Cisco Aironet 1540 Series Outdoor Access Points

Cisco® Aironet® 1540 Series outdoor access points offer the latest 802.11ac Wave 2 functions in a rugged, ultra-low-profile housing that service providers and enterprises can deploy easily.

The Cisco Aironet 1540 Series is ideal for applications requiring rugged outdoor Wi-Fi coverage and supports the latest 802.11ac Wave 2 radio standard. Housed in a compact, aesthetically pleasing, easy-to-deploy package, the 1540 Series offers flexible deployment options for service providers and enterprise networks that need the fastest links possible for mobile outdoor clients (smartphones, tablets, and laptops) and wireless backhaul. The 1540 Series access points give network operators the flexibility to balance their desired wireless coverage with their need for easy deployment.

Whether deployed as a traditional access point or a wireless mesh access point, the 1540 Series provides the throughput capacity needed for today's bandwidth-hungry devices.

Features and Benefits

By adhering to the 802.11ac Wave 2 standard, the 1540 Series provides a data rate of up to 867 Mbps on the 5-GHz radio. This exceeds the data rates offered by access points that support the 802.11n standard. It also enables a total aggregate dual-radio data rate of up to 1 Gbps. This provides the necessary foundation for enterprise and service provider networks to stay ahead of the performance expectations and needs of their wireless users.

In recent years corporate users have increasingly preferred wireless access as the form of network connectivity due to its convenience. With this shift, there is an expectation that wireless should not slow down users' day-to-day work, but should enable a high-performance experience. The 1540 Series delivers this performance with highly secure and reliable wireless connections for mobile end users.

Table 1 lists the features and benefits of the 1540 Series.

Table 1. Features and Benefits of Cisco Aironet 1540 Series

Feature	Benefit
Compact size	Enables deployment of the access point where it's needed. The 1540 Series easily mounts to walls or light poles without disturbing the aesthetics of the area.
802.11ac Wave 2 radio	Provides up to 867-Mbps data rates with 2 x 2 multiuser multiple-input, multiple-output (MU-MIMO) with up to two spatial streams.

Feature	Benefit
Multiuser MIMO (MU-MIMO)	Allows transmission of data to multiple 802.11ac Wave 2-capable clients simultaneously to improve client experience. Prior to the 802.11ac Wave 2 standard, access points could transmit data to only one client at a time, typically referred to as single-user MIMO.
Flexible deployment modes	Allows for deployment in a variety of ways, including as traditional access points and in mesh networks. The access points can also be deployed with the Cisco Mobility Express Solution. This deployment is ideal for small to medium-sized networks that that require 50 or fewer access points without a physical controller. All deployment modes are easy to set up and configure.

The Cisco Aironet 1540 Series offers the following features:

- Compact, lightweight size: At just over 2.5 pounds (1 kg) and with a small footprint, the 1540 Series is one of the smallest outdoor access points with internal antennas.
- Low power consumption: Achieves full operation on standard 802.3af power (13W).
- Integrated antenna options: The 1540 Series offers two models with different antenna patterns to address a variety of use cases.

Product Specifications

Table 2 lists the specifications of the 1540 Series access points.

Table 2. Specifications

<table>
<tr><th>Item</th><th colspan="5">Specifications</th></tr>
<tr><td>802.11ac Wave 1 and 2 capabilities</td><td colspan="5">• 1542I/D: 2 x 2 MIMO with two spatial streams
• Multiuser and single-user MIMO
• Maximal ratio combining (MRC)
• 802.11ac beamforming (transmit beamforming)
• 20-, 40-, and 80-MHz channels
• PHY data rates up to 867 Mbps (80 MHz in 5 GHz)
• Packet aggregation: A-MPDU (Tx/Rx) and A-MSDU (Tx/Rx)
• 802.11 dynamic frequency selection (DFS)
• Cyclic-shift-diversity (CSD) support</td></tr>
<tr><td>802.11n (and related) capabilities</td><td colspan="5">• 1542I/D: 2 x 2 MIMO with two spatial streams
• MRC
• 20- and 40-MHz channels (40 MHz in 5 GHz)
• PHY data rates up to 300 Mbps
• Packet aggregation: A-MPDU (Tx/Rx) and A-MSDU (Tx/Rx)
• 802.11 DFS
• CSD support</td></tr>
<tr><td rowspan="11">Data rates supported</td><td colspan="5">802.11a: 6, 9, 12, 18, 24, 36, 48, and 54 Mbps
802.11b/g: 1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, and 54 Mbps</td></tr>
<tr><td colspan="5">802.11n data rates on 2.4 and 5 GHz:</td></tr>
<tr><td>MCS Index</td><td colspan="2">GI = 800 ns</td><td colspan="2">GI = 400 ns</td></tr>
<tr><td></td><td>20-MHz Rates (Mbps)</td><td>40-MHz Rates (Mbps)</td><td>20-MHz Rates (Mbps)</td><td>40-MHz Rates (Mbps)</td></tr>
<tr><td>0</td><td>6.5</td><td>13.5</td><td>7.2</td><td>15</td></tr>
<tr><td>1</td><td>13</td><td>27</td><td>14.4</td><td>30</td></tr>
<tr><td>2</td><td>19.5</td><td>40.5</td><td>21.7</td><td>45</td></tr>
<tr><td>3</td><td>26</td><td>54</td><td>28.9</td><td>60</td></tr>
<tr><td>4</td><td>39</td><td>81</td><td>43.3</td><td>90</td></tr>
<tr><td>5</td><td>52</td><td>108</td><td>57.8</td><td>120</td></tr>
<tr><td>6</td><td>58.5</td><td>121.5</td><td>65</td><td>135</td></tr>
</table>

Item	Specifications							
	7	65	135	72.2	150			
	8	13	27	14.4	30			
	9	26	54	28.9	60			
	10	39	81	43.3	90			
	11	58.5	108	57.8	120			
	12	78	162	86.7	180			
	13	104	216	115.6	240			
	14	117	243	130	270			
	15	130	270	144.4	300			
	802.11ac Data Rates (5 GHz)							
	Spatial Streams	**MCS**	**GI = 800 ns**			**GI = 400 ns**		
			20 MHz	**40 MHz**	**80 MHz**	**20 MHz**	**40 MHz**	**80 MHz**
	1	0	6.5	13.5	29.3	7.2	15	32.5
	1	1	13	27	58.5	14.4	30	65
	1	2	19.5	40.5	87.8	21.7	45	97.5
	1	3	26	54	117	28.9	60	130
	1	4	39	81	175.5	43.3	90	195
	1	5	52	108	234	57.8	120	260
	1	6	58.5	121.5	263.3	65	135	292.5
	1	7	65	135	292.5	72.2	150	325
	1	8	78	162	351	86.7	180	390
	1	9	–	180	390	–	200	433.3
	2	0	13	27	58.5	14.4	30	65
	2	1	26	54	117	28.9	60	130
	2	2	39	81	175.5	43.3	90	195
	2	3	52	108	234	57.8	120	260
	2	4	78	162	351	86.7	180	390
	2	5	104	216	468	115.6	240	520
	2	6	117	243	526.5	130	270	585
	2	7	130	270	585	144.4	300	650
	2	8	156	324	702	173.3	360	780
	2	9	–	360	780	–	400	866.7
Frequency band and 20- MHz operating channels (regulatory domains)	A: 2.412 to 2.462 GHz, 11 channels 5.280 to 5.320 GHz, 3 channels 5.500 to 5.580 GHz, 5 channels 5.660 to 5.700 GHz, 3 channels 5.745 to 5.825 GHz, 5 channels B: 2.412 to 2.462 GHz, 11 channels 5.180 to 5.240 GHz, 4 channels 5.260 to 5.320 GHz, 4 channels 5.500 to 5.720 GHz, 12 channels 5.745 to 5.825 GHz, 5 channels							

Item	Specifications
	C: 2.412 to 2.472 GHz, 13 channels 5.745 to 5.825 GHz, 5 channels D: 2.412 to 2.462 GHz, 11 channels 5.745 to 5.865 GHz, 7 channels E: 2.412 to 2.472 GHz, 13 channels 5.500 to 5.580 GHz, 5 channels 5.660 to 5.700 GHz, 3 channels F: 2.412 to 2.472 GHz, 13 channels 5.745 to 5.805 GHz, 4 channels G: 2.412 to 2.472 GHz, 13 channels 5.745 to 5.825 GHz, 5 channels H: 2.412 to 2.472 GHz, 13 channels 5.745 to 5.825 GHz, 5 channels I: 2.412 to 2.472 GHz, 13 channels K: 2.412 to 2.462 GHz, 11 channels 5.280 to 5.320 GHz, 3 channels 5.500 to 5.620 GHz, 7 channels 5.745 to 5.805 GHz, 4 channels L: 2.412 to 2.472 GHz, 13 channels 5.500 to 5.620 GHz, 7 channels 5.745 to 5.865 GHz, 7 channels M: 2.412 to 2.472 GHz, 13 channels 5.500 to 5.580 GHz, 5 channels 5.660 to 5.700 GHz, 3 channels 5.745 to 5.805 GHz, 4 channels -N: 2.412 to 2.462 GHz, 11 channels 5.745 to 5.825 GHz, 5 channels -Q: 2.412 to 2.472 GHz, 13 channels 5.500 to 5.700 GHz, 11 channels -R: 2.412 to 2.472 GHz, 13 channels 5.260 to 5.320 GHz, 4 channels 5.660 to 5.700 GHz, 3 channels 5.745 to 5.825 GHz, 5 channels -S: 2.412 to 2.472 GHz, 13 channels 5.500 to 5.700 GHz, 11 channels 5.745 to 5.825 GHz, 5 channels -T: 2.412 to 2.462 GHz, 11 channels 5.500 to 5.580 GHz, 5 channels 5.660 to 5.700 GHz, 3 channels 5.745 to 5.825 GHz, 5 channels

<table>
<tr><th>Item</th><th>Specifications</th></tr>
<tr><td></td><td>-Z:
2.412 to 2.462 GHz, 11 channels
5.500 to 5.580 GHz, 5 channels
5.660 to 5.700 GHz, 3 channels
5.745 to 5.825 GHz, 5 channels</td></tr>
<tr><td colspan="2">Note: Customers are responsible f or verifying approval f or use in their individual countries. To verify approval that corresponds t o a particular country, please visit https://www.cisco.com/go/aironet/compliance.</td></tr>
<tr><td>Maximum number of nonoverlapping channels</td><td>2.4 GHz
• 802.11b/g:
◦ 20 MHz: 3
• 802.11n:
◦ 20 MHz: 3

5 GHz
• 802.11a:
◦ 20 MHz: 27
• 802.11n:
◦ 20 MHz: 27
◦ 40 MHz: 13
• 802.11ac:
◦ 20 MHz: 27
◦ 40 MHz: 13
◦ 80 MHz: 6</td></tr>
<tr><td colspan="2">Note: This number varies by regulatory domain. Refer to the product documentation f or specific details f or each regulatory domain.</td></tr>
<tr><td>Receive sensitivity</td><td>Transmit Power and Receive Sensitivity (1542I & 1542D)
<table>
<tr><th></th><th></th><th colspan="2">2.4 GHz Radio</th><th colspan="2">5 GHz Radio</th></tr>
<tr><th></th><th>Spatial Streams</th><th>Total TX Power (dBm)</th><th>RX Sensitivity (dBm)</th><th>Total TX Power (dBm)</th><th>RX Sensitivity (dBm)</th></tr>
<tr><td colspan="6">802.11/11b</td></tr>
<tr><td>1 Mbps</td><td>1</td><td>27</td><td>-100</td><td>NA</td><td>NA</td></tr>
<tr><td>11 Mbps</td><td>1</td><td>27</td><td>-92</td><td>NA</td><td>NA</td></tr>
<tr><td colspan="6">802.11a/g</td></tr>
<tr><td>6 Mbps</td><td>1</td><td>27</td><td>-95</td><td>25</td><td>-93</td></tr>
<tr><td>24 Mbps</td><td>1</td><td>27</td><td>-89</td><td>25</td><td>-87</td></tr>
<tr><td>54 Mbps</td><td>1</td><td>25</td><td>-79</td><td>24</td><td>-77</td></tr>
<tr><td colspan="6">802.11n HT20</td></tr>
<tr><td>MCS0</td><td>1</td><td>27</td><td>-95</td><td>25</td><td>-92</td></tr>
<tr><td>MCS4</td><td>1</td><td>27</td><td>-84</td><td>25</td><td>-82</td></tr>
<tr><td>MCS7</td><td>1</td><td>25</td><td>-76</td><td>23</td><td>-74</td></tr>
<tr><td>MCS8</td><td>2</td><td>27</td><td>-94</td><td>25</td><td>-91</td></tr>
<tr><td>MCS12</td><td>2</td><td>27</td><td>-82</td><td>25</td><td>-80</td></tr>
<tr><td>MCS15</td><td>2</td><td>25</td><td>-74</td><td>23</td><td>-72</td></tr>
<tr><td colspan="6">802.11n HT40</td></tr>
<tr><td>MCS0</td><td>1</td><td></td><td></td><td>25</td><td>-90</td></tr>
<tr><td>MCS4</td><td>1</td><td></td><td></td><td>25</td><td>-79</td></tr>
<tr><td>MCS7</td><td>1</td><td></td><td></td><td>23</td><td>-72</td></tr>
<tr><td>MCS8</td><td>2</td><td></td><td></td><td>25</td><td>-89</td></tr>
<tr><td>MCS12</td><td>2</td><td></td><td></td><td>25</td><td>-77</td></tr>
<tr><td>MCS15</td><td>2</td><td></td><td></td><td>23</td><td>-70</td></tr>
<tr><td colspan="6">802.11ac VHT20</td></tr>
<tr><td>MCS0</td><td>1</td><td></td><td></td><td>25</td><td>-92</td></tr>
<tr><td>MCS4</td><td>1</td><td></td><td></td><td>24</td><td>-82</td></tr>
<tr><td>MCS7</td><td>1</td><td></td><td></td><td>21</td><td>-74</td></tr>
</table></td></tr>
</table>

Item	Specifications					
	MCS8	1			20	-70
	MCS0	2			25	-91
	MCS4	2			24	-80
	MCS7	2			21	-72
	MCS8	2			20	-68
	802.11ac VHT40					
	MCS0	1			25	-90
	MCS4	1			23	-79
	MCS7	1			20	-72
	MCS8	1			19	-68
	MCS9	1			19	-66
	MCS0	2			25	-89
	MCS4	2			23	-77
	MCS7	2			20	-70
	MCS8	2			19	-66
	MCS9	2			19	-64
	802.11ac VHT80					
	MCS0	1			25	-87
	MCS4	1			23	-76
	MCS7	1			21	-69
	MCS8	1			19	-64
	MCS9	1			19	-62
	MCS0	2			25	-86
	MCS4	2			23	-74
	MCS7	2			21	-67
	MCS8	2			19	-62
	MCS9	2			19	-60
Note: The maximum power setting will vary by channel and according to individual country regulations. Refer to the product documentation for specific details.						
Maximum conducted transmit power	**1542I** • 2.4 GHz: 27 dBm with 2 antennas • 5 GHz: 25 dBm with 2 antennas			**1542D** • 2.4 GHz: 27 dBm with 2 antennas • 5 GHz: 25 dBm with 2 antennas		
Note: The maximum power setting will vary by channel and according to individual country regulations. Refer to the product documentation f or specific details.						
Interfaces	• WAN port 10/100/1000BASE-T Ethernet, autosensing (RJ-45), PoE in • Management console port (RJ-45) • Multicolor LED/Reset button					
Uplink options	Ethernet and wireless mesh					
Dimensions (L x W x H)	1542I/D: 7.9 x 5.9 x 2.4 in.(20 x 15 x 6.1 cm)					
Weight	1542I/D: 2.75 lb (1.25 kg)					

Item	Specifications
Environmental	Operating temperature: • –40° to 65°C (–40° to 149°F) ambient air with no solar loading • –40° to 55°C (–40° to 131°F) ambient air with solar loading • Storage temperature: –40° to 85°C (–40° to 185°F) Wind resistance: • Up to 100-mph sustained winds • Up to 165-mph wind gusts
Environmental ratings	• IEC 60529 IP67 • Icing protection NEMA 250-2008 • Corrosion NEMA 250-2008 (600 hours) • Solar radiation EN 60068-2-5 (1200 W/m2) • Vibration MIL-STD-810
Antennas	• 1542I: Integrated dual-band semi-omnidirectional antenna radome, vertically polarized, 5 dBi (2.4 GHz), 5 dBi (5 GHz) • 1542D: Integrated dual-band directional antenna radome, vertically polarized 8 dBi (2.4 GHz), 9 dBi (5 GHz)
Powering options	• 802.3af, 802.3at • Cisco power injectors: ◦ AIR-PWRINJ-60RGD1= (outdoor rated, 60W, with NEMA 5-15 AC plug) ◦ AIR-PWRINJ-60RGD2= (outdoor rated, 60W, unterminated AC cable) ◦ AIR-PWRINJ5= (indoor, 802.3af) ◦ AIR-PWRINJ6= (indoor, 802.3at)
Power consumption	1542I/D 13W
Compliance	**Safety** • UL60950, 2nd Edition • CAN/CSA-C22.2 No. 60950, 2nd Edition • IEC 60950, 2nd Edition • EN 60950, 2nd Edition **Immunity** • <= 5 mJ f or 6kV/3kA @ 8/20 ms waveform • ANSI/IEEE C62.41 • EN61000-4-5 Lev el 4 AC Surge Immunity • EN61000-4-4 Lev el 4 Electrical Fast Transient Burst Immunity • EN61000-4-3 Lev el 4 EMC Field Immunity • EN61000-4-2 Lev el 2 ESD Immunity • EN60950 Overvoltage Category IV **Radio Approvals** • FCC Part 15.247, 15.407 • FCC Bulletin OET-65C • RSS-210 • RSS-102 • AS/NZS 4268.2003 • ARIB-STD 66 (Japan) • ARIB-STD T71 (Japan) • EN 300 328 • EN 301 893 **EMI and Susceptibility** • FCC part 15.107, 15.109 • ICES-003 • EN 301 489-1, -17 **Security** • Wireless bridging/mesh • X.509 digital certificates • MAC address authentication • Advanced Encryption Standard (AES)

Item	Specifications
	Wireless Access • 802.11i, Wi-Fi Protected Access 2 (WPA2), and WPA • 802.1X authentication, including Extensible Authentication Protocol (EAP) and Protected EAP (EAP -PEAP), EAP Transport Layer Security (EAP-TLS), EAP-Tunneled TLS (EAP-TTLS), EAP-Subscriber Identity Module (EAP-SIM), and Cisco LEAP • VPN pass-through • IP Security (IPsec) • Layer 2 Tunneling Protocol (L2TP) • MAC address filtering
Warranty	1-year limited hardware warranty

Ordering Information

Table 3 gives ordering information for the Cisco Aironet 1540 Series.

Table 3. Ordering Information

Part Number	Product Description
Aironet 1540 Series	• AIR-AP1542I-x-K9: Dual-band 802.11a/g/n/ac, Wave 2, internal semi-omni antennas • AIR-AP1542D-x-K9: Dual-band 802.11a/g/n/ac, Wave 2, internal directional antennas Regulatory domains: (x = regulatory domain). Customers are responsible f or verifying approval f or use in their individual countries. To verify approval that corresponds to a particular country or the regulatory domain used in a specific country, visit https://www.cisco.com/go/aironet/compliance. Not all regulatory domains have been approved. As they are approved, the part numbers will be available on the Global Price List. **Cisco Smart Net Total Care™ Service for the Cisco Aironet 1540 Series Access Points** Refer to the service part numbers on Cisco Commerce Workspace f or available service offerings.

Warranty Information

The Cisco Aironet 1540 Series access points come with a 1 -year limited warranty that provides full warranty coverage of the hardware. The warranty includes 10 -day advance hardware replacement and helps ensure that software media are defect-free for 90 days. For more details, visit https://www.cisco.com/go/warranty.

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For More Information

For more information about the Cisco Aironet 1540 Series, visit https://www.cisco.com/go/wireless or contact your local Cisco account representative.

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Printed in USA C78-738585-02 12/17