



CHAPTER 4

Cisco Aironet 1200 Series Access Points

This section lists the 1200 series autonomous access point (models: AIR-AP1200, AIR-AP1210, AIR-AP1220B, AIR-AP1230B, AIR-AP1220A, AIR-AP-1230A, AIR-AP1231G, and AIR-AP1232AG) IEEE 802.11b (2.4-GHz), IEEE 802.11g (2.4-GHz), and IEEE 802.11a (5-GHz) channels, maximum power levels, and antenna gains supported by the world's regulatory domains.

For additional product hardware information refer to the *Cisco Aironet 1200 Series Access Point Hardware Installation Guide*.

The following topics are covered in this section:

- [Channels, page 4-2](#)
- [Maximum Power Levels and Antenna Gains, page 4-6](#)
- [Special Country Restrictions, page 4-13](#)
- [Power Conversion Table, page 4-13](#)
- [Changing Access Point Output Power, page 4-14](#)

Channels

IEEE 802.11b (2.4-GHz Band)

The channel identifiers, channel center frequencies, and regulatory domains of each IEEE 802.11b 22-MHz-wide channel are shown in [Table 4-1](#).

Table 4-1 Channels for IEEE 802.11b

Channel Identifier	Center Frequency (MHz)	Regulatory Domains			
		–A	–C	–E	–J
1	2412	X	X	X	X
2	2417	X	X	X	X
3	2422	X	X	X	X
4	2427	X	X	X	X
5	2432	X	X	X	X
6	2437	X	X	X	X
7	2442	X	X	X	X
8	2447	X	X	X	X
9	2452	X	X	X	X
10	2457	X	X	X	X
11	2462	X	X	X	X
12	2467	–	–	X	X
13	2472	–	–	X	X
14	2484	–	–	–	X



Note

Mexico is included in the Americas (–A) regulatory domain; however, channels 1 through 8 are for indoor use only while channels 9 through 11 can be used indoors and outdoors. Users are responsible for ensuring that the channel set configuration is in compliance with the regulatory standards of Mexico.

IEEE 802.11g (2.4-GHz Band)

The channel identifiers, channel center frequencies, and regulatory domains of each IEEE 802.11g 22-MHz-wide channel are shown in [Table 4-2](#).

Table 4-2 Channels for IEEE 802.11g

Channel Identifier	Center Frequency (MHz)	Regulatory Domains					
		-A		-E		-J	
		CCK	OFDM	CCK	OFDM	CCK	OFDM
1	2412	X	X	X	X	X	X
2	2417	X	X	X	X	X	X
3	2422	X	X	X	X	X	X
4	2427	X	X	X	X	X	X
5	2432	X	X	X	X	X	X
6	2437	X	X	X	X	X	X
7	2442	X	X	X	X	X	X
8	2447	X	X	X	X	X	X
9	2452	X	X	X	X	X	X
10	2457	X	X	X	X	X	X
11	2462	X	X	X	X	X	X
12	2467	–	–	X	X	X	X
13	2472	–	–	X	X	X	X
14	2484	–	–	–	–	X	–



Note

Mexico is included in the Americas (-A) regulatory domain; however, channels 1 through 8 are for indoor use only while channels 9 through 11 can be used indoors and outdoors. Users are responsible for ensuring that the channel set configuration is in compliance with the regulatory standards of Mexico.

IEEE 802.11a (5-GHz Band)

The channel identifiers, channel center frequencies, and regulatory domains of each IEEE 802.11a 20-MHz-wide channel are shown in [Table 4-3](#) and [Table 4-4](#).


Note

All channel sets are restricted to indoor usage except the Americas (–A), which allows for indoor and outdoor use on frequencies above 5250 MHz.

Table 4-3 Channels for IEEE 802.11a for the RM20A Radio Module

Channel Identifier	Center Frequency (MHz)	Regulatory Domains			
		–A	–J	–S	–T
34	5170	–	X	–	–
36	5180	X	–	X	–
38	5190	–	X	–	–
40	5200	X	–	X	–
42	5210	–	X	–	–
44	5220	X	–	X	–
46	5230	–	X	–	–
48	5240	X	–	X	–
52	5260	X	–	–	X
56	5280	X	–	–	X
60	5300	X	–	–	X
64	5320	X	–	–	X

Table 4-4 Channels for IEEE 802.11a for the RM21A and RM22A Radio Modules

Channel ID	Center Freq (MHz)	Regulatory Domains										
		-A	-C	-E	-I	-J	-K	-N	-P	-U	-S	-T
5150 to 5250 MHz												
34	5170	-	-	-	-	X	-	-	-	-	-	-
36	5180	X	-	X	X	-	X	X	X	X	X	-
38	5190	-	-	-	-	X	-	-	-	-	-	-
40	5200	X	-	X	X	-	X	X	X	X	X	-
42	5210	-	-	-	-	X	-	-	-	-	-	-
44	5220	X	-	X	X	-	X	X	X	X	X	-
46	5230	-	-	-	-	X	-	-	-	-	-	-
48	5240	X	-	X	X	-	X	X	X	X	X	-
5250 to 5350 MHz												
52	5260	X ¹	-	X ¹	X ¹	-	X ¹	X ¹	X ¹	-	X ¹	-
56	5280	X ¹	-	X ¹	X ¹	-	X ¹	X ¹	X ¹	-	X ¹	X
60	5300	X ¹	-	X ¹	X ¹	-	X ¹	X ¹	X ¹	-	X ¹	X
64	5320	X ¹	-	X ¹	X ¹	-	X ¹	X ¹	X ¹	-	X ¹	X
5470 to 5725 MHz												
100	5500	X ¹	-	X ¹	-	-	X ¹	-	-	-	-	-
104	5520	X ¹	-	X ¹	-	-	X ¹	-	-	-	-	-
108	5540	X ¹	-	X ¹	-	-	X ¹	-	-	-	-	-
112	5560	X ¹	-	X ¹	-	-	X ¹	-	-	-	-	-
116	5580	X ¹	-	X ¹	-	-	X ¹	-	-	-	-	-
120	5600	-	-	X ¹	-	-	X ¹	-	-	-	-	-
124	5620	-	-	X ¹	-	-	X ¹	-	-	-	-	-
128	5640	-	-	X ¹	-	-	-	-	-	-	-	-
132	5660	X ¹	-	X ¹	-	-	-	-	-	-	-	-
136	5680	X ¹	-	X ¹	-	-	-	-	-	-	-	-
140	5700	X ¹	-	X ¹	-	-	-	-	-	-	-	-
5725 to 5850 MHz												
149	5745	X	X	-	-	-	X	X	-	-	X	X
153	5765	X	X	-	-	-	X	X	-	-	X	X
157	5785	X	X	-	-	-	X	X	-	-	X	X
161	5805	X	X	-	-	-	X	X	-	-	X	X
165	5825	-	-	-	-	-	-	-	-	-	-	-

1. Frequencies require DFS (Uniform spreading not required in the -P and -U regulatory domain)s.

Maximum Power Levels and Antenna Gains

IEEE 802.11b (2.4-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. [Table 4-5](#) indicates the maximum power levels and antenna gains allowed for each IEEE 802.11b regulatory domain.

Table 4-5 Maximum Power Levels Per Antenna Gain for IEEE 802.11b

Regulatory Domain	Antenna Gain (dBi)	Maximum Power Level (mW)
-A (4 W EIRP maximum)	2.2	100
	5.2	100
	6	100
	8.5	100
	12	100
	13.5	100
-C (10 mW EIRP maximum)	2.2	5
-E (100 mW EIRP maximum)	2.2	50
	5.2	30
	6	30
	8.5	5
	12	5
	13.5	5
-I (100 mW EIRP maximum)	2.2	50
	5.2	30
	6	30
	8.5	5
	12	5
	13.5	5
-J (10 mW/MHz EIRP maximum)	2.2	30
	5.2	30
	6	30
	8.5	n/a
	12	n/a
	13.5	5

IEEE 802.11g (2.4-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. [Table 4-6](#) indicates the maximum power levels and antenna gains allowed for each IEEE 802.11g regulatory domain.

Table 4-6 Maximum Power Levels Per Antenna Gain for IEEE 802.11g

Regulatory Domain	Antenna Gain (dBi)	Maximum Power Level (mW)	
		CCK Modulation	OFDM Modulation
–A (4 W EIRP maximum)	2.2	100	30
	5	100	30
	6	100	30
	6.5	100	30
	8.5	100	30
	10	100	30
–E (100 mW EIRP maximum)	2.2	50	30
	5	30	10
	6	30	10
	6.5	20	10
	8.5	10	5
	10	10	5
–I (100 mW EIRP maximum)	2.2	50	30
	5	30	10
	6	30	10
	6.5	20	10
	8.5	10	5
	10	10	5
–J (10 mW/MHz EIRP maximum)	2.2	30	30
	5	30	30
	6	30	30
	6.5	30	30
	8.5	–	–
	10	–	–

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. [Table 4-7](#) indicates the maximum power levels allowed with RM20A radio module for each IEEE 802.11a regulatory domain.

Table 4-7 Maximum Power Per Antenna Gain for the RM20A Radio Module

Regulatory Domain	Maximum Power Level (mW) with 6-dBi Antenna Gain
-A (160 mW EIRP maximum on channels 36-48, (800 mW EIRP maximum on channels 52-64)	40
-J (10 mW/MHz EIRP maximum)	40
-S (100 mW EIRP maximum)	20
-T (800 mW EIRP maximum)	40



Note

The maximum power level for Chile is 20 mW. When operating in Chile, you must ensure that your access point Transmitter Power setting never exceeds 20 mW.

When shipped from the factory, the RM21A radio modules (with the 5-dBi integrated antenna) support the channels and maximum power levels listed in [Table 4-8](#) for their regulatory domain.

Table 4-8 Maximum Power for RM21A Radio Module with 5-dBi Integrated Antenna

Channel ID	Center Freq (MHz)	Regulatory Domains										
		-A	-C	-E	-I	-J	-K	-N	-P	-U	-S	-T
5150 to 5250 MHz												
34	5170	–	–	–	–	15	–	–	–	–	–	–
36	5180	15	–	17	17	–	15	15	15	15	17	–
38	5190	–	–	–	–	15	–	–	–	–	–	–
40	5200	15	–	17	17	–	15	15	15	15	17	–
42	5210	–	–	–	–	15	–	–	–	–	–	–
44	5220	15	–	17	17	–	15	15	15	15	17	–
46	5230	–	–	–	–	14	–	–	–	–	–	–
48	5240	15	–	17	17	–	15	15	15	15	17	–
5250 to 5350 MHz												
52	5260	17 ¹	–	17 ¹	17 ¹	–	17 ¹	17 ¹	14 ¹	–	14 ¹	–
56	5280	17 ¹	–	17 ¹	17 ¹	–	17 ¹	17 ¹	14 ¹	–	14 ¹	15
60	5300	17 ¹	–	17 ¹	17 ¹	–	17 ¹	17 ¹	14 ¹	–	14 ¹	15
64	5320	17 ¹	–	17 ¹	17 ¹	–	17 ¹²	17 ¹	14 ¹	–	14 ¹	15
5470 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	17	17	–	–	–	17	17	–	–	17	17
161	5805	17	17	–	–	–	17	17	–	–	17	17
165	5825	–	–	–	–	–	–	–	–	–	–	–

1. Frequencies require DFS (Uniform spreading not required for -P and -U regulatory domains).

When shipped from the factory, the RM21A radio modules (with the 9-dBi integrated antenna) support the channels and maximum power levels listed in [Table 4-9](#) for their regulatory domain.

Table 4-9 Maximum Power for RM21A Radio Module with 9-dBi Integrated Antenna

Channel ID	Center Freq (MHz)	Regulatory Domains										
		-A	-C	-E	-I	-J	-K	-N	-P	-U	-S	-T
5150 to 5250 MHz												
34	5170	-	-	-	-	11	-	-	-	-	-	-
36	5180	11	-	14	14	-	15	11	11	11	14	-
38	5190	-	-	-	-	11	-	-	-	-	-	-
40	5200	11	-	14	14	-	15	11	11	11	14	-
42	5210	-	-	-	-	11	-	-	-	-	-	-
44	5220	11	-	14	14	-	15	11	11	11	14	-
46	5230	-	-	-	-	11	-	-	-	-	-	-
48	5240	11	-	14	14	-	15	11	11	11	14	-
5250 to 5350 MHz												
52	5260	17 ¹	-	14 ¹	14 ¹	-	17 ¹	17 ¹	8 ¹	-	11 ¹	-
56	5280	17 ¹	-	14 ¹	14 ¹	-	17 ¹	17 ¹	8 ¹	-	11 ¹	11
60	5300	17 ¹	-	14 ¹	14 ¹	-	17 ¹	17 ¹	8 ¹	-	11 ¹	11
64	5320	11 ¹	-	14 ¹	14 ¹	-	17 ¹	17 ¹	8 ¹	-	11 ¹	11
5470 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 and -U regulatory domains).

When shipped from the factory, the RM22A radio modules support the channels and maximum power levels listed in [Table 4-10](#) for their regulatory domain.

Table 4-10 Maximum Power for the RM22A Radio Module with Up To 9.5-dBi External Antennas

Channel ID	Center Freq (MHz)	Regulatory Domains										
		-A	-C	-E ¹	-I	-J	-K ²	-N ³	-P	-U	-S	-T
5150 to 5250 MHz												
34	5170	-	-	-	-	11	-	-	-	-	-	-
36	5180	11	-	17	17	-	15	11	11	11	14	-
38	5190	-	-	-	-	11	-	-	-	-	-	-
40	5200	11	-	17	17	-	15	11	11	11	14	-
42	5210	-	-	-	-	11	-	-	-	-	-	-
44	5220	11	-	17	17	-	15	11	11	11	14	-
46	5230	-	-	-	-	11	-	-	-	-	-	-
48	5240	11	-	17	17	-	15	11	11	11	14	-
5250 to 5350 MHz												
52	5260	17 ⁴	-	17 ⁴	17 ⁴	-	17 ⁴	17 ⁴	8 ⁴	-	11 ⁴	-
56	5280	17 ⁴	-	17 ⁴	17 ⁴	-	17 ⁴	17 ⁴	8 ⁴	-	11 ⁴	11
60	5300	17 ⁴	-	17 ⁴	17 ⁴	-	17 ⁴	17 ⁴	8 ⁴	-	11 ⁴	11
64	5320	11 ⁴	-	17 ⁴	17 ⁴	-	17 ⁴	11 ⁴	8 ⁴	-	11 ⁴	11
5470 to 5725 MHz												
100	5500	17 ⁴	-	17 ⁴	-	-	17 ⁴	-	-	-	-	-
104	5520	17 ⁴	-	17 ⁴	-	-	17 ⁴	-	-	-	-	-
108	5540	17 ⁴	-	17 ⁴	-	-	17 ⁴	-	-	-	-	-
112	5560	17 ⁴	-	17 ⁴	-	-	17 ⁴	-	-	-	-	-
116	5580	17 ⁴	-	17 ⁴	-	-	17 ⁴	-	-	-	-	-
120	5600	-	-	17 ⁴	-	-	17 ⁴	-	-	-	-	-
124	5620	-	-	17 ⁴	-	-	17 ⁴	-	-	-	-	-
128	5640	-	-	17 ⁴	-	-	-	-	-	-	-	-
132	5660	17 ⁴	-	17 ⁴	-	-	-	-	-	-	-	-
136	5680	17 ⁴	-	17 ⁴	-	-	-	-	-	-	-	-
140	5700	17 ⁴	-	17 ⁴	-	-	-	-	-	-	-	-
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. For the -E and -I regulatory domains, see the "Maximum Power Levels in Some Regulatory Domains with External Antennas" section on page 4-12.
2. In South Korea, the AIR-RM22A-N-K9 is approved only with antenna gains of 6 dBi or less.
3. In Australia and New Zealand, the AIR-RM22A-N-K9 is approved only with antenna gains of 6 dBi or less.
4. Frequencies require DFS (Uniform spreading not required for the -P and -U regulatory domains).

Maximum Power Levels in Some Regulatory Domains with External Antennas

**Caution**

To avoid exceeding maximum conducted power levels in the EMEA (-E) and Israel (-I) regulatory domains when using an external antenna, you must manually set the access point output power level as shown in [Table 4-11](#). The Israel (-I) regulator domain does not support channels 100 to 140.

**Note**

For the latest EMEA (-E) regulatory domain information, refer to the EU Directive 1999/5/EC Compliance Information document that ships with this product.

Table 4-11 RM22A Radio Module Maximum Power with External Antennas in the (-E) and (-I) Regulatory Domains

Channel Identifier	Center Frequency (MHz)	Maximum Power Levels (dBm)				
		4-dBi Antenna	5-dBi Antenna	6-dBi Antenna	7-dBi Antenna	9.5-dBi Antenna
5150 to 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 MHz¹						
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 MHz¹						
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	–	–	–	–	–

1. Frequencies require DFS.

Special Country Restrictions

Table 4-12 lists special restrictions for wireless operation in some countries.

Table 4-12 Special Country Restrictions for Wireless Operation

Country	Frequency Band	Regulatory Domain	Special Limitation and Restrictions
Australia and New Zealand	5 GHz	-N	5 GHz external antenna gain limited to 6 dBi or less.
Japan	5 GHz	-J, -P, and -U	Operation limited to indoor use only.
South Korea	2.4 and 5 GHz	-K	2.4 and 5 GHz external antenna gain limited to 6 dBi or less.
Mexico	2.4 GHz	-N	End user must limit 2.4 GHz operation to 2450 to 2483.5 MHz and 36 dBm EIRP ¹ .
Russian Federation	5 GHz	-E	End user must limit 5 GHz operation to 5150 to 5350 and 5650 to 5725 MHz.
United States	2.4 GHz	-A	Operation limited to indoor use only from 5150-5250 MHz.

1. EIRP (dBm) = maximum output power (dBm) + antenna gain (dBi)

Power Conversion Table

You can use Table 4-13 to convert power values from dBm to mW or from mW to dBm.

Table 4-13 Power Conversion Table

mW	dBm	mW	dBm
200	23	15	12
150	22	12	11
125	21	10	10
100	20	8	9
80	19	6	8
60	18	5	7
50	17	4	6
40	16	3	5
30	15	2	2
25	14	1	-1
20	13	-	

Changing Access Point Output Power

This section provides instructions for changing the 1200 series access point output power to comply with the maximum power limits imposed by special regulatory and country restrictions (see [Table 4-5](#), [Table 4-6](#), [Table 4-7](#), the “Maximum Power Levels in Some Regulatory Domains with External Antennas” section on page 4-12, and the “Special Country Restrictions” section on page 4-13).

**Note**

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

**Note**

Regulatory domains are set at the factory and cannot be changed by the user.

**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 appears, click **Radio0-802.11G** or **Radio0-802.11A** and the radio status page appears.
- Step 3** Click **Settings** and the radio settings page appears.
- Step 4** For the 802.11G radio, follow these steps:
 - a.** Scroll down to the CCK Transmit Power (mW) settings and click the desired output power level.
 - b.** For the OFDM Transmit Power (mW) settings, click the desired output power level.
- Step 5** For the 802.11A radio, scroll down to the Transmit Power (dBm) settings and 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.

For additional configuration information, refer to the *Cisco IOS Software Configuration Guide for Cisco Aironet Access Points*.