CISCO CONFIDENTIAL_Draft 1

Channels and Maximum Power Settings for Cisco Aironet Access Points and Bridges

August, 2006

Corporate Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
http://www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 526-4100

Customer Order Number:
Text Part Number: OL--11142-01

THE SPECIFICATIONS AND INFORMATION REGARDING THE PRODUCTS IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE. ALL STATEMENTS, INFORMATION, AND RECOMMENDATIONS IN THIS MANUAL ARE BELIEVED TO BE ACCURATE BUT ARE PRESENTED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. USERS MUST TAKE FULL RESPONSIBILITY FOR THEIR APPLICATION OF ANY PRODUCTS.

THE SOFTWARE LICENSE AND LIMITED WARRANTY FOR THE ACCOMPANYING PRODUCT ARE SET FORTH IN THE INFORMATION PACKET THAT SHIPPED WITH THE PRODUCT AND ARE INCORPORATED HEREIN BY THIS REFERENCE. IF YOU ARE UNABLE TO LOCATE THE SOFTWARE LICENSE OR LIMITED WARRANTY, CONTACT YOUR CISCO REPRESENTATIVE FOR A COPY.

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

The following information is for FCC compliance of Class B devices: The equipment described in this manual generates and may radiate radio-frequency energy. If it is not installed in accordance with Cisco's installation instructions, it may cause interference with radio and television reception. This equipment has been tested and found to comply with the limits for a Class B digital device in accordance with the specifications in part 15 of the FCC rules. These specifications are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation.

Modifying the equipment without Cisco's written authorization may result in the equipment no longer complying with FCC requirements for Class A or Class B digital devices. In that event, your right to use the equipment may be limited by FCC regulations, and you may be required to correct any interference to radio or television communications at your own expense.

You can determine whether your equipment is causing interference by turning it off. If the interference stops, it was probably caused by the Cisco equipment or one of its peripheral devices. If the equipment causes interference to radio or television reception, try to correct the interference by using one or more of the following measures:

• Turn the television or radio antenna until the interference stops.

• Move the equipment to one side or the other of the television or radio.

• Move the equipment farther away from the television or radio.

• Plug the equipment into an outlet that is on a different circuit from the television or radio. (That is, make certain the equipment and the television or radio are on circuits controlled by different circuit breakers or fuses.)

Modifications to this product not authorized by Cisco Systems, Inc. could void the FCC approval and negate your authority to operate the product.

The Cisco implementation of TCP header compression is an adaptation of a program developed by the University of California, Berkeley (UCB) as part of UCB's public domain version of the UNIX operating system. All rights reserved. Copyright © 1981, Regents of the University of California.

NOTWITHSTANDING ANY OTHER WARRANTY HEREIN, ALL DOCUMENT FILES AND SOFTWARE OF THESE SUPPLIERS ARE PROVIDED "AS IS" WITH ALL FAULTS. CISCO AND THE ABOVE-NAMED SUPPLIERS DISCLAIM ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, THOSE OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OR ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE.

IN NO EVENT SHALL CISCO OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR LOSS OR DAMAGE TO DATA ARISING OUT OF THE USE OR INABILITY TO USE THIS MANUAL, EVEN IF CISCO OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

CCSP, CCVP, the Cisco Square Bridge logo, Follow Me Browsing, and StackWise are trademarks of Cisco Systems, Inc.; Changing the Way We Work, Live, Play, and Learn, and iQuick Study are service marks of Cisco Systems, Inc.; and Access Registrar, Aironet, BPX, Catalyst, CCDA, CCDP, CCIE, CCIP, CCNA, CCNP, Cisco, the Cisco Certified Internetwork Expert logo, Cisco IOS, Cisco Press, Cisco Systems, Cisco Systems Capital, the Cisco Systems logo, Cisco Unity, Enterprise/Solver, EtherChannel, EtherFast, EtherSwitch, Fast Step, FormShare, GigaDrive, GigaStack, HomeLink, Internet Quotient, IOS, IP/TV, iQ Expertise, the iQ logo, iQ Net Readiness Scorecard, LightStream, Linksys, MeetingPlace, MGX, the Networkers logo, Networking Academy, Network Registrar, *Packet*, PIX, Post-Routing, Pre-Routing, ProConnect, RateMUX, ScriptShare, SlideCast, SMARTnet, The Fastest Way to Increase Your Internet Quotient, and TransPath are registered trademarks of Cisco Systems, Inc. and/or its affiliates in the United States and certain other countries.

All other trademarks mentioned in this document or Website are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (0601R)

Any Internet Protocol (IP) addresses used in this document are not intended to be actual addresses. Any examples, command display output, and figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses in illustrative content is unintentional and coincidental.

Channels and Maximum Power Settings for Cisco Aironet Access Points and Bridges
© 2006 Cisco Systems, Inc. All rights reserved.

CHAPTER 1 **Cisco Aironet 1000 Series Access Points** 1-1

Channels and Maximum Power Levels 1-2
IEEE 802.11b/g (2.4-GHz Band) 1-2
IEEE 802.11a (5-GHz Band) 1-3
Special Country Restrictions 1-6
Changing the Lightweight Access Point Output Power 1-6

CHAPTER 2 **Cisco Aironet 1100 Series Access Points** 2-1

Channels and Power Settings for Autonomous Access Points 2-2
Channels 2-2
AIR-AP1120B IEEE 802.11b (2.4-GHz Band) 2-2
AIR-AP1121G IEEE 802.11g (2.4-GHz Band) 2-3
Maximum Power Levels 2-3
AIR-AP1120B IEEE 802.11b (2.4-GHz Band) 2-3
AIR-1121G IEEE 802.11g (2.4-GHz Band) 2-4
Channels and Power Settings for Lightweight Access Points 2-5
Channels 2-5
AIR-LAP1121G IEEE 802.11g (2.4-GHz Band) 2-5
Maximum Power Levels 2-6
IEEE 802.11b (2.4-GHz Band) 2-6
IEEE 802.11g (2.4-GHz Band) 2-6
Changing the Lightweight Access Point Output Power 2-7

CHAPTER 3 **Cisco Aironet 1130 Series Access Points** 3-1

Channels and Power Settings for Autonomous Access Points 3-2
Channels and Maximum Power Levels 3-2
IEEE 802.11b/g (2.4-GHz Band) 3-2
IEEE 802.11a (5-GHz Band) 3-2
Special Country Restrictions 3-4
Changing Access Point Output Power 3-4
Channels and Power Settings for Lightweight Access Points 3-5
Channels and Maximum Power Levels 3-5
IEEE 802.11b/g (2.4-GHz Band) 3-5
IEEE 802.11a (5-GHz Band) 3-5

CISCO CONFIDENTIAL_Draft 1

Special Country Restrictions 3-7
Changing the Lightweight Access Point Output Power 3-7

CHAPTER 4 **Cisco Aironet 1200 Series Access Points 4-1**

Channels and Power Settings for Autonomous Access Points 4-2
Channels 4-2
IEEE 802.11b (2.4-GHz Band) 4-2
IEEE 802.11g (2.4-GHz Band) 4-3
IEEE 802.11a (5-GHz Band) 4-4
Maximum Power Levels and Antenna Gains 4-6
IEEE 802.11b (2.4-GHz Band) 4-6
IEEE 802.11g (2.4-GHz Band) 4-7
IEEE 802.11a (5-GHz Band) 4-8
Maximum Power Levels in Some Regulatory Domains with External Antennas 4-12
Special Country Restrictions 4-13
Power Conversion Table 4-13
Changing Access Point Output Power 4-14
Channels and Power Settings for Lightweight Access Points 4-15
Channels 4-15
IEEE 802.11g (2.4-GHz Band) 4-15
IEEE 802.11a (5-GHz Band) 4-15
Maximum Power Levels and Antenna Gains 4-17
IEEE 802.11g (2.4-GHz Band) 4-17
IEEE 802.11a (5-GHz Band) 4-17
Maximum Power Levels in Some Regulatory Domains with External Antennas 4-21
Special Country Restrictions 4-22
Power Conversion Table 4-22
Changing the Lightweight Access Point Output Power 4-22

CHAPTER 5 **Cisco Aironet 1240AG Series Access Points 5-1**

Channels and Power Settings for Autonomous Access Points 5-2
Channels and Maximum Power Levels 5-2
IEEE 802.11b/g (2.4-GHz Band) 5-2
IEEE 802.11a (5-GHz Band) 5-2
Maximum Power Levels in Some Regulatory Domains with External Antennas 5-4
Special Country Restrictions 5-6
Changing Access Point Output Power 5-6
Channels and Power Settings for Lightweight Access Points 5-7
Channels and Maximum Power Levels 5-7

CISCO CONFIDENTIAL_Draft 1

Maximum Power Levels in Some Regulatory Domains with External Antennas 5-9
Special Country Restrictions 5-11
Changing the Lightweight Access Point Output Power 5-11

CHAPTER 6 **Cisco Aironet 1250 Series Access Point** 6-1
Channels and Power Settings for Autonomous Access Points 6-2
Channels and Maximum Power Levels 6-2
IEEE 802.11b/g (2.4-GHz Band) on Single Radio Models 6-2
IEEE 802.11b/g (2.4-GHz Band) on Dual Radio Models 6-3
IEEE 802.11a (5-GHz Band) 6-3
Maximum Power Levels in Some Regulatory Domains with External Antennas 6-5
Special Country Restrictions 6-7
Changing Access Point Output Power 6-7
Channels and Power Settings for Lightweight Access Points 6-8
Channels and Maximum Power Levels 6-8
IEEE 802.11b/g (2.4-GHz Band) on Single Radio Models 6-8
IEEE 802.11b/g (2.4-GHz Band) on Dual Radio Models 6-9
IEEE 802.11a (5-GHz Band) 6-9
Maximum Power Levels in Some Regulatory Domains with External Antennas 6-11
Special Country Restrictions 6-13
Changing Access Point Output Power 6-13

CHAPTER 7 **Cisco Aironet 1300 Series Access Points/Bridges** 7-1
Channels and Power Settings for Autonomous Access Points/Bridges 7-2
Channels 7-2
IEEE 802.11b/g (2.4-GHz Band) 7-2
Maximum Power Levels and Antenna Gains 7-3
IEEE 802.11b/g (2.4-GHz Band) 7-3
Changing the Autonomous Access Point/Bridge Output Power 7-4
Channels and Power Settings for Lightweight Access Points/Bridges 7-6
Channels 7-6
IEEE 802.11g (2.4-GHz Band) 7-6
Maximum Power Levels and Antenna Gains 7-7
IEEE 802.11b/g (2.4-GHz Band) 7-7
Changing the Lightweight Access Point Output Power 7-8
Power Conversion Table 7-10

CISCO CONFIDENTIAL_Draft 1

CHAPTER 8 **Cisco Aironet 1400 Series Outdoor Bridges** 8-1

Channels 8-2

IEEE 802.11a (5.8-GHz Band) 8-2

Maximum Power Levels 8-3

5.8-GHz Band 8-3

CHAPTER 9 **Cisco Aironet 1500 Series Mesh Access Points** 9-1

Channels and Maximum Power Levels 9-2

IEEE 802.11b/g (2.4-GHz Band) 9-2

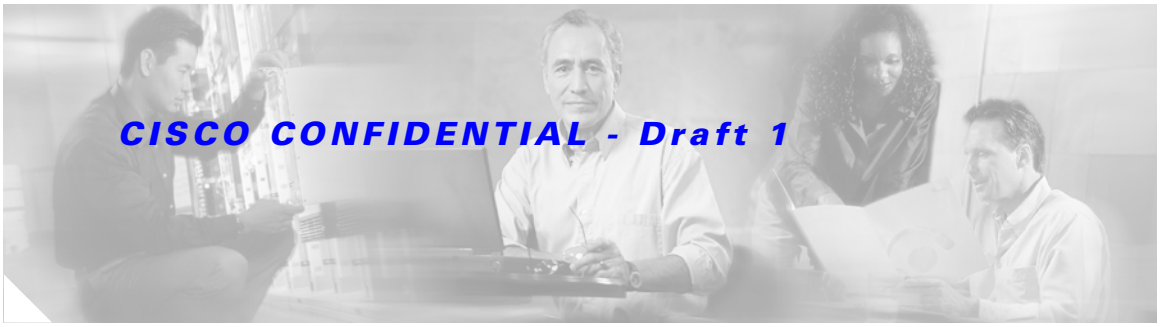
IEEE 802.11a (5-GHz Band) 9-3

Antenna Settings 9-4

Maximum Power Levels Allowed in Some Regulatory Domains 9-4

Special Country Restrictions 9-5

Changing the Lightweight Access Point Output Power 9-6



Preface

Audience

This guide is for the networking professional who installs and manages Cisco Aironet access points and bridges. To use this guide with autonomous access points and bridges, you should have experience working with Cisco IOS software and be familiar with the concepts and terminology of wireless local area networks.

To use this guide with lightweight access points, you should have experience working with a Cisco Wireless LAN Controller and be familiar with the concepts and terminology of wireless local area networks.

Purpose

This guide provides the channel and maximum power settings you need to install your autonomous or lightweight access points and bridges in supported regulatory regions.

For detailed information about Cisco IOS commands used with autonomous access points and bridges, refer to the *Cisco IOS Command Reference for Cisco Aironet Access Points and Bridges* for this release. For information about the standard Cisco IOS Release 12.3 commands, refer to the Cisco IOS documentation set available from the Cisco.com home page at **Technical Support & Documentation**. On the Technical Support & Documentation home page, click **Cisco IOS Software > Cisco IOS Software Releases 12.3 Mainline**.

For hardware information about Cisco Aironet access points and bridges, refer to the product hardware installation guides for your access points and bridges available from the Cisco.com home page at **Technical Support & Documentation**. On the Technical Support & Documentation home page, click **Wireless** and the product are listed under the “Wireless LAN Access” section. Choose the needed product, then click **Install and Upgrade Guides** on the product documentation page.

For information about Cisco Wireless LAN Controllers, refer to the Cisco documentation sets available from the Cisco.com home page at **Technical Support & Documentation**. On the Technical Support & Documentation home page, click **Wireless** and the documentation is listed under the “Wireless LAN Controllers” section.

CISCO CONFIDENTIAL - Draft 1

Organization

This guide is organized into these chapters:

Chapter 1, "Cisco Aironet 1000 Series Access Points," lists the 1000 series lightweight access point radio channels and the maximum power levels supported by the world's regulatory domains.

Chapter 2, "Cisco Aironet 1100 Series Access Points," lists the 1100 series autonomous and lightweight access point radio channels and the maximum power levels supported by the world's regulatory domains.

Chapter 3, "Cisco Aironet 1130AG Series Access Points," lists the 1130AG series autonomous and lightweight access point radio channels and the maximum power levels supported by the world's regulatory domains.

Chapter 4, "Cisco Aironet 1200 Series Access Points," lists the 1200 series autonomous and lightweight access point radio channels and the maximum power levels supported by the world's regulatory domains.

Chapter 5, "Cisco Aironet 1240AG Series Access Points," lists the 1240AG series autonomous and lightweight access point radio channels and the maximum power levels supported by the world's regulatory domains.

Chapter 6, "Cisco Aironet 1250 Series Access Point," lists the 1250 series autonomous and lightweight access point radio channels and the maximum power levels supported by the world's regulatory domains.

Chapter 7, "Cisco Aironet 1300 Series Access Point/Bridge," lists the 1300 series autonomous and lightweight outdoor access point/bridge radio channels and the maximum power levels supported by the world's regulatory domains.

Chapter 8, "Cisco Aironet 1400 Series Outdoor Bridges," lists the 1400 series autonomous bridge radio channels and the maximum power levels supported by the world's regulatory domains.

Chapter 9, "Cisco Aironet 1500 Series Mesh Access Points," lists the 1500 series lightweight outdoor mesh access point radio channels and the maximum power levels supported by the world's regulatory domains.

Conventions

This publication uses these conventions to convey instructions and information:

Interactive examples use these conventions:

- Terminal sessions and system displays are in `screen` font.
- Information you enter is in **`boldface screen`** font.
- Nonprinting characters, such as passwords or tabs, are in angle brackets (< >).

Notes, cautions, and timesavers use these conventions and symbols:

Tip Means the following will help you solve a problem. The tips information might not be troubleshooting or even an action, but could be useful information.

Note Means reader take note. Notes contain helpful suggestions or references to materials not contained in this manual.

CISCO CONFIDENTIAL - Draft 1

Caution Means reader be careful. In this situation, you might do something that could result equipment damage or loss of data.

Related Publications

These documents provide information about the access points and bridges:

- Cisco Aironet 1000 Series Lightweight Access Point Hardware Installation Guide
- Cisco Aironet 1100 Series Access Point Hardware Installation Guide
- Cisco Aironet 1130AG Series Access Point Hardware Installation Guide
- Cisco Aironet 1200 Series Access Point Hardware Installation Guide
- Cisco Aironet 1240AG Series Access Point Hardware Installation Guide
- Cisco Aironet 1250 Series Access Point Hardware Installation Guide
- Cisco Aironet 1300 Series Access Point/Bridge Hardware Installation Guide
- Cisco Aironet 1400 Series Bridge Hardware Installation Guide
- Cisco Aironet 1500 Series Lightweight Outdoor Mesh Access Point Hardware Installation Guide
- Cisco IOS Software Configuration Guide for Cisco Aironet Access Points
- Cisco Wireless LAN Controller Configuration Guide

Click this link to browse to the Cisco Wireless documentation home page:

http://www.cisco.com/en/US/products/hw/wireless/tsd_products_support_category_home.html

To browse to the access point and bridge documentation, click a product listed under “Wireless LAN Access.”

To browse to the Cisco Wireless LAN Controller documentation, click **Cisco 4400 Series Wireless LAN Controllers** or **Cisco 2000 Series Wireless LAN Controllers** listed under “Wireless LAN Controllers.”

Obtaining Documentation

Cisco documentation and additional literature are available on Cisco.com. Cisco also provides several ways to obtain technical assistance and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

Cisco.com

You can access the most current Cisco documentation at this URL:

http://www.cisco.com/techsupport

You can access the Cisco website at this URL:

http://www.cisco.com

You can access international Cisco websites at this URL:

http://www.cisco.com/public/countries_languages.shtml

CISCO CONFIDENTIAL - Draft 1

Product Documentation DVD

Cisco documentation and additional literature are available in the Product Documentation DVD package, which may have shipped with your product. The Product Documentation DVD is updated regularly and may be more current than printed documentation.

The Product Documentation DVD is a comprehensive library of technical product documentation on portable media. The DVD enables you to access multiple versions of hardware and software installation, configuration, and command guides for Cisco products and to view technical documentation in HTML. With the DVD, you have access to the same documentation that is found on the Cisco website without being connected to the Internet. Certain products also have .pdf versions of the documentation available.

The Product Documentation DVD is available as a single unit or as a subscription. Registered Cisco.com users (Cisco direct customers) can order a Product Documentation DVD (product number DOC-DOCDVD=) from the Ordering tool or Cisco Marketplace.

Cisco Ordering tool:

http://www.cisco.com/en/US/partner/ordering/

Cisco Marketplace:

http://www.cisco.com/go/marketplace/

Ordering Documentation

Beginning June 30, 2005, registered Cisco.com users may order Cisco documentation at the Product Documentation Store in the Cisco Marketplace at this URL:

http://www.cisco.com/go/marketplace/

Cisco will continue to support documentation orders using the Ordering tool:

- Registered Cisco.com users (Cisco direct customers) can order documentation from the Ordering tool:

  http://www.cisco.com/en/US/partner/ordering/

- Instructions for ordering documentation using the Ordering tool are at this URL:

  http://www.cisco.com/univercd/cc/td/doc/es_inpck/pdi.htm

- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco Systems Corporate Headquarters (California, USA) at 408 526-7208 or, elsewhere in North America, by calling 1 800 553-NETS (6387).

Documentation Feedback

You can rate and provide feedback about Cisco technical documents by completing the online feedback form that appears with the technical documents on Cisco.com.

You can send comments about Cisco documentation to bug-doc@cisco.com.

CISCO CONFIDENTIAL - Draft 1

You can submit comments by using the response card (if present) behind the front cover of your document or by writing to the following address:

Cisco Systems
Attn: Customer Document Ordering
170 West Tasman Drive
San Jose, CA 95134-9883

We appreciate your comments.

Cisco Product Security Overview

Cisco provides a free online Security Vulnerability Policy portal at this URL:

http://www.cisco.com/en/US/products/products_security_vulnerability_policy.html

From this site, you can perform these tasks:

- Report security vulnerabilities in Cisco products.
- Obtain assistance with security incidents that involve Cisco products.
- Register to receive security information from Cisco.

A current list of security advisories and notices for Cisco products is available at this URL:

http://www.cisco.com/go/psirt

If you prefer to see advisories and notices as they are updated in real time, you can access a Product Security Incident Response Team Really Simple Syndication (PSIRT RSS) feed from this URL:

http://www.cisco.com/en/US/products/products_psirt_rss_feed.html

Reporting Security Problems in Cisco Products

Cisco is committed to delivering secure products. We test our products internally before we release them, and we strive to correct all vulnerabilities quickly. If you think that you might have identified a vulnerability in a Cisco product, contact PSIRT:

- Emergencies—security-alert@cisco.com

  An emergency is either a condition in which a system is under active attack or a condition for which a severe and urgent security vulnerability should be reported. All other conditions are considered nonemergencies.

- Nonemergencies—psirt@cisco.com

In an emergency, you can also reach PSIRT by telephone:

- 1 877 228-7302
- 1 408 525-6532

Tip We encourage you to use Pretty Good Privacy (PGP) or a compatible product to encrypt any sensitive information that you send to Cisco. PSIRT can work from encrypted information that is compatible with PGP versions 2.*x* through 8.*x*.

CISCO CONFIDENTIAL - Draft 1

Never use a revoked or an expired encryption key. The correct public key to use in your correspondence with PSIRT is the one linked in the Contact Summary section of the Security Vulnerability Policy page at this URL:

http://www.cisco.com/en/US/products/products_security_vulnerability_policy.htm

The link on this page has the current PGP key ID in use.

Obtaining Technical Assistance

Cisco Technical Support provides 24-hour-a-day award-winning technical assistance. The Cisco Technical Support & Documentation website on Cisco.com features extensive online support resources. In addition, if you have a valid Cisco service contract, Cisco Technical Assistance Center (TAC) engineers provide telephone support. If you do not have a valid Cisco service contract, contact your reseller.

Cisco Technical Support & Documentation Website

The Cisco Technical Support & Documentation website provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The website is available 24 hours a day, at this URL:

http://www.cisco.com/techsupport

Access to all tools on the Cisco Technical Support & Documentation website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a user ID or password, you can register at this URL:

http://tools.cisco.com/RPF/register/register.do

Note Use the Cisco Product Identification (CPI) tool to locate your product serial number before submitting a web or phone request for service. You can access the CPI tool from the Cisco Technical Support & Documentation website by clicking the **Tools & Resources** link under Documentation & Tools. Choose **Cisco Product Identification Tool** from the Alphabetical Index drop-down list, or click the **Cisco Product Identification Tool** link under Alerts & RMAs. The CPI tool offers three search options: by product ID or model name; by tree view; or for certain products, by copying and pasting **show** command output. Search results show an illustration of your product with the serial number label location highlighted. Locate the serial number label on your product and record the information before placing a service call.

Submitting a Service Request

Using the online TAC Service Request Tool is the fastest way to open S3 and S4 service requests. (S3 and S4 service requests are those in which your network is minimally impaired or for which you require product information.) After you describe your situation, the TAC Service Request Tool provides recommended solutions. If your issue is not resolved using the recommended resources, your service request is assigned to a Cisco engineer. The TAC Service Request Tool is located at this URL:

http://www.cisco.com/techsupport/servicerequest

CISCO CONFIDENTIAL - Draft 1

For S1 or S2 service requests or if you do not have Internet access, contact the Cisco TAC by telephone. (S1 or S2 service requests are those in which your production network is down or severely degraded.) Cisco engineers are assigned immediately to S1 and S2 service requests to help keep your business operations running smoothly.

To open a service request by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)
EMEA: +32 2 704 55 55
USA: 1 800 553-2447

For a complete list of Cisco TAC contacts, go to this URL:

http://www.cisco.com/techsupport/contacts

Definitions of Service Request Severity

To ensure that all service requests are reported in a standard format, Cisco has established severity definitions.

Severity 1 (S1)—Your network is “down,” or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Severity 2 (S2)—Operation of an existing network is severely degraded, or significant aspects of your business operation are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Severity 3 (S3)—Operational performance of your network is impaired, but most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

Severity 4 (S4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

Obtaining Additional Publications and Information

Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- Cisco Marketplace provides a variety of Cisco books, reference guides, documentation, and logo merchandise. Visit Cisco Marketplace, the company store, at this URL:

  http://www.cisco.com/go/marketplace/

- *Cisco Press* publishes a wide range of general networking, training and certification titles. Both new and experienced users will benefit from these publications. For current Cisco Press titles and other information, go to Cisco Press at this URL:

  http://www.ciscopress.com

- *Packet* magazine is the Cisco Systems technical user magazine for maximizing Internet and networking investments. Each quarter, Packet delivers coverage of the latest industry trends, technology breakthroughs, and Cisco products and solutions, as well as network deployment and troubleshooting tips, configuration examples, customer case studies, certification and training information, and links to scores of in-depth online resources. You can access Packet magazine at this URL:

  http://www.cisco.com/packet

CISCO CONFIDENTIAL - Draft 1

- *iQ Magazine* is the quarterly publication from Cisco Systems designed to help growing companies learn how they can use technology to increase revenue, streamline their business, and expand services. The publication identifies the challenges facing these companies and the technologies to help solve them, using real-world case studies and business strategies to help readers make sound technology investment decisions. You can access iQ Magazine at this URL:

  http://www.cisco.com/go/iqmagazine

  or view the digital edition at this URL:

  http://ciscoiq.texterity.com/ciscoiq/sample/

- *Internet Protocol Journal* is a quarterly journal published by Cisco Systems for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the Internet Protocol Journal at this URL:

  http://www.cisco.com/ipj

- Networking products offered by Cisco Systems, as well as customer support services, can be obtained at this URL:

  http://www.cisco.com/en/US/products/index.html

- Networking Professionals Connection is an interactive website for networking professionals to share questions, suggestions, and information about networking products and technologies with Cisco experts and other networking professionals. Join a discussion at this URL:

  http://www.cisco.com/discuss/networking

- World-class networking training is available from Cisco. You can view current offerings at this URL:

  http://www.cisco.com/en/US/learning/index.html

CHAPTER 5

Cisco Aironet 1240AG Series Access Points

This chapter lists the 1240 series access point IEEE 802.11b/g (2.4-GHz) and IEEE 802.11a (5-GHz) channels and the maximum power levels supported by the world's regulatory domains. For additional product hardware information refer to the *Cisco Aironet 1240AG Series Access Point Hardware Installation Guide*.

The following topics are covered in this chapter:

- Channels and Power Settings for Autonomous Access Points, page 5-2
- Channels and Power Settings for Lightweight Access Points, page 5-7

CISCO CONFIDENTIAL_Draft 1

Channels and Power Settings for Autonomous Access Points

This section lists the 1100 series autonomous access point (AIR-AP1242AG-x-K9) IEEE 802.11b/g (2.4-GHz) and the IEEE 802.11a (5-GHz) channels and maximum power levels supported by the world's regulatory domains.

Channels and Maximum Power Levels

IEEE 802.11b/g (2.4-GHz Band)

When shipped from the factory, the 1240 series access points support the channels and maximum power levels listed in Table 5-1 for their regulatory domain.

Note Table 5-1 lists the power levels shipped from the factory. The B columns indicate IEEE 802.11b data rates and the G columns indicate IEEE 802.11g data rates . In the –C, –E, –I, –K, and –S regulatory domains, you must manually adjust power levels depending upon the antenna being used (see Table 5-3).

Table 5-1 Channels and Maximum Conducted Power for the 802.11b/g Radio with up to 10-dBi External Antennas

Channel Id	Center Freq (MHz)	Maximum Conducted Power Levels (dBm) in the Regulatory Domains																			
		Americas (–A)		China (–C)		EMEA (–E)		Israel (–I)		Japan (–J)		South Korea (–K)		Non-FCC (–N)		Japan (–P)		Singapore (–S)		Taiwan (–T)	
		B	G	B	G	B	G	B	G	B	G	B	G	B	G	B	G	B	G	B	G
1	2412	20	17	17	17	17	17	17	17	14	14	17	17	20	17	14	14	17	17	20	17
2	2417	20	17	17	17	17	17	17	17	14	14	17	17	20	17	14	14	17	17	20	17
3	2422	20	17	17	17	17	17	17	17	14	14	17	17	20	17	14	14	17	17	20	17
4	2427	20	17	17	17	17	17	17	17	14	14	17	17	20	17	14	14	17	17	20	17
5	2432	20	17	17	17	17	17	17	17	14	14	17	17	20	17	14	14	17	17	20	17
6	2437	20	17	17	17	17	17	17	17	14	14	17	17	20	17	14	14	17	17	20	17
7	2442	20	17	17	17	17	17	17	17	14	14	17	17	20	17	14	14	17	17	20	17
8	2447	20	17	17	17	17	17	17	17	14	14	17	17	20	17	14	14	17	17	20	17
9	2452	20	17	17	17	17	17	17	17	14	14	17	17	20	17	14	14	17	17	20	17
10	2457	20	17	17	17	17	17	17	17	14	14	17	17	20	17	14	14	17	17	20	17
11	2462	20	17	17	17	17	17	17	17	14	14	17	17	20	17	14	14	17	17	20	17
12	2467	–	–	17	17	17	17	17	17	14	14	17	17	–	–	14	14	17	17	–	–
13	2472	–	–	17	17	17	17	17	17	14	14	17	17	–	–	14	14	17	17	–	–
14	2484	–	–	–	–	–	–	–	–	14	–	–	–	–	–	14	–	–	–	–	–

IEEE 802.11a (5-GHz Band)

An improper combination of power level and antenna gain can result in equivalent isotropic radiated power (EIRP) above the amount allowed per regulatory domain.

CISCO CONFIDENTIAL_Draft 1

When shipped from the factory, the 1240 series access points support the channels and maximum power levels listed in Table 5-2 for their regulatory domain.

Note Table 5-2 lists the power levels shipped from the factory. In the –E and –I regulatory domains, you must manually adjust power levels depending upon the antenna being used (see Table 5-4).

Table 5-2 Channels and Maximum Conducted Power for IEEE 802.11a Radio with up to 9.5-dBI External Antennas

Channel ID	Center Freq (MHz)	Maximum Conducted Power Levels (dBm) in the Regulatory Domains									
		Americas (–A)	China (–C)	EMEA (–E)	Israel (–I)	Japan (–J)	South Korea (–K)	North America (–N)	Japan (–P)	Singapore (–S)	Tiawan (–T)
5150 to 5250 MHz											
34	5170	–	–	–	–	11	–	–	–	–	–
36	5180	11	–	17	17	–	15	11	11	14	–
38	5190	–	–	–	–	11	–	–	–	–	–
40	5200	11	–	17	17	–	15	11	11	14	–
42	5210	–	–	–	–	11	–	–	–	–	–
44	5220	11	–	17	17	–	15	11	11	14	–
46	5230	–	–	–	–	11	–	–	–	–	–
48	5240	11	–	17	17	–	15	11	11	14	–
5250 to 5350 MHz											
52	5260	17	–	17[1]	17[1]	–	17[1]	17	8[1]	11[1]	–
56	5280	17	–	17[1]	17[1]	–	17[1]	17	8[1]	11[1]	11
60	5300	17	–	17[1]	17[1]	–	17[1]	17	8[1]	11[1]	11
64	5320	11	–	17[1]	17[1]	–	17[1]	11	8[1]	11[1]	11
5450 to 5725 MHz											
100	5500	17[1]	–	17[1]	–	–	17[1]	–	–	–	–
104	5520	17[1]	–	17[1]	–	–	17[1]	–	–	–	–
108	5540	17[1]	–	17[1]	–	–	17[1]	–	–	–	–
112	5560	17[1]	–	17[1]	–	–	17[1]	–	–	–	–
116	5580	17[1]	–	17[1]	–	–	17[1]	–	–	–	–
120	5600	–	–	17[1]	–	–	17[1]	–	–	–	–
124	5620	–	–	17[1]	–	–	17[1]	–	–	–	–
128	5640	–	–	17[1]	–	–	–	–	–	–	–
132	5660	17[1]	–	17[1]	–	–	–	–	–	–	–
136	5680	17[1]	–	17[1]	–	–	–	–	–	–	–
140	5700	17[1]	–	17[1]	–	–	–	–	–	–	–
5725 to 5850 MHz											
149	5745	17	17	–	–	–	17	17	–	17	17
153	5765	17	17	–	–	–	17	17	–	17	17
157	5785	14	17	–	–	–	17	14	–	17	14
161	5805	11	17	–	–	–	17	11	–	17	11
165	5825	–	–	–	–	–	–	–	–	–	–

1. Frequencies require DFS (Uniform spreading not required for the –P regulatory domain).

CISCO CONFIDENTIAL_Draft 1

Maximum Power Levels in Some Regulatory Domains with External Antennas

Caution To avoid exceeding maximum conducted power levels in the China (–C), EMEA (-E), South Korea (–K), Israel (–I), and Singapore (–S) regulatory domains when using an 802.11b/g radio with 2.2- to 10-dBi external antennas, you must manually set the access point output power level as shown in Table 5-3.

Note Table 5-3 supports all 802.11g data rates (CCK and OFDM).

Table 5-3 Maximum Power Levels for the 802.11b/g Radio in the (–C), (–E), (–K), (–I), and (–S) Regulatory Domains

Channel Identifier	Center Frequency (MHz)	Maximum Power Levels (dBm)					
		2.2 dBi Antenna	5.2 dBi Antenna	6.0 dBi Antenna	6.5dBi Antenna	9.0 dBi Antenna	10 dBi Antenna
1	2412	17	14	14	11	11	8
2	2417	17	14	14	11	11	8
3	2422	17	14	14	11	11	8
4	2427	17	14	14	11	11	8
5	2432	17	14	14	11	11	8
6	2437	17	14	14	11	11	8
7	2442	17	14	14	11	11	8
8	2447	17	14	14	11	11	8
9	2452	17	14	14	11	11	8
10	2457	17	14	14	11	11	8
11	2462	17	14	14	11	11	8
12	2467	17	14	14	11	11	8
13	2472	17	14	14	11	11	8
14	2484	–	–	–	–	–	–

CISCO CONFIDENTIAL_Draft 1

Caution To avoid exceeding maximum conducted power levels in the EMEA (-E) and Israel (–I) regulatory domains when using a IEEE 802.11a radio with 6.0- to 9.5-dBi external 5-MHz antennas, you must manually set the access point output power level as shown in Table 5-4.

Table 5-4 *Maximum Power Levels for IEEE 802.11a Radio* in the EMEA(–E) and Israel (–I) Regulatory Domains

Channel Identifier	Center Frequency (MHz)	Maximum Power Levels (dBm)				
		3.5 dBi Antenna	4.5 dBi Antenna	6.0 dBi Antenna	7.0 dBi Antenna	9.5 dBi Antenna
UNII-1 (5150-5250 MHz)						
34	5170	–	–	–	–	–
36	5180	17	17	15	15	11
38	5190	–	–	–	–	–
40	5200	17	17	15	15	11
42	5210	–	–	–	–	–
44	5220	17	17	15	15	11
46	5230	–	–	–	–	–
48	5240	17	17	15	15	11
5250 to 5350 MHz						
52	5260	17	17	15	15	11
56	5280	17	17	15	15	11
60	5300	17	17	15	15	11
64	5320	17	17	15	15	11
5470 to 5725 MHz						
100	5500	17	17	17	17	17
104	5520	17	17	17	17	17
108	5540	17	17	17	17	17
112	5560	17	17	17	17	17
116	5580	17	17	17	17	17
120	5600	17	17	17	17	17
124	5620	17	17	17	17	17
128	5640	17	17	17	17	17
132	5660	17	17	17	17	17
136	5680	17	17	17	17	17
140	5700	17	17	17	17	17
5725 to 5850 MHz						
149	5745	–	–	–	–	–
153	5765	–	–	–	–	–
157	5785	–	–	–	–	–
161	5805	–	–	–	–	–
165	5825	–	–	–	–	–

CISCO CONFIDENTIAL_Draft 1

Special Country Restrictions

Table 5-5 lists special restrictions for wireless operation in some countries.

Table 5-5 Special Country Restrictions for Wireless Operation

Country	Frequency Bands (GHz)	Regulatory Domain	Special Limitation and Restrictions
South Korea	2.4 and 5	–K	Maximum antenna gain limited to 6 dBi.
Mexico	2.4	–N	End user must limit 2.4 GHz operation to 2450 to 2483.5 MHz and 36 dBm EIRP.
Russian Federation	5	–E	End user must limit 5 GHz operation to 5150 to 5350 and 5650 to 5725 MHz.
United States	5	–A	Indoor use only from 5150-5250 MHz.

Changing Access Point Output Power

This section provides instructions for changing the 1100 series access point output power to comply with the maximum power limits imposed by special regulatory and country restrictions (see the"Maximum Power Levels in Some Regulatory Domains with External Antennas" section on page 5-4 and the "Special Country Restrictions" section on page 5-6).

Note Administrator privileges may be required in order to change access point settings.

Caution To meet regulatory restrictions, the access point and the external antenna must be professionally installed. The network administration or other IT professional responsible for installing and configuring the unit is a suitable professional installer. Following configuration, access to the unit should be password protected by the network administrator to maintain regulatory compliance.

To change the access point output power level, follow these instructions:

Step 1 Use your web-browser to access your access point.

Step 2 When the Summary Status page displays, click **Radio0-802.11G** or **Radio0-802.11A**.

Step 3 On the radio status page, click **Settings**. The radio settings page appears.

Step 4 For the 802.11G radio, follow these steps:

a. Under CCK Transmit Power (dBm), click the desired output power level.

b. Under OFDM Transmit Power (dBm), click the desired output power level.

Step 5 For the 802.11A radio, under Transmit Power (dBm), click the desired output power level.

Step 6 Scroll down to the bottom of the page and click **Apply**.

Step 7 Close your web-browser.