W110 WLAN Access Point Quick Start Guide

AVAYA

Regulatory Flyer for the W110

Before installing the W110 WLAN Access Point, you must go to the **Documentation CD-ROM** to read the regulatory flyer. You must install and use this product in strict accordance to the manufacturer's instructions described in the Regulatory Flyer.

The regulatory flyer describes regulatory information, such as, important safety information, restrictions, country-specific radio approval information and installation requirements.

What You Will Need Prior to the Installation

The items below are required prior to starting the installation:

Included in the W110 package

- ❒ One Avaya W110 WLAN Access Point (also known as a (LAP))
- ❒ One Mounting Bracket with Screws
- ❒ One Documentation CD
- ❒ This Quick Start Flyer

Required but not included in the package

- ❒ One W310 WLAN Gateway
- ❒ One Category 5 Ethernet Cable

Installation and Configuration Procedure

The steps that follow describe how to complete the installation and basic configuration of the W110.

Step 1: Connect the Ethernet Cable to the W110

The W110 has one LAN port on the rear panel which is used to connect the standard Category 5 Ethernet cable from the W110 to a W310 port.

Insert the RJ45 plug from a standard Category 5 Ethernet cable into the W110 LAN port. The cable also provides Power over Ethernet (PoE) from the W310.

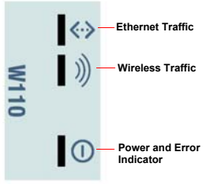
Step 2: Connect the Other End of Cable(s)

Directly connect the other end of the cable to one of the W310 Ethernet ports.

Insert the RJ45 plug from the standard Category 5 Ethernet cable into the W310 Ethernet port. The W310 provides 16 10/100 Base-T Ethernet interfaces with PoE. The W310 will supply power to a port only after it has detected a W110.

Step 3: W110 LEDs

Once you connect both ends of the Ethernet cable and the W310 mobility gateway is up and running, all front panel LEDs illuminate briefly.



The table below describes the function of each LED on the W310 front panel.

LEDs on the W110

LED	Description	State		Meaning
	Ethernet	Yellow	Solid	10BaseT Ethernet connection - no traffic
		Yellow	Flashing	10BaseT Ethernet traffic
		Green	Solid	100BaseT Ethernet connection - no traffic
		Green	Flashing	100BaseT Ethernet traffic
	Wireless	Green	Flashing	Wireless traffic.

LEDs on the W110 (continued)

LED	Description	State		Meaning
	Power	Green	Solid	Power is on - no operational errors.
		Amber	Solid	Authentication between the W110 and W310 is occurring
		Amber	Flashing	Authentication between the W110 and W310 is occurring; there is a Power On Self Test (POST) failure
		Red	Solid	Operational error. Software image may be corrupt, reload the image. Try reconnecting cables.
		Red	Flashing	Rebooting

LEDs on the W310

PoE	Power over Ethernet	Green	Solid	Port is power enabled and is delivering power
		Green	Flashing	Port is power enabled but there is no W110 connected
			Off	Port is power disabled
Speed	Ethernet Connection Type	Green	Solid	100BaseT Ethernet Connection
			Off	10BaseT Ethernet Connection

Step 4: Mount the W110

Mount the W110 to one of the following:

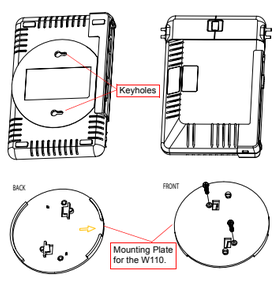
— Ceiling
— Wall

You can also place the W110 on a desktop rather than mounting it to a wall and ceiling.

Mounting the W110 to a ceiling:

CAUTION:
It is the your responsibility to use the proper hardware (screws/ mounting plate) for the installation, and, to mount the device in a safe and secure manner and location for your environment.

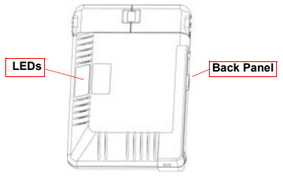
a. Attach the mounting plate to the bottom of the W110 by lining up the keyholes and snapping it into place.
b. Snap the tabs onto the ceiling T-bar. Rotate the W110 until it snaps on to the T-bar.



Mounting the W110 to a Wall

CAUTION:
You must use the proper screws and mounting hardware that is appropriate for the material to which you are attaching the W110.

a. Put the mounting plate up to the wall.
b. Screw through the mounting plate.
c. Place the AP up against the mounting plate. Orient the AP vertically (as shown below), with the LAN connector facing to the right.



Step 5: Configure the W110 Through the W310

The W110 configuration is done through the W310 using the Command Line Interface (CLI) or the W310 Device Manager (Web Interface).

NOTE:
It is recommended that you use the *Quick Setup Guide* for the W310 Device Manager or Command Line Interface (CLI) for installation and configuration instructions.

If you want to verify the W110 port parameters on the W310, you can use the CLI. This CLI allows you to check if you have the correct version of the W110 software image loaded.

a. If you have not done so already, open a CLI session for the W310 that has the W110 connected to it.
b. Type **`show lap parameters`** at the prompt to display the parameters for each W110 connected to a W310 port. In the example shown below, port 1 does not have a W110 connected to it while port 2 does.

```
LAP's General Attributes:
Lap Name                        port-01
Lap Location                    N/A
Physical Port Number            1
Hardware Version                N/A
Software Image Version          N/A
Original Boot Loader Version N/A
Upgrade Boot Loader Version  N/A
Up Time                         N/A
Current Operational Mode        802.11a

LAP's General Attributes:
Lap Name                        port-02
Lap Location                    N/A
Physical Port Number            2
Hardware Version                58.0.0
Software Image Version          1.1.12
Original Boot Loader Version 1.1.1
Upgrade Boot Loader Version  255.255.255
Up Time                         50264230
Current Operational Mode        802.11a
.......
```

c. It is recommended that you go to the *Quick Setup Guide* or the *W310 Command Line Reference Guide* before making any changes to the W110 configuration using the CLI.

Troubleshooting

This section describes how to troubleshoot connection issues with the W110. For configuration issues, see the *W310 Installation and Configuration User Guide*.

Connectivity - No LED Activity on the W110

1. Check to see if the **PoE** LED for the port on the W310 is either solid or flashing green. If it is not lit, check to see if the port is set to deliver Power over Ethernet. Use the W310 CLI command **`show powerinline`** to see if the port is set to receive power.
   — If the port is receiving power, the Inline Operational Status for the port will display as "Delivering Power".
   — If power is not enabled, then try the CLI command **`set port powerinline 1/<port_number> enable`** to enable power for the port. (where **1** is the module number, **<port_number>** is the W310 port, and **enable/disable** is to enable/disable power for the port.
   — If it is set correctly, try a different port on the W310 – if it works, there is probably a faulty port or bad RJ-45 port connection.
2. Double check to see if all cables are connected to the W110 correctly.
3. Make sure you are using a standard Category 5 cable to power the W110. The cable should have a length less than the Ethernet standard of 100 meters (325 feet) from the Ethernet port on the W310 to the W110 LAN port.
4. Try using a different Ethernet cable – if it works, there may be a faulty connection on the cable.
5. Try to connect a different W110 to the same port on the W310 – if it works and a link is established, there is probably a faulty data link in the W110.

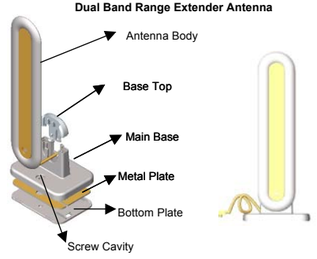
Connectivity - LED Activity But Users Cannot Access the W310

Make sure you have configured the W110 with the proper Network Name (SSID) and Security settings. This is done through the W310 using the W310 Device Manager or W310 CLI.

Range Antenna Installation

The Dual Band REA is a dual band indoor antenna that works with both 2.4 GHz (802.11b/g) and 5 GHz (802.11a) radios. You can optionally install up to two Dual Band Range Extender Antennas on the W110.

Dual Band Range Extender Antenna



Perform the following procedures to mount the Dual Band REA to a wall or ceiling and to install it on the W110:

Dual Band REA Wall Mount Installation

Perform the following steps to wall mount the Dual Band REA.

1. Detach the Antenna Body from the Main Base.
2. Press the Base Top upward to release it from the Main Base.
3. Use a metal plate or a coin to push the tenon between the Antenna body and the Base Top to remove the Base Top.
4. Screw the Base Top to the wall.
5. Attach the Antenna Body to the Base Top.

Dual Band REA Ceiling Installation Without a T-Bar

Perform the following step to mount the Dual Band REA to a normal ceiling:

1. Screw the antenna directly to the ceiling through the hole on the Base; use the anchor if necessary.

Dual Band REA Ceiling Installation Using the T-Bar

Perform the following steps to mount the Dual Band REA to a T-bar ceiling:

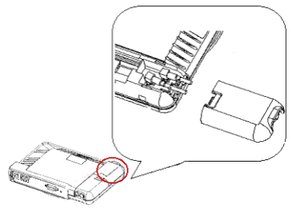
1. Detach the Antenna Body from the Main Base.
2. Remove the Metal Plate.
3. Turn over the Bottom Plate and reinstall it on the Main Base.
4. Attach the antenna to the T-Bar and adjust/swivel it to lock on the T-Bar.

Attach the antenna(s) to the W110.

Perform the following steps to attach a Dual Band REA to the W110:

CAUTION:
Use electrostatic discharge (ESD) precautions when connecting the Dual Band REA to the W110.

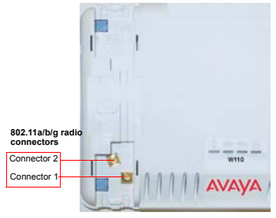
1. Press down near the center of the compartment covering and slide open the External Antenna Access compartment on the W110.
   The compartment closer to the LED panel contains the connectors for the 802.11 a/b/g radio.



Opening an W110 Antenna Compartment

2. When connecting the first REA cable, attach the cable to the outer connector in the compartment (connector 1).

NOTE:
There are two antenna connectors in the W110, 1 and 2 (see the illustration that follows). Connectors 1 and 2 are for the 802.11a/b/g radios. Connector 1 is labeled on the hardware. When connecting one REA, use connector 1, as appropriate. The second REA for a radio should be connected to connector 2.



W110 Antenna Connector

3. If installing a second REA, connect the cable to connector 2 (802.11a/b/g radio).
4. Close the External Antenna Access compartments.

Specifications

Number of Stations per BSS

Feature	W110
Without encryption	up to 63
With WEP encryption	up to 63
With 802.1x Authentication	up to 63
With WPA	up to 27

Medium Access Control (MAC) Functions

Feature	802.11b	802.11a	802.11b/g
Automatic Channel Selection (ACS)	yes	yes	yes
Closed System Feature	yes	yes	yes
TX Power Control	yes	yes	yes

Security Functions

Feature	Supported by W110
IEEE 802.11 WEP [1]	yes
MAC Access Control	yes
RADIUS MAC-based Access Control	yes
IEEE 802.1x Authentication [2]	yes
Rogue Access Point Detection	yes
Wi-Fi Protected Access (WPA)	yes

Note 1: Key lengths supported by 802.11a: 64-bit, 128-bit, and 152-bit.
Key lengths supported by 802.11b: 64-bit and 128-bit.
Key lengths supported by 802.11b/g: 64-bit, 128-bit, and 152-bit.

Note 2: EAP-MD5, EAP-TLS, EAP-TTLS, and PEAP client supplicant supported.

Physical Specifications

Dimensions (H x W x L) = 1 x 4.75 x 7.8 in (2.5 x 12.1 x 19.8 in.)
Weight = 0.65 kg (1.50 lb.)

Environmental Specifications

— Temperature
  — Operating: 0° to +55°C (32° to 131°F)
  — Storage: -20° to +85°C (-4° to 185°F)
— Humidity
  — Operating: 5 to 95% relative humidity (non condensing at 5°C and 40°C or 41°F to 104°F)
  — Storage: 5 to 95% relative humidity (non condensing at 5°C and 85°C or 41°F to 185°F)
— Altitude: up to 10,000 feet (3048 meters)
  — Non-operating transport: as cargo in unpressurized civilian aircraft holds

Power over Ethernet (PoE)

— 802.3af PoE - Compliant with IEEE 802.3af PoE specification as a Class 3 device

Ethernet Interface

10/100 Base-TX Auto Sensing, RJ-45 female socket

Power over Ethernet Interface

— Category 5, twisted pair cables must be used to ensure compliance with FCC Part 15, subpart B, Class B requirements
— Standard 802.3af pin assignments

Radio Specifications

NOTE:
Refer to the Regulatory Flyer included with the W110 for the latest regulatory information.

802.11a Channel Frequencies

The available 802.11a channel frequencies vary by regulatory domain and/or country. 802.11a radio certification is available in the following regions:

— FCC: U.S., Canada, and Australia
— ETSI: Europe and the United Kingdom
— MKK: Japan
— SG: Singapore
— ASIA: China, Hong Kong, and South Korea
— TW: Taiwan

There are five sets of frequency bands that determine the available channels depending on the regulatory domain and/or country.

Frequency Band	Channel ID	FCC (GHz)	ETSI (GHz)	MKK (GHz)	SG (GHz)	ASIA (GHz)	TW (GHz)
Lower Band (36 = default)	34	—	—	5.170 [1]	—	—	—
	36	5.180	5.180	—	5.180	—	—
	38	—	—	5.190	—	—	—
	40	5.200	5.200	—	5.200	—	—
	42	—	—	5.210	—	—	—
	44	5.220	5.220	—	5.220	—	—
	46	—	—	5.230	—	—	—
	48	5.240	5.240	—	5.240	—	—
Middle Band (52 = default)	52	5.260	5.260	—	—	—	5.260
	56	5.280	5.280	—	—	—	5.280
	58	5.300	5.300	—	—	—	5.300
	60	5.320	5.320	—	—	—	5.320
H Band	100	—	5.500	—	—	—	—
	104	—	5.520	—	—	—	—
	108	—	5.540	—	—	—	—
	112	—	5.560	—	—	—	—
	116	—	5.580	—	—	—	—
	120	—	5.600	—	—	—	—
	124	—	5.620	—	—	—	—
	128	—	5.640	—	—	—	—
	132	—	5.660	—	—	—	—
	136	—	5.680	—	—	—	—
	140	—	5.700	—	—	—	—
Upper Band (149 = default)	149	5.745	—	—	5.745	5.745	5.745
	153	5.675	—	—	5.675	5.675	5.675
	157	5.785	—	—	5.785	5.785	5.785
	161	5.805	—	—	5.805	5.805	5.805
ISM Band	165	5.825	—	—	5.825	—	5.825

Note 1: Channel 34 is the default channel for Japan

802.11b/g Channel Frequencies

The available 802.11b and 802.11g channels vary by regulatory domain and/or country. 802.11b radio certification is available in the following regions:

— FCC - U.S./Canada, Mexico, and Australia
— ETSI - Most of Europe, including the United Kingdom and some Eastern block countries
— MKK - Japan
— IL - Israel

Channel ID	FCC (GHz)	ETSI (GHz)	MKK (GHz)	IL (GHz)
1	2.412	2.412	2.412	-
2	2.417	2.417	2.417	-
3	2.422	2.422	2.422	-
4	2.427	2.427	2.427	2.427
5	2.432	2.432	2.432	2.432
6	2.437	2.437	2.437	2.437
7	2.442	2.442	2.442	2.442
8	2.447	2.447	2.447	2.447
9	2.452	2.452	2.452	-
10	2.457	2.457[1]	2.457	-
11	2.462	2.462[1]	2.462	-
12	-	2.467[1]	2.467	-
13	-	2.472[1]	2.472	-
14	-	-	2.484	-

Note 1: France is restricted to these four channels.

802.11g Channel Frequencies

— 802.11g Channel Frequencies
— The available 802.11g channels vary by regulatory domain and/ or country. 802.11g radio certification is available in the following regions:
— FCC - U.S./Canada, Mexico, and Australia
— ETSI - Europe and the United Kingdom
— ETSI - Europe, including the United Kingdom, China, and South Korea
— MKK - Japan
— IL - Israel

Channel ID	FCC (GHz)	ETSI (GHz)	MKK (GHz)	IL (GHz)
1	2.412	2.412	2.412	-
2	2.417	2.417	2.417	-
3	2.422	2.422	2.422	-
4	2.427	2.427	2.427	2.427
5	2.432	2.432	2.432	2.432
6	2.437	2.437	2.437	2.437
7	2.442	2.442	2.442	2.442
8	2.447	2.447	2.447	2.447
9	2.452	2.452	2.452	-
10	2.457	2.457[1]	2.457	-
11	2.462	2.462[1]	2.462	-
12	-	2.467[1]	2.467	-
13	-	2.472[1]	2.472	-
14	-	-	2.484[2]	-

Note 1: France is restricted to these channels.

Note 2: Channel 14 is only available when using **802.11b only** mode.

Wireless Communication Range

The range of the wireless signal is related to the composition of objects in the radio wave path and the transmit rate of the wireless communication. Communications at a lower transmit range may travel longer distances. These values are provided as a guide of relative ranges by data rates only and should ot be considered as an absolute value of performance.

The range of your wireless devices can be affected when the antennas are placed near metal surfaces and solid high-density materials. Range is also impacted due to "obstacles" in the signal path of the radio that may either absorb or reflect the radio signal.

— In Open Office environments, antennas can "see" each other (no physical obstructions between them).
— In Semi-open Office environments, workspace is divided by shoulder-height, hollow wall elements; antennas are at desktop level.
— In a Closed Office environment, solid walls and other obstructions may affect signal strength.

The following tables show typical range values for various environments for FCC-certified products (range may differ for products certified in other regulatory domains).

802.11a Wireless Communication Ranges

Range	54 Mbits/s	48 Mbits/s	36 Mbits/s	24 Mbits/s	18 Mbits/s	12 Mbits/s	9 Mbits/s	6 Mbits/s
Open Office	46 m (151 ft.)	62 m (203 ft.)	82 m (269 ft.)	110 m (361 ft.)	136 m (446 ft.)	169 m (554 ft.)	181 m (594 ft.)	195 m (640 ft.)
Semi-Open Office	32 m (105 ft.)	42 m (138 ft.)	57 m (187 ft.)	75 m (246 ft.)	94 m (308 ft.)	116 m (381 ft.)	125 m (410 ft.)	134 m (440 ft.)
Closed Office	22 m (72 ft.)	29 m (95 ft.)	39 m (128 ft.)	52 m (171 ft.)	64 m (210 ft.)	80 m (262 ft.)	86 m (282 ft.)	92 m (302 ft.)
Tx Power (dBm)	16	17	18	18	18	18	18	18
Receiver Sensitivity (dBm)	-69	-73	-77	-81	-84	-87	-88	-89
Antenna Gain	0 dBi (integrated diversity antenna module; 5.15-5.85 GHz)							

802.11 b/g Wireless Communication Ranges

Range	54 Mbits/s	48 Mbits/s	36 Mbits/s	24 Mbits/s	18 Mbits/s	12 Mbits/s
Open Office	56 m (184 ft.)	69 m (226 ft.)	107 m (351 ft.)	164 m (538 ft.)	219 m (718 ft.)	272 m (892 ft.)
Semi-Open Office	38 m (125 ft.)	48 m (157 ft.)	73 m (239 ft.)	113 m (371 ft.)	151 m (495 ft.)	187 m (614 ft.)
Closed Office	26 m (85 ft.)	33 m (108 ft.)	51 m (167 ft.)	78 m (256 ft.)	104 m (341 ft.)	129 m (423 ft.)
Tx Power (dBm)	17	18	18	18	18	18
Receiver Sensitivity (dBm)	-68	-70	-75	-80	-84	-87
Antenna Gain	1 dBi (integrated diversity antenna module; 2.4-2.5 GHz)					

Range	9 Mbits/s	6 Mbits/s	11 Mbits/s	5.5 Mbits/s	2 Mbits/s	1 Mbits/s
Open Office	292 m (958 ft.)	314 m (1030 ft.)	204 m (669 ft.)	236 m (774 ft.)	253 m (830 ft.)	338 m (1109 ft.)
Semi-Open Office	201 m (659 ft.)	216 m (709 ft.)	140 m (459 ft.)	162 m (531 ft.)	174 m (571 ft.)	232 m (761 ft.)
Closed Office	138 m (453 ft.)	149 m (489 ft.)	97 m (318 ft.)	111 m (364 ft.)	120 m (394 ft.)	160 m (525 ft.)
Tx Power (dBm)	18	18	20	20	20	20
Receiver Sensitivity (dBm)	-88	-89	-83	-85	-86	-90
Antenna Gain	0 dBi (integrated diversity antenna module; 2.4-2.5 GHz)					

Dual Band Range Extender Antenna Specifications

The Dual Band REA has the following technical specifications.

Dual Band REA Electrical Specifications

Frequency Range	2400 MHz - 2500 MHz	5150 MHz - 5875 MHz
Average gain including cable loss	0.5 dBi	1.5 dBi
VSWR	2.0 : 1 Max	2.0 : 1 Max
Polarization	Linear, vertical	Linear, vertical
Power handling	2 W (cw)	2 W (cw)
Impedance	50 Ohms	

Dual Band REA Environmental and Mechanical Specifications

Temperature	-10°C to 55°C (14°F to 131°F)
Humidity	5% to 95% at 5° to 25°C (41° to 77°F)
Weight	110 g
Dimensions	76 x 56 x 194 mm
Cable length	1.5 m

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