure. This term applies to both routed and non-routed topologies.
- **IntelliVue Network -** This term refers to the entire IntelliVue network. In a routed topology, the IntelliVue Network includes the routers and all inter-connected Database Domain(s) and the IntelliVue Smart-hopping Infrastructure wireless subnet.
- **IntelliVue Patient Monitor (IPM)** - The IntelliVue Patient Monitor relays real-time physiological waveforms and trends to the Philips IntelliVue Information Center (PIIC) or Philips IntelliVue Information Center iX (PIIC iX).
- **IntelliVue Smart-hopping infrastructure** - Philips proprietary wireless network designed for continuous monitoring that provides two-way communications between IntelliVue Patient Monitors, and the IntelliVue Information Center.
- **IntelliVue Smart-hopping Infrastructure Service Tool** - The software used to upgrade IntelliVue Smart-hopping APCs and APs, verify that APCs on your network are configured correctly, and display warning and error messages that you may use to troubleshoot any configuration errors that may exist on your IntelliVue Smart-hopping network. The IntelliVue Smart-hopping Infrastructure Service Tool is also referred to as the Upgrade Tool. This tool was previously referred to as the Upgrade Wizard.
- **IntelliVue Telemetry System (ITS)** - Deprecated term for the cellular wireless architecture that provides two-way communications between IntelliVue Patient Monitors, and the IntelliVue Information Center. See *IntelliVue Smart-hopping infrastructure*.

- **Partnered APC** - Configurable element within an AP Group used to determine which APC will manage the operation of the AP members of a particular AP Group.
- **Power over Ethernet (PoE) Switch** - The Power over Ethernet (PoE) Switch is a 24-port Power-over-Ethernet device that provides 48 VDC power to IntelliVue Access Points (and also remote Sync Units if connected) via 100-Base-TX Ethernet LAN cabling. For systems using a Power over Ethernet Switch, the ITS4844A Tele Synchronization Unit is required to use the PoE feature of the PoE Switch.
- **Power over Ethernet (PoE) Unit** - The Power over Ethernet (PoE) Unit is a 6- or 12-port Power-over-Ethernet device that provides 48 VDC power to IntelliVue Access Points (and also remote Sync Units if connected) via 100-Base-TX Ethernet LAN cabling.
- **RF Access Code** - Configurable element in the IntelliVue Smart-hopping AP defaults shared among APs and IntelliVue Patient Monitors to control wireless access to the monitoring network. Portable devices will only connect to access points with which they share access codes. The RF Access Code allows a specific wireless client that is programmed with a matching Access Point RF Access Code to connect to that Access Point.
- **Synchronization (Sync) Unit** - The IntelliVue Smart-hopping Sync Unit provides a necessary common clock signal to synchronize all the IntelliVue Access Points in the system. As patients ambulate around the hospital coverage area their transmitted data are handed over from one AP to another seamlessly without interruption or data loss. The ITS4844A (866212) IntelliVue Smart-hopping Synchronization Unit provides the same features as the M4844A (862114) Sync Unit, but is required to use the PoE feature of the PoE Switch.
- **Smart-hopping Network**- This term is used to describe the IntelliVue Smart-hopping network and infrastructure used in a routed topology to connect IntelliVue Smart-hopping infrastructure devices.
- **System ID** - Configurable element in the APC Configuration to logically associate Access Points and Access Point Controllers operating within the same IntelliVue Smart-hopping Infrastructure.
- **Uninterruptible Power Supply (UPS)** - The UPS supplies backup power to protect against hospital generator changeover interruptions, and short power line transients.

1

Overview

This chapter provides a high-level overview of the 1.4 GHz IntelliVue Smart-hopping Core Access Points and Remote Antennas. This chapter and includes:

- Introduction
- A General Description of the IntelliVue Smart-hopping Core Access Point
- Connectors and Status Indicators
- Specifications
- Ordering Information

Introduction

The IntelliVue Smart-hopping infrastructure uses a cellular wireless architecture to provide two-way communications between IntelliVue Patient Monitors and the IntelliVue Information Center.

Using the “IntelliVue Smart-hopping” wireless protocol, the IntelliVue Smart-hopping infrastructure provides monitoring capabilities for ambulatory patients within a wide coverage area. The IntelliVue Smart-hopping IntelliVue Patient Monitors and infrastructure operate on the 1.4 GHz US Wireless Medical Telemetry Service

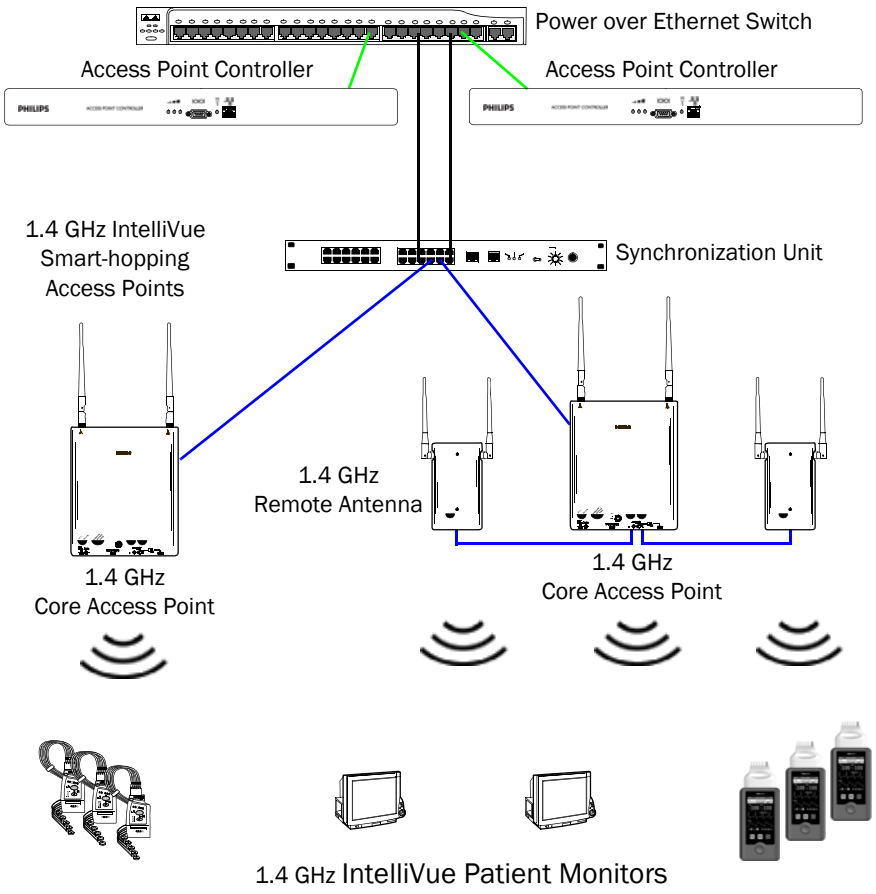

Figure 1-1: 1.4 GHz IntelliVue Smart-hopping infrastructure

You can configure the Access Point Controller to communicate with IntelliVue 1.4 GHz IntelliVue Smart-hopping Access Points (APs). IntelliVue 1.4 GHz APs can only communicate with 1.4 GHz IntelliVue Patient Monitors.

IntelliVue Smart-hopping networks utilize a cognitive radio that senses the RF environment and adapt to it. Dynamic wireless channel allocation ensures best use of available wireless spectrum. The IntelliVue Smart-hopping infrastructure is designed to co-exist with other 802.11 wireless deployments.

A General Description of the IntelliVue Smart-hopping Core Access Point

The IntelliVue Smart-hopping Core Access Point (AP) and remote antennas (RA), shown in Figure 1-2, provide an air-link to transmit and receive data between IntelliVue Smart-hopping IntelliVue Patient Monitors and the Patient Information Center iX (PIC iX) via the IntelliVue Smart-hopping infrastructure.

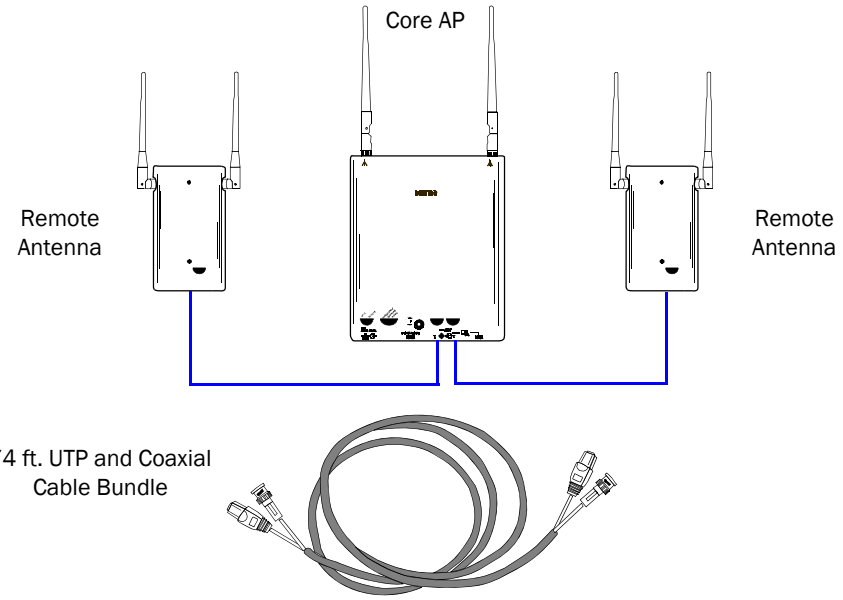

Figure 1-2: IntelliVue Smart-hopping Core Access Point with Remote Antennas

The Core AP (CAP) is a modular antenna infrastructure consisting of an Access Point (AP) with up to two connected Remote Antennas (RAs). A 74-foot (22.6 m) coaxial and unshielded twisted pair (UTP) cable bundle is used to connect a Remote Antenna to a Core AP. Core APs are only available for the 1.4 GHz IntelliVue Smart-hopping infrastructure.

The effective range of the Core AP and of each Remote Antenna is typically 32 feet. The Core AP supports a maximum of 18 IntelliVue Patient Monitors regardless of its component configuration.

- A single Core AP with no RAs supports 18 monitors.
- When used with a single RA, the Core AP supports nine IntelliVue Patient Monitors and its connected RA supports nine IntelliVue Patient Monitors (9+9=18).
- When used with two RAs, the Core AP supports six IntelliVue Patient Monitors and its connected RAs each support six IntelliVue Patient Monitors (6+6+6=18).

When monitored patients are ambulatory, data roaming is handled seamlessly between the other IntelliVue Access Points in the coverage area. The Core AP and each RA are always used with their two supplied antennas installed. The Core AP and its attached Remote Antennas can be mounted out of the way on corridor walls, or above or below ceiling tiles.

Core AP Mounting Options

Wall-mounting hardware is standard. An optional above/below ceiling tile mount kit (P/N 866328 Option IM2 [453564052201]) is available for both the Core AP and its Remote Antennas.

Power Source

The IntelliVue Smart-hopping 1.4 GHz Core Access Point receives its 48V DC operating power source via its Ethernet LAN cabling from Power over Ethernet via the IntelliVue Smart-hopping Sync Unit. The AP is not equipped with a power socket. The AP consumes less than 13.8W, and internally generates a variety of voltages used for its internal components.

The CAT-5 UTP cable within the 74 ft.-cable bundle carries 5.5V DC power, Transmit and Receive control signals, and Antenna Diversity signals from the Core AP to a connected Remote Antenna.

The 75 Ohm coaxial cable within the 74 ft.-cable bundle carries RF and DC sense signals from the Core AP to a connected Remote Antenna.

Synchronization Signal

The Access Point receives a synchronization signal from a network of Sync Units that enables an IntelliVue Patient Monitor to hand over data seamlessly between APs within the coverage area when a patient is ambulatory and to transfer data to the IntelliVue Information Center without interruption. Each Sync Unit provides synchronization for up to 12 APs. The sync signal distributes the common reference clock signal needed by the IntelliVue Smart-hopping infrastructure.

IntelliVue Patient Monitor Mobility

The IntelliVue Smart-hopping infrastructure supports seamless roaming of IntelliVue Patient Monitors within the area of coverage. This roaming is accomplished via communications between the IntelliVue Patient Monitors and the Access Points (AP) as follows.

As an IntelliVue Patient Monitor is moved around a building, it automatically monitors the quality of the wireless link to its current AP (and it also detects the presence of other APs). When the quality starts to deteriorate, the IntelliVue Patient Monitor automatically establishes a new connection to another AP.

The IntelliVue Patient Monitor remains connected to two APs for a finite time, and thus the same data is received by these APs. During this time, information for header compression and other data for the connection is routed to the new AP.

One of the two APs subsequently releases the radio connection. If a packet is in progress when a handover occurs, then the packet is reassembled co-operatively between the two APs.

The PIC or PIC iX receives an unbroken flow of complete IP packets.

Technical Alerts

Each AP is configured to signal alert conditions that are viewed by the IntelliVue Application Performance Monitor (APM).

The IntelliVue Access Point is configured to raise alerts on error conditions. The alerts are sent over the IntelliVue Smart-hopping and Ethernet LAN infrastructure to a monitoring station or Database Sever. The Access Point raises an alert if:

- if data loss exceeds the configured threshold
- it loses its synchronization signal

For small systems having only one AP and no Sync Unit, you can configure the AP to suppress the loss of synchronization signal alert.

Note that the IntelliVue Smart-hopping APC provides System Alerts such as loss of synchronization, high data loss, AP hardware failure, and over capacity. Additionally, when redundant APCs are installed, the APC provides a System Alert for APC hardware or software failure.

Firmware Updates

Firmware on the IntelliVue Smart-hopping 1.4 GHz Core Access Point is upgraded from the Access Point Controller by using the Upgrade Tool. Refer to the service document entitled *IntelliVue Smart-hopping Infrastructure Installation and Service Guide* for details. The AP firmware image is provided on the *Smart-hopping Telemetry Service Tool* CD-ROM.

Management Interfaces

The Access Point supports the full range of management interfaces via the IntelliVue Smart-hopping Access Point Controller (APC). These interfaces also enable you to view the status of the Access Point including the following information:

- System configuration such as firmware version
- Connection information such as numbers of packets received and transmitted, and number of errors
- Wave data information such as total number of seconds of data sent and lost

The AP statistics can be read by remote devices (e.g., an IntelliVue Database Server), using the Scaleable Node Address Protocol (SNAP).

The following status items can be displayed using the APC web interface:

- AP Name
- Physical Address
- Partnered AP Controller
- IP Address
- Subnet Mask
- Default Gateway
- AP Type

Connectors and Status Indicators

Figure 1-3 shows the connectors on the Core AP and Remote Antenna.

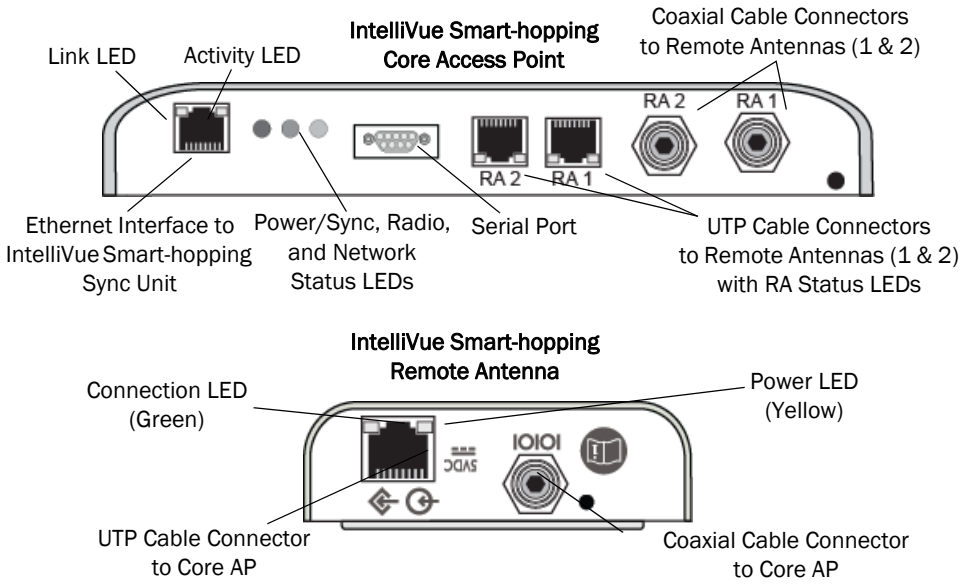

Figure 1-3: 1.4 GHz IntelliVue Smart-hopping Core AP and Remote Antenna Connectors

IntelliVue Smart-hopping Core AP Connectors

Note the following connectors on the IntelliVue Smart-hopping Core AP:

- Ethernet Interface - The AP provides a 100 Base-T Ethernet interface with an RJ-45 connector to connect the Core AP to the IntelliVue Smart-hopping Sync Unit.

  The AP Ethernet interface provides data communications to and from the IntelliVue Information Center over the IntelliVue Smart-hopping LAN infrastructure. It also presents the 48V DC power and synchronization signals required by the Core AP. The synchronization signal is superimposed on the power supply voltage. Attach the provided ferrite block to the CAT 5 cabling (from the Sync Unit) no more than 20 inches (50 cm) from the RJ-45 connector as shown in Figure 3-2 to reduce electromagnetic (radiation) interference. Table 1-1 lists the pin signals for the AP Ethernet interface.

Table 1-1: AP Ethernet Interface Pin Signals

Pin	Signal Description
1	Transmit Pair TX + Conductor
2	Transmit Pair TX - Conductor
3	Receive Pair RX + Conductor
4	+ 48V DC Power and Synchronization
5	+ 48V DC Power and Synchronization
6	Receive Pair RX - Conductor

Table 1-1: AP Ethernet Interface Pin Signals

Pin	Signal Description
7	0V Power Return
8	0V Power Return

- Serial Port - The serial port is used only for manufacturing purposes.
- UTP Cable Connectors to Remote Antennas - Two standard RJ-45 connectors are provided for the UTP cables that connect the Core AP to its Remote Antennas.Each UTP cable carries 5.5 VDC power, Transmit, Receive and Antenna Diversity Control signals to the Remote Antenna.
- Coaxial Cable Connectors to Remote Antennas - Two standard 75 Ohm connectors are provided for the coaxial cables that connect the Core AP to its Remote Antennas. Each coaxial cable carries RF and DC sense signals from the Remote Antenna.

Remote AP Connectors

Note the following connectors on the Remote Antenna:

- UTP Cable Connector to Core AP - A standard RJ-45 connector is provided for the UTP cable that connect the Remote Antenna to its Core AP. The UTP cable carries 5.5 VDC power, Transmit, Receive and Antenna Diversity Control signals to the Remote Antenna.
- Coaxial Cable Connector to Core AP - A standard 75 Ohm connector is provided for the coaxial cable that connects the Remote Antenna to its Core AP. The coaxial cable carries RF and DC sense signals from the Core AP.

Note If an installed, powered Remote Antenna becomes disconnected from its Core AP via its Coax/UTP cable bundle, you must reconnect the Coax/UTP cable bundle to the RA and Core AP, and then cycle power to the connected Core AP before the RA will re-establish communications with the Core AP.

IntelliVue Smart-hopping Core AP Status LEDs

The IntelliVue Smart-hopping Core AP provides the following status LEDs.

- Wired/Ethernet Activity - The Core AP provides two LEDs to indicate wired/ Ethernet activity to the IntelliVue Smart-hopping infrastructure. During normal operation, these LEDs indicate the following information:
  - Link LED - Link present/Ethernet connection. Lights GREEN (ON) when a pass-through link is present - OFF when not present.
  - Act LED - Wired network activity. Flashes YELLOW (ON) when there is activity over the wired network.
- Wireless/RF Activity - The Core AP provides three LEDs to indicate wireless/RF activity. During normal operation, these LEDs indicate the following information:
  - Power/Sync LED - GREEN (ON) when power and synchronization signal is present.
  - Radio LED - Normally OFF (not lit) - flashes green to indicate wireless network activity.
  - Network LED - Normally OFF (not lit) - flashes green to indicate wired network activity.

  At initial power on the AP runs a Power On Self-Test (POST). During the POST, the above LEDs indicators flicker and then all three will illuminate continuously (AMBER) to indicate correct startup operation. Then, the Power ON LED will illuminate (GREEN) continuously to indicate that the 48Vdc power and sync signal are being supplied, and the other two (AMBER) LEDs turn off (not lit).
- Remote Antenna - The Core AP provides two LEDs on each RJ-45 UTP cable connector that provides status on a connected Remote Antenna:
  - RA Connection - Lights GREEN to indicate a RA is connected to the Core AP.
  - RA Power - Lights YELLOW to indicate connected RA is receiving power from the Core AP.

Remote Antenna Status LEDs

The Remote Antenna provides the following status LEDs.

- Remote Antenna Status LEDs - The green and yellow LEDs above the RJ-45 UTP cable connector to the Core AP provide status on the Remote Antenna as summarized below.

Table 1-2: Remote Antenna Status LEDs

Green/Yellow LEDs	Remote Antenna Status
Off/Off	No connection to or power from Core AP/Self-test Failed.
Flash Green/Yellow	Remote Antenna is running self-test/Power on.
Solid Green/Yellow	Connection to Core AP is Successful/Power On. This is the expected normal operational status.

Specifications

Table 1-3: 1.4 GHz Core Access Point Specifications

Specification	Value
Physical:	
Chassis (only) Dimensions (H x W x L)	30 mm x 204 mm x 243 mm (1.2 in x 8.0 in x 9.6 in)
Local Antenna (only) Dimensions	160 mm (6.3 inches L) Sleeve Dipole
Weight with Antenna	<.79g (1.8 lb)
Mounting	Above Ceiling, Below Ceiling, or Wall Mount, Below Ceiling with quick release, or Wall Mount with bracket
Environmental:	
Operating Temperature	0 to +55^{o} C (32 to 131oF)
Storage Temperature	-40 to +60^{o} C (-4 to 140oF)
Humidity Range (Operating)	< 95% RH @ 40^{o} C non-condensing
Humidity Range (Storage)	< 90% RH @ 60^{o} C
Altitude	Operating and Storage up to 3048 m (10,000 ft)
Electrical:	
Power	48 VDC nominal (44 - 52 VDC), from PoE Unit via Sync Unit) 8 Watts, 287 mA
RF Power	8.5 dBm +2/-1.5dB (4.5 mW to 11.2 mW) into Antenna load.
RF Power (High Power AP)	12.5 dBm +/-1.5dB (12.6 mW to 25 mW) into Antenna load.
Power Sensing	Auto sensing POE, compliant with 802.3af
RF Diversity	Uses Dual Antenna, selects antenna with best signal.
Frequency Diversity	Dynamic, selects RF channels for best signals.
Antenna Type	Sleeve Dipole > 10dB over 1395MHz to 1432MHz in 50 Ohms.
LED Indicators	Two LEDs for LAN activity, part of LAN RJ-45 connector. Three LEDs for Radio Activity, Sync, Network status. Two LEDs on Remote Antenna Ports provide Power and Fault status (part of RA RJ-45 connector).
Electrical Installation:	
Fire Safety	1.4 GHz Core Access Points are Listed for use within "Other Spaces Used for Environmental Air (Plenum)" per NFPA70: 2011, Article 300.22. Note: The term "plenum" as used in Article 300.22 Section C correlates with the use of the term "plenum" in NFPA 90A-2009, Standard for the Installation of Air-Conditioning and Ventilating Systems, and other mechanical codes where the plenum is used for return air purposes, as well as some other air-handling spaces. The area above dropped ceilings is an example of plenum space.
Interface Connections:	

Table 1-3: 1.4 GHz Core Access Point Specifications

Specification	Value
LAN Input (Data): 1 Port; Ethernet 100 Base-T (only 100 Mbps Full Duplex)	RJ-45 Female Socket.
LAN Cable to Network Switch	CAT-5 or better, up to 100m (328 ft.).
Remote Antenna UTP Cable Connectors	Two RJ-45 Female Socket Connectors are provided to connect the UTP cables on which 5.5 VDC power, Transmit and Receive control signals, and Antenna Diversity signals to the remote Antennas are carried. Connectors are protected against damage from unexpected connection to LAN with PoE
Remote Antenna 75 Ohm Coaxial Cable Connectors	Two standard 75 Ohm connectors are provided for the coaxial cables on which RF and DC sense signals are carried to the Remote Antenna.
Local Antenna Connections (two)	Two SMA-style connectors.

Table 1-4: 1.4 GHz Remote Antenna Specifications

Specification	Value
Physical:	
Chassis (only) Dimensions (H x W x L)	30 mm x 100 mm x 174 mm (1.2 in x 4.0 in x 6.9 in)
Local Antenna (only) Dimensions	160 mm (6.3 inches L) Sleeve Dipole
Weight with Antenna	<.32kg (0.7 lb)
Mounting	Above Ceiling, Below Ceiling, or Wall Mount
Environmental:	
Operating Temperature	0 to +55^{o} C (32 to 131oF)
Storage Temperature	-40 to +60^{o} C (-4 to 140oF)
Humidity Range (Operating)	< 95% RH @ 40^{o} C non-condensing
Humidity Range (Storage)	< 90% RH @ 60^{o} C
Altitude	Operating and Storage up to 3048 m (10,000 ft)
Electrical:	
Power	5.0 VDC nominal input via Core AP RJ-45 Cable Connector
Power Sensing	802.3af-compliant
RF Diversity	Uses Dual Antenna, selects antenna with best signal.
Antenna Type	Sleeve Dipole > 10dB over 1395MHz to 1432MHz in 50 Ohms.
LED Indicators	Power and Connection LED notification on RJ-45 connector.
Electrical Installation:	

Table 1-4: 1.4 GHz Remote Antenna Specifications

Specification	Value
Fire Safety	Model ITS4846A 1.4 GHz Remote Antennas are Listed for use within "Other Spaces Used for Environmental Air (Plenum)" per NFPA70: 2011, Article 300.22. Note: The term "plenum" as used in Article 300.22 Section C correlates with the use of the term "plenum" in NFPA 90A-2009, Standard for the Installation of Air-Conditioning and Ventilating Systems, and other mechanical codes where the plenum is used for return air purposes, as well as some other air-handling spaces. The area above dropped ceilings is an example of plenum space.
Interface Connections:	
Control Signals	RJ-45 Female Socket.
Core AP 75 Ohm Coaxial Cable Connector	One standard 75 Ohm connector is provided for the coaxial cable on which RF and DC sense signals are carried to the Remote Antenna.
Local Antenna Connections (two)	Two SMA-style connectors.

Ordering Information

Table 1-5: IntelliVue Smart-hopping 1.4 GHz Access Point Part Numbers

Device	Part Numbers
1.4 GHz Enhanced IntelliVue Smart-hopping Access Point (High power AP) with Remote Antenna	989803171211 or 866394
IntelliVue Remote Antenna	453564036561 or 865052
IntelliVue Remote Antenna	453564656031 or 867151
Cable — Coaxial/UTP Access Point to Remote Antenna*	453564656041
Cable — Coaxial/UTP Access Point to Remote Antenna	453564056081
IntelliVue Smart-hopping Mounting Options: Above & Below Ceiling Tile-mount Option for the following: • 989803171211 (866394) • 453564036561 (865052) • 453564656031 (867151)	453564052201 or 866328/IM2 (Ceiling wall mount) 453564056621 or 866328/IM3 (AP CA Earthquake-rated wall mount) 453564056631 or 866328/IM4 (RA CA Earthquake-rated wall mount)
***-** The 453564656041 *Cable — Coaxial/UTP Access Point to Remote Antenna* is incompatible with the 453564036561 *IntelliVue Remote Antenna.*	

Regulatory Information

Table 1-6: IntelliVue Smart-hopping 1.4 GHz Access Point Regulatory Information

Description	Philips part#:	FCC ID:	Model#	Software
1.4 GHz Enhanced IntelliVue Smart-hopping Access Point	989803171211 862228	PQC-4843C	ITS4843C	C.00.07 or greater, D.0 or greater
1.4 GHz Enhanced IntelliVue Smart-hopping High power Access Point with Remote Antenna	989803171211 866394	PQC-4843D	ITS4843D	C.00.08 or greater, D.0 or greater
Remote Antenna	453564036561 865052	PQC-4843C	ITS4846A	C.00.07 or greater, D.0 or greater
Remote Antenna	453564656031 867151	PQC-4843D	ITS4846B	C.00.08 or greater, D.0 or greater

FCC Compliance

Operation of this equipment requires the prior coordination with a frequency coordinator designated by the FCC for the Wireless Medical Telemetry Service. The transceiver and the IntelliVue Smart-hopping infrastructure are subject to radio frequency interference. In the event of suspected radio frequency interference with your device, contact your service provider. This device complies with Parts 15 and 95H of the Federal Communications Commission (FCC) Rules. Operation is subject to the condition that this device does not cause harmful interference.

This equipment complies with the FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and any part of your body.

2

Mounting the IntelliVue Smart-hopping 1.4 GHz Core Access Point

This chapter provides procedures to physically install the Philips IntelliVue Smart-hopping 1.4 GHz Core Access Point and includes:

- Mounting the IntelliVue Smart-hopping Core AP to a Wall (Fixed Mount)
- Mounting the IntelliVue Smart-hopping Core AP to a Wall (CA Earthquake Rated)
- Mounting the IntelliVue Smart-hopping Core AP Above a Ceiling Tile
- Mounting the IntelliVue Smart-hopping Core AP Below a Ceiling Tile (Fixed Mount)
- Mounting the IntelliVue Smart-hopping Core AP Below a Ceiling Tile (Quick Release)
- Mounting the IntelliVue Smart-hopping Remote Antenna to a Wall (Fixed Mount)
- Mounting the IntelliVue Smart-hopping Remote Antenna to a Wall (CA Earthquake Rated)
- Mounting the IntelliVue Smart-hopping Remote Antenna Above a Ceiling Tile (Mounting Rails)
- Mounting the IntelliVue Smart-hopping Remote Antenna Above a Ceiling Tile (Tether Mount)
- Mounting the IntelliVue Smart-hopping Remote Antenna Below a Ceiling Tile (Fixed Mount)
- Mounting the IntelliVue Smart-hopping RA Below a Ceiling Tile (Quick Release)

Mounting the IntelliVue Smart-hopping Core AP to a Wall (Fixed Mount)

You can mount the IntelliVue Smart-hopping Core Access Point to a wall using the mounting screws and screw anchors supplied with the AP. We recommend that you mount the Core AP high on the wall as close to the ceiling as possible.

To mount the 1.4 GHz IntelliVue Smart-hopping Core AP to a wall:

1. Using a 3/16-inch drill bit, drill a pilot hole 0.188 inches (5 mm) in diameter at the locations shown in Figure 2-1.
2. Tap a supplied plastic screw anchor into each pilot hole until it is flush with the wall surface.

   This step is not necessary if mounting the IntelliVue Smart-hopping Core AP on a wood surface.
3. Screw a supplied #6 x 1 1/4 inch self-tapping screw into each screw anchor (or pilot hole) as shown in Figure 2-1.

   Tighten each screw until a 1/16-inch (2 mm) gap remains between the screw head and the mounting surface.

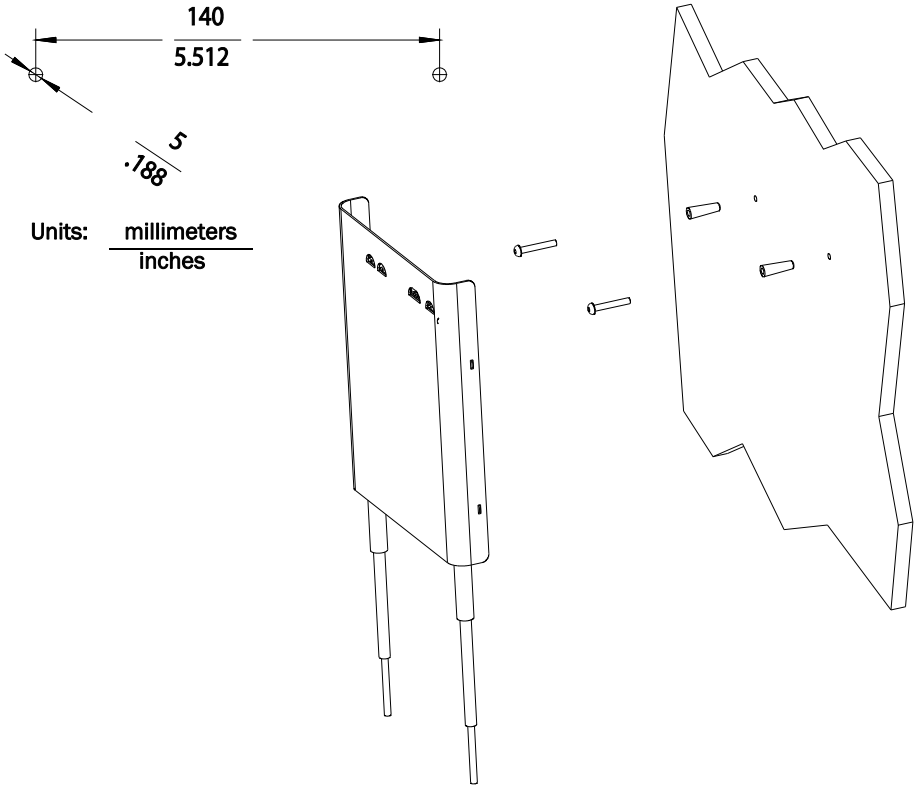

Figure 2-1: Mounting the IntelliVue Smart-hopping 1.4 GHz Core AP to a Wall (Fixed Mount)

4. While holding the AP chassis with its antennas pointing down as shown in Figure 2-1, fit the holes in the back of the AP chassis over the screw heads that protrude from the wall. Slide the AP chassis down so that the screw heads are securely in the grooves in the back of the AP chassis.

Mounting the IntelliVue Smart-hopping Core AP to a Wall (CA Earthquake Rated)

You can mount the IntelliVue Smart-hopping Core Access Point onto walls using an optional California (CA) earthquake-rated wall plate. We recommend that you mount the Core AP high on the wall as close to the ceiling as possible.

To mount the 1.4 GHz IntelliVue Smart-hopping Core AP to a wall:

1. Using a 3/16-inch drill bit, drill two pilot holes 0.188 inches (5 mm) in diameter at the locations shown in Figure 2-2.

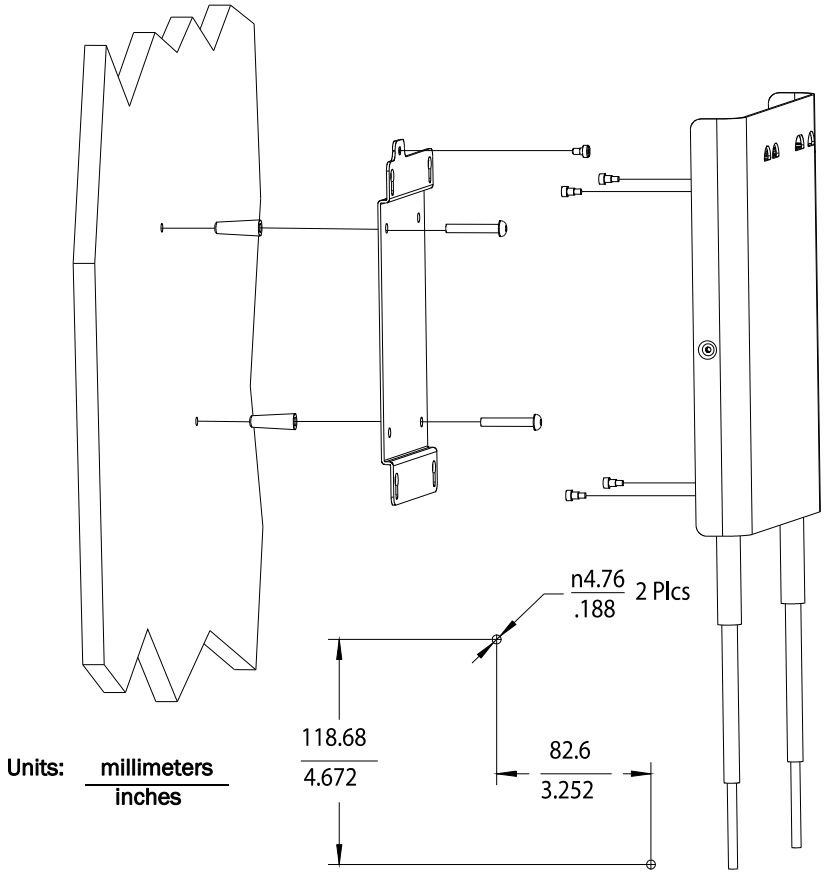

Figure 2-2: Mounting the IntelliVue Smart-hopping 1.4 GHz Core AP to a Wall (CA Earthquake Rated)

2. Tap a supplied plastic screw anchor into each pilot hole until flush with the wall surface.

   This step is not necessary if mounting the IntelliVue Smart-hopping Core AP on a wood surface.

3. Secure the quick release wall plate to the wall by screwing a supplied #6 x 1 1/4 inch self-tapping screw through the wall plate into each screw anchor (or pilot hole) as shown in Figure 2-2.

   Tighten each screw until the wall plate is fixed securely in place.

4. Using a 5/64-inch (2 mm) Allen (i.e., hexagonal) wrench, secure the four supplied M3 X 0.5 hex-head shoulder screws to the back of the Core AP as shown in Figure 2-2. Torque-tighten each shoulder screw to 8-inch lbs.
5. Mount the Core AP to the wall plate by inserting the head of each shoulder screw into the four mounting holes provided in the wall plate and then sliding the Core AP down so that the shoulder screw heads are securely in the grooves of the wall plate.
6. Using a Torx T10 screw driver, secure the Core AP to the wall plate by screwing the supplied M3.5 X 0.6 T-10 Torx Head security screw into the PEM nut in the wall plate as shown in Figure 2-3. Torque-tighten the screw to 10-inch lbs. Note that this safety screw is used to prevent the Core AP from sliding out of the wall plate.

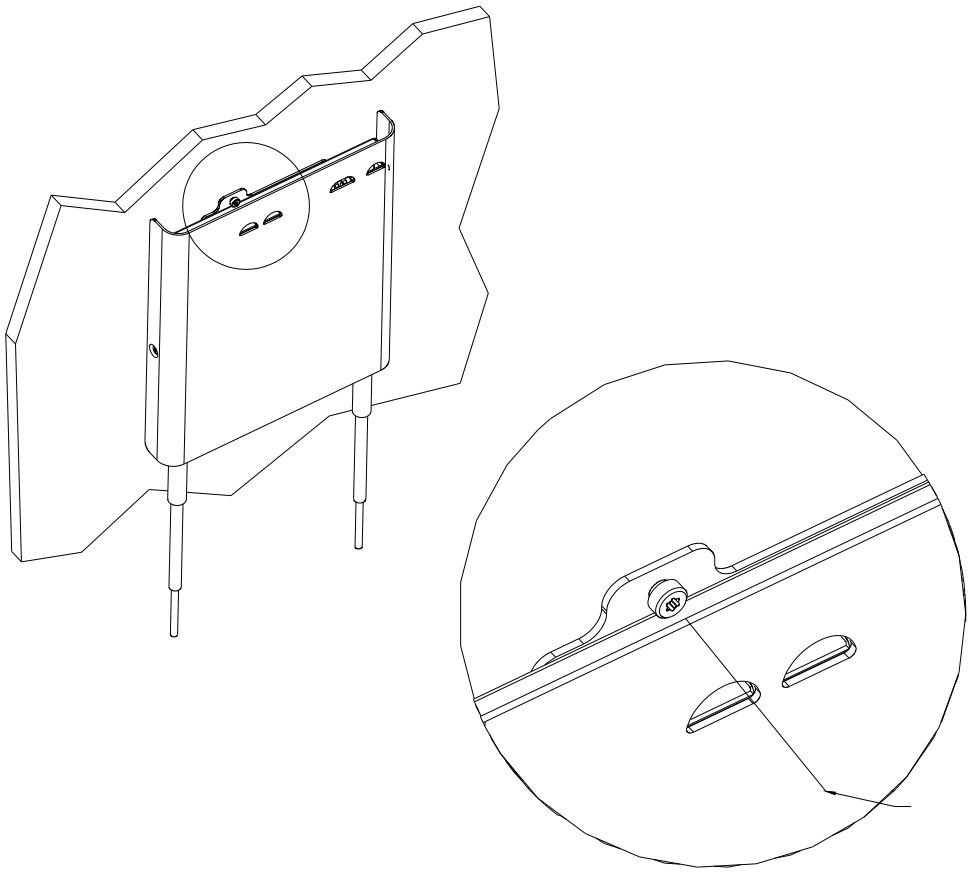

Figure 2-3: Securing the Core AP to its Quick Release Wall Plate

Mounting the IntelliVue Smart-hopping Core AP Above a Ceiling Tile

You can mount the IntelliVue Smart-hopping Core Access Point above a ceiling tile by using the mounting rails provided in the Above & Below Ceiling Tile Mount Kit (866328-IM2) for the Core AP and Remote Antennas.

Caution When installing the IntelliVue Access Point onto a suspended ceiling, make certain the ceiling grid is structurally rated to support the weight of the Core Access Point, 0.79 kg (1.8 lbs), and any extra cabling.

To mount the 1.4 GHz IntelliVue Smart-hopping Core AP above a ceiling tile:

1. Determine which ceiling tile the Core AP is be mounted onto, and the approximate Core AP placement and orientation of the antennas on the tile. Also, check for adequate clearance above the Core AP.
2. Remove the ceiling tile to which the Core AP will be mounted (and also an adjacent tile to facilitate installation).
3. Orient the antenna(s) on the Core AP chassis so they bend downward at right angles to the chassis. Unscrew the collar and rotate the antenna into position and tighten the collar to secure the antenna in place.
4. Determine where the two holes for the antennas are going to be located on the tile and mark the centers of the holes.

   The Core AP chassis can be rotated 90 degrees to the mounting rails. Choose the best placement of the Core AP to facilitate where the antennas will go through the ceiling tile. Note that there are additional holes in the mounting rails to allow for tethering to other permanent structures where local building codes require this type of installation. Refer to Figure 2-4 or Figure 2-5 for the dimensions used to locate the antenna holes in the tile.
5. Drill out two 3/4-inch (19 mm) diameter holes in the ceiling tile for the antennas. Lightly coat both plastic grommets with silicone adhesive and insert them into both holes in the tile (Insert grommets from the outside of the tile).
6. Secure the mounting rails to the AP. Insert the four (4) M3 x 0.5 (8 mm LG) screws into the Core AP mounting rail holes, and into the mating holes in the back of the Core AP as shown in Figure 2-4 or Figure 2-5. Torque-tighten each shoulder screw to 8-inch lbs.
7. Place the Core AP with mounting rails across the top of the tile.
8. Replace the tile back onto the ceiling frame structure with the Core AP antennas hanging down through the ceiling. Wiring connections to the Core AP can be accessed via the open adjacent tile.
9. Replace other adjacent ceiling tiles if necessary.

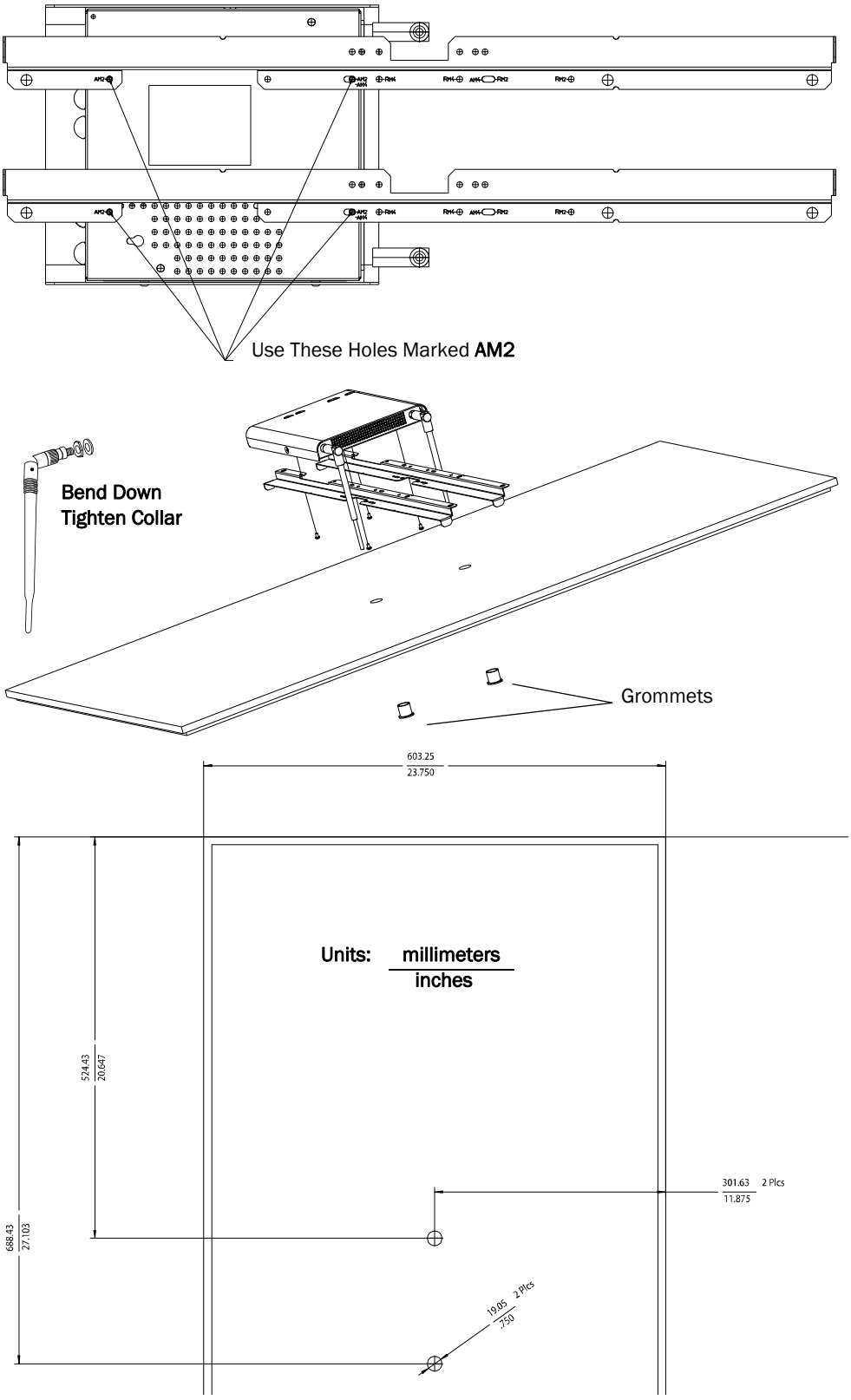

Figure 2-4: Possible Above the Ceiling Core AP Mounting Position

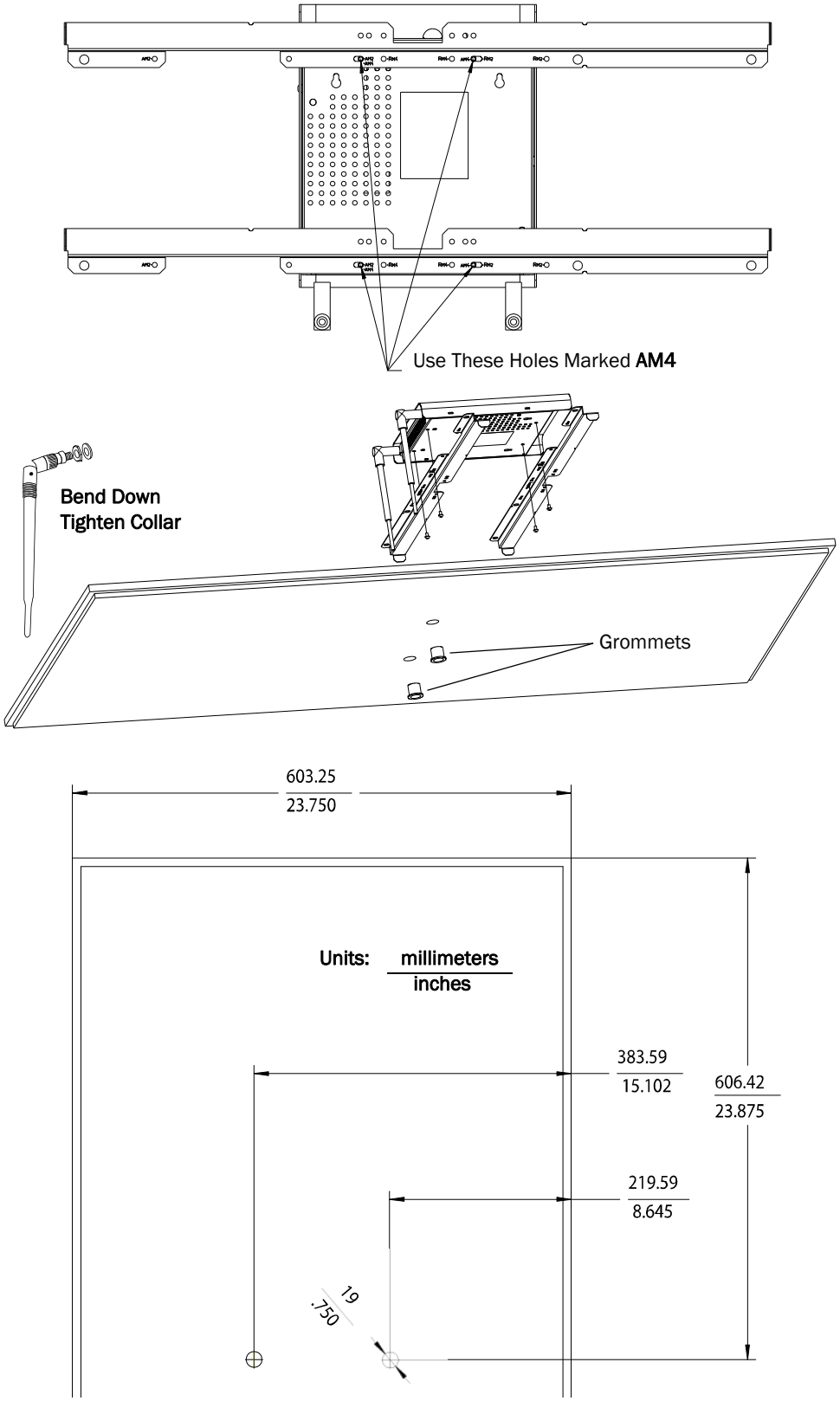

Figure 2-5: Alternative Above the Ceiling Core AP Mounting Position

Mounting the IntelliVue Smart-hopping Core AP Below a Ceiling Tile (Fixed Mount)

You can mount the IntelliVue Smart-hopping Access Point below a ceiling tile by using the mounting rails provided in the Above & Below Ceiling Tile Mount Kit (866328-IM2) for the Core AP and Remote Antennas.

Caution When installing the IntelliVue Access Point onto a suspended ceiling, make certain the ceiling grid is structurally rated to support the weight of the Access Point, 0.7kg (1.5 lbs), and any extra cabling.

To mount the 1.4 GHz IntelliVue Smart-hopping Core AP below a ceiling tile:

1. Determine which ceiling tile the Core AP is be mounted onto, and the approximate placement of the Core AP and orientation of the antennas hanging down from the ceiling tile.
2. Remove the ceiling tile the Core AP will be mounted to (and also the adjacent tile to facilitate installation).
3. Refer to Figure 2-6 for all dimensions and hole locations. Place the mounting rails across the tile (underside of tile). For ceiling tiles that are smaller than standard 2’ x 4’ size ceiling tile, the mounting rails can be cut down in length at the u-shaped cutouts.
4. Mark the location of the AB screw holes in the mounting rails on the ceiling tile where the holes will be drilled through the tile as shown in Figure 2-7. Drill four .375-inch (10 mm) diameter holes in the ceiling tile.
5. Determine where the two holes for the Remote Antenna cables are going to be located on the tile and mark the centers of the hole.

   Note that one of these holes will also be used to route the CAT 5 cable that connects the Core AP to the Sync Unit on the IntelliVue Smart-hopping infrastructure.
6. Drill or cut out two .813-inch (21 mm) diameter holes for the Remote Antenna cables to be connected to the Core AP. Lightly coat a plastic grommet with silicone adhesive and insert it into each hole in the tile (insert grommet from the outside of the tile).
7. Insert the four (4) M3-.5 X 30 lobe screws into the Core AP mounting rail holes, through the provided plastic spacers, through the tile, and into the mating holes in the back of the Core AP as shown in Figure 2-8. Torque-tighten each screw to 8-inch lbs.

   Note that the Core AP mounting rails and spacers allow for sufficient airflow between the Core AP and the ceiling tile.
8. Orient the antenna(s) on the Core AP chassis so they bend upward at right angles to the chassis. Unscrew the collar and rotate into position and tighten the collar to secure the antenna in place.
9. Replace the tile back onto the ceiling frame structure with the Core AP antennas hanging down from the ceiling. Cabling connections to the Core AP can be accessed via the open holes in the tile.

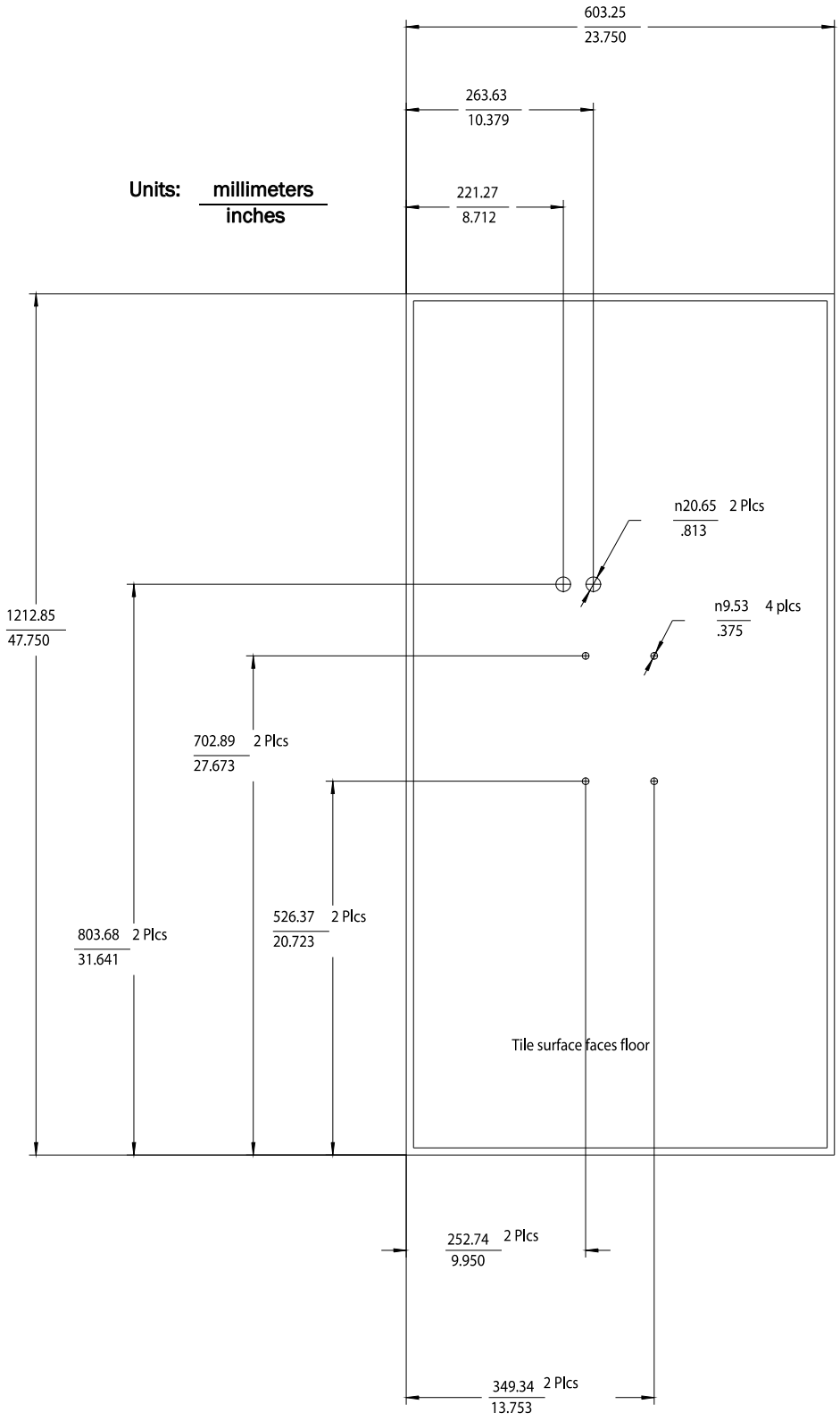

Figure 2-6: Core AP Below Ceiling Tile Hole Locations and Dimensions

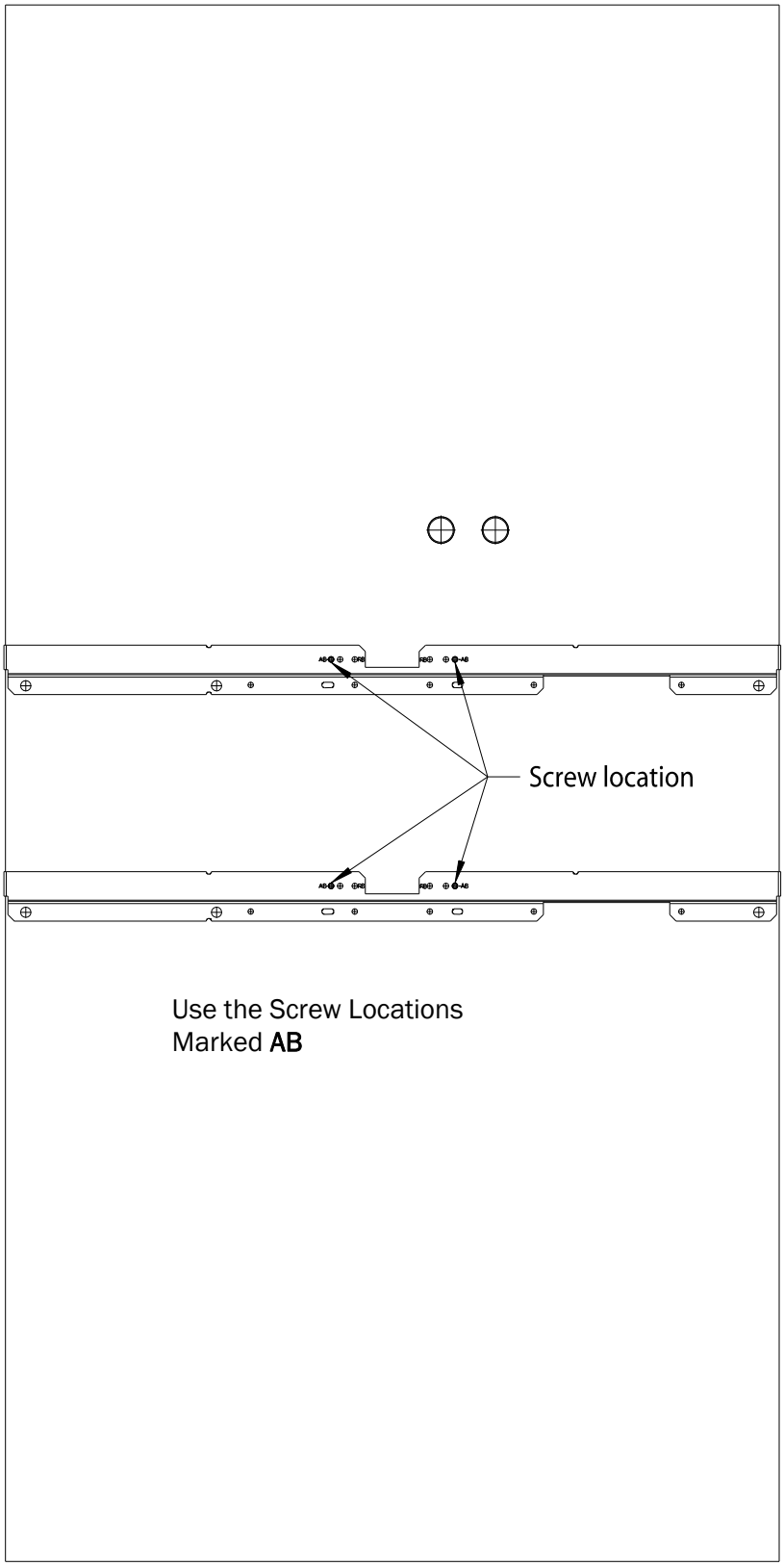

Figure 2-7: Core AP Below Ceiling Tile Mounting Rail Screw Locations

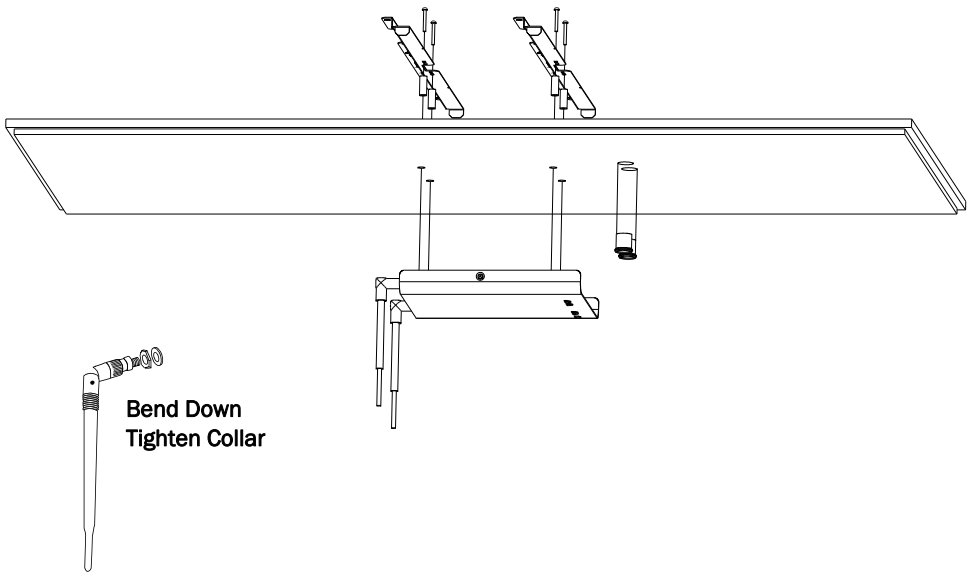

Figure 2-8: Mounting the Core AP Below a Ceiling Tile (Fixed Mount)

Note that there are additional holes in the mounting rails to allow for tethering to other permanent structures where local building codes require this type of installation.

10. Replace other adjacent ceiling tiles if necessary.

Mounting the IntelliVue Smart-hopping Core AP Below a Ceiling Tile (Quick Release)

You can mount the IntelliVue Smart-hopping Access Point below a ceiling tile by using an optional quick release wall plate along with the mounting rails provided in the Above & Below Ceiling Tile Mount Kit for the Core AP and Remote Antennas (866328-IM2). Use of this wall plate enables you to relocate 1.4 GHz IntelliVue Smart-hopping Core APs within your facility quickly and easily.

Caution When installing the IntelliVue Access Point onto a suspended ceiling, make certain the ceiling grid is structurally rated to support the weight of the Access Point, 0.7kg (1.5 lbs), and any extra cabling.

To mount the 1.4 GHz IntelliVue Smart-hopping Core AP below a ceiling tile:

1. Determine which ceiling tile the Core AP is be mounted onto, and the approximate placement of the Core AP and orientation of the antennas hanging down from the ceiling tile.
2. Remove the ceiling tile to which the Core AP will be mounted (and also the adjacent tile to facilitate installation).
3. Refer to Figure 2-9 for all dimensions and hole locations. Place the mounting rails across the tile (underside of tile). For ceiling tiles that are smaller than standard 2’ x 4’ size ceiling tile, the mounting rails can be cut down in length at the u-shaped cutouts.
4. Mark the location of the AB screw holes in the mounting rails on the ceiling tile where the holes will be drilled through the tile as shown in Figure 2-10. Drill four .375-inch (10 mm) diameter holes in the ceiling tile.
5. Determine where the two holes for the Remote Antenna cabling are going to be located on the tile and mark the centers of the hole.

   Note that one of these holes will also be used to route the CAT 5 cable that connects the Core AP to the Sync Unit on the IntelliVue Smart-hopping infrastructure.
6. Drill or cut out two .813-inch (21 mm) diameter holes for the Remote Antenna cables to be connected to the Core AP. Lightly coat a plastic grommet with silicone adhesive and insert it into each hole in the tile (insert grommet from the outside of the tile).
7. Place the AP wall plate over the four holes drilled on the bottom of the tile. Note: The top of the tile is the side facing up when the tile is in its installed position.
8. Insert the four (4) M3 .5 x 0.6 x 30mm screws into the AP wall plate, through the tile, and into the mating holes in the mounting rails on top of the tile. Hand tighten the four locking hex nuts onto the screws, and then torque-tighten each nut to 10-inch lbs (#1 Pozidrive).
9. Using a 5/64-inch (2 mm) Allen (i.e., hexagonal) wrench, secure the four supplied M3 X 0.5 hex-head shoulder screws to the back of the Core AP as shown in Figure 2-11. Torque-tighten each shoulder screw to 8-inch lbs.

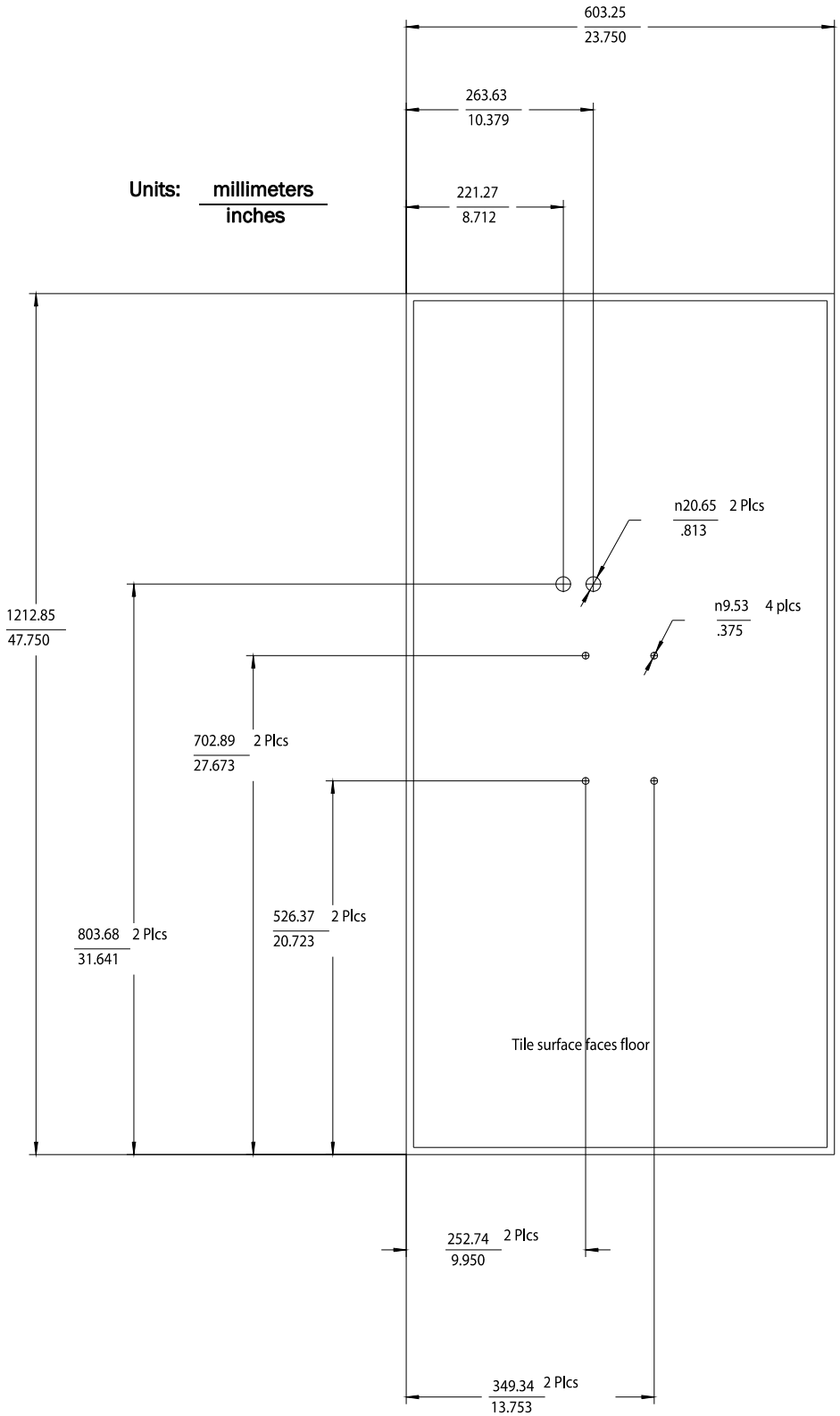

Figure 2-9: Core AP Below Ceiling Tile Hole Locations and Dimensions

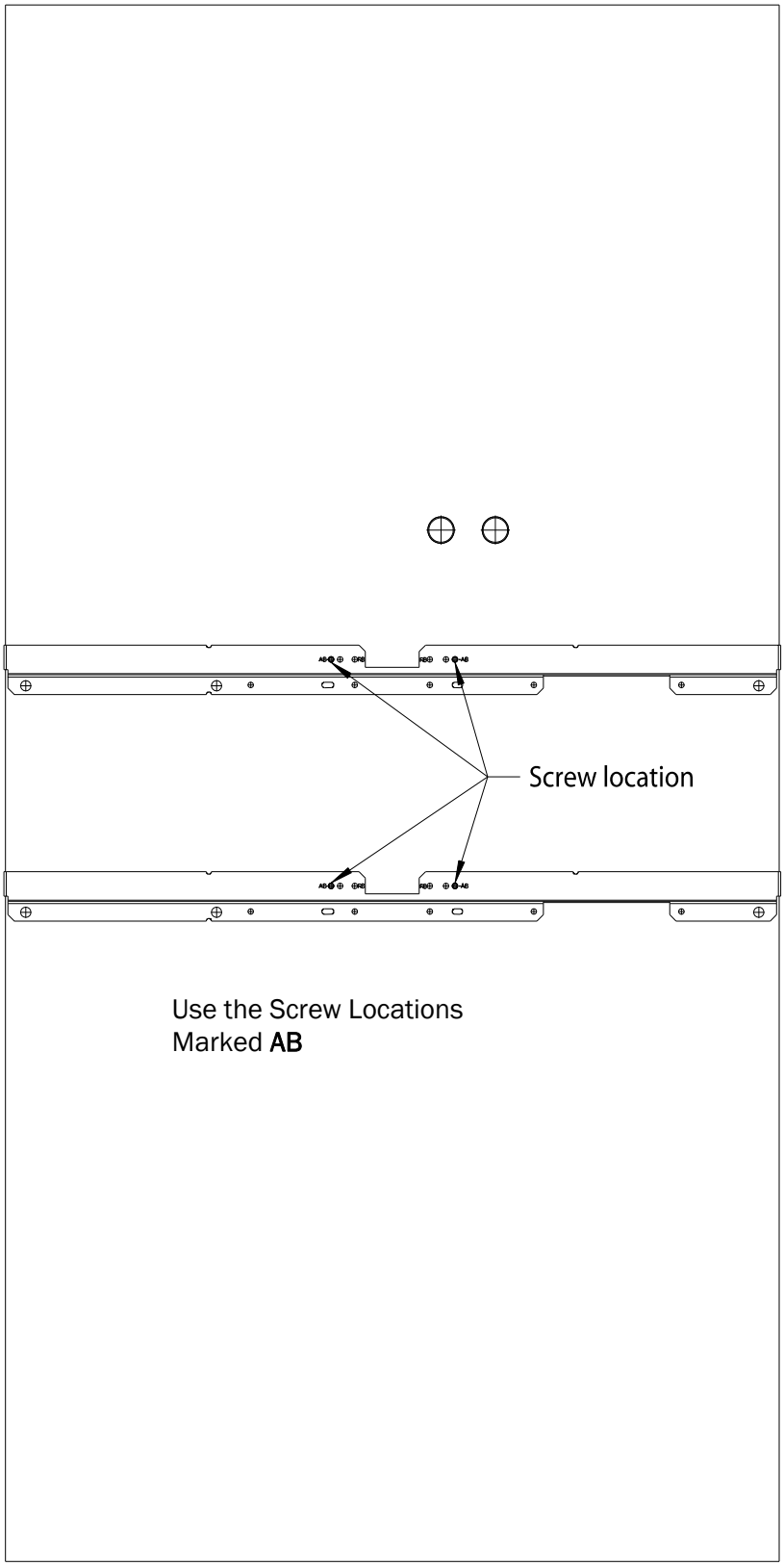

Figure 2-10: Core AP Below Ceiling Tile Mounting Rail Screw Locations

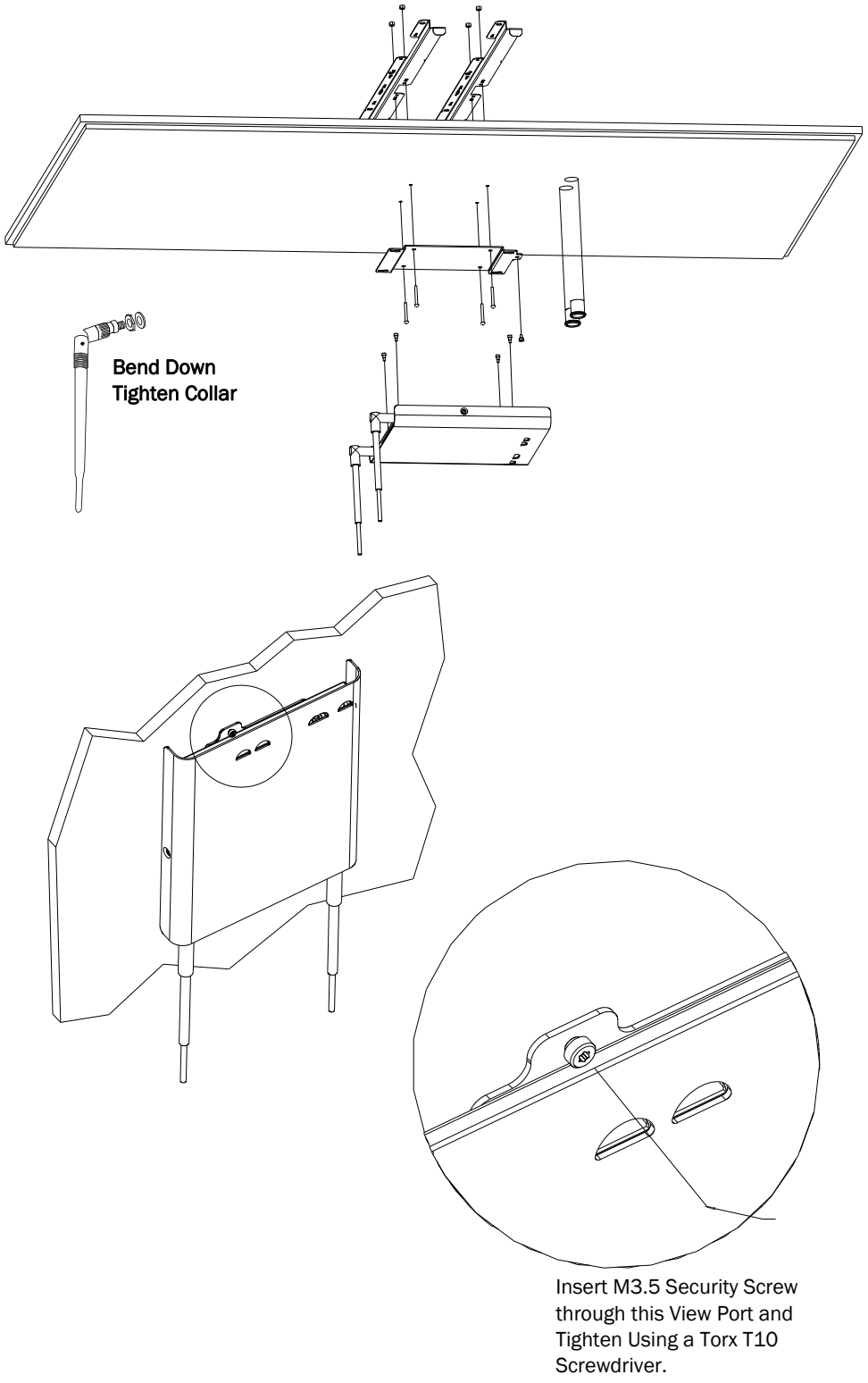

Figure 2-11: Mounting the Core AP Below a Ceiling Tile (Quick Release

10. Mount the Core AP to the wall plate by inserting the head of each shoulder screw into the four mounting holes provided in the wall plate and then sliding

the Core AP so that the shoulder screw heads are securely in the grooves of the wall plate.

11. Using a Torx T10 screw driver, secure the Core AP to the wall plate by screwing the supplied M3 0.5 X 0.6 T-10 Torx Head security screw into the PEM nut in the wall plate as shown in Figure 2-11. Torque-tighten the screw to 10-inch lbs. Note that this safety screw is used to prevent the Core AP from sliding out of the wall plate.
12. Orient the antenna(s) on the Core AP chassis so they bend upward at right angles to the chassis. Unscrew the collar, rotate the antenna into position, and then retighten the collar to secure the antenna in place.
13. Replace the tile back onto the ceiling frame structure with the Core AP antennas hanging down from the ceiling. Wiring connections to the Core AP can be accessed via the open hole in the tile.
14. Replace other adjacent ceiling tiles if necessary.

Mounting the IntelliVue Smart-hopping Remote Antenna to a Wall (Fixed Mount)

You can mount the IntelliVue Smart-hopping Remote Antenna (RA) to a wall using the mounting screws and screw anchors supplied with the RA. We recommend that you mount the RA high on the wall as close to the ceiling as possible.

To mount the 1.4 GHz IntelliVue Smart-hopping RA to a wall:

1. Using a 3/16-inch drill bit, drill two pilot holes 0.188 inches (5 mm) in diameter at the locations shown in Figure 2-12.
2. Tap a supplied plastic screw anchor into each pilot hole until it is flush with the wall surface.

   This step is not necessary if mounting the IntelliVue Smart-hopping RA on a wood surface.
3. Screw a supplied #6 x 1 1/4 inch self-tapping screw into each screw anchor (or pilot hole) as shown in Figure 2-12.

   Tighten each screw until a 1/16-inch (2 mm) gap remains between the screw head and the mounting surface.

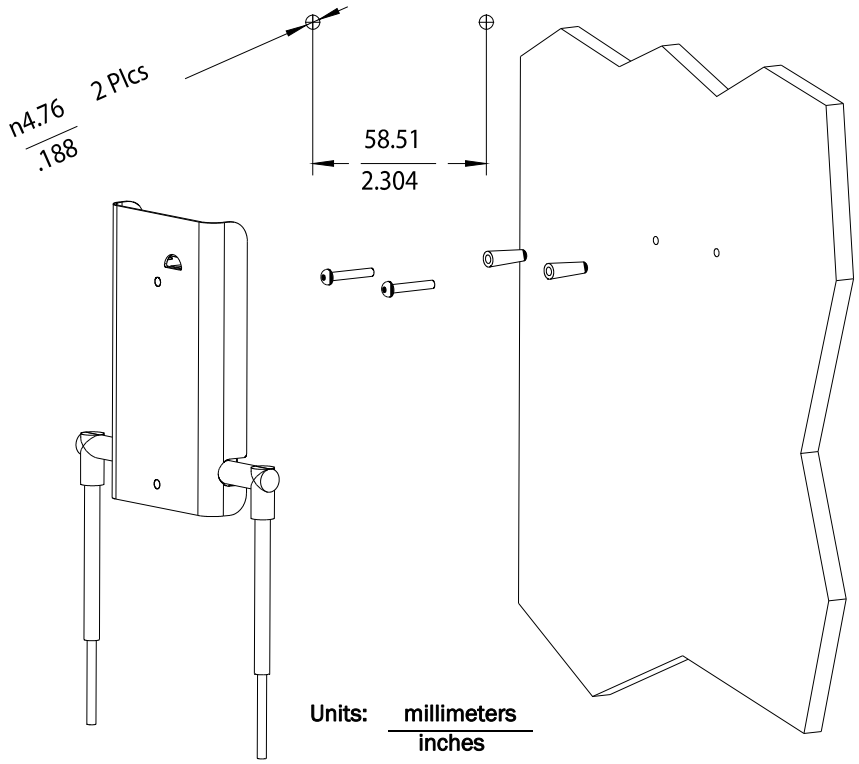

Figure 2-12: Mounting the IntelliVue Smart-hopping 1.4 GHz Remote Antenna to a Wall

4. While holding the RA chassis with its antennas pointing down as shown in Figure 2-12, fit the holes in the back of the RA chassis over the screw heads

that protrude from the wall. Slide the RA chassis down so that the screw heads are securely in the grooves in the back of the RA chassis.

Mounting the IntelliVue Smart-hopping Remote Antenna to a Wall (CA Earthquake Rated)

You can mount the IntelliVue Smart-hopping Remote Antenna onto walls using an optional California (CA) earthquake-rated wall plate. Use of this quick release wall plate enables you to relocate 1.4 GHz IntelliVue Smart-hopping RAs within your facility quickly and easily.

To mount the 1.4 GHz IntelliVue Smart-hopping RA to a wall:

1. Using a 3/16-inch drill bit, drill two pilot holes 0.188 inches (5 mm) in diameter at the locations shown in Figure 2-13.

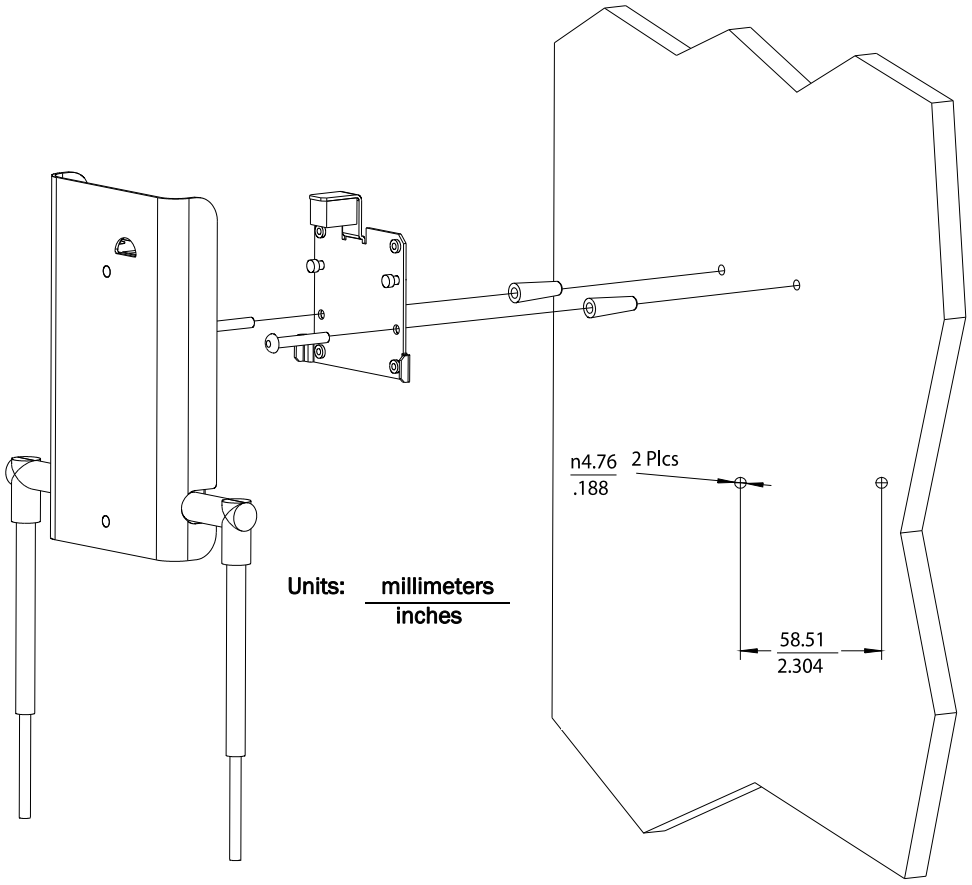

Figure 2-13: Mounting the IntelliVue Smart-hopping 1.4 GHz RA to a Wall (CA Earthquake Rated)

2. Tap a supplied plastic screw anchor into each pilot hole until flush with the wall surface.

   This step is not necessary if mounting the IntelliVue Smart-hopping RA on a wood surface.

3. Secure the quick release wall plate to the wall by screwing a supplied #6 x 1 1/4 inch self-tapping screw through the wall plate into each screw anchor (or pilot hole) as shown in Figure 2-13.

   Tighten each screw until the wall plate is fixed securely in place.

4. While holding the RA chassis with its antennas pointing down as shown in Figure 2-13, fit the openings in the back of the RA chassis over the two mounting studs that protrude from the wall plate, and then slide the RA chassis down so that the mounting studs are securely in the grooves in the back of the RA chassis.

Mounting the IntelliVue Smart-hopping Remote Antenna Above a Ceiling Tile (Mounting Rails)

You can mount the IntelliVue Smart-hopping Remote Antenna (RA) above a ceiling tile by using the mounting rails provided in the Above & Below Ceiling Tile Mount Kit (866328-IM2) for the Core AP and Remote Antennas.

Caution When installing the IntelliVue Smart-hopping Remote Antenna onto a suspended ceiling, make certain the ceiling grid is structurally rated to support the weight of the Remote Antenna, 0.32 kg (.7 lbs), and any extra cabling.

To mount the 1.4 GHz IntelliVue Smart-hopping RA above a ceiling tile:

1. Determine which ceiling tile the RA will be mounted onto, and the approximate RA placement and orientation of the antennas on the tile. Also, check for adequate clearance above the RA.
2. Remove the ceiling tile to which the RA will be mounted (and also an adjacent tile to facilitate installation).
3. Orient the antenna(s) on the RA chassis so they bend downward at right angles to the chassis. Unscrew the collar and rotate the antenna into position and tighten the collar to secure the antenna in place.
4. Determine where the two holes for the antennas are going to be located on the tile and mark the centers of the holes.

   The RA chassis can be rotated 90 degrees to the mounting rails. Choose the best placement of the RA to facilitate where the antennas will go through the ceiling tile. Note that there are two holes in the RA chassis to allow for tethering to other permanent structures where local building codes require this type of installation. Refer to Figure 2-14 or Figure 2-15 for the dimensions to locate the antenna holes in the ceiling tile.
5. Drill out two 3/4-inch (19 mm) diameter holes in the ceiling tile for the antennas. Lightly coat both plastic grommets with silicone adhesive and insert them into both holes in the tile (insert grommets from the outside of the tile).
6. Secure the mounting rails to the RA. Insert the four (4) M3 X 0.5 (8 mm LG) screws into the RA mounting rail holes, and into the mating holes in the back of the RA chassis as shown in Figure 2-15 or Figure 2-16. Torque-tighten each screw to 8-inch lbs.
7. Place the RA with mounting rails across the top of the tile.
8. Replace the tile back onto the ceiling frame structure with the RA antennas hanging down through the ceiling. Wiring connections to the RA can be accessed via the open adjacent tile.
9. Replace other adjacent ceiling tiles if necessary.

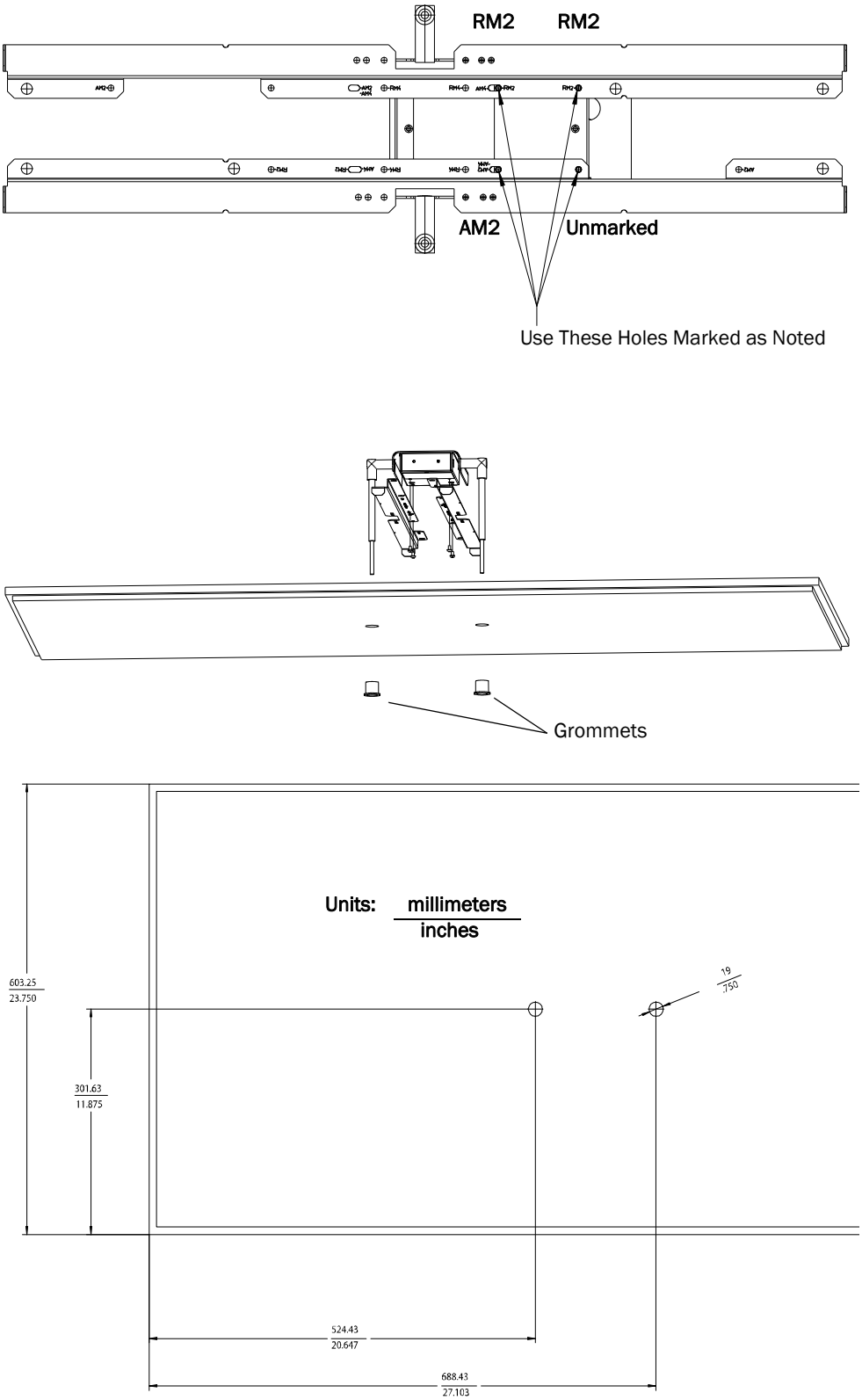

Figure 2-14: Possible Above the Ceiling Remote Antenna Mounting Position

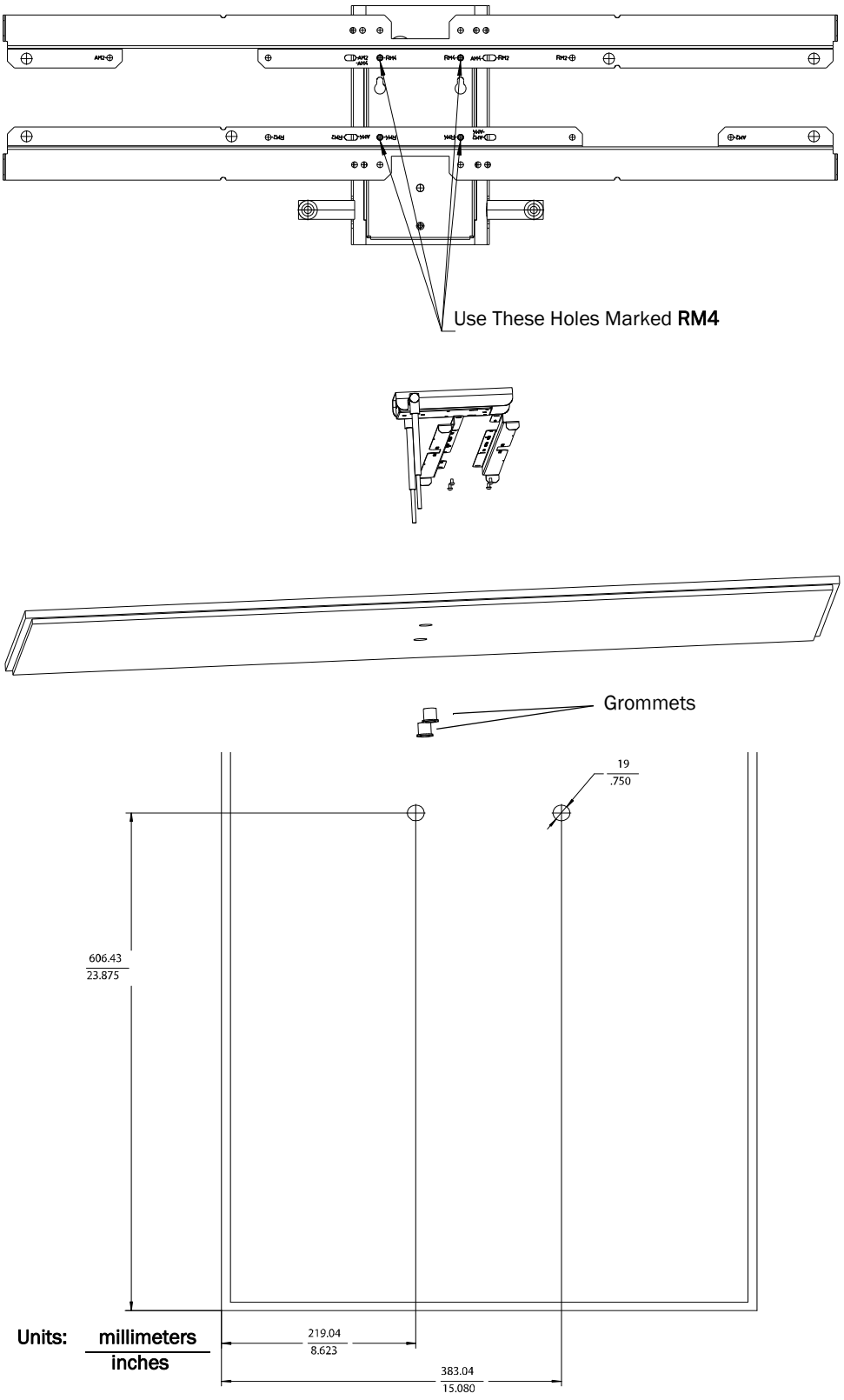

Figure 2-15: Alternative Above the Ceiling Remote Antenna Mounting Position

Mounting the IntelliVue Smart-hopping Remote Antenna Above a Ceiling Tile (Tether Mount)

You can mount the IntelliVue Smart-hopping Remote Antenna (RA) above a ceiling tile without the use of mounting rails if the following conditions are met:

- The ceiling tile can support the weight of the RA, 0.32 kg (.7 lbs), and any extra cabling.
- The RA is tethered securely to a permanent structure within the ceiling.
- A minimum of 12-gauge galvanized soft annealed mild steel wire conforming to ASTM A 641 is used to tether the RA chassis to a permanent structure within the ceiling.

To mount the 1.4 GHz IntelliVue Smart-hopping RA above a ceiling tile:

1. Determine which ceiling tile the RA is be mounted onto, and the approximate RA placement and orientation of the antennas on the tile. Also, check for adequate clearance above the RA.
2. Remove the ceiling tile to which the RA will be mounted (and also an adjacent tile to facilitate installation).
3. Orient the antenna(s) on the RA chassis so they bend downward at right angles to the chassis. Unscrew the collar and rotate the antenna into position and then retighten the collar to secure the antenna in place.
4. Determine where the two holes for the antennas are going to be located on the tile and mark the centers of the holes.

   Note that the RA antennas can be placed, and oriented in a variety of places to accommodate positioning the antennas through the tile (e.g., close to a side wall).

   Also, the RA chassis can be rotated 90 degrees. Choose the best placement of the RA to facilitate where the antennas will go through the ceiling tile. Refer to Figure 2-14 or Figure 2-15 for the dimensions to locate the antenna holes in the ceiling tile.
5. Drill out two 3/4-inch (19 mm) diameter holes in the ceiling tile for the antennas. Lightly coat both plastic grommets with silicone adhesive and insert them into both holes in the tile (insert grommets from the outside of the tile).
6. Insert the tether wire through the two holes located at the corner of the RA chassis. The tether wire should have three tight turns of the wire within 1.5 inches of the end of the wire.
7. Connect the other end of the tether wire to a permanent structure within the ceiling. The tether wire may be attached to any of the following:
   - wood or metal stud framing
   - blocking attached to wood or metal framing
   - plywood adequately attached to wood or metal stud framing, reinforced concrete, or reinforced masonry
   - reinforced concrete
   - reinforced masonry

8. Place the RA across the top of the tile.
9. Replace the tile back onto the ceiling frame structure with the RA antennas hanging down through the ceiling. Wiring connections to the RA can be accessed via the open adjacent tile.
10. Replace other adjacent ceiling tiles if necessary.

Mounting the IntelliVue Smart-hopping Remote Antenna Below a Ceiling Tile (Fixed Mount)

You can mount the IntelliVue Smart-hopping Remote Antenna (RA) below a ceiling tile by using the mounting rails provided in the Above & Below Ceiling Tile Mount Kit (866328-IM2) for the Core AP and Remote Antennas.

Caution When installing the IntelliVue Smart-hopping Remote Antenna onto a suspended ceiling, make certain the ceiling grid is structurally rated to support the weight of the Remote Antenna, 0.32 kg (.7 lbs), and any extra cabling.

To mount the 1.4 GHz IntelliVue Smart-hopping RA below a ceiling tile:

1. Determine which ceiling tile the RA is be mounted onto, and the approximate placement of the RA and orientation of the antennas hanging down from the ceiling tile.
2. Remove the ceiling tile the RA will be mounted to (and also the adjacent tile to facilitate installation).
3. Refer to Figure 2-16 for all dimensions and hole locations. Place the mounting rails across the tile (underside of tile). For ceiling tiles that are smaller than standard 2’ x 4’ size ceiling tile, the mounting rails can be cut down in length at the u-shaped cutouts.
4. Mark the location of the **RB** screw holes in the mounting rails on the ceiling tile where the holes will be drilled through the tile as shown in Figure 2-17. Drill four 0.25-inch (6 mm) diameter holes in the ceiling tile.
5. Determine where the hole for the Core AP cable is going to be located on the tile and mark the center of the hole.
6. Drill or cut out a 0.813-inch (21 mm) diameter hole for the Core AP cable to be connected to the RA. Lightly coat a plastic grommet with silicone adhesive and insert it into the hole in the tile (insert grommet from the outside of the tile).
7. Insert the four (4) M3-.5 x 30 lobe screws into the RA mounting rail holes, through the ceiling tile, through the provided plastic spacers, and into the mating holes in the back of the RA chassis as shown in Figure 2-18. Torque-tighten each screw to 8-inch lbs.

   Note that the RA mounting rails and spacers allow for sufficient airflow between the RA and the ceiling tile.
8. Orient the antenna(s) on the RA chassis so they bend upward at right angles to the chassis. Unscrew the collar and rotate into position and then retighten the collar to secure the antenna in place.
9. Replace the tile back onto the ceiling frame structure with the RA antennas hanging down from the ceiling. Cabling connections to the RA can be accessed via the open holes in the tile.

   Note that there are additional holes in the mounting rails to allow for tethering to other permanent structures where local building codes require this type of installation.
10. Replace other adjacent ceiling tiles if necessary.

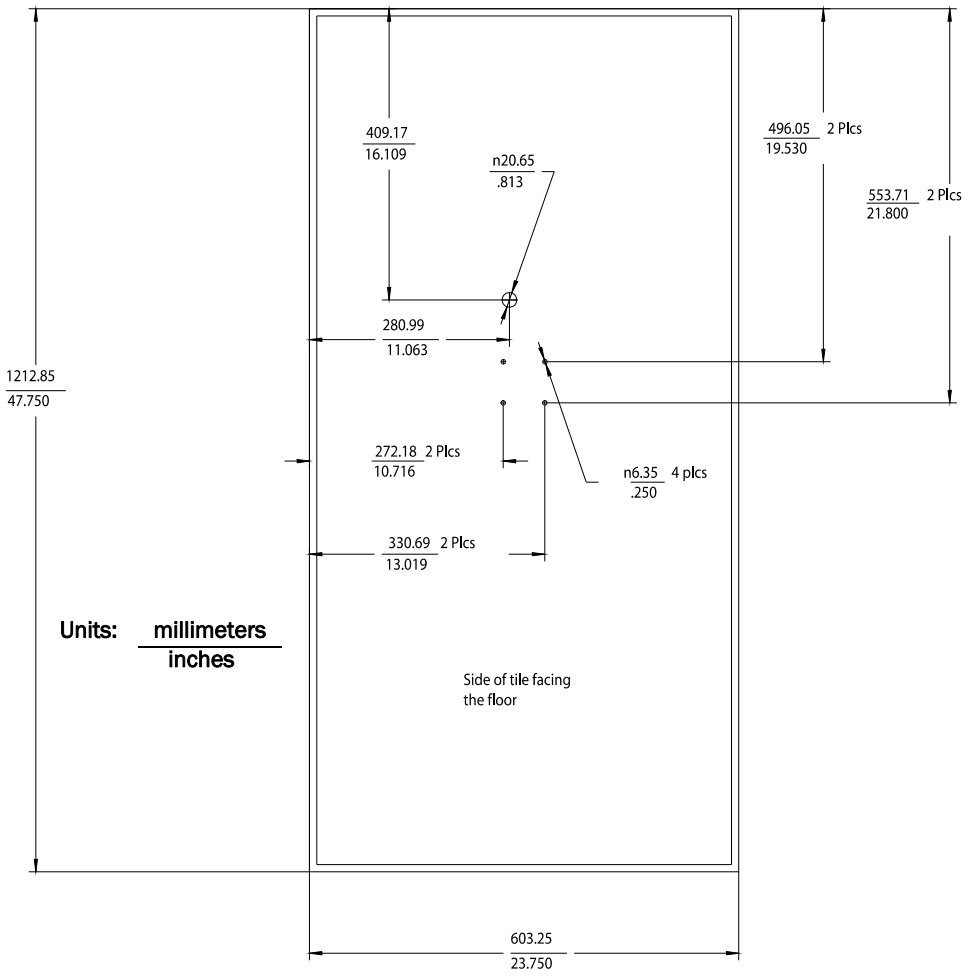

Figure 2-16: RA Below Ceiling Tile Hole Locations and Dimensions

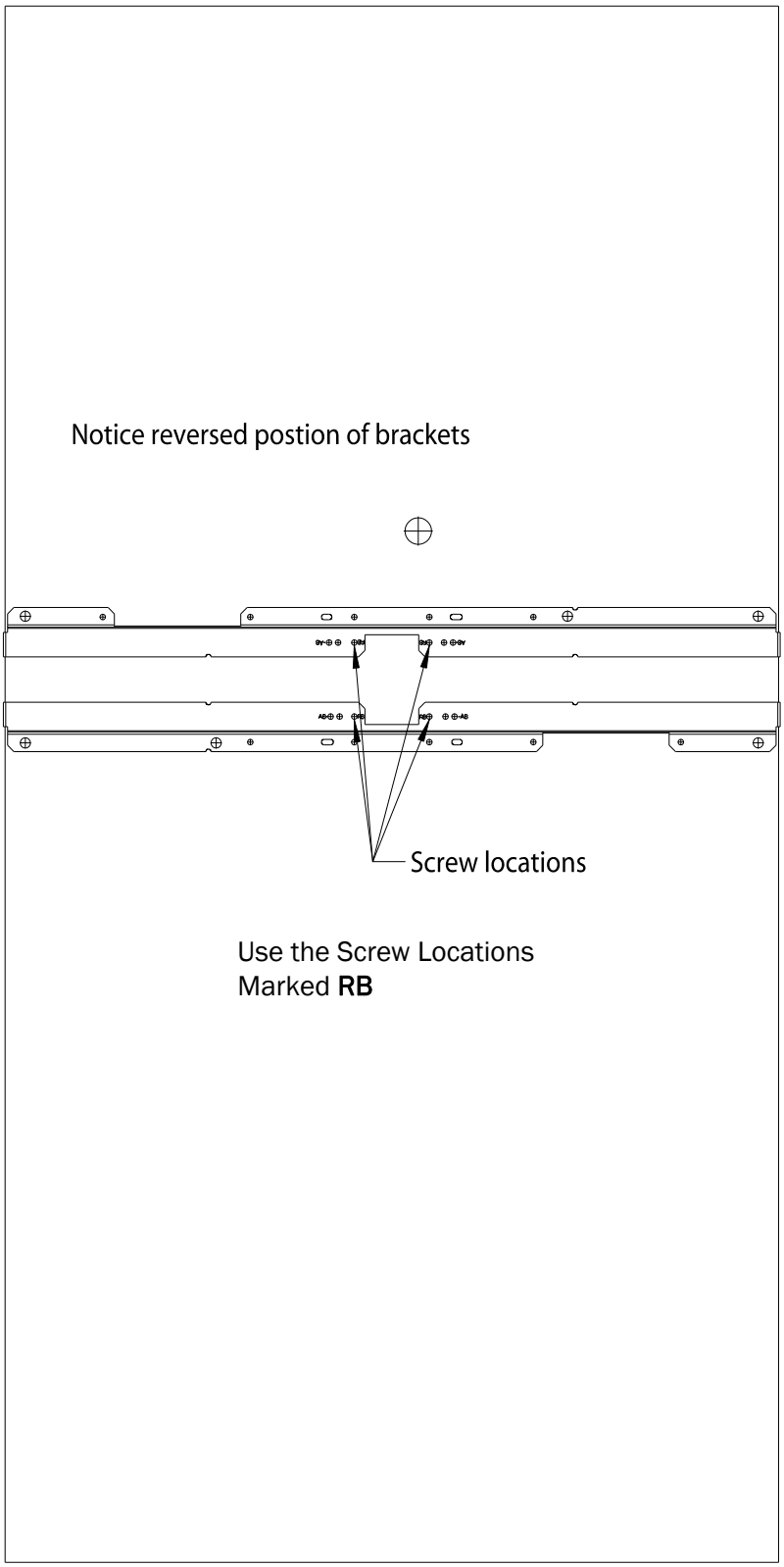

Figure 2-17: RA Below Ceiling Tile Mounting Rail Screw Locations

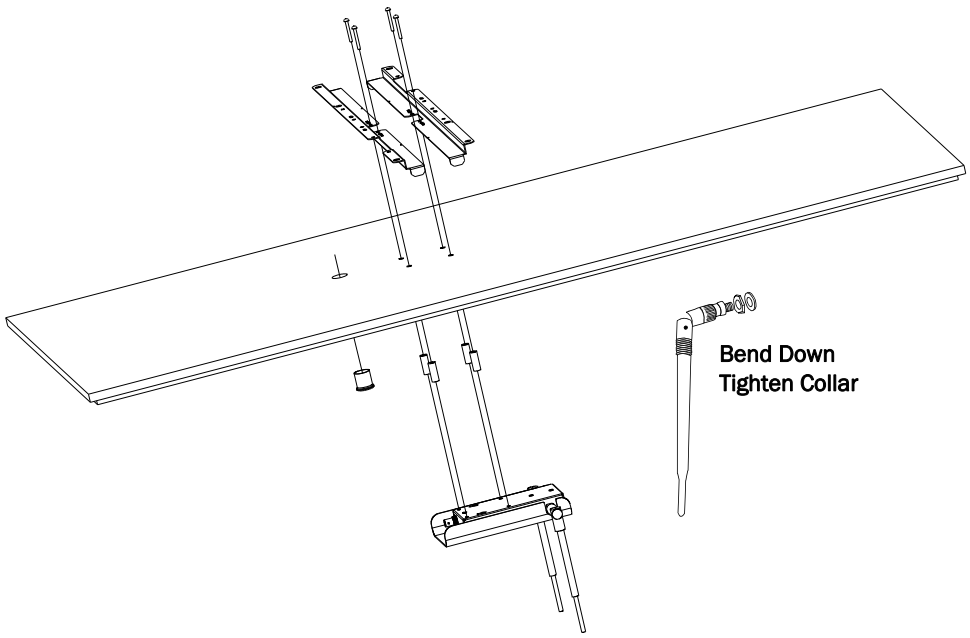

Figure 2-18: Mounting the RA Below a Ceiling Tile (Fixed Mount)

Mounting the IntelliVue Smart-hopping RA Below a Ceiling Tile (Quick Release)

You can mount the IntelliVue Smart-hopping Remote Antenna below a ceiling tile by using an optional quick release wall plate along with the mounting rails provided in the Above & Below Ceiling Tile Mount Kit (866328-IM2) for the Core AP and Remote Antennas. Use of this wall plate enables you to relocate 1.4 GHz IntelliVue Smart-hopping RAs within your facility quickly and easily.

Caution When installing the IntelliVue Access Point onto a suspended ceiling, make certain the ceiling grid is structurally rated to support the weight of the Access Point, 0.7kg (1.5 lbs), and any extra cabling.

To mount the 1.4 GHz IntelliVue Smart-hopping RA below a ceiling tile:

1. Determine which ceiling tile the RA will be mounted onto, and the approximate placement of the RA and orientation of the antennas hanging down from the ceiling tile.
2. Remove the ceiling tile to which the RA will be mounted (and also the adjacent tile to facilitate installation).
3. Refer to Figure 2-19 for all dimensions and hole locations. Place the mounting rails across the tile (underside of tile). For ceiling tiles that are smaller than standard 2’ x 4’ size ceiling tile, the mounting rails can be cut down in length at the u-shaped cutouts.
4. Mark the location of the “RB” screw holes in the mounting rails on the ceiling tile where the holes will be drilled through the tile as shown in Figure 2-20. Drill four 0.25-inch (6 mm) diameter holes in the ceiling tile.
5. Determine where the two holes for the Remote Antenna cabling are going to be located on the tile and mark the centers of the hole.
6. Drill or cut out a 0.813-inch (21 mm) diameter hole for the Core AP cable to be connected to the RA. Lightly coat a plastic grommet with silicone adhesive and insert it into each hole in the tile (insert grommet from the outside of the tile).
7. Place the wall plate over the four holes drilled on the bottom of the tile. Note: The top direction is as when the tile is in its installed position.
8. Insert the four (4) M3-.5 x 30 lobe screws into the RA mounting rail holes, through the ceiling tile, through the provided plastic spacers, and into the mating holes in the back of the wall plate.
9. Fit the openings in the back of the RA chassis over the two mounting studs that protrude from the wall plate and then slide the RA chassis so that the mounting studs are securely in the grooves in the back of the RA chassis.

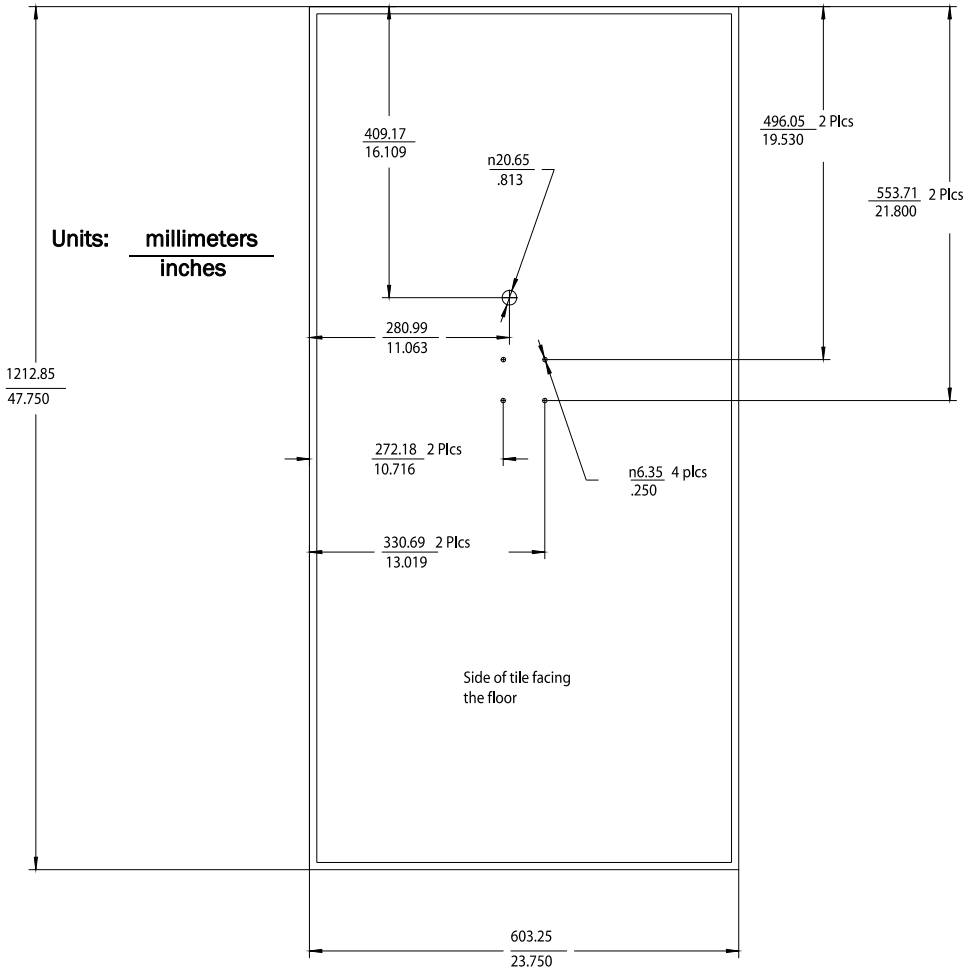

Figure 2-19: RA Below Ceiling Tile Hole Locations and Dimensions

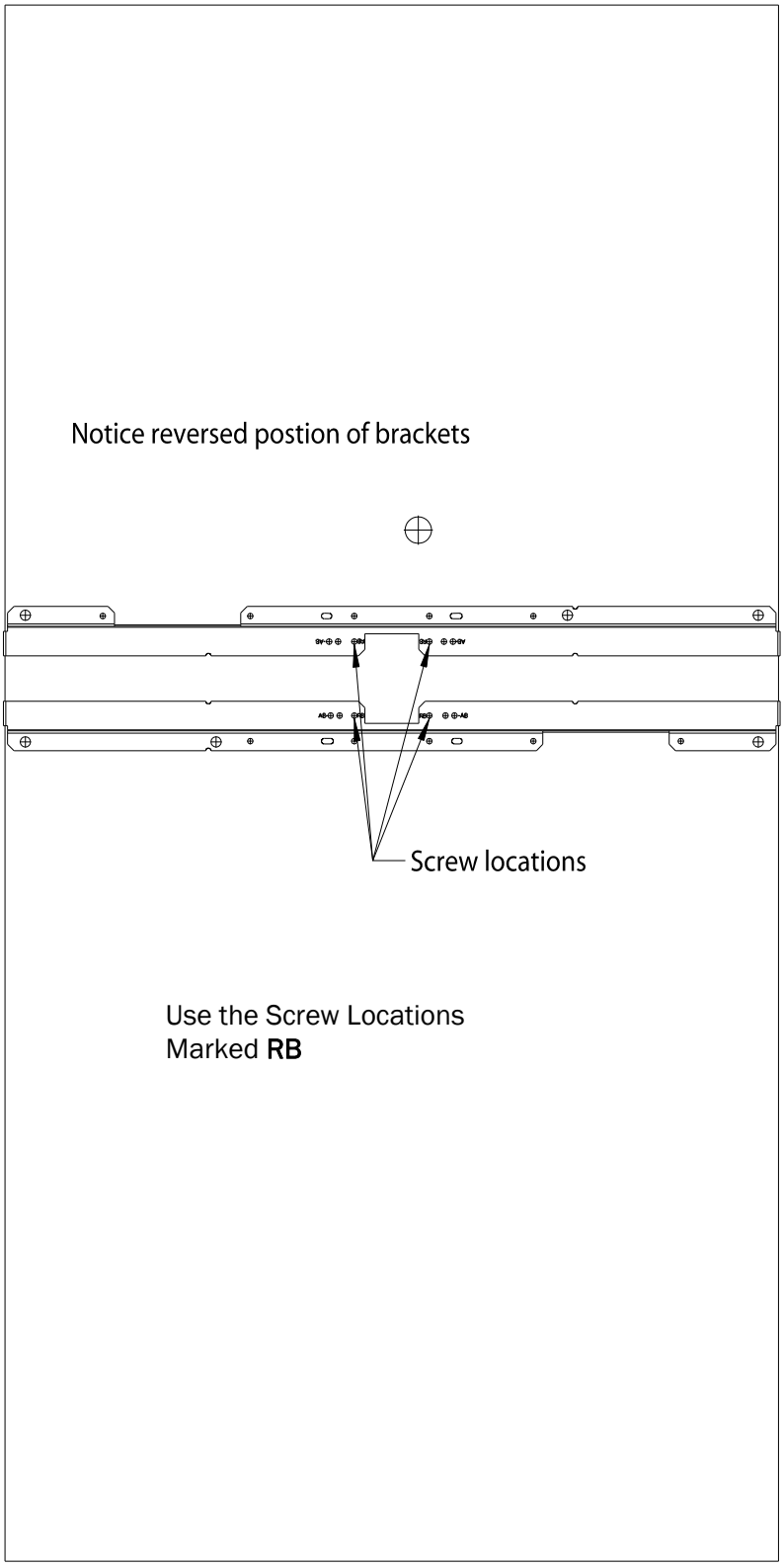

Figure 2-20: RA Below Ceiling Tile Mounting Rail Screw Locations

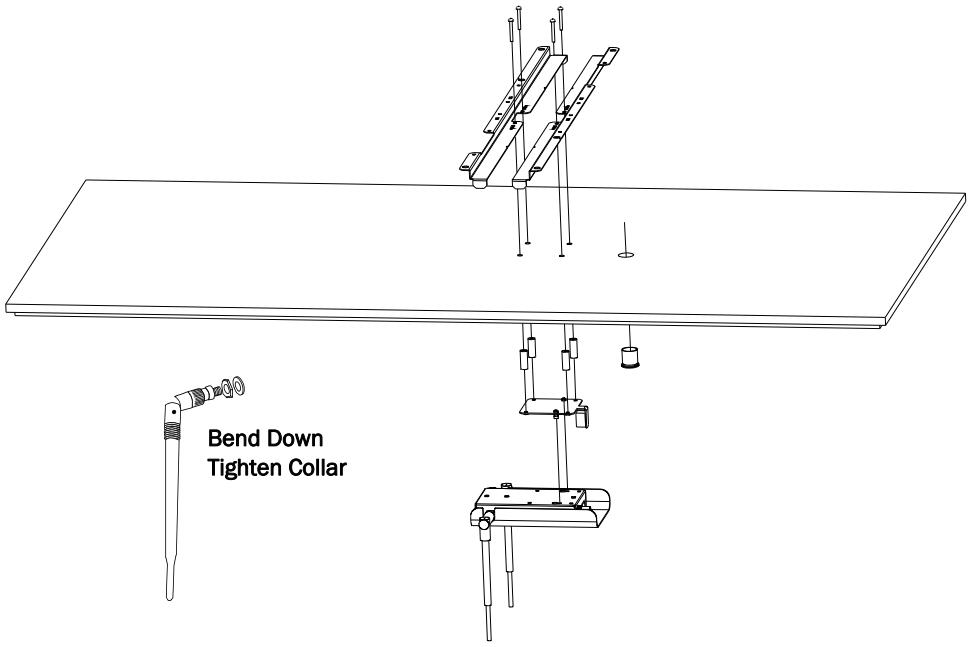

Figure 2-21: Mounting the RA Below a Ceiling Tile (Quick Release

3

Installing the IntelliVue Smart-hopping 1.4 GHz Core Access Point

This chapter provides procedures to physically install the Philips IntelliVue Smart-hopping 1.4 GHz Core Access Point and includes:

- Access Point Placement Guidelines
- Installation Procedure
- AP Configuration Information
- Access Point Startup Sequence

Access Point Placement Guidelines

Note the following important guidelines when locating IntelliVue Smart-hopping Access Points:

- Consider building construction when placing APs to account for interference from ceramic wall tile, lead lined walls, elevator shafts, reinforced windows, and other obstacles which may cause signal degradation.
- APs should not be placed in locations with more than one wall between the AP and the coverage area.
- Ensure that the coverage area takes into account bathrooms, hallways, and windows.
- AP antennas must be more than four inches (10 cm) away from metal structures. If the antennas are too close to the structure, antenna performance can be degraded.
- A Core AP alone supports 18 IntelliVue Patient Monitors. When used with a single RA, the Core AP supports nine IntelliVue Patient Monitors and its connected RA supports nine IntelliVue Patient Monitors (9+9=18). When used with two RAs, the Core AP supports six IntelliVue Patient Monitors and its connected RAs each support six IntelliVue Patient Monitors (6+6+6=18).
- If there is a need to support more than 18 IntelliVue Patient Monitors within a single Radius-of-Coverage cell, Access Points/Remote Antennas can be moved closer together until the desired density is achieved.
- APs or Remote Antennas shall not be placed closer than three feet (1 m) from other APs or RAs to prevent signal overload conditions.
- Each IntelliVue Smart-hopping Access Point requires a 100Mbps/Full Duplex switch port connection.
- Try to avoid placing APs close to other electrical devices (exit lights, light fixtures, speakers, etc.). Devices like florescent light ballasts can create a significant amount of interference that can impact system performance.
- Orient the antennas on IntelliVue Smart-hopping APs so that they are perpendicular to the floor.

Installation Procedure

To install the IntelliVue Smart-hopping 1.4 GHz Core Access Point:

1. Mount the Access Point and Remote Antennas where they can communicate with IntelliVue Patient Monitors. Note these guidelines when installing the IntelliVue Smart-hopping Core Access Point and Remote Antennas:
   - You may mount each IntelliVue Smart-hopping Core Access Point as follows:
     - to a wall (fixed mount) as described on page 2-2
     - to a wall (CA earthquake rated) as described on page 2-3
     - above a ceiling as described on page 2-5
     - below a ceiling (fixed mount) as described on page 2-8
     - below a ceiling (quick release) as described on page 2-12
   - You may mount each IntelliVue Smart-hopping Remote Antenna as follows:
     - to a wall (fixed mount) as described on page 2-17
     - to a wall (CA earthquake rated) as described on page 2-19
     - above a ceiling as described on page 2-21
     - above a ceiling (tether mount) as described on page 2-24
     - below a ceiling (fixed mount) as described on page 2-26
     - below a ceiling (quick release) as described on page 2-30
   - Use category 5 (or better) Unshielded Twisted Pair cable to connect each IntelliVue Smart-hopping Core Access Point to the IntelliVue Smart-hopping infrastructure.
   - The total length of UTP cable from the IntelliVue Smart-hopping access point to the IntelliVue Smart-hopping Synchronization Unit to the IntelliVue Smart-hopping Power over Ethernet Unit to the network switch cannot exceed 328 ft. (100 m).
   - Use only the supplied, unmodified 74 ft. (22.6m) Coax and UTP cable bundle when connecting Remote Antennas to the Core AP.
2. Attach each supplied local antenna to the Core AP chassis by inserting the antenna into the socket connector. Orient the antenna (either straight for wall mounting or rotate downward for ceiling tile mounting) and then screw on its collar until the antenna is secure to the chassis.
3. Attach each supplied antenna to the Remote Antenna chassis by inserting the antenna into the socket connector. Orient the antenna (either straight for wall mounting or rotate downward for ceiling tile mounting) and then screw on its collar until the antenna is secure to the chassis.
4. If you have installed Remote Antennas, connect each IntelliVue Smart-hopping Core Access Point to its installed Remote Antenna(s) using the supplied, unmodified 74 ft. (22.6m) Coax and UTP cable bundle(s).

Caution Ensure you do not kink the RA Coax-and-UTP-cable-bundle during installation. You must maintain a minimum 2.5 inch (64-mm) bend radius for the RA Coaxial and UTP cable bundle throughout the installation.

a) Connect the first Remote Antenna to the Core AP using the UTP and Coaxial cable connectors labeled **RA 1** in Figure 3-1.

b) Connect the second Remote Antenna to the Core AP using the UTP and Coaxial cable connectors labeled **RA 2** in Figure 3-1.

c) Be sure to label the UTP cable bundles and the Remote Antennas themselves as **RA 1** and **RA 2** corresponding to the cable connections you made in steps a and b.

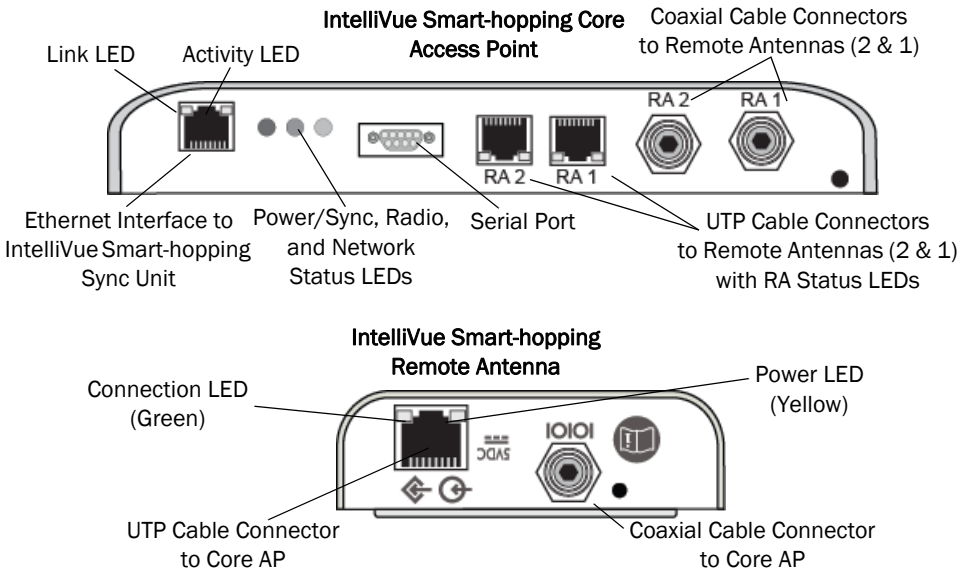

Figure 3-1: Smart-hopping Core AP and Remote Antenna Controls and Connectors

5. Route a Category 5 (or higher) RJ-45 cable between each IntelliVue Smart-hopping Core Access Point and the equipment closet in which the IntelliVue Smart-hopping infrastructure devices are installed.
   - The 862228 Access Points use Unshielded Twisted Pair cables.
   - The 866394 Access Points require Shielded Twisted Pair cables to protect the system from power line transients.
6. Install a ferrite block on the RJ-45 cable within 20 inches (50 cm) of the RJ-45 connector that connects to the Core Access Point as shown in Figure 3-2.

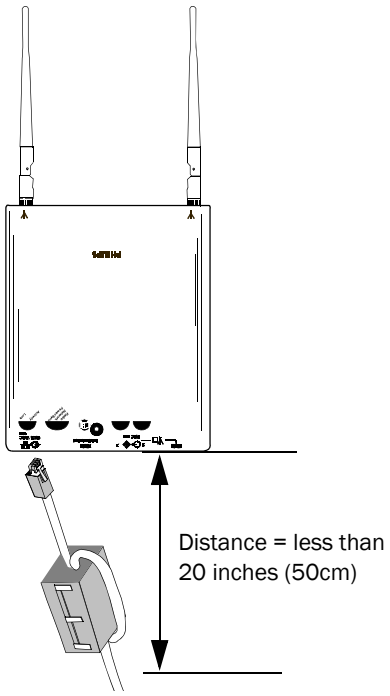

Figure 3-2: Installing a Ferrite Block on the UTP Cable to the IntelliVue Smart-hopping Infrastructure

7. Connect the Access Point to the IntelliVue Smart-hopping Sync Unit only when appropriate as part of the overall IntelliVue Smart-hopping installation.
   a) After initially connecting and powering the Core AP, verify that the two status LEDs on each of its connected Remote Antennas are lit. You can verify this by viewing the AP status page presented in the APC web interface.

Note If after connecting and powering the Core AP, its LEDs are lit red and the Remote Antenna LEDs do not light at all, open the APC web interface, click **System** in the **View Device tree**, click **Configure** and then select the **Advanced** tab. Verify that the **Allow new APs to be added automatically** option is set to **True**. This option must be set to **True** for the Core AP and Remote Antenna LEDs to light properly.

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   b) Reboot the Core AP.

      The Core AP and its connected Remote Antennas should now be listed in the APC web interface. Press **F5** to refresh the web interface display if the Core AP and RAs are not listed.

   c) For instructions on the AP startup sequence, see page 3-6.

Access Point Startup Sequence

Upon power on/start up, the IntelliVue Smart-hopping Core Access Point will perform a Power-on-Self-Test (POST) to ensure that its basic components are fully functional.

This test detects critical system failures. As the test progresses the state of the system is displayed through a series of color combinations on the Power/Sync, Radio, and Network LEDs on the front of the AP. All three LEDs illuminate AMBER color, then the Power/Sync LED illuminates GREEN and the other two LEDs turn off (not illuminated) indicating correct startup. Should a test fail the LEDs are left in a state which indicates the point at which the test failed. When the system is transmitting data the radio and network LEDs on the AP will flicker on and off as data is transmitted.

AP Configuration Information

Refer to the *IntelliVue Smart-hopping Infrastructure Installation and Service Guide* for complete details about configuring the IntelliVue Smart-hopping AP.

4

Maintaining the IntelliVue Smart-hopping 1.4 GHz Core Access Point

This chapter provides procedures and information for maintaining the IntelliVue Smart-hopping 1.4 GHz Core Access Point and includes:

- Maintenance Procedure
- Troubleshooting the Core AP Using its LEDs
- Replacing a Core AP or Remote Antenna
- Ordering Replacement Units

Maintenance Procedure

To ensure that your Access Point/Core Access Point (AP) and Remote Antenna (RA) continue to operate properly, perform the following maintenance tasks periodically:

- Ventilation - The AP and RA cases are vented to provide air circulation and cooling for the devices. Keep the immediate area around the AP and RA open to allow for natural air circulation around the devices. Periodically, dust the AP and RA cases to keep their ventilation holes open.
- Antenna Orientation - Under normal operation, the AP or RA antennas may get bumped by cleaning crews and/or construction crews and cause the antennas to move from their original position set at installation.

  Periodically check the antennas on all of the APs and RAs at the installation site for correct orientation, alignment, direction, and placement. If necessary, loosen the collar on the antenna and adjust the antenna for proper placement, orientation, and direction. Then, tighten the antenna collar to secure the antenna in place. In general, orient the two local antennas on each Core AP and RA so they are perpendicular to the floor.

Troubleshooting the Core AP Using its LEDs

Complete test and inspection procedures for the Core Access Point are provided in the *IntelliVue Smart-hopping Infrastructure Installation and Service Guide*. Perform these procedures when the IntelliVue Smart-hopping Access Point is initially installed and after servicing the unit.

Figure 4-1 shows the location of the Core Access Point LEDs.

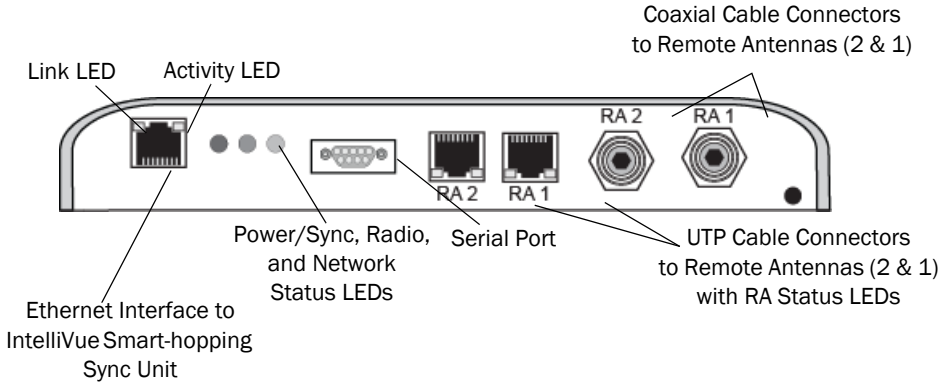

Figure 4-1: Core Access Point LEDs

This section provides a summary of the Core AP system status LEDs to help you troubleshoot AP issues that may arise. The Core AP provides the following status LEDs:

- Wired/Ethernet Activity - The Core AP provides two LEDs to indicate wired/ Ethernet activity to the IntelliVue Smart-hopping infrastructure. During normal operation, these LEDs indicate the following information:

- **Link LED** - Link present/Ethernet connection. Lights GREEN (ON) when a pass-through link is present - OFF when not present.
- **Act LED** - Wired network activity. Flashes GREEN (ON) when there is activity is over the wired network.

- **Wireless/RF Activity** - The AP provides three LEDs to indicate wireless/RF activity. During normal operation, these LEDs indicate the following information:
  - **Power/Sync LED** - GREEN (ON) when power and synchronization signal is present.
  - **Radio LED** - Normally OFF (not lit) - flashes green to indicate wireless network activity.**Network LED** - Normally OFF (not lit) - flashes green to indicate wired network activity.
- **Remote Antenna** - The Core AP provides two LEDs on each RJ-45 UTP cable connector that provides status on a connected Remote Antenna:
  - **RA Connection** - Lights GREEN to indicate a RA is connected to the Core AP.
  - **RA Power** - Lights YELLOW to indicate connected RA is receiving power from the Core AP.

If the Status LED indicators are not functioning properly as indicated, perform the appropriate troubleshooting procedures. If you cannot resolve the problem with the LEDs, then note the LED lighting and sequence of colors, replace the unit, and send the defective unit back to Philips with the explanation of LEDs sequence and colors displayed. Refer to the *IntelliVue Smart-hopping Infrastructure Installation and Service Guide* for complete AP replacement procedures.

Troubleshooting the Remote Antenna Using its LEDs

Complete test and inspection procedures for the IntelliVue Smart-hopping 1.4 GHz Remote Antenna are provided in the *IntelliVue Smart-hopping Infrastructure Installation and Service Guide*. You must perform these procedures when the Remote Antenna is initially installed and after servicing the unit.

Figure 4-2 shows the location of the Remote Antenna LEDs.

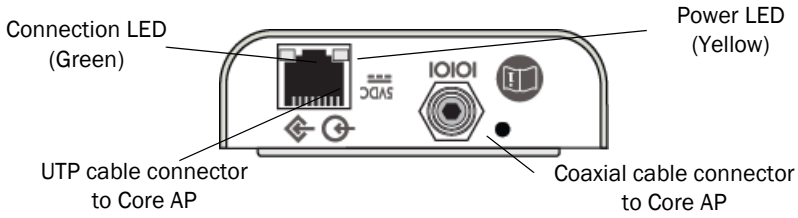

Figure 4-2: Remote Antenna LEDs

This section provides a summary of the Remote Antenna's status LEDs to help you troubleshoot RA issues that may arise.

- **Remote Antenna** - The Core AP provides two LEDs on each RJ-45 UTP cable connector that provides status on a connected Remote Antenna:
  - **RA Connection** - Lights GREEN to indicate a RA is connected to the Core AP.

- **RA Power** - Lights YELLOW to indicate connected RA is receiving power from the Core AP.

If the Status LED indicators are not functioning properly as indicated, then refer to the following sections and the *IntelliVue Smart-hopping Infrastructure Installation and Service Guide* for complete Remote Antenna replacement procedures.

Replacing a Core AP or Remote Antenna

To repair a non-working Access Point or Remote Antenna, replace the unit. Individual AP or RA components, PC assemblies, or sub-assemblies are not available for purchase.

If an AP or RA is not working properly, call your local Philips Field Service Engineer, Customer Engineer, or the Philips Customer Care Solutions Center for information on ordering a replacement unit and returning the defective unit.

Use the following toll-free number to contact the Philips Customer Care Solutions Center:

- Telephone: (+1) 800-722-9377

When replacing defective equipment on your IntelliVue Smart-hopping infrastructure, be sure to follow the procedures given in the *IntelliVue Smart-hopping Infrastructure Installation and Service Guide*.

Ordering Replacement Units

This section contains information for ordering replaceable parts and assemblies for the IntelliVue Smart-hopping 1.4 GHz Core Access Point and Remote Antenna. The parts are listed in tables by major assemblies. Each table contains the orderable part number (new or exchange) and a description of the part. You can order only the part numbers listed in Table 4-1.

To order a replacement part:

1. Identify the faulty component, part, subassembly or assembly.
2. Locate the replacement part number for that major assembly in Table 4-1.
3. Order replaceable parts from your nearest Philips Sales/Service office or from the Philips Support Materials Organization. A complete listing of the Philips Sales/Service Offices addresses with phone numbers is located at the end of this chapter.

Table 4-1: Ordering Core Access Point and Remote Antenna Replacement Parts

Part Number	Description
453564235171	IntelliVue 1.4 GHz Enhanced Smart-hopping High power Access Point with Remote Antenna, 1.4 GHz. Complete AP unit includes the following: AP Case (top cover and shell), Main PC Board, Radio Module PC Board, and Two External Antennas.
453564656031	IntelliVue Remote Antenna, 1.4 GHz. Complete unit includes the following: RA Case (top cover and shell), Main PC Board, Radio Module PC Board, and Two External Antennas.
453564656041	1.4 GHz Antenna with SMA-style Connector
453564052201	Core AP/Remote Antenna Ceiling Mount Kit
453564090571	Ferrite Core Block

Philips Sales and Support Offices Worldwide

Please call your local sales office listed in your telephone directory or a regional office listed below for the location of your nearest sales office.

CORPORATE HEADQUARTERS:

Philips Medical Systems
Netherlands B.V.
Postbus 10.000
5680 DA Best
Netherlands

UNITED STATES:

Philips Medical Systems
3000 Minuteman Road
Andover, MA 01810
(800) 934-7372

CANADA:

Philips Medical Systems
281 Hillmount Road
Markham, ON L6C 2S3
(800) 291-6743

EUROPE, MIDDLE EAST AND AFRICA:

Philips Medizin Systeme Böblingen GmbH
Cardiac and Monitoring Systems
Hewlett-Packard Str. 2
71034 Böblingen
Germany
Fax: (+49) 7031 463 1552

LATIN AMERICA HEADQUARTERS:

Philips Medical Systems
1550 Sawgrass Corporate Parkway #300
Sunrise, FL 33323
Tel: 954-835-2600
Fax: 954-835-2626

ASIA PACIFIC HEADQUARTERS:

Philips Medical Systems
30/F Hopewell Centre
17 Kennedy Road
Wanchai
Hong Kong
Tel: (852) 2821 5888
Fax: (852) 2527 6727

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