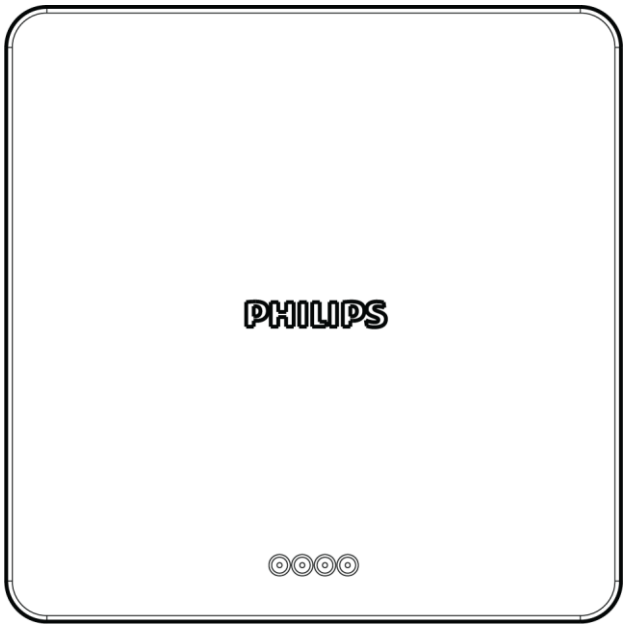
Smart-hopping 2.0 Access Point 1.4 GHz Installation Guide



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Proprietary Information

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Contents

About This Guide

This *Smart-hopping 2.0 Access Point 1.4 GHz Installation Guide* provides complete instructions and procedures for installing the Philips Smart-hopping 2.0 Access Point 1.4GHz. This chapter describes the document and includes:

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

Audience

Philips wrote the *Smart-hopping 2.0 Access Point 1.4 GHz Installation Guide* for trained service personnel who install the Smart-hopping 1.4 GHz Access Point as part of an overall Smart-hopping deployment.

Document Organization

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

- *Chapter 1, Overview,* describes the Smart-hopping 2.0 1.4 GHz Access Point and how it provides a bidirectional data flow between the Philips Patient Information Center iX (PIC iX) server and Patient Monitors.
- *Chapter 2, Mount and Install the Smart-hopping 2.0 Access Point 1.4 GHz,* includes instructions for mounting the Access Point to a wall, flush with a ceiling tile, below a ceiling tile, and tether mounted.
- *Chapter 3, Installing the Smart-hopping 2.0 Access Point 1.4 GHz,* provides procedures for physically installing the Philips Smart-hopping 2.0 Access Point 1.4GHz.
- *Chapter 3, Maintaining the Smart-hopping 2.0 Access Point 1.4 GHz,* provides procedures to maintain and troubleshoot operation of the Philips Smart-hopping 2.0 Access Point 1.4GHz.

Notational Conventions

This guide uses the following notational conventions to convey information:

Note Notes direct your attention to important information.

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

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

Related Documentation

Refer to these other documents for other installation service information about the Smart-hopping infrastructure:

- *Smart-hopping 2.0 Access Point Controller Installation Guide* - provides procedures for physically installing and powering the Smart-hopping Access Point Controller at the clinical site.
- *Smart-hopping 2.0 Infrastructure Installation and Service Guide* - provides complete information and procedures to install, configure, inter-connect, and deploy the 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, Access Point configuration procedures, and APC and Access Point firmware deployment procedures.
- *Smart-hopping Synchronization Unit Installation Guide* - lists procedures to install the Smart-hopping Sync Unit at the clinical site.
- *Smart-hopping 2.0 Upgrade Guide* - gives instructions on upgrading Philips Smart-hopping infrastructure (Access Points and Access Point Controllers).

Terminology

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

- **Access Point (AP)** - A Smart-hopping component that provides bidirectional wireless access to the monitoring network for Patient Monitors.
- **Access Point Controller (APC)** - A Smart-hopping component used to manage the operation of the Access Points. One APC is elected as the Primary APC. The Primary APC supports the web-based interface to the system and manages the overall configuration.
- **Access Point Group/AP Group** - A logical grouping of Access Points. Access Point members of the same Access Point Group inherits common configuration settings (defaults). Access Point groups often map logically to the clinical units in which you install the Smart-hopping Infrastructure.
- **IntelliVue Network -** This term refers to the entire IntelliVue Network. In a routed topology, the IntelliVue Network includes the routers, switches, firewalls, and the Smart-hopping wireless infrastructure.
- **Patient-Worn Monitor (PWM)** - The Patient-Worn Monitor relays real time Physiological waveforms and trends to the Philips Patient Information Center iX (PIC iX).
- **Smart-hopping infrastructure** - Philips proprietary wireless network designed for continuous monitoring that provides two-way communications between Patient Monitors and the PIC iX server.
- **Smart-hopping Infrastructure Service Tool** - The software used to upgrade Smart-hopping APCs and Access Points, 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 Smart-hopping network. The Smart-hopping Infrastructure Service Tool is also referred to as the Upgrade Tool. This tool was previously referred to as the Upgrade Wizard.
- **Partnered APC** - Configurable element within an Access Point Group used to determine which APC manages the operation of the Access Point members of a particular Access Point Group.
- **Power over Ethernet (PoE) Switch** - The Power over Ethernet (PoE) Switch is a Power-over-Ethernet device that provides 48-VDC power to Access Points (and also remote Sync Units if connected) via 100Base-TX Ethernet LAN cabling.
- **RF (Radio Frequency) Access Code** - Configurable element in the Smart-hopping Access Point defaults shared among Access Points and wireless clients to control wireless access to the

monitoring network. Wireless devices 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 Smart-hopping Sync Unit provides a necessary common clock signal to synchronize all the Access Points in the system. When patients move around the hospital coverage area their transmitted data are handed over from one Access Point to another seamlessly without interruption or data loss.
- **Smart-hopping Network**- This term is used to describe the infrastructure used in a network topology to connect Smart-hopping devices (Access Points, Access Point Controllers, Synchronization Units).
- **System ID** - Configurable element in the APC Configuration that logically associates Access Points and Access Point Controllers operating within the same Smart-hopping Infrastructure.
- **Uninterruptible Power Supply (UPS)** - The UPS supplies backup power to protect against hospital generator change-over interruptions, and short power line transients.

1

Overview

This chapter provides a high-level overview of the Smart-hopping 2.0 Access Point 1.4 GHz. This chapter and includes:

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

Introduction

The Smart-hopping infrastructure uses a cellular wireless architecture to provide two-way communications between Patient-Worn Monitors and the PIC iX server.

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

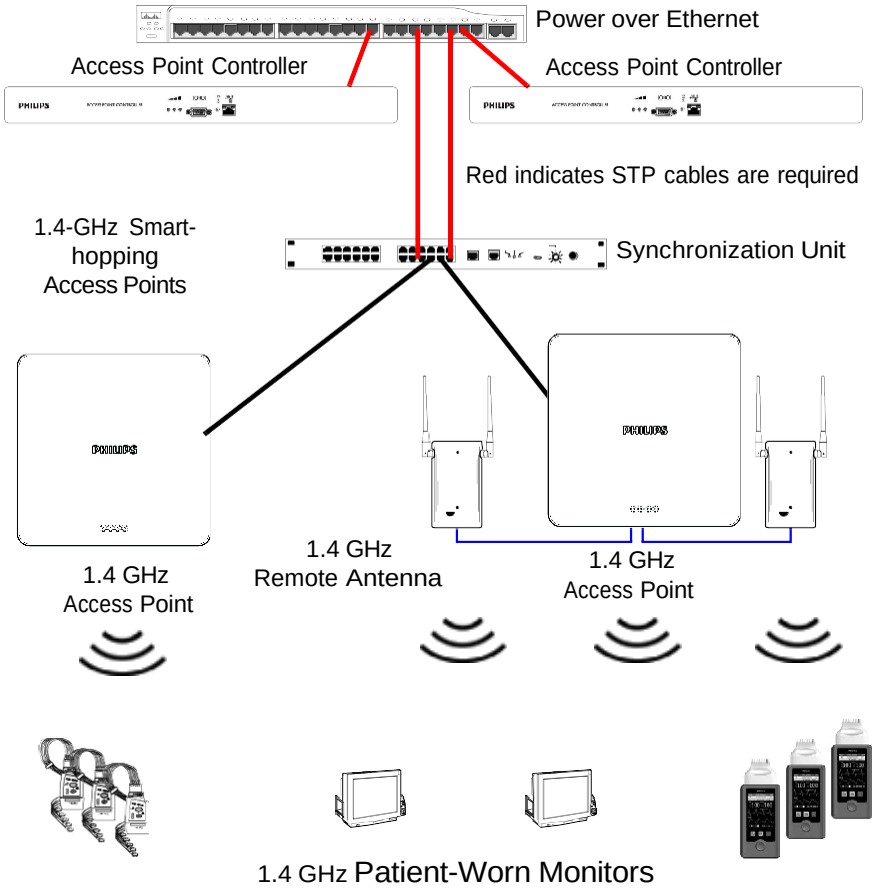

Figure 1-1: Smart-hopping 2.0 Access Point 1.4 GHz Infrastructure

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

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 Smart-hopping infrastructure is designed to co-exist with other 802.11 wireless deployments.

A General Description of the Smart-hopping Access Point

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

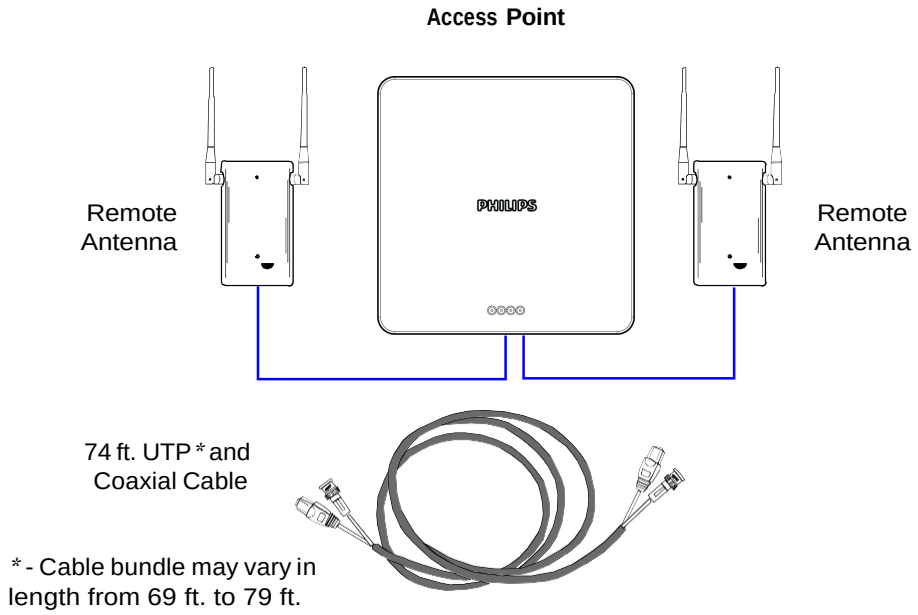

Figure 1-2: Smart-hopping Access Point with Remote Antennas

Note Mounting Access Points must be performed by qualified personnel, using certified conductors and following national electrical codes.

The Access Point 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 an Access Point.

Caution The coaxial cable bundle cable length may vary from 69 - 79 feet. When planning remote antenna placement, ensure the maximum length between the Access Point and the remote antennae is 69 feet.

The effective range of the Access Point and of each Remote Antenna is typically 32 feet. The Access Point supports a maximum of 18 Patient-Worn Monitors regardless of its component configuration.

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

Access Point Mounting Options

Wall-mounting hardware is standard. There are also options available for mounting Access Points to ceiling tiles (mounted on the tile or flush-mounted with the tiles. The part numbers for these options include the following:

- 867216 - Basic Access Point Kit (includes hardware for wall mounting)
  - Optional 453564979681 (IM4) Plastic Access Point cosmetic cover
- 867416 - IntelliVue Smart-hopping Access Point mounting hardware options:
  - Basic Ceiling Mount - 453564979661 Metal rail and hardware (IM2) with the (optional) 453564979681 (IM4) Plastic Access Point cosmetic cover
  - Flush Ceiling Mount - 453564979661 (IM2) Metal rail and hardware and 453564979671 (IM3) Plastic cosmetic ring
- If you plan to connect Remote Antennas to the Access Point, you must order the 453564979661 Metal rail and hardware (IM2) with the 453564979681 (IM4) Plastic Access Point cosmetic cover

Power Source

The Smart-hopping 2.0 Access Point 1.4 GHz receives its 48-V DC operating power source via its Ethernet LAN cabling from Power over Ethernet via the Smart-hopping Sync Unit. The Access Point is not equipped with a power socket. The Access Point internally generates a variety of voltages used for its internal components.

The CAT-5e (or higher) UTP cable within the 74 ft.-cable bundle carries a 5 VDC (maximum of 5.5 V DC power), Transmit and Receive control signals, and Antenna Diversity signals from the Access Point to a connected Remote Antenna.

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

Synchronization Signal

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

Wireless Client Mobility

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

As a wireless client is moved around a building, it automatically monitors the quality of the wireless link to its current Access Point (and it also detects the presence of other Access Points). When the quality starts to deteriorate, the wireless client automatically establishes a new connection to another Access Point.

The Patient-Worn Monitor remains connected to two Access Points for a finite time, and thus the same data is received by these Access Points. During this time, information for header compression and other data for the connection is routed to the new Access Point.

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

The Information Center server receives an unbroken flow of complete IP packets.

Technical Alerts

Each Access Point is configured to signal alert conditions that are viewed by the PerformanceBridge Focal Point management system.

The Access Point is configured to raise alerts on error conditions. The alerts are sent over the Smart-hopping and Ethernet LAN infrastructure to a monitoring station or Database Server. 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 Access Point and no Sync Unit, you can configure the Access Point to suppress the loss of synchronization signal alert.

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

Firmware Updates

Firmware on the Smart-hopping 2.0 Access Point 1.4 GHz is upgraded from the Upgrade Tool. Refer to the service document entitled *Smart-hopping 2.0 Infrastructure Installation and Service Guide* for details. The Access Point 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 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
- Waveform data information such as total number of seconds of data sent and lost

The Access Point statistics can be read by remote devices (for example, an IntelliVue Database Server), using the Scaleable Node Address Protocol (SNAP).

You can display the following status items using the APC web-based interface:

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

Connectors and Status Indicators

Figure 1-3 shows the connectors on the Access Point:

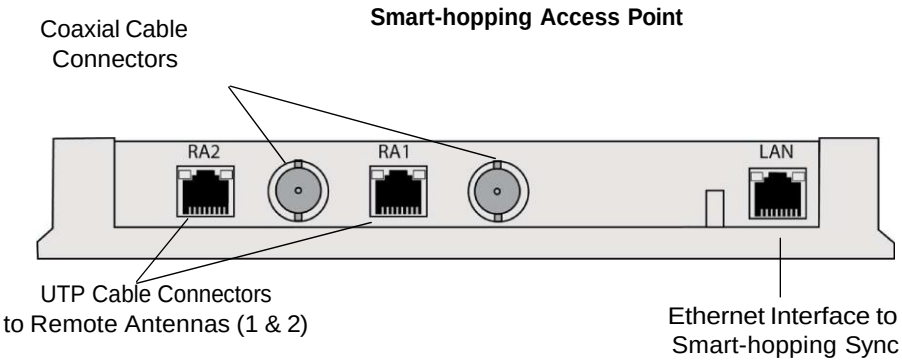

Figure 1-3: Smart-hopping 2.0 Access Point 1.4 GHz Connectors

Smart-hopping Access Point Connectors

Note the following connectors on the Smart-hopping Access Point:

- **Ethernet Interface (LAN)** - The Access Point provides a 100-Base-T Ethernet interface with an RJ45 connector to connect the Access Point to the Smart-hopping Sync Unit.

  The Access Point Ethernet interface provides data communications to and from the IntelliVue Information Center over the Smart-hopping LAN infrastructure. It also presents the power and synchronization signals required by the Access Point. The synchronization signal is superimposed on the power supply voltage. Table 1-1 lists the pin signals for the Access Point Ethernet interface.

Table 1-1: Access Point Ethernet Interface Pin Signals

Pin	Signal Description
1	Transmit Pair TX + Conductor
2	Transmit Pair TX - Conductor
3	Receive Pair RX + Conductor
4	+ 48 V DC Power and Synchronization
5	+ 48 V DC Power and Synchronization
6	Receive Pair RX - Conductor
7	0 V Power Return
8	0 V Power Return

- **UTP Cable Connectors to Remote Antennas (RA1 and RA2)** - Two standard RJ45 connectors are provided for the UTP cables that connect the Access Point to its Remote Antennas. Each UTP cable carries 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 Access Point to its Remote Antennas. Each coaxial cable carries RF and DC sense signals from the Remote Antenna.

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

Smart-hopping Access Point Status LEDs

Front Panel The Smart-hopping Access Point provides the following status LEDs on the front panel of the Access Point. At initial power on the Access Point runs a Power On Self-Test (POST). During the POST, the LED indicators flicker illuminate continuously (AMBER) to indicate correct startup operation. Next, the Power ON LED illuminates (GREEN) continuously to indicate that the 48-V DC power and sync signal are being supplied, and the other two (AMBER) LEDs turn change color (or turn off), depending on the status of the Access Point.

Table 1-2 summarizes the status the Access Point LEDs:

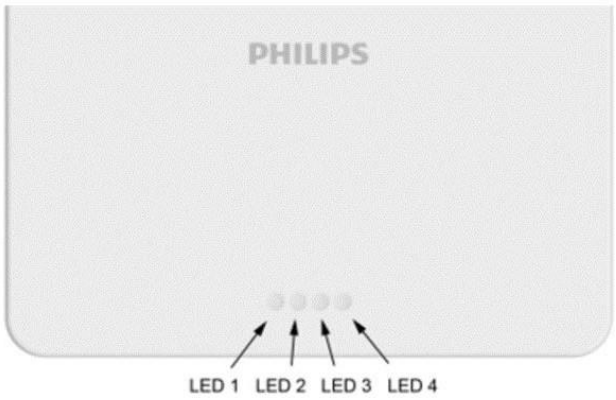

Table 1-2: Access Point Status L

LED1 - Power/Sync	LED2 - Network	LED3 - Radio	LED4	Access Point Status
Green	Flashing Green	Flashing Green	Off	Power/Sync, Network, and Radio are working properly.
Flashing Green	Flashing Green	Flashing Green	Off	The Access Point has lost remote synchronization. Check remote (upstream) synchronization.
Green	Flashing Green	Flashing Amber	Off	Power/Sync, Network, Radio, and Remote Antennas are working properly.

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Table 1-2: Access Point Status LEDs

LED1 - Power/Sync	LED2 - Network	LED3 - Radio	LED4	Remote Antenna Status
Green	Flashing Green	Flashing Red	Off	Power/Sync and Network are working properly. There is an issue with the radio.
Amber	Amber	Amber	Amber	LEDs that display during the Access Point Initial POST (Power-On-Self-Test)
Amber	Amber	Amber	Off	The Access Point is not registered to any APC.
Flashing Red	Flashing Green	Flashing Green	Off	The Access Point has lost local synchronization. Check local (upstream) synchronization.
Red	Off	Off	Off	If the Access Point is in this state for more than 5 seconds, this indicates that the Access Point has power but has a hardware fault in another area. Replace the Access Point.
Flashing Red	Flashing Red	Flashing Red	Off	Hardware POST failure (there is an issue with one or more of the following components: DRAM, Flash Memory, CPU, Radio, LAN Interface)
Off	Off	Off	Off	The Access Point either does not have power or configured to turn the LEDs off.
White	White	White	White	
Blue	Blue	Blue	Blue	

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Blue - not in service
See Specs in Windchill 867216-90002

Specifications

Table 1-3: Smart-hopping 2.0 Access Point 1.4 GHz Specifications

Specification	Value
Physical:	
Chassis (only) Dimensions (H x W x L)	30 mm x 163 mm x 163 mm (1.2 in x 6.38 in x 6.38 in)
Weight with Internal Antennas	320 g (0.71 lb)
Mounting	Flush Mount with Ceiling tile (includes Cosmetic Ring, Below Ceiling, Below Ceiling with Cosmetic Cover, Wall Mount, or Wall Mount with Cosmetic Cover
Environmental:	
Operating Temperature	0 to +55^{o} C (32 to 131^{o}F)
Storage Temperature	-40 to +60^{o} C (-40 to 140^{o}F)
Humidity Range (Operating)	< 95% RH @ 40^{o} C non-condensing
Humidity Range (Storage)	< 90% RH @ 60^{o} C
Altitude	Operating and Storage up to 3,048 m (10,000 ft)
Electrical:	
Power (Input)	48 VDC nominal (37-57 VDC) 8 watts, 287 mA (Access Point)
Power Sensing	Auto-sensing PoE, compliant with 802.3af and 802.3at (Type 1)
Power (Output)	5 VDC @ 50 mA at Remote Antenna RJ-45 connectors
LED Indicators	Four LEDs for: • Power/Sync • Network • Radio Activity • Future use
Smart-hopping Radio	
Smart-hopping Antenna Frequency Range	1395-1400 MHz + 1427-1432 MHz WMTS - Wireless Medical Telemetry Service (USA)
Antenna Type	Smart-hopping dual internal antennas
RF Diversity	Uses two antennas and selects the antenna with the best signal.
Frequency Diversity	Dynamic, selects RF channels for best signals.
Compatibility Mode (6 channel mode):	
Channel spacing	1.6 MHz
Modulation	GFSK
Power output	12.5 (±1.5) dBm (12.6 mW to 25 mW) into Antenna Load (2:1 VSWR maximum)
Antenna gain	2 dBi
Time slot types supported	Single or double/long
Total time slots available	32

Table 1-3: Smart-hopping 2.0 Access Point 1.4 GHz Specifications

Specification	Value
Time slots allocated for wireless clients • No Remote Antennas connected • One Remote Antenna connected • Two Remote Antennas connected • Time slots allocated for roaming	 18 9 (and 9 for the Remote Antenna) 6 (and 6 for each Remote Antenna) 14
Advanced Mode (4 channel mode):	
Channel spacing	1.728 MHz
Modulation	PI/2-DBPSK, PI/4-DQPSK
Power output	14 (±1.5) dBm (17.8 mW to 35.5 mW) into Antenna Load (2:1 VSWR maximum)
Antenna gain	2 dBi
Time slot types supported	Single
Total time slots available	32
Time slots allocated for wireless clients • No Remote Antennas connected	 18
Time slots allocated for roaming	14
Electrical Installation:	
Fire Safety	Smart-hopping 2.0 Access Point 1.4 GHz 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:	
LAN Input (Data): One-port Ethernet 10/100 Base-T (100-Mbps connections must be Full Duplex)	RJ45 Female Socket
LAN Cable to Network Switch	CAT-5e (or higher) with a length of up to 100 m (328 ft.).
Remote Antenna UTP Cable Connectors	Two RJ45 Female Socket Connectors are provided to connect the UTP cables with 5 V DC 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.

Ordering Information

Table 1-4: Smart-hopping 2.0 Access Point 1.4 GHz Part Numbers and Contents

Item	Commercial Part Number	Contents
Smart-hopping Access Point	867216	Access Point, Wall anchors, #6 1.25-Inch self-tapping screws, Mounting Bracket
Philips Smart-hopping 2.0 Installation Material:	867416	See options (IM1, IM2, IM3, IM4 below:
• Smart-hopping Smart-hopping 2.0 Access Point 1.4 GHz Remote Antenna Cable	Option IM1	Applicable for USA and Puerto Rico only. One cable required for each Remote Antenna.
• Basic Ceiling Mount Kit	Option IM2	Mounting Rail, nuts (4), push nuts (8), adapter plates (2), adhesive strips for adapter plates (2)
• Flush Mount Ceiling Ring Kit	Option IM3	Cosmetic Ring
• Ceiling/Wall Mount Cover Kit	Option IM4	Plastic Cover, machine screws (2), and plastic grommets (2)

Table 1-5: Smart-hopping 2.0 Access Point 1.4 GHz Mounting Options by Mount Type

Mounting Option	Order these product options	
Wall Mounting with Cosmetic Cover	867416	IM4
Below Ceiling Mount	867416	IM2
Below ceiling Mount with Cover	867416	IM2 and IM4
Flush Ceiling Mount with Cover	867416	IM2 and IM3

Regulatory Information

Table 1-6: -Smart-hopping 2.0 Access Point 1.4 GHz Regulatory Information

Description	Philips part#:	FCC ID:	Model#	Software
Smart-hopping 2.0 Access Point 1.4 GHz with Remote Antenna	453564883261 867216	PQC-867216A	ITS867216A	5.0 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 Smart-hopping infrastructure are subject to radio frequency interference. If 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.

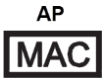
Symbol Definitions

Table 1-7 illustrates and defines the symbols appearing on the Smart-hopping Access Point hardware:

Table 1-7: Smart-hopping 2.0 Access Point 1.4 GHz Symbol Definitions

Symbol	Description
	Philips shield logo
	Legal Manufacturer Information
	Country of manufacturer and date of manufacture
	Tested to comply with FCC standards
	Non-ionizing radiation
	Contains parts that you must not put into normal waste disposal but must be recycled or dealt with as chemical waste. Dispose of in accordance with the local country requirements.
	Tested to comply with CSA Group standards
	Consult instructions for use
	See Warnings (Table 1-8)
	Catalog Number (867216)

Table 1-7: Smart-hopping 2.0 Access Point 1.4 GHz Symbol Definitions

Symbol	Description
	Serial Number (DKYWWNNNNN)
	Access Point MAC (Machine Access Code) address (MMMMMMMMMMM)
	BLE Antenna MAC (Machine Access Code) address (MMMMMMMMMMM)
	Service Number (453564883261)
	Rated power input, DC (48 VDC)
	10/100 Base-T RJ-45 LAN connection
LAN	Local Area Network Connection
	Rated power, output (5 VDC)
	Data input/output connection
RA1	Access Point to Remote Antenna 1 Connection
RA2	Access Point to Remote Antenna 2 Connection
	Coaxial Remote Antenna connection
	2D Bar code that includes the following: • REF, Serial and Service numbers • Access Point MAC • BLE MAC address

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Warnings

See Table 1-8 for product warnings:

Table 1-8: Product Warnings

	Warnings Consult the instructions for use. This product can expose you to chemicals including Lead and Lead Compounds, which are known to the State of California to cause cancer. For more information, go to www.P65Warnings.ca.gov. The EU REACH Regulation 1907/2006 requires Philips to provide chemical content information for Substances of Very High Concern (SVHC), if they are present in the relevant article above a concentration of 0.1% weight by weight. Information on substances, contained in the Philips products, can be found on the Philips REACH website: www.philips.com/REACH Disposables (product cannot be repaired): • Wash hands after use, wear gloves, where possible, and avoid food intake while handling the product. Operation of this equipment requires the prior coordination with a frequency coordinator designated by the FCC for the Wireless Medical Telemetry Service. This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: • That this device may not cause harmful interference • This device must accept any interference received, including interference that may cause undesired operation.

2

Mount and Install the Smart-hopping 2.0 Access Point 1.4 GHz

This chapter provides procedures to physically install the Philips Smart-hopping 2.0 Access Point 1.4GHz and includes:

Access Point Placement Guidelines

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

- Consider building construction when placing Access Points to account for interference from ceramic wall tile, lead lined walls, elevator shafts, reinforced windows, and other obstacles which may cause signal degradation.
- Place Access Points in locations where there is no more than one wall between the Access Point and the coverage area.
- Ensure that the coverage area takes into account bathrooms, hallways, and windows.
- Access Point (internal) 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.
- Access Points or Remote Antennas shall not be placed closer than three feet (1 m) from other Access Points or RAs to prevent signal overload conditions.
- Each Smart-hopping Access Point requires a 100Mbps/Full Duplex or 1000 Mbps switch port connection.
- The coaxial cable bundle cable length may vary from 69 - 79 feet. When planning remote antenna placement, ensure the maximum length between the Access Point and the remote antenna is 69 feet.
- Try to avoid placing Access Points 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.
- When installing a Smart-hopping network, Philips requires that the following LAN cables are Shielded Twisted Pair cables:
  - Cables connecting the switch to the Access Point Controllers
  - Cables connecting the switch to the Synchronization Units (that connects to the Access Points)

Warning Qualified personnel must mount Access Points and use certified conductors and follow national and local electrical codes.

All Smart-hopping devices are intended for indoor use only.

Fixed Mounting the Smart-hopping Access Point to a Wall

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

Table 2-1: Required Wall Mounting Material

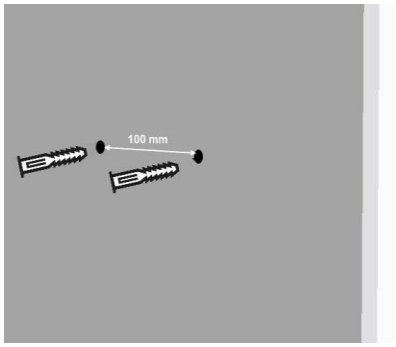
Required Parts		
Illustration	**Part Name**	**Quantity**
867216 Access Point Kit -includes the following:		1
	Access Point	1
	Wall anchors	2
	#6 1.25-Inch self-tapping screws	2
	Mounting Bracket	1

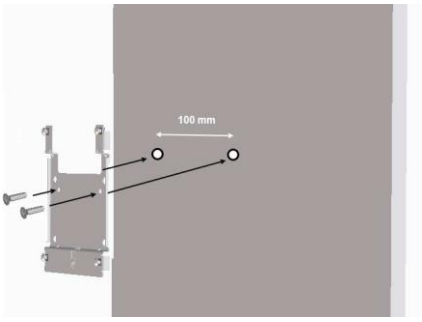
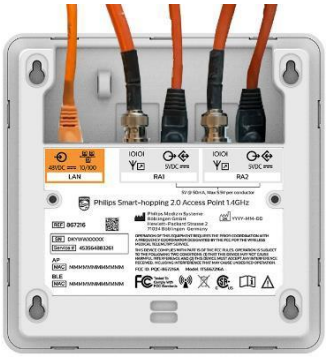
Table 2-2: Wall Mounting Tools

Required Tools	
	Tape Measure
	Level
	Hammer (when using wall anchors)
	Drill
	7/32 -inch drill bit

Required Tools	
	Phillips head screwdriver
	Marker

Installation

1	Using a 7/32-inch drill bit, drill two pilot holes 0.219 inches (5.5 mm) in diameter, 3.394 inches (100 mm) apart (from the center points of the holes), and horizontally level with each other.	
2	If the screws are going directly into the wall (not into building studs), tap a supplied plastic screw anchor into each pilot hole until it is flush with the wall surface.	
3	Place the mounting bracket against the wall and line up the two holes.	

4	Screw a supplied #6 x 1 1/4 inch self-tapping screw through each hole in the mounting bracket and into each screw anchor (or pilot hole).	
5	Pull the cables out from the ceiling and connect them to the appropriate jacks on the Access Point. Connect the Ethernet (network connection) cable to the LAN port on the Access Point. This provides power to the Access Point and lights up the LEDs on the front of the Access Point (if the other end of the Ethernet cable is connected to a Power over Ethernet Switch that is powered on). If using two Remote Antennas, perform this step on both the RA1 and RA2 connectors on the Access Point: • Connect the Coaxial cables (from the same side of the strand) to the RA coaxial connector. • b) Connect the RJ-45 connector to the RA RJ-45 connector.	

6	While holding the Access Point chassis, fit the holes in the back of the Access Point chassis over the keyhole screws that protrude from the mounting bracket. Slide the Access Point chassis down so that the screw heads are securely in the grooves in the back of the Access Point chassis. You hear a click noise when the Access Point is securely placed in the mounting bracket.	

Fixed Mounting the Smart-hopping Access Point to a Wall (With Cosmetic Cover)

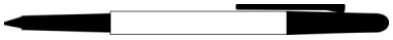
You can mount the Smart-hopping Access Point to a wall using the mounting screws and screw anchors supplied with the Access Point. We recommend that you mount the Access Point high on the wall as close to the ceiling as possible.

To mount the Smart-hopping 2.0 Access Point 1.4 GHz and the plastic cover to a wall:

Table 2-3: Required Wall Mounting Material

Required Parts		
Illustration	**Part Name**	**Quantity**
867216 Access Point Kit -includes the following:		1
	Access Point	1
	Wall anchors	2
	#6 1.25-Inch self-tapping screws	2
	Mounting Bracket	1
Access Point Mounting Kit IM4 - includes the following:		1
	Cosmetic Cover	1
	M3 x 0.5 x8 machine screws	2
	Plastic Grommets (included with kit)	2

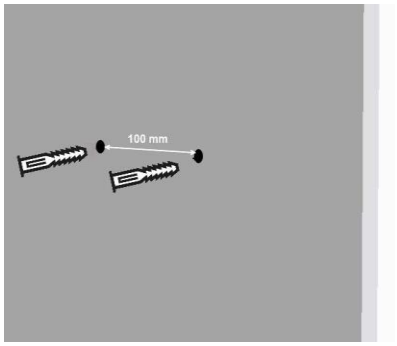
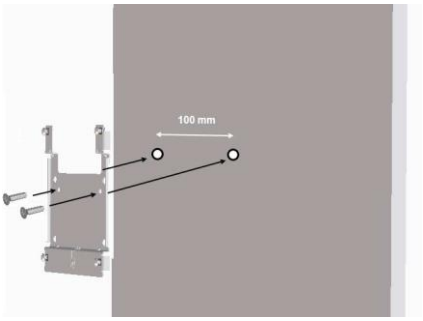
Table 2-4: Wall Mounting Tools

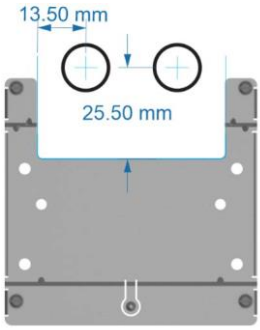
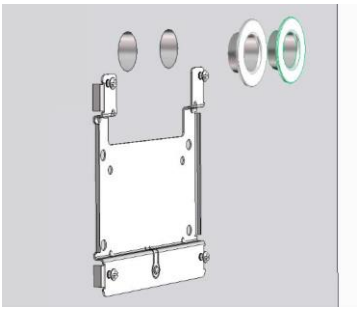
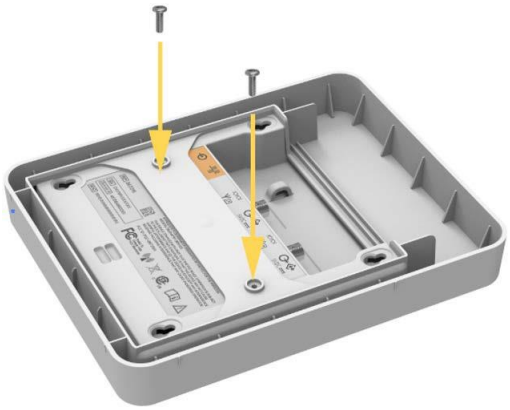
Required Tools	
	Tape Measure
	Level
	Hammer (when using wall anchors)
	Drill
	7/32 -inch drill bit
	One-inch hole saw bit
	Phillips head screwdriver
	T-8 Torx screwdriver
	Marker
	Silicone Adhesive

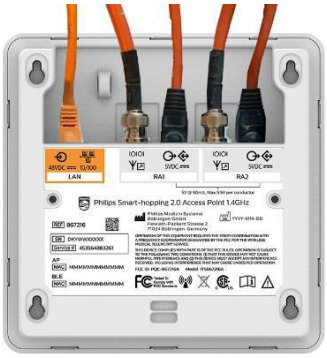
Installation

Caution To mount the Access Point to a wall, connector cables must come through the wall.

1	Using a 7/32-inch drill bit, drill two pilot holes 0.219 inches (5.5 mm) in diameter, 3.394 inches (100 mm) apart (from the center points of the holes), and horizontally level with each other.	

2	Tap a supplied plastic screw anchor into each pilot hole until it is flush with the wall surface.	
3	Place the mounting bracket against the wall and line up the two holes.	
4	Screw a supplied #6 x 1 1/4 inch self-tapping screw through each hole in the mounting bracket and into each screw anchor (or pilot hole).	

5	Mark two holes at the locations shown in the illustration below.	
6	Using a one-inch hole saw, drill out a one-inch hole around the two marks. This is for connector cables to come out of the wall and attach to the Access Point. On the finished side of the wall, secure the one-inch grommets to the one-inch holes you drilled. You need adhesive to secure the grommet	
7	Attach the access point to the Cosmetic Cover using the two M3 x 0.5 x8 screws. Place the Access Point face down. Place the plastic cover over the Access Point. Make sure the two holes in the plastic cover align with the corresponding holes in the Access Point. Secure the Access Point to the cosmetic ring by screwing in the two M3 x 0.5 x8 machine screws into the holes in the cosmetic ring and into the Access Point.	

8	Pull the cables out from the wall (through the grommets) and connect them to the appropriate jacks on the Access Point. Connect the Ethernet (network connection) cable to the LAN port on the Access Point. This provides power to the Access Point and lights up the LEDs on the front of the Access Point (if the other end of the Ethernet cable is connected to a Power over Ethernet Switch that is powered on). If using two Remote Antennas, perform this step on both the RA1 and RA2 connectors on the Access Point: • Connect the Coaxial cables (from the same side of the strand) to the RA coaxial connector. • b) Connect the RJ-45 connector to the RA RJ-45 connector.	
9	While holding the Access Point chassis and attached plastic cover, fit the holes in the back of the Access Point chassis over the keyhole screws that protrude from the mounting bracket. Slide the Access Point chassis down so that the screw heads are securely in the grooves in the back of the Access Point chassis. You hear a click noise when the Access Point is securely placed in the mounting bracket.	

Flush Ceiling Mount (with Cosmetic Ring)

You can mount the Smart-hopping Access Point on a ceiling tile and make the Access Point flush with the tile (the Access Point protrudes 7-10 mm from the finished side of the ceiling tile).

To mount the Smart-hopping 2.0 Access Point 1.4 GHz and cosmetic ring to a ceiling tile:

Note Wall anchors and #6 1.25-inch self-tapping screws are included with the Access Point. These are not used in this mounting method.

:

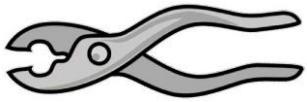
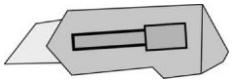
Table 2-5: Required Flush Mounting with Cosmetic Ring Material

Required Parts		
Illustration	**Part Name**	**Quantity**
867216 Access Point Kit -includes the following:		1
	Access Point	1
	Mounting Bracket	1
Access Point Mounting Kit IM2 - includes the following:		1
	Mounting Rail	1
	M6 Push Nut	2
	M6 x 1 Nut	2

Table 2-5: Required Flush Mounting with Cosmetic Ring Material

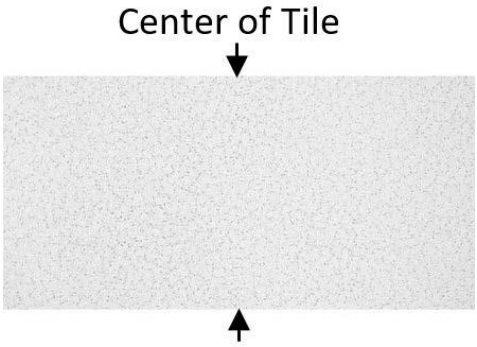
Required Parts		
Illustration	**Part Name**	**Quantity**
	Adapter Plates	2
Access Point Mounting Kit IM3 - includes the following:		1
	Cosmetic Ring	1

Table 2-6: Ceiling Flush Mounting Tools

Required Tools	
	Tape Measure
	Pliers (or wrench)
	Marker
	Utility Knife

Installation

Prepare the Tile

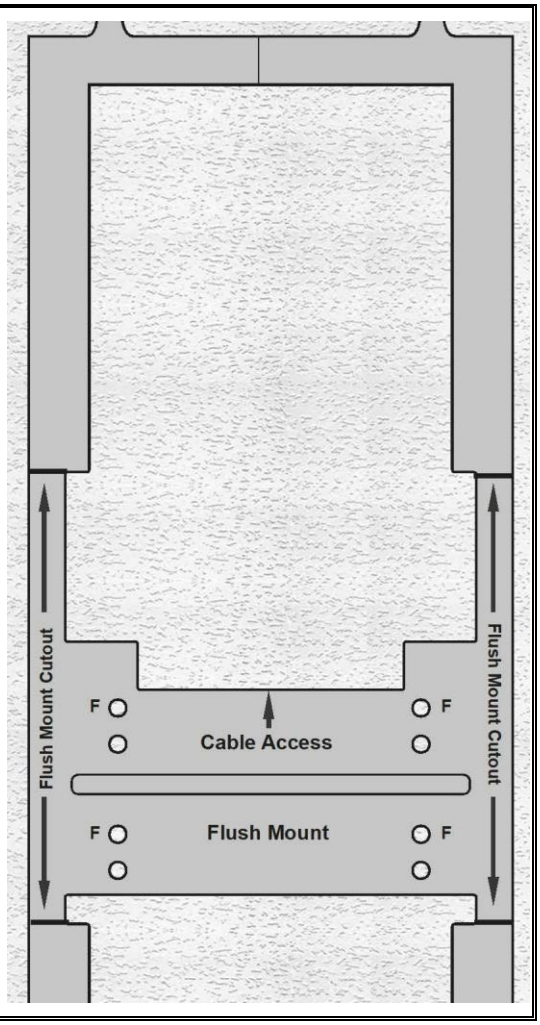
1	Remove (or get) the ceiling tile on which you wish to mount the Access Point.	
2	Measure the tile and mark the middle points on the long side of the finished side of the tile.	

3

Place the mounting rail against the finished side of the tile, aligning the center of the mounting rail with the marks you made on the tile.
Make sure the side of the rail labeled

Cable Access
Flush Mount

faces you.

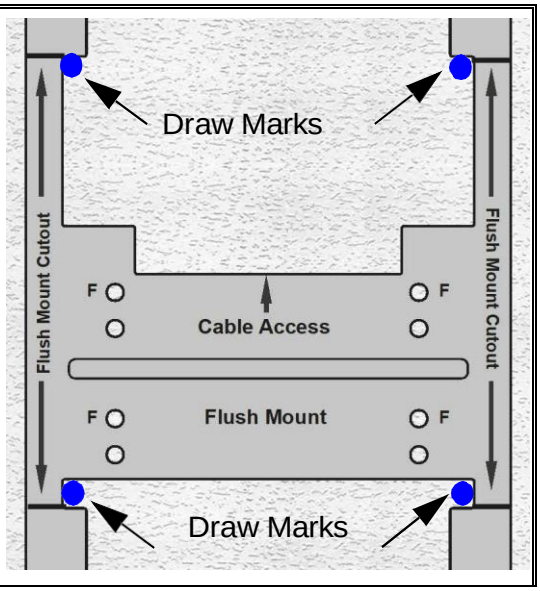


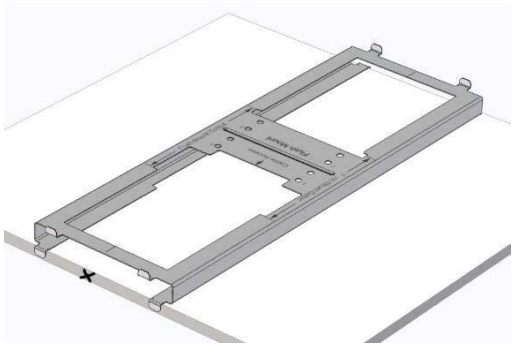
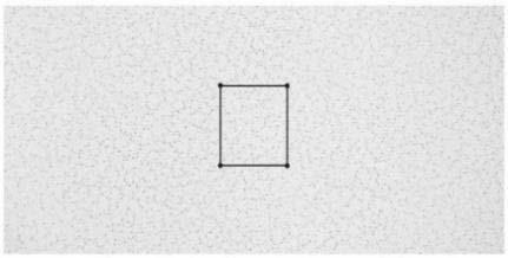
4

Place four marks on the inner edge of the ceiling tile at the points where the arrows of the

<--Flush Mount Cutout-->

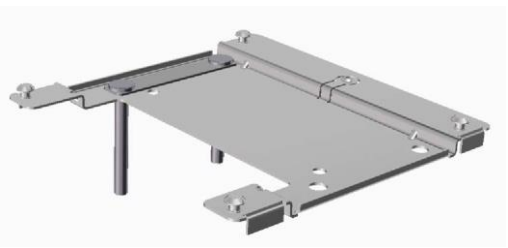
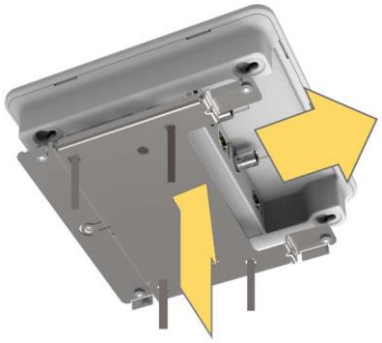
markings on the mounting rail end.

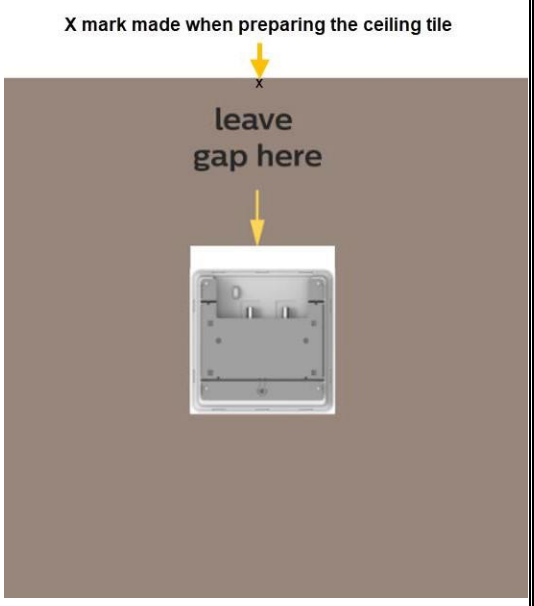
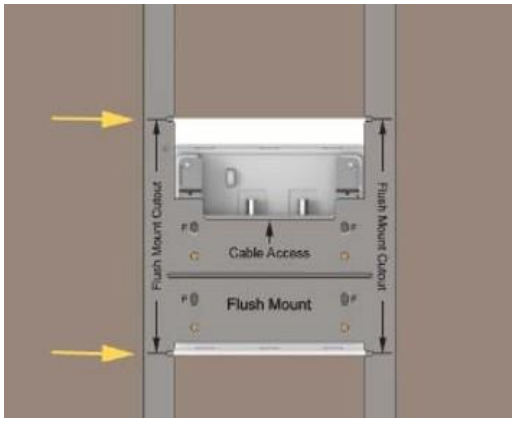
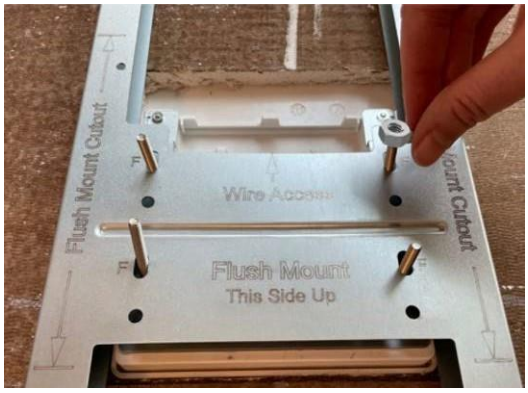


5	Mark an **X** on the edge of the tile where the Cable Access marking on the mounting rail points. This ensures that the mounting rail faces the correct direction when you flip the tile to mount the mounting rail on its unfinished side (in a later step).	
6	(Optional) Remove the mounting rail from the tile and draw lines that connect the points together.	
7	After taking the mounting rail off of the tile, cut out the area of the tile between the dots you marked.The open space is where you mount the Access Point.	
8	Put the tile and mounting rail aside.	

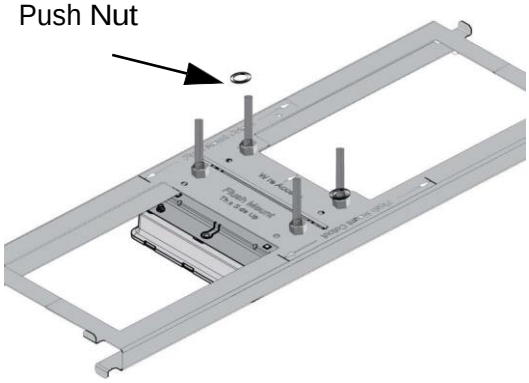
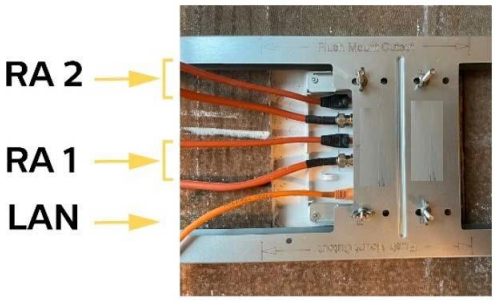
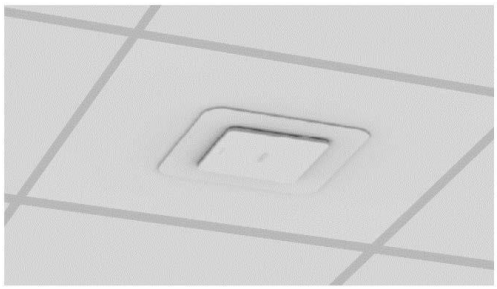
PHILIPS

Mount the Hardware

1	Perform this step to connect both adapter plates to the mounting bracket: • Remove the adhesive strip from the adapter plate. • Orient the adapter plate so the bolts face the same direction as the shoulder screws that are already attached to the bracket. • Place the bolts through one set of outer holes on the bracket. • Press the adapter plate firmly against the bracket to ensure a strong adhesive hold.	 
2	Connect the mounting bracket to the Access Point. Make sure the side of the mounting bracket with the rectangular cutout lines up with the connectors on the back of the Access Point. Line up the shoulder screws on the bracket with the 4 keyholes in the Access Point and slide the bracket toward the connectors. You hear a click noise when the bracket is secure on the Access Point.	
3	Place the Access Point assembly, finished side down, on a flat surface and place the Cosmetic Ring over the Access Point assembly.	

4	Place the ceiling tile, with the unfinished side facing you, over the Access Point and Cosmetic Cover. Make sure the Access Point is aligned along the bottom edge of the rectangular cutout in the ceiling tile (the bottom edge of cutout refers to the edge furthest away from the mark you made on the tile when preparing the tile). This leaves space for the minimum bending radius of the cables.	
5	Place the mounting rail over the Access Point assembly, on top of the unfinished side of the tile. Make sure the **Flush Mount** label on the Mounting Rail faces you and the **Cable Access** label points toward the Access Point connectors. Feed the 4 bolts through the holes marked **F**. The **Flush Mount Cutout** arrows must align with the rectangular cutout in the tile.	
6	Secure the Access Point assembly and Mounting Rail to the tile: • Place an M6 x 1 nut on each of the bolts from the adapter plate that stick through the holes in the mounting rail. • Tighten the nuts and make sure you do not over tighten the nuts, which may break the tile.	

PHILIPS

7	To secure the nuts, place a push nut over each of the bolts and push down until it sits on top of each nut. You can do this by hand or use a tool, such as pliers or an open-ended wrench.	Push Nut 
8	Connect the Ethernet (network connection) cable to the LAN port on the Access Point. This provides power to the Access Point and lights up the LEDs on the front of the Access Point (if other end of Ethernet cable is connected to a powered Synchronization Unit). If using two Remote Antennas (perform this step on both the RA1 and RA2 connectors on the Access Point: • Connect the Coaxial cables (from the same side of the strand) to the RA coaxial connector. • Connect the RJ-45 connector to the RA RJ-45 connector.	
9	Place the tile into the ceiling. Replace other adjacent ceiling tiles, if necessary.	

Below Ceiling Mount

You can mount the Smart-hopping Access Point below a ceiling tile. To mount the Smart-hopping 2.0 Access Point 1.4 GHz to a ceiling tile:

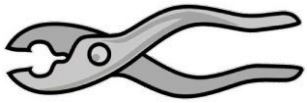
Note Because this installation option does not include a Cosmetic Cover to hide the Remote Antenna cabling, only use this option with installations of stand-along Access Points.

:

Table 2-7: Required Below Mounting Material

Required Parts		
Illustration	**Part Name**	**Quantity**
867216 Access Point Kit -includes the following:		
	Access Point	1
	Mounting Bracket	1
Access Point Mounting Kit IM2 - includes the following:		
	Mounting Rail	1
	M6 Push Nut	2
	M6 x 1 Nut	2
	Adapter Plates	2

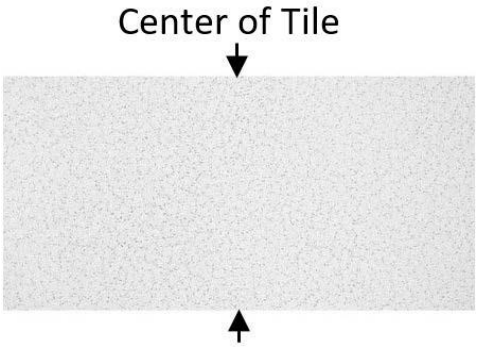
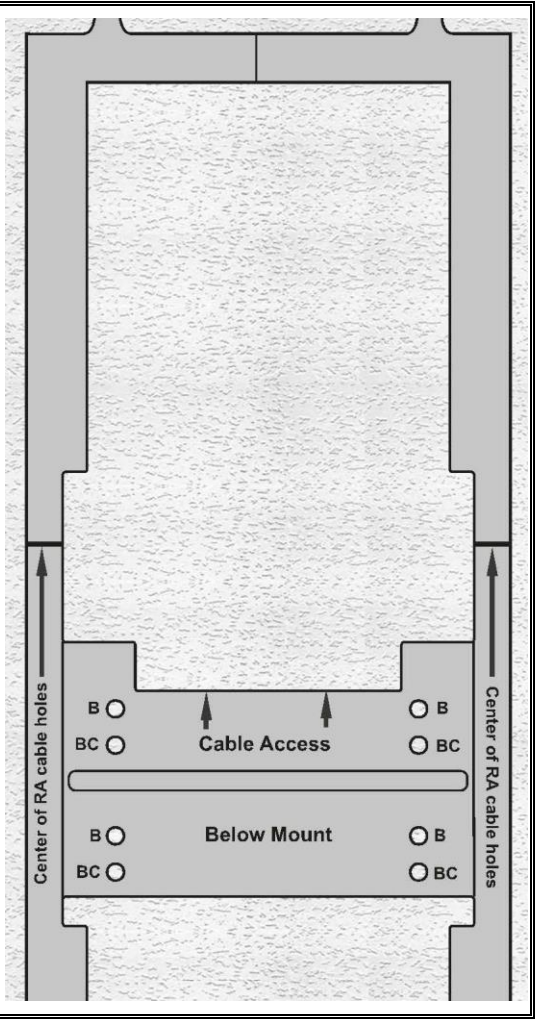
Table 2-8: Required Below Mounting Tools

Required Tools	
	Tape Measure
	Drill
	1/4 -inch drill bit
	One-inch hole saw bit
	Marker
	Pliers (or wrench)

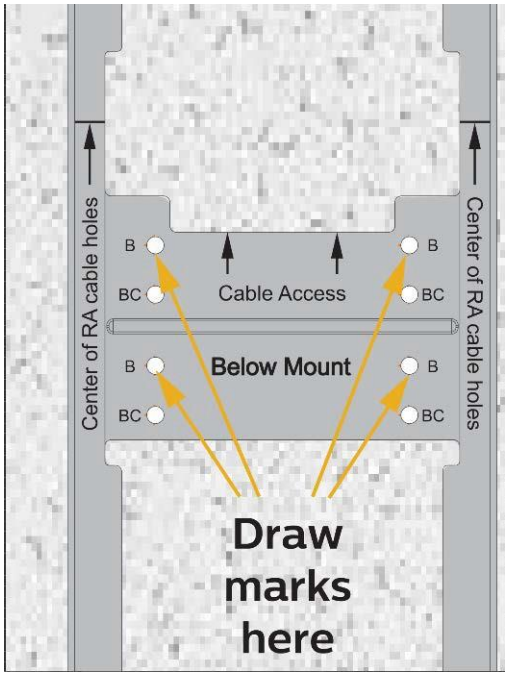
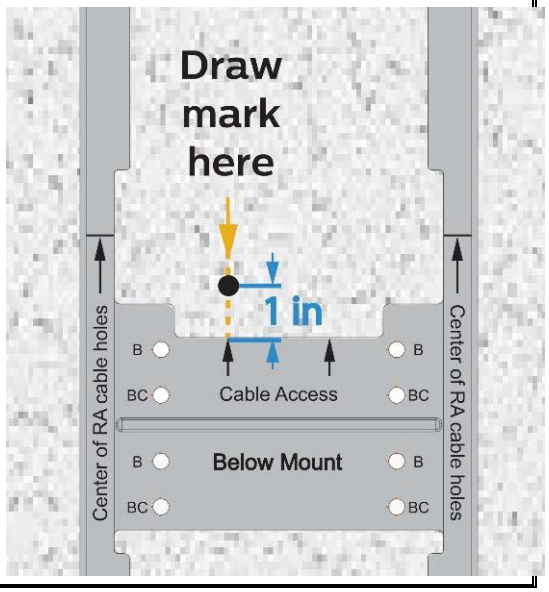
Installation

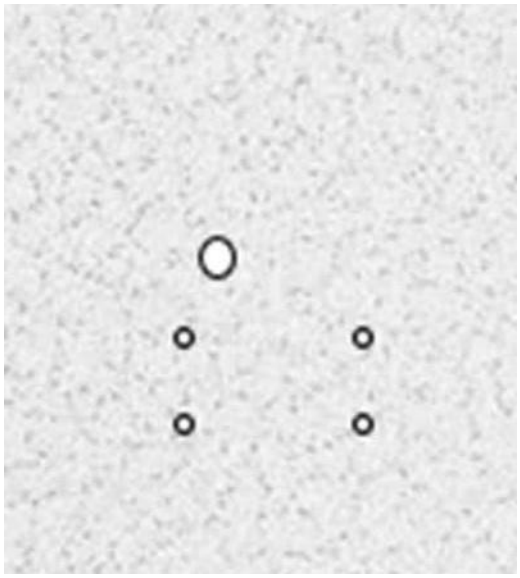
Prepare the Tile

1	Remove (or get) the ceiling tile on which you wish to mount the Access Point.	

2	Measure the tile and mark the middle point in the area between the finished an unfinished areas on the long side of the tile.	
3	Place the mounting rail against the finished side of the tile, aligning the center of the mounting rail with the marks you made on the tile. Make sure the side of the rail labeled **Cable Access** **Below Mount** faces you.	

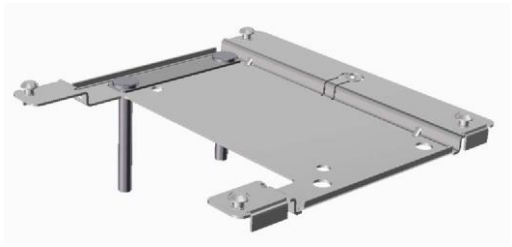
PHILIPS

4	Place marks on the ceiling tile in the holes labeled **B** on the mounting rail.	
5	Place a mark on the ceiling tile at the left **Cable Access** arrow, one inch above the edge of the Mounting Rail.	

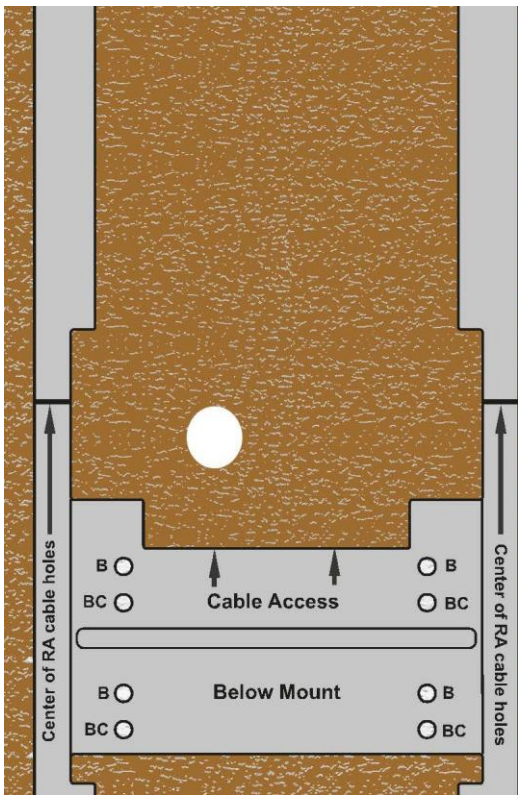
6	Remove the Mounting Rail. With the finished side of the ceiling tile facing you, use the drill and 1/4-inch drill bit to drill four holes where you marked in the **B** holes in the previous steps. Using the mark you made in Step 5 as the center point, use a one-inch hole saw to drill out a one-inch hole in the ceiling tile. This hole is to pass the Ethernet/LAN cable through the ceiling to the Access Point.	

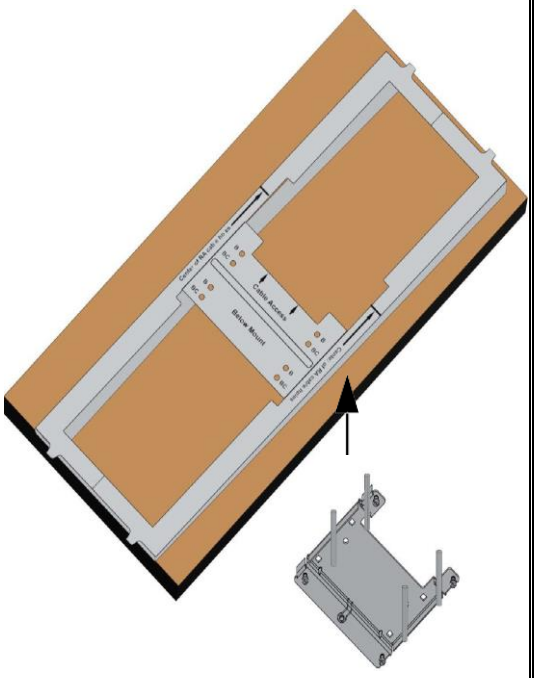
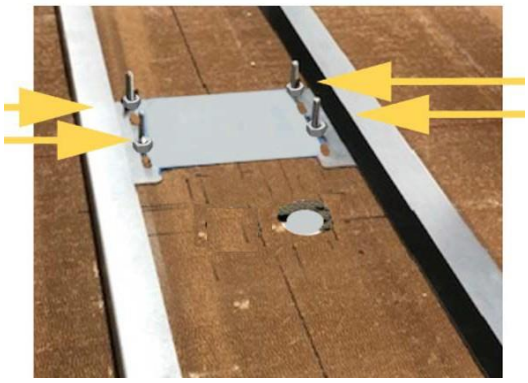
7	Put the tile and mounting rail aside.	

Mount the Hardware

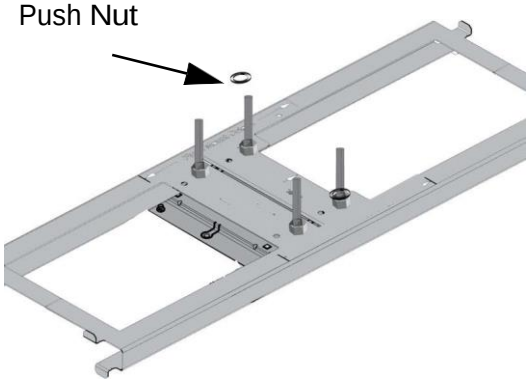
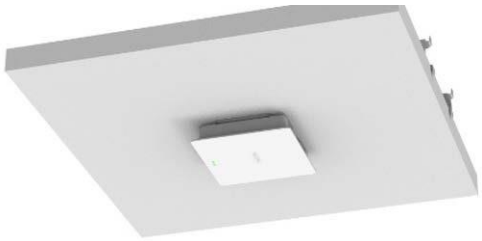
1	Perform this step to connect both adapter plates to the mounting bracket: • Remove the adhesive strip from the adapter plate. • Orient the adapter plate so the bolts face the same direction as the shoulder screws that are already attached to the bracket. • Place the bolts through one set of outer holes on the bracket. • Press the adapter plate firmly against the bracket to ensure a strong adhesive hold.	 

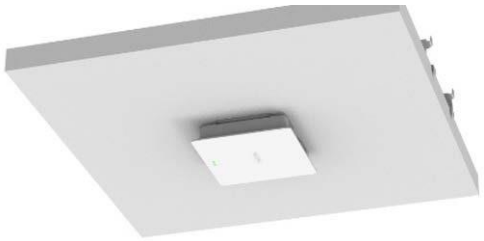
PHILIPS

2	Place the Mounting Rail on the unfinished side of the tile. Make sure the **Cable Access** arrows on the Mounting Rail are pointed toward the one-inch hole you drilled for the cables. The four 1/4-inch holes you drilled must align with the **B** holes in the Mounting Rail.	

3	Connect the Mounting Bracket and Rail to the ceiling tile: • Pick up the Mounting Bracket and orient it so that the rectangular cutout on the Bracket is in the same direction as the **Cable Access** arrows on the Mounting Rail. • With the adapter plates adhered to the Mounting Bracket, insert the 4 bolts from the finished side of the tile through the four 1/4-inch holes in the ceiling tile and through the **B** holes in the Mounting Rail.	
4	Secure the Mounting Bracket and Mounting Rail to the tile: • Place an M6 x 1 nut on each of the bolts from the adapter plate that stick through the holes in the mounting rail. • Tighten the nuts and make sure you do not over tighten the nuts, which may break the tile.	

PHILIPS

5	To secure the nuts, place a push nut over each of the bolts and push down until it sits on top of each nut. You can do this by hand or use a tool, such as pliers or an open-ended wrench	Push Nut 
6	Connect the Ethernet (network connection) cable to the LAN port on the Access Point. This provides power to the Access Point and lights up the LEDs on the front of the Access Point (if other end of Ethernet cable is connected to a powered Synchronization Unit).	
7	With the LAN cable now connected, attach the Access Point to the Mounting Bracket and make sure that the rectangular cutout in the Mounting Bracket aligns with the shape of the Access Point. Insert the four small shoulder screws on the Bracket into the keyholes on the AP and slide the AP toward the LEDs. You hear a click noise when the Access Point is secured to the Bracket.	

8	Place the tile into the ceiling. Replace other adjacent ceiling tiles, if necessary.	

PHILIPS

Below Ceiling Mount (with Cosmetic Cover)

You can mount the Smart-hopping Access Point below a ceiling tile and place a cosmetic cover around the Access Point to hide exposed cables. To mount the Smart-hopping 2.0 Access Point 1.4 GHz and cosmetic ring to a ceiling tile:

Note Wall anchors and #6 1.25-inch self-tapping screws are included with the Access Point. These are not used in this mounting method.

:

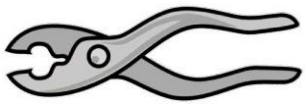
Table 2-9: Required Below Mounting with Plastic Cover Material

Required Parts		
Illustration	**Part Name**	**Quantity**
867216 Access Point Kit -includes the following:		1
	Access Point	1
	Mounting Bracket	1
Access Point Mounting Kit IM2 - includes the following:		1
	Mounting Rail	1
	M6 Nut	2
	M6 x 1 Nut	2

Table 2-9: Required Below Mounting with Plastic Cover Material

Required Parts		
Illustration	**Part Name**	**Quantity**
	Adapter Plates	2
Access Point Mounting Kit IM4 - includes the following:		1
	Cosmetic Cover	1
	M3 x 0.5 x8 machine screws	2
	Plastic Grommets (included with kit)	2

Table 2-10: Required Below Mounting Tools

Required Tools	
	Tape Measure
	Drill
	1/4 -inch drill bit
	One-inch hole saw bit
	Pliers (or wrench)

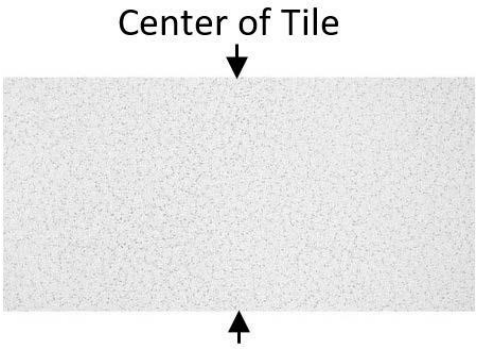
PHILIPS

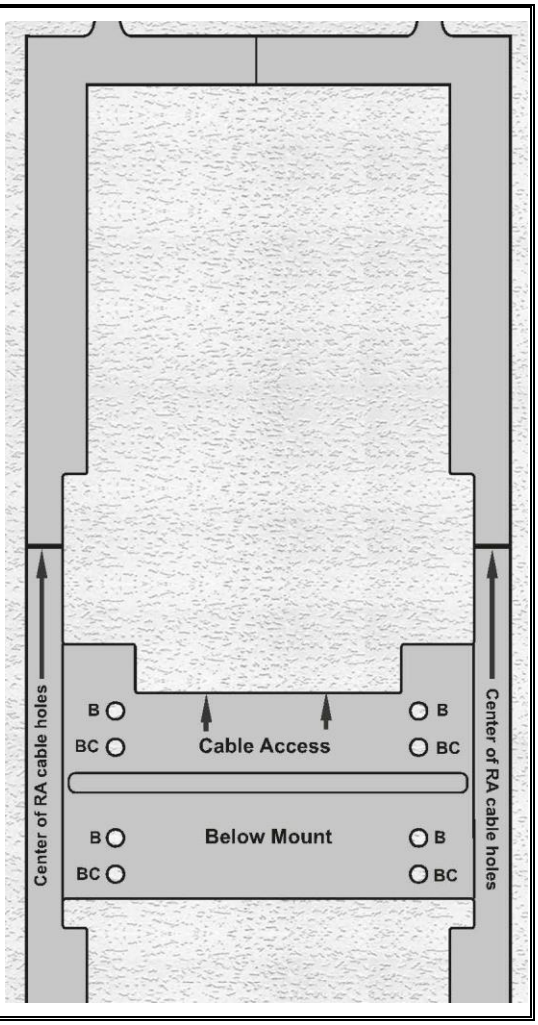
Required Tools	
	T-8 Torx screwdriver
	Marker
	Silicone Adhesive

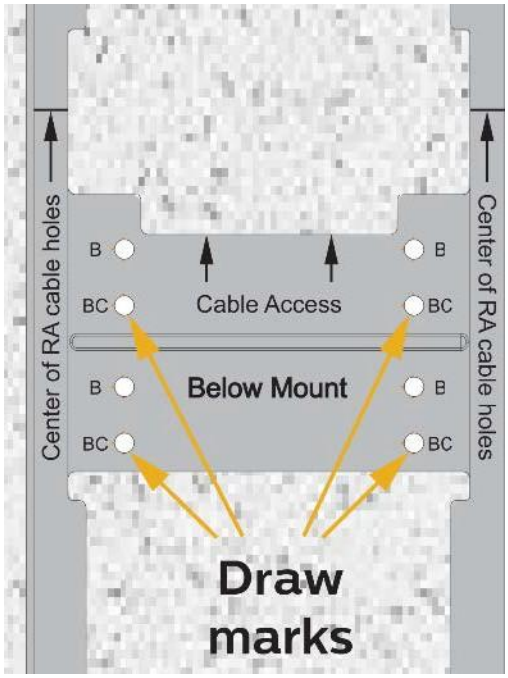
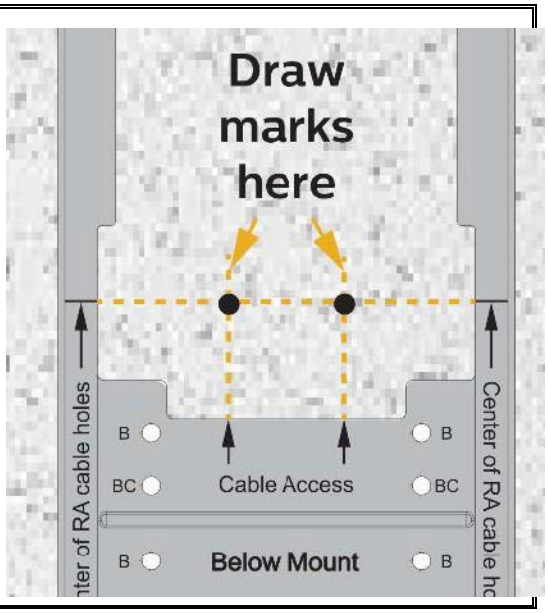
Installation

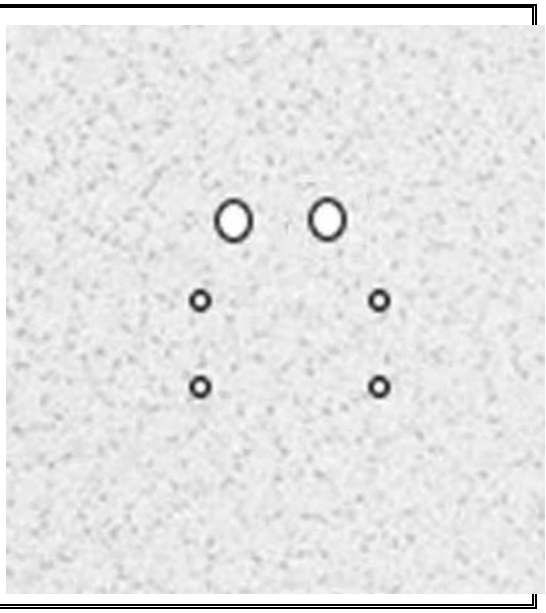
Prepare the Tile

1	Remove (or get) the ceiling tile on which you wish to mount the Access Point.	

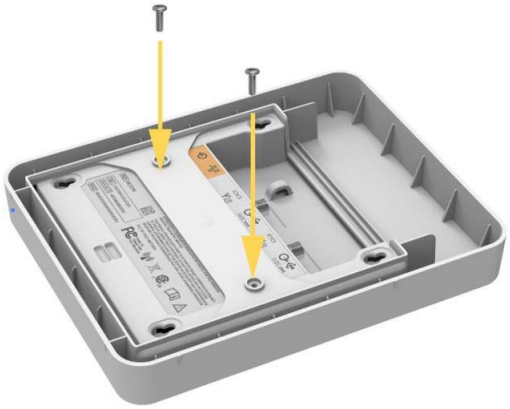
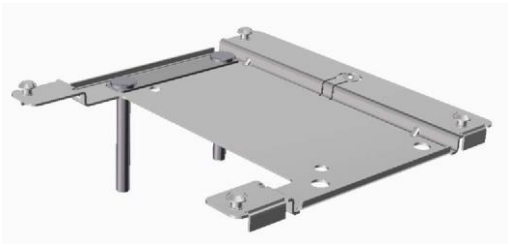
2	Measure the tile and mark the middle point in the area between the finished an unfinished areas on the long side of the tile.	

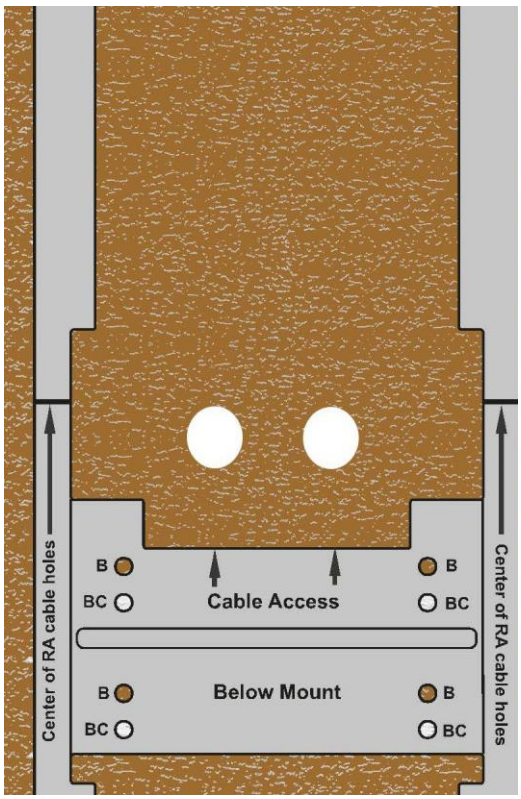
3	Place the mounting rail against the finished side of the tile, aligning the center of the mounting rail with the marks you made on the tile. Make sure the side of the rail labeled **Cable Access** **Below Mount** faces you.	

4	Place marks on the ceiling tile in the holes labeled **BC** on the mounting rail.	
5	Using a ruler (recommended) or visually, mark two RA Cable Hole marks on the ceiling tile where the **Cable Access** arrows and the lines at the ends of the **Center of RA Cable Holes** text on the Mounting Rail intersect.	

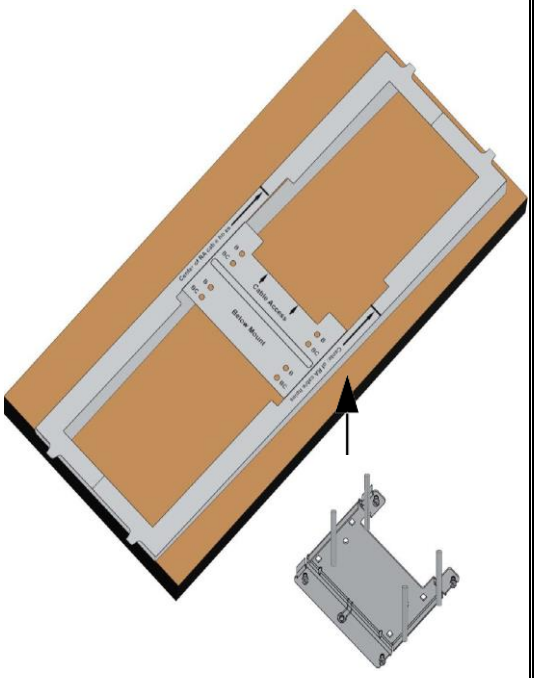
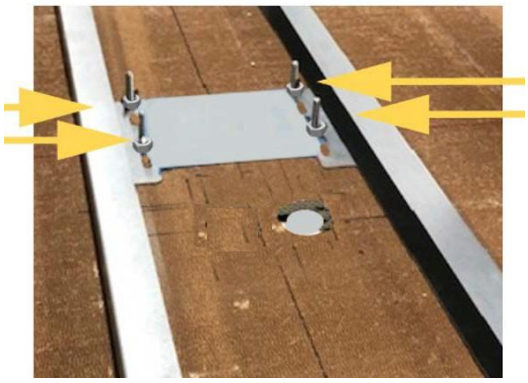
6	Remove the Mounting Rail. With the finished side of the ceiling tile facing you, use the drill and 1/4-inch drill bit to drill four holes where you marked in the **BC** holes in the previous steps. Using the marks you made in Step 5 as the center point, use a one-inch hole saw to drill out two one-inch holes in the ceiling tile. These holes are to pass cable connectors through the ceiling to the Access Point.	
7	Lightly coat both plastic grommets with silicone adhesive and insert them into both one-inch holes in the tile (Insert the grommets from the finished side of the tile).	
8	Put the tile and mounting rail aside.	

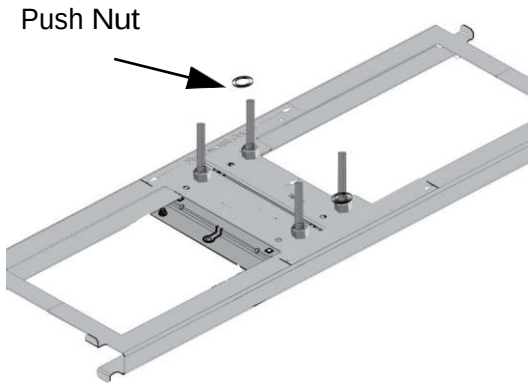
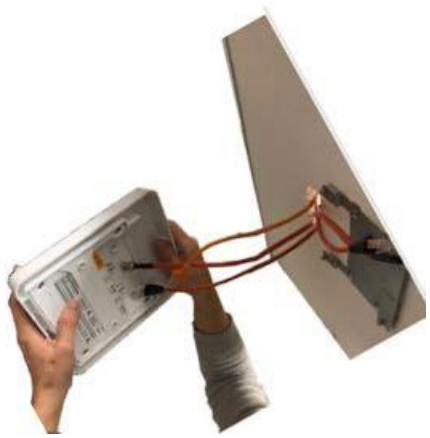
Mount the Hardware

1	Attach the access point to the Cosmetic Cover using the two M3 x 0.5 x8 screws. • Place the Access Point face down. • Place the plastic cover over the Access Point. • Make sure the two holes in the plastic cover align with the corresponding holes in the Access Point. • Secure the Access Point to the cosmetic ring by screwing in the two M3 x 0.5 x8 machine screws into the holes in the cosmetic ring and into the Access Point.	
2	Perform this step to connect both adapter plates to the mounting bracket: • Remove the adhesive strip from the adapter plate. • Orient the adapter plate so the bolts face the same direction as the shoulder screws that are already attached to the bracket. • Place the bolts through one set of outer holes on the bracket. • Press the adapter plate firmly against the bracket to ensure a strong adhesive hold.	 

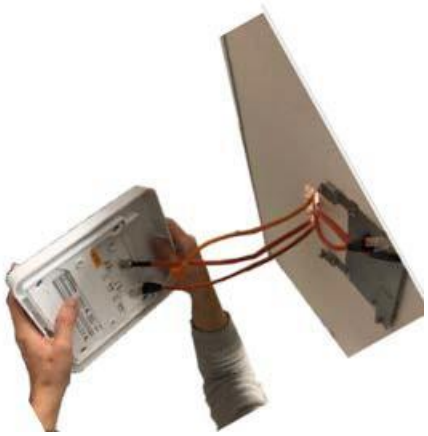
3	Place the Mounting Rail on the unfinished side of the tile. Make sure the **Cable Access** arrows on the Mounting Rail are pointed toward the one-inch holes you drilled in the tile for the cables. The four 1/4-inch holes you drilled must align with the **BC** holes in the Mounting Rail.	

PHILIPS

4	Connect the Mounting Bracket and Rail to the ceiling tile: • Pick up the Mounting Bracket and orient it so that the rectangular cutout on the Bracket is in the same direction as the **Cable Access** arrows on the Mounting Rail. • With the adapter plates adhered to the Mounting Bracket, insert the 4 bolts from the finished side of the tile through the four 1/4-inch holes in the ceiling tile and through the **B** holes in the Mounting Rail.	
5	Secure the Mounting Bracket and Mounting Rail to the tile: • Place an M6 x 1 nut on each of the bolts from the adapter plate that stick through the holes in the mounting rail. • Tighten the nuts and make sure you do not over tighten the nuts, which may break the tile.	

6	To secure the nuts, place a push nut over each of the bolts and push down until it sits on top of each nut. You can do this by hand or use a tool, such as pliers or an open-ended wrench	
7	Pull the LAN cable and Remote Antenna cables (if applicable) through the 1-inch holes on the unfinished side of the ceiling tile so the cable connectors end up on the finished side of the tile. **Note**: If connecting to two remote antennas, pull two cables through one of the holes and three cables through the other hole. If using two Remote Antennas (perform this step on both the RA1 and RA2 connectors on the Access Point): • Connect the Coaxial cables (from the same side of the strand) to the RA coaxial connector. • Connect the RJ-45 connector to the RA RJ-45 connector.	

PHILIPS

8	With all of the necessary cables now connected, attach the Access Point and the attached Cosmetic Cover to the Bracket, making sure the rectangular cutout in the Bracket aligns with the shape of the Access Point. Insert the 4 small shoulder screws on the Bracket into the keyholes on the Access Point and slide the Access Point with Cosmetic Cover in the direction of the arrow molded into the Cover. When the Access Point is secured to the bracket, you hear a click noise. **Note**: there are 4 “tick” marks on the outside surface of the Cosmetic that indicate the location of the keyholes to help with alignment to the shoulder screws.	

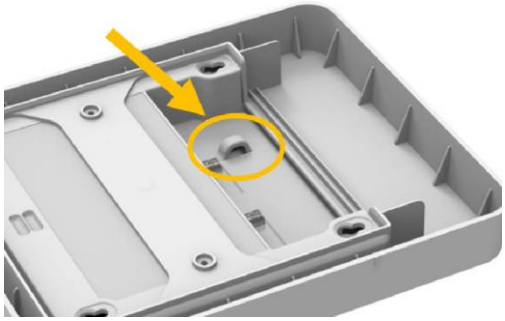
9	Place the tile into the ceiling. Replace other adjacent ceiling tiles, if necessary.	

Mounting the Smart-hopping Access Point with a Tether Mount (Optional)

In addition to (not as a substitute for) any of the other installation options described in this chapter, you can add a tether from the tether point on the Access Point to a permanent building structure for extra security (where local building codes require this type of installation [such as earthquake-prone areas]).

Note You must connect the other end of the tether to a stable part of the building frame.

Perform these steps before replacing the ceiling tile onto the ceiling frame structure, or prior to attaching the Access Point to a wall:

1	There is a tether point on the Access Point housing to allow for tethering to other permanent structures. Use a 18-gauge galvanized steel wire. Make sure the tether wire complies with national and local building standards. Thread the wire through the tether point in the Access Point housing. The tether wire must have three tight turns of the wire within 1.5 inches of the end of the wire.	
2	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	

Installation Procedure

To install the Smart-hopping 2.0 Access Point 1.4 GHz:

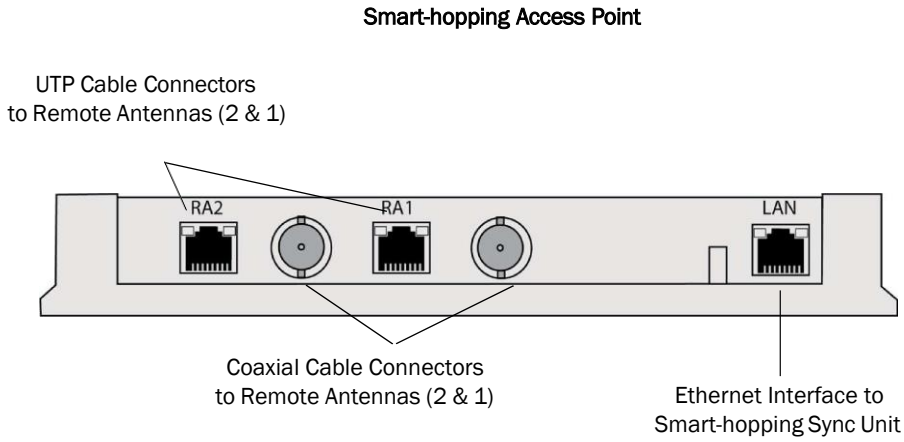
1. Mount the Access Point where they can communicate with Patient Monitors. Note these guidelines when installing the Smart-hopping Access Point:
   - You may mount each Smart-hopping Access Point as follows:
     - To a wall (fixed mount) as described on page 2-3 and page 2-7
     - Below a ceiling (flush mount) as described on page 2-12
     - Below a ceiling (fixed mount) as described on page 2-20 and page 2-29
   - Mounting instructions for Smart-hopping Remote Antenna are available in the *Smart-hopping Remote Antenna Installation Guide* document, which is available on the Philips InCenter web site.
   - Use a category 5e (or better) Unshielded Twisted Pair cable to connect each Smart-hopping Access Point to the Smart-hopping infrastructure.
   - The total length of UTP cable from the Smart-hopping access point to the Smart-hopping Synchronization 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 Access Point.

Caution The coaxial cable bundle cable length may vary from 69 - 79 feet. When planning remote antenna placement, ensure the maximum length between the Access Point and the remote antenna is 69 feet.

1. If you have installed Remote Antennas, connect each Smart-hopping Access Point to its installed Remote Antenna(s) using the supplied, unmodified 74 ft. (22.6m) Coaxial 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) 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 when mounting the Access Point.
   b) Route a Category 5e (or higher) RJ-45 cable between each Smart-hopping Access Point and the equipment closet in which the Smart-hopping infrastructure devices are installed.



2. Connect the Access Point to the Smart-hopping Sync Unit only when appropriate as part of the overall Smart-hopping installation.

   a) After initially connecting and powering the Access Point, verify that the two status LEDs on each of its connected Remote Antennas are lit. You can verify this by viewing the Access Point status page presented in the APC web interface.

Note If after connecting and powering the Access Point, 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 Access Point and Remote Antenna LEDs to light properly.

---

   b) Reboot the Access Point.

      The Access Point and its connected Remote Antennas ought to be listed in the APC web interface. Press **F5** to refresh the web interface display if the Access Point and RAs are not listed.

   c) For instructions on the Access Point startup sequence, see page 2-43.

Access Point Startup Sequence

Upon power on/start up, the Smart-hopping Access Point performs 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 four LEDs on the front of the Access Point. All four LEDs illuminate Amber color, the Power/Sync LED illuminates green, the Network and Radio LEDs flash green, and the LED turns off (not illuminated) indicating correct startup. If a test fails, 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 Access Point flicker on and off as data is transmitted.

Access Point Configuration Information

Refer to the *Smart-hopping 2.0 Infrastructure Installation and Service Guide* for complete details about configuring the Smart-hopping Access Point.

PHILIPS

3

Maintaining the Smart-hopping 2.0 Access Point 1.4 GHz

This chapter provides procedures and information for maintaining the Smart-hopping 2.0 Access Point 1.4 GHz and includes:

- Troubleshooting the Access Point Using its LEDs
- Replacing the Access Point
- Ordering Replacement Units

Troubleshooting the Access Point Using its LEDs

Complete test and inspection procedures for the Access Point are provided in the *Smart-hopping 2.0 Infrastructure Installation and Service Guide*. Perform these procedures when the Smart-hopping Access Point is initially installed and after servicing the unit.

For information on the Status LEDS, see “Smart-hopping Access Point Status LEDs” on page 1-8. 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 *Smart-hopping 2.0 Infrastructure Installation and Service Guide* for complete Access Point replacement procedures.

Replacing the Access Point

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

If an Access Point is not working properly, call 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 Smart-hopping infrastructure, be sure to follow the procedures given in the *Smart-hopping 2.0 Infrastructure Installation and Service Guide*.

Ordering Replacement Units

This section contains information for ordering replaceable parts and assemblies for the Smart-hopping 2.0 Access Point 1.4 GHz 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 3-1.

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 3-1.
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.

Ordering Information.

Table 3-1: Ordering Access Point and Remote Antenna Replacement Parts

Device	Part Numbers
Smart-hopping 2.0 Access Point 1.4 GHz	453564883261
Smart-hopping Mounting Options:	
Basic Access Point Kit (includes hardware for wall mounting)	453564979681 (IM4)
• Wall Mounting with Cover	453564979681 (IM4) with 453564979681 (IM4) Plastic Access Point cosmetic cover
• Below Ceiling Mount	453564979661 (IM2) Metal rail and hardware
• Below ceiling Mount with Cover)	453564979661 (IM2) Metal rail and hardware with 453564979681 (IM4) Plastic Access Point cosmetic cover
• Flush Ceiling Mount with Cover	453564979661 (IM2) Metal rail and hardware with 453564979671 (IM3) Plastic cosmetic ring
• Remote Antenna connections	453564979661 Metal rail and hardware (IM2)

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 North America Company
222 Jacobs Street
Cambridge, MA 02141
(800) 291-6743

CANADA:

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

EUROPE, MIDDLE EAST AND AFRICA:

Philips Medizin Systeme Böblingen GmbH
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

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
-Reorient or relocate the receiving antenna.
-Increase the separation between the equipment and receiver.
-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-Consult the dealer or an experienced radio/TV technician for help.

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