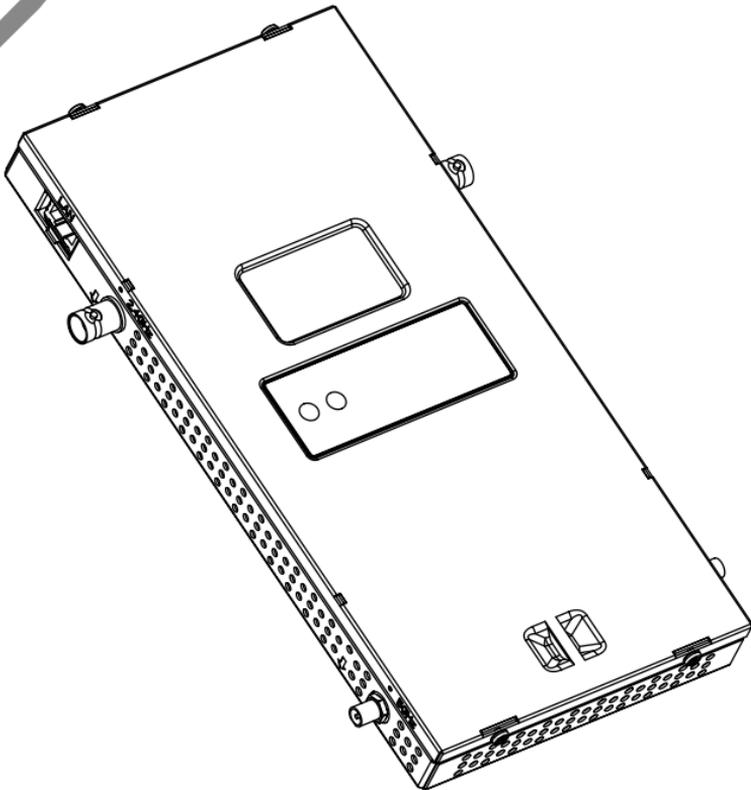


DRAFT

AP 300

802.11a/b/g Access Port
External Antenna Model
Quick Reference Guide



symbol[®]

Copyright

© 2004 SYMBOL TECHNOLOGIES, INC. All rights reserved.

All rights reserved. No part of this publication may be modified or adapted in any way, for any purposes without permission in writing from Symbol Technologies, Inc. (Symbol). The material in this manual is subject to change without notice. Symbol reserves the right to make changes to any product to improve reliability, function, or design. No license is granted, either expressly or by implication, estoppels, or otherwise under any Symbol Technologies, Inc., intellectual property rights. An implied license only exists for equipment, circuits and subsystems contained in Symbol products. Symbol, the Symbol logo and Spectrum24 are registered trademarks of Symbol Technologies, Inc.

Patents

This product is covered by one or more of the following U.S. and foreign Patents:

U.S. Patent No. 4,593,186; 4,603,262; 4,607,156; 4,652,750; 4,673,805; 4,736,095;
4,758,717; 4,760,248; 4,806,742; 4,816,660; 4,845,350; 4,896,026; 4,897,532; 4,923,281;
4,933,538; 4,992,717; 5,015,833; 5,017,765; 5,021,641; 5,029,183; 5,047,617; 5,103,461;
5,113,445; 5,130,520; 5,140,144; 5,142,550; 5,149,950; 5,157,687; 5,168,148; 5,168,149;
5,180,904; 5,216,232; 5,229,591; 5,230,088; 5,235,167; 5,243,655; 5,247,162; 5,250,791;
5,250,792; 5,260,553; 5,262,627; 5,262,628; 5,266,787; 5,278,398; 5,280,162; 5,280,163;
5,280,164; 5,280,498; 5,304,786; 5,304,788; 5,306,900; 5,324,924; 5,337,361; 5,367,151;
5,373,148; 5,378,882; 5,396,053; 5,396,055; 5,399,846; 5,408,081; 5,410,139; 5,410,140;
5,412,198; 5,418,812; 5,420,411; 5,436,440; 5,444,231; 5,449,891; 5,449,893; 5,468,949;
5,471,042; 5,478,998; 5,479,000; 5,479,002; 5,479,441; 5,504,322; 5,519,577; 5,528,621;
5,532,469; 5,543,610; 5,545,889; 5,552,592; 5,557,093; 5,578,810; 5,581,070; 5,589,679;
5,589,680; 5,608,202; 5,612,531; 5,619,028; 5,627,359; 5,637,852; 5,664,229; 5,668,803;
5,675,139; 5,693,929; 5,698,835; 5,705,800; 5,714,746; 5,723,851; 5,734,152; 5,734,153;
5,742,043; 5,745,794; 5,754,587; 5,762,516; 5,763,863; 5,767,500; 5,789,728; 5,789,731;
5,808,287; 5,811,785; 5,811,787; 5,815,811; 5,821,519; 5,821,520; 5,823,812; 5,828,050;
5,848,064; 5,850,078; 5,861,615; 5,874,720; 5,875,415; 5,900,617; 5,902,989; 5,907,146;
5,912,450; 5,914,478; 5,917,173; 5,920,059; 5,923,025; 5,929,420; 5,945,658; 5,945,659;
5,946,194; 5,959,285; 6,002,918; 6,021,947; 6,029,894; 6,031,830; 6,036,098; 6,047,892;
6,050,491; 6,053,413; 6,056,200; 6,065,678; 6,067,297; 6,082,621; 6,084,528; 6,088,482;
6,092,725; 6,101,483; 6,102,293; 6,104,620; 6,114,712; 6,115,678; 6,119,944; 6,123,265;
6,131,814; 6,138,180; 6,142,379; 6,172,478; 6,176,428; 6,178,426; 6,186,400; 6,188,681;
6,209,788; 6,209,789; 6,216,951; 6,220,514; 6,243,447; 6,244,513; 6,247,647; 6,308,061;
6,250,551; 6,295,031; 6,308,061; 6,308,892; 6,321,990; 6,328,213; 6,330,244; 6,336,587;
6,340,114; 6,340,115; 6,340,119; 6,348,773; 6,380,949; 6,394,355; D305,885; D341,584;
D344,501; D359,483; D362,453; D363,700; D363,918; D370,478; D383,124; D391,250;
D405,077; D406,581; D414,171; D414,172; D418,500; D419,548; D423,468; D424,035;
D430,158; D430,159; D431,562; D436,104.
Invention No. 55,358; 62,539; 69,060; 69,187, NI-068564 (Taiwan); No. 1,601,796; 1,907,875;
1,955,269 (Japan); European Patent 367,299; 414,281; 367,300; 367,298; UK 2,072,832;
France 81/03938; Italy 1,138,713
rev. 06/02

Symbol Technologies, Inc.
One Symbol Plaza
Holtsville, N.Y. 11742-1300
<http://www.symbol.com>

Introduction

The AP 300 Access Port, a component of the Symbol Wireless Switch System, links wireless 802.11a/b/g devices to the switch, enabling incremental growth of your wireless network with a cost-effective alternative to standard access points. For optimal performance, the AP 300 provides two placement options: wall and ceiling. Wall mount slots fit onto two screws provided. Arrows on the AP 300 case guide placement of the screws. For placement above a suspended ceiling, a safety cable tie point on the case provides for a loop of regulatory safety cable, and the light pipe, a pair of small pipes, fits through a hole in the ceiling tile to provide a view of the AP 300's status lights.

The AP 300 receives all power and transfers data through the same CAT-5 cable without any strain relief. There is no additional power supply.

Technical Specifications

Operating Voltage	48VDC typical; 36-57VDC range	Power Over Ethernet
Operating Current	100mA to 165mA	
Peak Current	250mA	
Operating Temperature	-20°C to 50°C (-4°F to 122°F)	
Operating Humidity	5% to 95% non-condensing	
Storage Temperature	-40°C to 70°C (-40°F to 158°F)	
Storage Humidity	85%	
Altitude	2438m (8,000ft.) 4572m (15,000ft.)	maximum operating maximum storage
Drop	91cm (36in.) to concrete	Without antenna modules
Electrostatic Discharge	+/-15kV air; +/-8kV contact; +/-2kV pin	

Dimensions & Weight

Length	23.5cm (9.25in.)
Width	14.6cm (5.75in.)
Height	2.54cm (1.0in.)
Weight	0.73kg (1.6lbs)

Radio Characteristics

The AP 300 is an IEEE a/b/g-compliant device with the appropriate radio option configured. The table below shows the characteristics for each device compliance.

Device	Mbps Data Rate Support	Utilizing Diversity	GHz
802.11a	6, 9, 12, 18, 24, 36, 48, and 54	Transmit and receive	4.9 to 5.875 range
802.11g*	1.0, 2.0, 5.5, 6, 9, 12, 18, 24, 36, 48, and 54	Transmit and receive	2.4 to 2.5 ISM range

*The supported 802.11g modes include either CCK only or OFDM only.

Package Contents

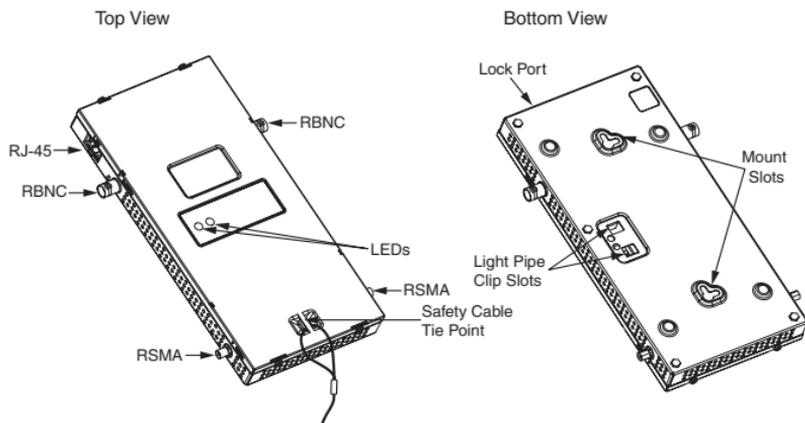
The AP 300 package contains the following items:

- AP 300 Access Port
- Two wide-shoulder screws
- Light pipe
- Badge for light pipe
- Decal for badge

Description

The AP 300 Access Port has two radios capable of concurrent 802.11a/b/g radio configurations. The AP 300 external version supports external antennas listed in [Supported Antennas on page 9](#). The AP 300 takes power from any 802.3af-compatible Power Over Ethernet (PoE) switch or power injector.

Features



- Primary and secondary Reverse BNC connectors for 802.11b/g antennas purchased separately
- Primary and secondary Reverse SMA connectors for 802.11a antennas purchased separately
- One RJ-45 connector
- Two redundant sets of LED indicators, top and bottom; slots next to the bottom LEDs are for a clip on the light pipe
- Point for a safety cable loop
- Kensington® Lock Port (not visible in views)
- Slots for wall mounting

The AP 300 has one RJ-45 connector for a 10/100 Ethernet port, and two pairs of antenna connectors: Reverse BNC for 2.4 to 2.5GHz and Reverse SMA for 4.9 to 5.875GHz. The LAN port connects to a wireless switch with a standard CAT-5 cable, straight through or cross-over, without any strain relief.

The AP 300 receives power through the Ethernet cable, optionally connected to a Port Power Injector—for example, Symbol Model AP-PSBIAS-T-12-AF Power Injector 12 Port. See the Symbol web site for available PoE devices.

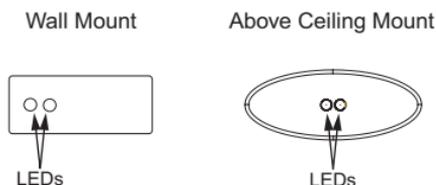
Review installation plans to determine device placement and cable routing.

The AP 300 Access Port comprises two 802.11 radios: an 802.11b/g radio operating in the 2.4 to 2.5GHz band and an 802.11a radio operating in the 4.9 to 5.875GHz band. Each radio has an embedded controller which runs local firmware used to perform the functions of the lower 802.11 MAC. All upper MAC functions and MAC management are controlled by the Wireless Switch.

Motherboard firmware enables the AP 300 to boot after either a power up or a watchdog reset. After self-boot, the motherboard sends an “I am alive” message into the network to be adopted and loaded with the actual runtime code. The boot firmware on the motherboard and the firmware downloaded from the switch can be modified via the Ethernet interface from either the Wireless Switch or by other Symbol diagnostic software tools.

LED Indicators

The LED activity indicators appear on the top of the case for a wall mount. With the unit mounted above a ceiling, the LEDs are at the center of an oval badge on the ceiling; a light pipe enables the view through the ceiling tile.



The LEDs provide a status display indicating error conditions, transmission, and network activity for the 802.11a (amber) radio or the 802.11b/g (green) radio.

802.11a Activity LED Amber

Booting	The amber LED flashes three times per second until firmware is loaded. During boot, no 802.11a mobiles can associate.
Normal	After adoption, the amber LED is steady or flashes with 802.11a radio traffic.
Error	The amber LED flashes once per second if an error prevents the 802.11a radio from operating normally.

802.11b/g Activity LED Green

Booting	The green LED flashes three times per second until firmware is loaded. During boot, no 802.11b/g mobiles can associate.
Normal	After adoption, the green LED is steady or flashes with 802.11b/g radio traffic.
Error	The green LED flashes once per second if an error prevents the 802.11b/g radio from operating normally.

Installation Instructions

The AP 300 mounts either on a wall with wide-shouldered screws included or in the ceiling.

Before Beginning

Perform the following:

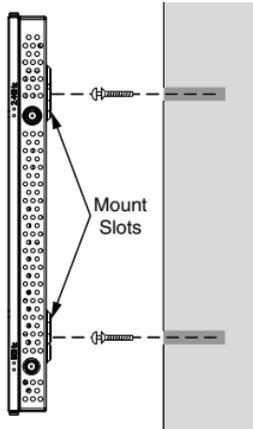
- Match the model number on the purchase order with the model numbers in the packing list and on the case of the device shipped.
- Verify that the contents of the box include the intended AP 300 and the mounting hardware:

Item	Notes
WSAP-5030-300-WW	802.11a and 802.11g configurations with external RSMA (.11a radio) and RBNC (.11g radio) antenna connectors. The antenna is a separate purchasable item. Mounting Hardware: Two wide-shoulder Phillips pan head self-tapping screws.

- Review site survey and network analysis reports to determine the location and mounting position for the AP 300.

Wall Mounting

In this procedure, hang the AP 300 Access Port along its width or length using the slots on the bottom of the unit. The following illustration shows a lengthwise mount.

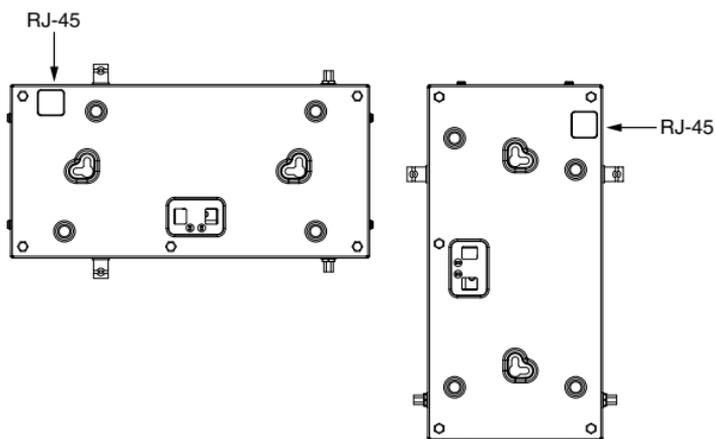


Hardware

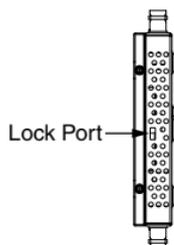
- A CAT-5 cable connected to a compatible Symbol wireless switch—for example, the WS 2000 or WS 5000—with sufficient slack and without a molded or integrated strain relief on the connector to the AP 300
- Two wide-shoulder Phillips pan head self-tapping screws (provided)
- Case: In the procedure, use the arrows on the AP 300's case as a guide to determine the proper placement for the unit's mounting screws.
- Safety cable (recommended)
- Security cable (optional)

Procedure

1. Orient the case on the wall by its width or length.



2. Using the arrows on the edge of the case as guides, move the edge to the midline of the mounting area and mark points on the midline for the screws.
3. At each point, screw in the self-tapping screws and stop where the threads meet the shank or shoulder of the screw.
4. If required, install and attach a security cable to the unit's lock port.



5. Place the large corner of each of the case's mount slots over the screw heads.
6. Slide the case down along the mounting surface to hang the mount slots on the screw heads.
7. Attach the Ethernet cable.
8. Verify the unit has power by observing that the LEDs are lit or flashing.

Suspended Ceiling Tile (Plenum) Mount

In this procedure, place the AP 300 above a suspended ceiling.

Note: Notes or warnings about suspended ceiling mounts apply to all installations where the unit is placed on suspended ceiling tile. The AP 300 case has a safety cable tie point for a standard safety cable.

Caution: *Symbol does not recommend mounting the AP 300 directly to any suspended ceiling tile with a thickness less than 1.27cm (0.5in.) or a suspended ceiling tile with an unsupported span greater than 66cm (26in.). Symbol does strongly recommend fitting the AP 300 with a safety cable suitable for the specific installation. The safety cable should be steel—a steel wire rope to the standard ceiling suspension cable—and in diameter at least .159cm (.062in.) to .25cm (.10in.).*

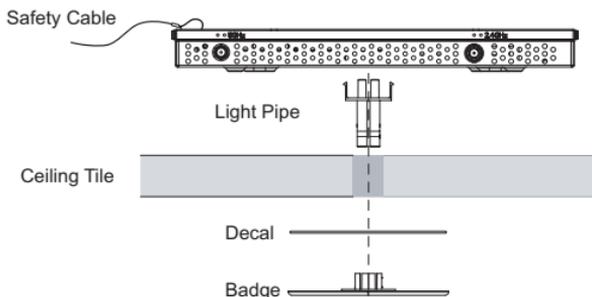
This placement requires installation of the provided light pipe for viewing the status lights of the unit.

Hardware

- A CAT-5 cable connected to a compatible Symbol wireless switch—for example, the WS 2000 or WS 5000—with sufficient slack—optimally, to reach a work surface from the ceiling
- Light pipe
- Badge for light pipe
- Decal for badge
- Safety cable (recommended)
- Security cable (optional)

Procedure

1. If possible, remove the ceiling tile from its frame and place it, finished side down, on a work surface.
2. If required, install in the ceiling space the recommended safety cable—steel at least .159cm (.06in.) to .25cm (.10in.) in diameter—and a security cable.
3. Mark a point on the upper or unfinished side of the tile.
4. Push the lightpipe through the tile at the mark. If necessary, use a drill to make a hole in the tile.



5. Snap the clips of the light pipe into the bottom of the case.
6. Fit the light pipe into hole in the tile from its unfinished side.
7. Place the decal on the back of the badge and snap the badge onto the light pipe from the finished side of the tile.
8. Bring the tile into the ceiling space, and attach any safety cable to the safety cable tie point or security cable to the unit's lock port.
9. Plug the Ethernet cable into the LAN port.
10. Verify the unit has power by observing the LEDs.
11. Place the ceiling tile back in its frame.

Supported Antennas

Contact a Symbol sales associate for these and other available AP 300 antenna options.

802.11b/g Antennas

Antenna Option	Part Number
2.4-2.5GHz, 11 dBi 120 Degree Sector Antenna	ML-2499-11PNA2-01
2.4-2.5GHz, 3.5 dBi Fixed Point Dipole Antenna	ML-2499-APA2-01
2.4-2.5GHz, 5 dBi OMNI Antenna	ML-2499-HPA3-01
2.4-2.5GHz, 14 dBi YAGI Antenna	ML-2499-BYGA2-01

802.11a Antennas

Antenna Option	Part Number
5.15GHz to 5.825GHz, 2Bi RSMA Dipole Antenna	ML-5299-APA1-01
5.15GHz to 5.825GHz, 13Bi Patch Antenna	ML-5299-WPNA1-01
5.15GHz to 5.825GHz, 5Bi OMNI Antenna	ML-5299-HPA1-01

Customer Support

Symbol Technologies provides its customers with prompt and accurate customer support. Use the Symbol Support Center as the primary contact for any technical problem, question or support issue involving Symbol products.

If the Symbol Customer Support specialists cannot solve a problem, access to all technical disciplines within Symbol becomes available for further assistance and support. Symbol Customer Support responds to calls by e-mail, telephone or fax within the time limits set forth individual contractual agreements.

When contacting Symbol Customer Support, please provide the following information:

- Device serial number
- Product name or model number
- Software type and version number

North American Contacts

Inside North America, contact Symbol at:

Symbol Technologies, Inc.
One Symbol Plaza
Holtsville, New York 11742-1300
Telephone: 1-631-738-2400/1-800-SCAN 234
Fax: 1-631-738-5990

Symbol Support Center (for warranty and service information):

Telephone: 1-631-738-6213/1-800-653-5350
Fax: (631) 563-5410
E-mail: support@symbol.com

International Contacts

Outside North America, contact Symbol at:

Symbol Technologies, Inc.
Symbol Place
Winnersh Triangle, Berkshire, RG41 5TP
United Kingdom
0800-328-2424 (Inside UK)
+44 118 945 7529 (Outside UK)

Web Support Sites

MySymbolCare

<http://www.symbol.com/services/msc>

Symbol Services Homepage

<http://symbol.com/services>

Symbol Software Updates

<http://symbol.com/services/downloads>

Symbol Developer Program

<http://software.symbol.com/devzone>

Symbol Knowledge Base

<http://kb.symbol.com/register.asp>

Additional Information

Obtain additional information by contacting Symbol at:

- 1-800-722-6234, inside North America
- +1-631-738-5200, in/outside North America
- <http://www.symbol.com/>

Legal Information

Regulatory

All Symbol devices are designed to be compliant with rules and regulations in locations they are sold and will be labeled as required.

Any changes or modifications to Symbol Technologies equipment, not expressly approved by Symbol Technologies, could void the user's authority to operate the equipment.

Use only the supplied or an approved replacement antenna. Unauthorized antennas, modifications, or attachments could cause damage and may violate regulations.

This device is to be used only with Symbol Technologies Wireless Switch.

Applying the Regulatory Country Stamp

Regulatory labels are applied to the device signifying the radio(s) are approved for use in the following countries: United States, Canada, Australia, Japan & Europe 1,2.

Note 1: For 2.4GHz Products: Europe includes, Austria, Belgium, Croatia, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Liechtenstein, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

Note 2: The use of 5GHz RLAN's has varying restrictions of use; please refer to the Symbol Declaration of Conformity (DoC) for details at <http://www2.symbol.com/doc/>.

In addition to the list above other countries may require a regulatory stamp to be affixed to the product.

Please refer to www.symbol.com/ for the list of countries where mandatory stamps are required.

For countries that require regulatory label, a sheet of stamps may be enclosed within the package.

If the appropriate stamps are not provided, please contact your supplier.

To apply the country stamp:

1. Peel the stamp appropriate to the country where this device is to be used.
2. Apply the country stamp in the space provided on the regulatory label.

Caution: *Operation of the device without a regulatory label or the correct country Stamp is illegal.*

FCC RF Exposure Guidelines

Safety Information

Caution: *The device complies with internationally recognized standards covering Specific Absorption Rate (SAR) related to human exposure to electromagnetic fields from radio devices.*

It is advisable to use the device only in the normal operating position.

Remote and Standalone Antenna Configurations.

To comply with FCC RF exposure requirements, antennas that are mounted externally at remote locations or operating near users at stand-alone desktops of similar configurations must operate with a minimum separation distance of 20cm from all persons.

Radio Frequency Interference Requirements



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.

Radio Transmitters (Part 15)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Radio Frequency Interference Requirements - Canada

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

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Radio Transmitters

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

Label Marking: The Term "IC:" before the radio certification only signifies that Industry Canada technical specifications were met.



Marking and European Economic Area (EEA)

The use of 2.4GHz RLANS, for use in the EEA, have the following restrictions:

- In the range of 2.400GHz -2.4835GHz, the maximum radiated transmit power is 100mW EIRP.
- In France, the equipment is restricted to the range 2.4465GHz to 2.4835GHz.
- For Belgium outside usage, the equipment is restricted to the range 2.460GHz to 2.4835GHz.
- Italy requires a user license for outside usage.

The use of 5GHz RLANS has varying restrictions for use within the EEA; please refer to the Symbol Declaration of Conformity (DoC), details at <http://www2.symbol.com/doc/>

Statement of Compliance

Symbol Technologies, Inc., hereby, declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

A Declaration of Conformity may be obtained from <http://www2.symbol.com/doc/>.

Other Countries

Mexico—Restrict Frequency Range to: 2.450GHz - 2.4835GHz.

Israel—Restrict Frequency Range to: 2.418GHz - 2.457GHz.

Sri Lanka—Restrict Frequency Range to: 2.400GHz - 2.430GHz.

Tested to Comply With FCC Standards

For Home or Office Use

Symbol Technologies Inc.