Wireless CPE, Access Points, Adapters
Wireless Networking Tutorial

What is a Wireless Network?

A wireless network is very similar to a wired network, the only thing that's missing are the cables that are used in a wired network that connect PCs and laptops to the switch (or Access Point/CPE/WiFi router in the case of a wireless network). Like wired Ethernet networks, 802.11x based wireless networks communicate via the Internet Protocol (IP). The end result is the same, PC and laptop access to the internet, printers, and servers. Additionally, 802.11 networks provide wireless access for devices such as smart phones and tablets.

Access Point/CPE Overview

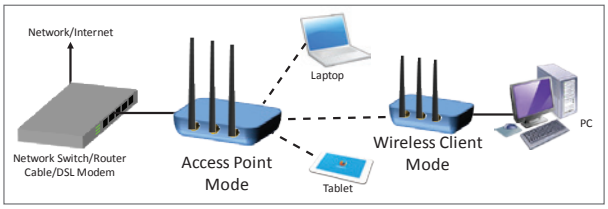
An access point or Customer Premise Equipment (CPE) performs the function of connecting wireless users (and other wireless networks) to a wired router or wired WLAN controller. Most modern access points or CPEs can be configured for several modes of operation.

Access Point (AP) Mode:

Allows wireless equipment such as a Smart Phone or Laptop to be connected to a wired network. In this mode the CPE unit is typically connected to a router on a wired network. The CPE unit provides security features that allow only select wireless devices to connect to it.

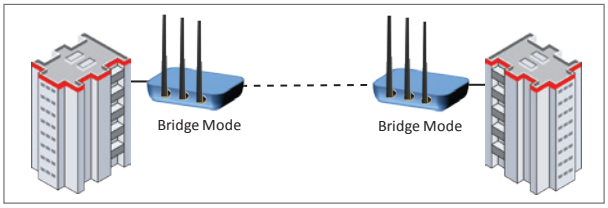
Wireless Client Mode:

In this mode the CPE unit connects to another active access point as if it were a wireless device like a Laptop. Once connected it can provide network/internet connectivity to wired devices without wireless functionality via the CPE's Ethernet port.



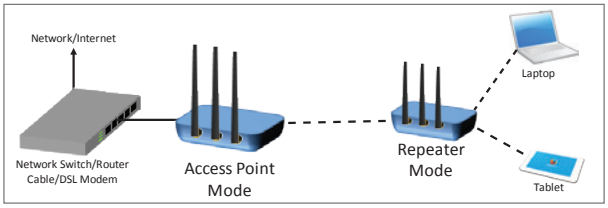
Bridge Mode:

Wireless bridge mode is used to connect two or more network segments that are physically separated. Using the WDS settings, only the selected CPEs can communicate with each other and will deny access to other wireless devices trying to access them. Bridges can be used in Point-to-Point (connecting two commercial buildings) or Point-to Multipoint (connecting multiple buildings on a college campus) applications.



Repeater Mode:

This mode is used to extend the range of an existing access point. This mode is also ideal when an obstruction is preventing wireless connectivity within a select area. Repeaters are commonly used when providing wireless connectivity to multi-story buildings and large homes.



802.11 Wireless Standards					
IEEE Standard	**802.11a**	**802.11b**	**802.11g**	**802.11n**	**802.11ac**
Year Adopted	1999	1999	2003	2009	2014
Frequency	5 GHz	2.4 GHz	2.4 GHz	2.4/5 GHz	5 GHz
Max. Data Rate	54 Mbps	11 Mbps	54 Mbps	600 Mbps	1 Gbps
Typical Range Indoors*	100 ft.	100 ft.	125 ft.	225 ft.	90 ft.
Typical Range Outdoors*	400 ft.	450 ft.	450 ft.	825 ft.	1,000 ft.

*Range estimates are typical and require line of sight.

Wireless Network Design Resources

L-com offers an online library of wireless network application diagrams to show how our products work together to support various WiFi applications. Additionally we offer free technical design documents and calculators to help you with your wireless network applications.
See more online at L-com.com/resources

Item #	Description	List Price

L-com Brand CPE Wireless Access Points

Today's wireless market, more specifically the outdoor wireless market, continues to demand higher transmit power, greater dependability and advanced feature sets, all while keeping the client-side cost down. L-com brand CPEs are all-in-one cost effective weatherproof wireless devices featuring high output power as well as all the essential features for both operating as an Access Point or a CPE Client. This dual approach offers greater flexibility and reduced inventory stock as these units can perform all that is required for establishing reliable wireless networks.

WLAN-LCCPE516-1	L-com 5 GHz 802.11a/n Outdoor CPE	88.08

L-com Brand USB Series Wireless Adapter

ARK-2404U-3	L-com 2.4 GHz 802.11b/g/n Outdoor USB Wireless Adapter Kit with 4 dBi Antenna - FCC/IC Certified	86.00
WLAN-LCUSB-01	L-com USB 2.0 Wireless 802.11g Adapter with 2 dBi Antenna	21.00
WLAN-LCUSB2458	L-com USB 2.0 Wireless 802.11a/b/g/n Adapter with 5 dBi Antenna	42.00

HyperLink® Dual Polarity Antenna Kits

L-com's 5.8 GHz ARK series combine a high gain antenna, high power L-com Wireless Access Point/CPE and the required cables into one cost savings package. Customers can enjoy the cost savings of these kits compared to purchasing components separately. Ideal for IEEE 802.11a/n WiFi applications, these 5.8 GHz ARK series kits are the perfect solution for WISP installers.

ARK4958DP-17Y-2	HyperLink 17 dBi Yagi Antenna/L-com Outdoor CPE/AP Kit	233.80
ARK4958DP-25D-2	HyperLink 25 dBi Dish Antenna/L-com Outdoor CPE/AP Kit	210.13
ARK4958DP-30D-2	HyperLink 30 dBi Dish Antenna/L-com Outdoor CPE/AP Kit	233.80
ARK4958DP-34D-2	HyperLink 34 dBi Dish Antenna/L-com Outdoor CPE/AP Kit	352.38
ARK5158DP-10U-2	HyperLink 10 dBi Omni Antenna/L-com Outdoor CPE/AP Kit	210.13
ARK5158DP-13U-2	HyperLink 13 dBi Omni Antenna/L-com Outdoor CPE/AP Kit	247.85
ARK5158DP-29D-2	HyperLink 28.5 dBi Dish Antenna/L-com Outdoor CPE/AP Kit	338.37
ARK5158DP-32D-2	HyperLink 32 dBi Dish Antenna/L-com Outdoor CPE/AP Kit	413.81

Item #	Description	1-9	10-24	25-99	100+

HyperLink® MIMO Antennas with Ubiquiti® RocketM2/M5 Mounting Kits

These ARK Series kits feature HyperLink MIMO Dual Polarized 2.4 GHz and 5 GHz antennas available in Dish, Omni and Sector models. Included with each antenna is a unique mounting bracket that allows the Ubiquiti RocketM2 or RocketM5 radio to be attached directly to the antenna. Also included are a pair of cable assemblies to connect the Rocket to the antenna. Customers can enjoy the cost saving of these kits compared to purchasing an Ubiquiti antenna to use with the RocketM2 or M5 radio.

ARK2406DPU-0	2.4 GHz 6 dBi Dual Polarized Omni Antenna w/Ubiquiti RocketM2 Mounting Kit	145.00	133.40	121.80	CALL
ARK2410DPU-0	2.4 GHz 10 dBi Dual Polarized Omni Antenna w/Ubiquiti RocketM2 Mounting Kit	210.00	193.20	176.40	CALL
ARK2413DPU-0	2.4 GHz 13 dBi Dual Polarized Omni Antenna w/Ubiquiti RocketM2 Mounting Kit	280.00	257.60	235.20	CALL
ARK5158DP-10U-0	5 GHz 10 dBi Dual Polarized Omni Antenna w/Ubiquiti RocketM5 Mounting Kit	161.59	151.90	142.20	CALL
ARK5158DP-13U-0	5 GHz 13 dBi Dual Polarized Omni Antenna w/Ubiquiti RocketM5 Mounting Kit	210.09	197.48	184.88	CALL
ARK2422DPD-0	2.4 GHz 22 dBi Dual Polarized Dish Antenna w/Ubiquiti RocketM2 Mounting Kit	178.00	163.76	149.52	CALL
ARK2425DPD-0	2.4 GHz 25 dBi Dual Polarized Dish Antenna w/Ubiquiti RocketM2 Mounting Kit	313.00	287.96	262.92	CALL
ARK5158DP-29D-0	5 GHz 29 dBi Dual Polarized Dish Antenna w/Ubiquiti RocketM5 Mounting Kit	188.53	177.22	165.91	CALL
ARK4958DP-30D-0	5 GHz 30 dBi Dual Polarized Dish Antenna w/Ubiquiti RocketM5 Mounting Kit	188.53	173.45	158.37	CALL
ARK5158DP-32D-0	5 GHz 32 dBi Dual Polarized Dish Antenna w/Ubiquiti RocketM5 Mounting Kit	323.24	303.85	284.45	CALL
ARK4958DP-34D-0	5 GHz 34 dBi Dual Polarized Dish Antenna w/Ubiquiti RocketM5 Mounting Kit	323.24	297.38	271.52	CALL
ARK2414DP-090-0	2.4 GHz 14 dBi Dual Polarized 90° Sector Antenna w/Ubiquiti RocketM2 Mounting Kit	218.00	200.56	183.12	CALL
ARK5158-16DP-120-0	5 GHz 16 dBi Dual Polarized 120° Sector Antenna w/Ubiquiti RocketM5 Mounting Kit	145.43	139.61	133.79	CALL
ARK4958-17DP-090-0	5 GHz 17 dBi Dual Polarized 90° Sector Antenna w/Ubiquiti RocketM5 Mounting Kit	131.42	126.16	120.91	CALL
ARK5158-19DP-090-0	5 GHz 19 dBi Dual Polarized 90° Sector Antenna w/Ubiquiti RocketM5 Mounting Kit	193.92	186.17	178.41	CALL

Item #	Description	List Price

PLANET Access Points/Range Extenders

PLANET Technologies provide a wide range of IP-based networking products and solutions for small-to-medium-sized businesses, enterprises, and SOHO markets.

PLANET WDAP Series 802.11ac Wireless Access Points

PLANET's WDAP series access points supports IEEE 802.11a/b/g/n/ac dual band standards. These high speed PoE access points are feature packed and easy to setup. Order some today and move up to 802.11ac speeds.

PT-WDAP-1750AC-FCC	PLANET WDAP-1750AC-FCC 1750Mbps Dual Band Wall Mount Enterprise Wireless Access Point	250.00
PT-WDAP-C7200AC	PLANET WDAP-C7200AC 200Mbps Dual Band Ceiling-Mount Wireless Access Point	165.00
PT-WDAP-8350	PLANET WDAP-8350 600Mbps IP66 Rated Outdoor Dual Band CPE	925.00

PLANET WNAP Series Wireless Range Extender

Extend the coverage and eliminate the dead spot of wireless network with PLANET's WNAP series wireless range extenders.

PT-WNAP-1110	PLANET WNAP-1110 150Mbps 802.11n Wireless Range Extender	40.00

PLANET CPE/Access Points

Planet's WNAP Outdoor CPE/AP series are designed to provide a highly-stable, better performance and cost-effective wireless solution in outdoor wireless deployment. With the same transmission power, it offers better significant range and excellent throughput than those of the traditional wireless devices. Available in 2.4 GHz 802.11n and 5 GHz 802.11a/n models with or without internal antennas.

PT-WNAP-6325	PLANET 2.4 GHz 300Mbps 802.11n Outdoor Wireless CPE, Internal 12 dBi Antenna	115.00
PT-WNAP-6335	PLANET 2.4 GHz 300Mbps 802.11n Outdoor Wireless CPE, (2) RP-SMA Connectors	95.00
PT-WNAP-7325	PLANET 5 GHz 300Mbps 802.11a/n Outdoor Wireless CPE, Internal 14 dBi Antenna	130.00
PT-WNAP-7335	PLANET 5 GHz 300Mbps 802.11a/n Outdoor Wireless CPE, (2) RP-SMA Connectors	120.00

PLANET 802.11ac Range Extender

Planet's WRE-1200, an 802.11ac Dual-band WiFi Range Extender with universal wall plug design, is case-shaped, thus making it easy to install and connects to your router wirelessly. The WRE-1200 supports Gigabit Ethernet connectivity and conforms to IEEE 802.11a/b/g/n/ac Dual Band standard technology; therefore, it can provide a wireless speed of up to 300+867Mbps which is 16x faster than the 11a access point at 5 GHz frequency and 5.5x faster than the 11g access point at 2.4 GHz frequency.

PT-WRE-1200-US	PLANET 1200Mbps 802.11ac Dual Band Wall Plug WiFi Range Extender	60.00


WLAN-LCCPE516-1


ARK-2404U-3


WLAN-LCUSB2458

ARK4958DP-17Y-2

ARK5158DP-10U-0

ARK2425DPD-0

ARK5158-19DP-090-0

PT-WDAP-8350

PT-WDAP-1750AC-FCC

PT-WNAP-1110

PT-WNAP-6325

PT-WRE-1200-US


EN-EUB-1200AC


EN-ECB1200


EN-EAP1200H


EN-EPG600


EN-EPG5000


EN-EBK1000


EN-EAP-350


EN-ENH710EXT


EN-ENS202

Item #	Description	List Price

EnGenius® 802.11ac Series Access Points/Routers/Bridges/Adapters

With speeds up to 3 times faster than 802.11n, the new IEEE standard 802.11ac provides better performance and quality in wireless communications. The following wireless EnGenius products in this section all feature 802.1ac capability. Be sure to get on the high speed wireless super highway and order an EnGenius 802.11ac radio today.

EN-EUB-1200AC	EnGenius EUB1200AC Dual-Band 802.11ac Wireless AC1200 USB Adapter	85.00
EN-ECB1200	EnGenius ECB1200 802.11ac 2 x 2 Dual-Band High-Power Access Point/Client Bridge	290.00
EN-ECB1750	EnGenius ECB1750 802.11ac 3 x 3 Dual-Band High-Power Access Point/Client Bridge	465.00
EN-EAP1200H	EnGenius EAP1200H 802.11ac Dual-Band AC1200 Indoor Access Point	290.00
EN-EAP1750H	EnGenius EAP1750H 802.11ac 3 x 3 Dual-Band Ceiling-Mount Access Point/WDS	415.00
EN-ENS1200	EnGenius ENS1200 802.11ac Dual-Band AC1200 Outdoor Access Point	415.00
EN-ENS1750	EnGenius ENS1750 802.11ac Dual-Band AC1750 Outdoor Access Point	520.00
EN-ENH1750EXT	EnGenius ENH1750EXT 802.11ac Hi-Power, Long-Range, Ruggedized 3 x 3 Dual-Band AC1750 Outdoor Access Point	1035.00

EnGenius® Cloud IoT Routers and Gateways

EnGenius Cloud Internet of Things (IoT) Solutions are designed to make your family, your home or your business more secure; the way you communicate effortless and less costly; your music, photos, video and documents safer and quicker to store and retrieve.

EN-EPG600	EnGenius EPG600 Intelligent Phone Gateway	155.00
EN-EPG5000	EnGenius EPG5000 Dual-Band IoT Intelligent Cloud Gateway	190.00
EN-ESR300	EnGenius ESR300 2.4 GHz N300 IoT Cloud Router with Built-in Switch and USB Port	65.00
EN-ESR600	EnGenius ESR600 Dual-Band 2.4/5 GHz N600 IoT Gigabit Cloud Router with USB Port	75.00
EN-EBK1000	EnGenius EBK1000 EnGuardian Kit with HD720P IP Camera and Dual-Band IoT Gateway	335.00

EnGenius® ECB Series Indoor Access Points

With the quality and functionality expected of an EnGenius product, the ECB series provides up to 800mW of high wireless output power and also adds advanced features such as SNMP management, Wireless Distribution System (WDS), and Power over Ethernet (PoE) capability.

EN-ECB-300	EnGenius ECB300 802.11b/g/n Wireless-N, N300 Indoor Access Point/Client Bridge/WDS/Repeater	105.00
EN-ECB-350	EnGenius ECB350 802.11b/g/n Wireless-N, N300 Indoor Access Point/Client Bridge/WDS/Repeater	135.00
EN-ECB-600	EnGenius ECB600 802.11b/g/n Wireless-N, N600 Indoor Access Point/Client Bridge/WDS/Repeater	210.00

EnGenius® EAP Series Access Points/Repeaters

EAP Series are smoke detector looking Wireless Access Point/Universal Repeaters that operate seamlessly in the 2.4GHz frequency spectrum supporting the 802.11b (2.4GHz, 11Mbps) standard and SuperG 108Mbps high speed feature.

EN-EAP-300	EnGenius EAP300 802.11b/g/n 29dBm WDS Bridge, Indoor VLAN Access Point	105.00
EN-EAP-350	EnGenius EAP350 800mW, 300Mbps, 802.11b/g/n Indoor Access Point	125.00

EnGenius® EUB Series 802.11b/g High Power USB Adapter

The EnGenius EUB series USB WLAN adapters are designed for users who require maximum range and performance in their wireless networks. The EUB series offers a rich feature set including security features such as WPA and 802.1x.

EN-EUB-600	EnGenius EUB600 Dual-Band Wireless N600 USB Adapter	45.00

EnGenius® ENH Series Outdoor Access Point/Client Bridge

The ENH series Business-Class Long-Range Wireless-N Outdoor Access Point/Client Bridge is an affordable, high-performance, secure wireless networking solution. Designed for outdoor deployments that require secure and robust wireless coverage, the ENH series is a great fit for demanding applications including high-speed IP camera and video streaming applications.

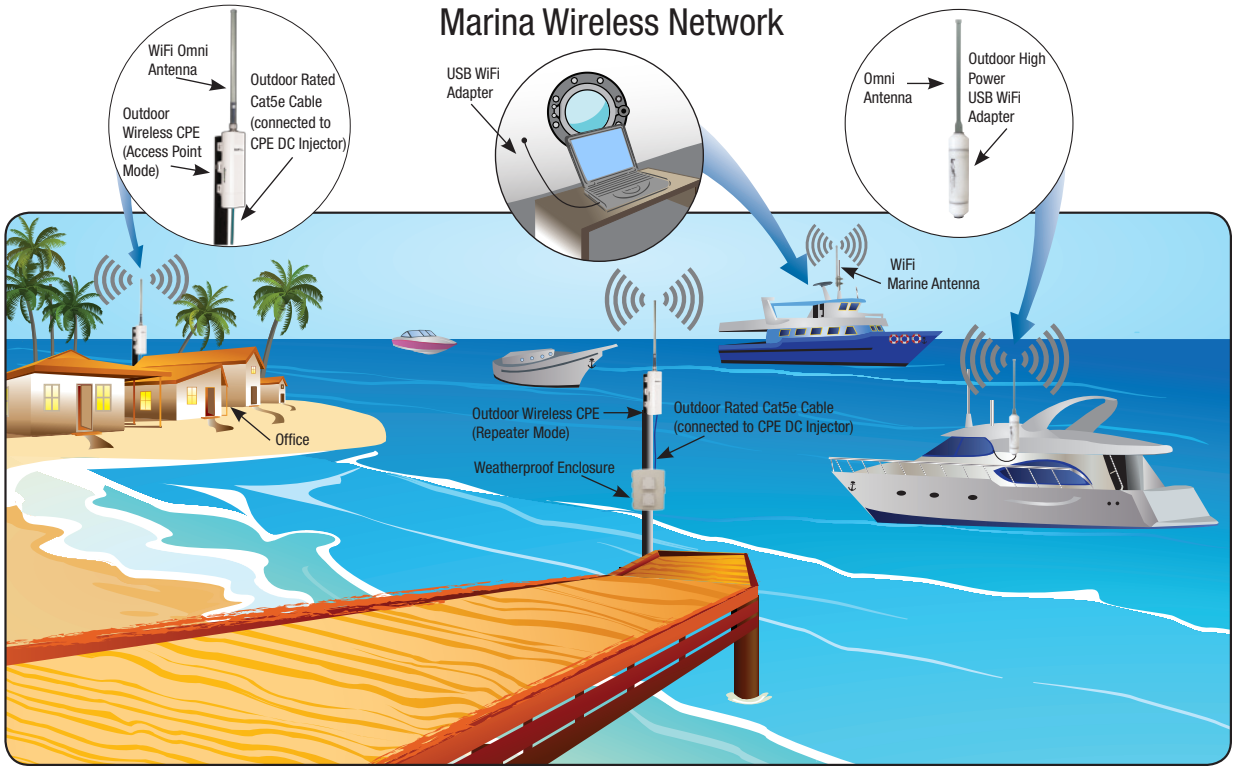
EN-ENH202	EnGenius ENH202 Wireless Outdoor 500mW Long-range Access Point/Client Bridge	105.00
EN-ENH210	EnGenius ENH210 802.11n 2.4GHz Wireless Outdoor Access Point/Client Bridge	280.00
EN-ENH500	EnGenius ENH500 Long Range 11n 5GHz Wireless Outdoor Access Point/Client Bridge	105.00
EN-ENH710EXT	EnGenius ENH710EXT High-Powered, Dual Band Ruggedized N600 Outdoor Access Point	520.00
EN-ENH900EXT	EnGenius ENH900EXT 802.11b/g/n Dual-Band 3 x 3 Ruggedized Outdoor Access Point/Client Bridge	780.00

EnGenius® ENS Series Outdoor Access Point/Client Bridge

The ENS series is a long-range Wireless-N Outdoor Access Point/Client Bridge operating in the 2.4/5 GHz frequency bands at data rates of 300Mbps. ENS high power output of up to 400mW is ideal for high-speed wireless connection for building-to-building deployments or IP security camera wireless applications in parking lots or parking structures.

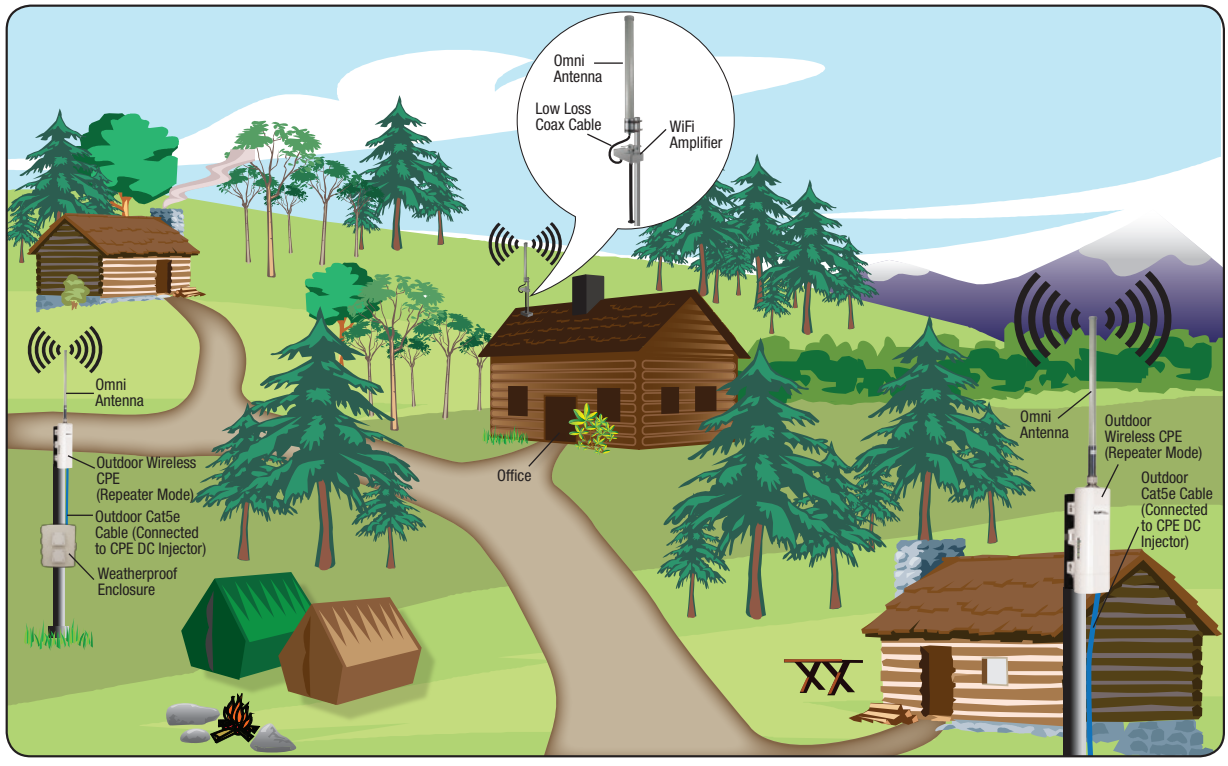
EN-ENS202	EnGenius ENS202 High-Powered, Long-Range 2.4 GHz Wireless N300 Outdoor Client Bridge	85.00
EN-ENS202EXT	EnGenius ENS202EXT High-Powered, Long-Range 2.4 GHz Wireless N300 Outdoor Access Point	95.00
EN-ENS500	EnGenius ENS500 High-Powered, Long-Range 5 GHz Wireless N300 Outdoor Client Bridge	85.00
EN-ENS500EXT	EnGenius ENS500EXT High-Powered, Long-Range 5 GHz Wireless N300 Outdoor Access Point	95.00

Marina Wireless Network



This diagram is representational only and depicts a typical Marina WiFi application. Each wireless installation is unique and results can vary due to many different environmental factors. For outdoor wireless networks Line of Sight (LOS) must be considered. You will need a clear unobstructed view of the antenna from the remote point in the link. Trees and leaves are obstructions to 802.11 frequencies so they will partially or entirely block the signal.

Campground Wireless Network



This diagram is representational only and depicts a typical campground WiFi application. Each wireless installation is unique and results can vary due to many different environmental factors. For outdoor wireless networks Line of Sight (LOS) must be considered. Basically that means you will need a clear unobstructed view of the antenna from the remote point in the link. Trees and leaves are obstructions to 802.11 frequencies so they will partially or entirely block the signal.