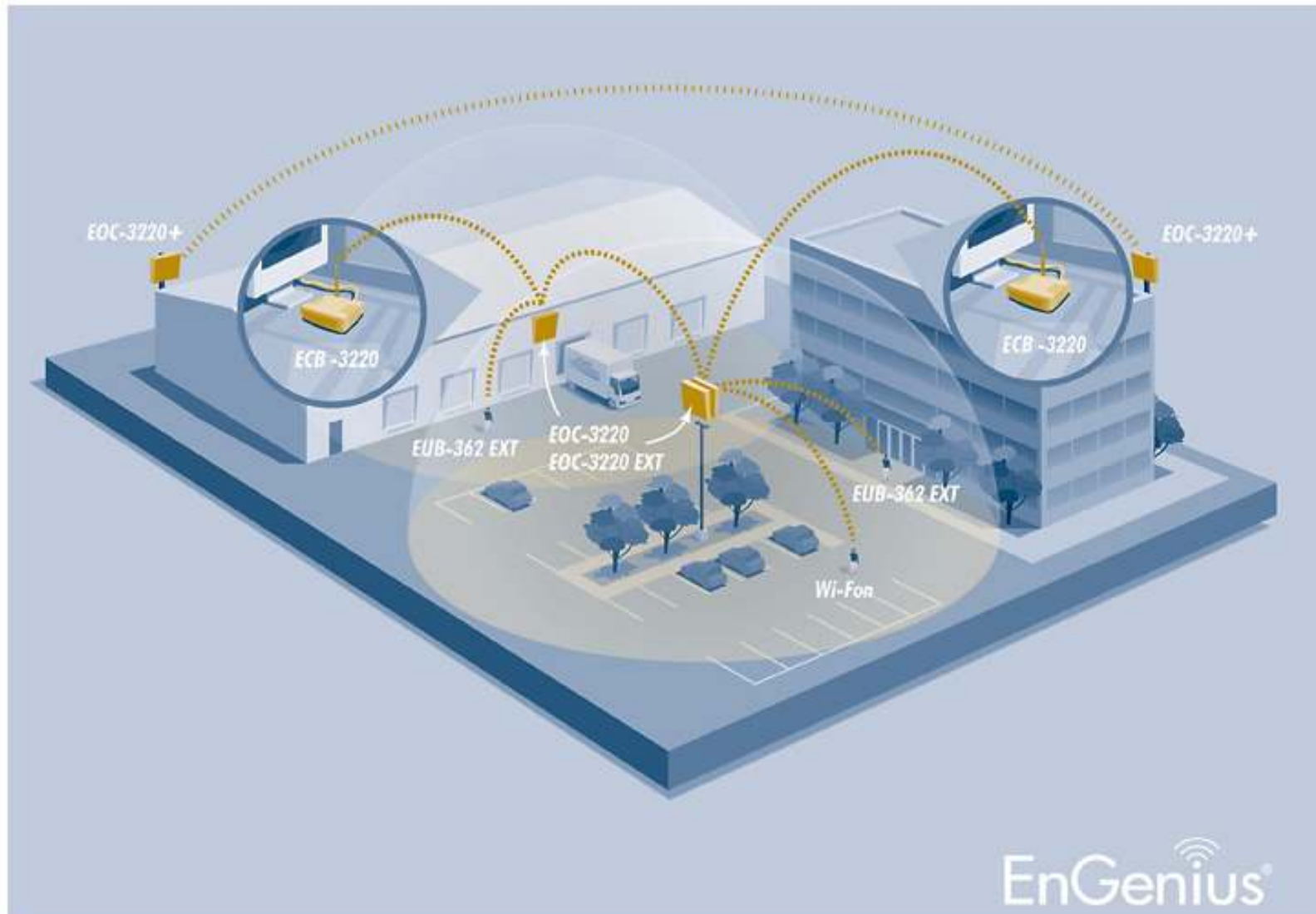


# Designing and Planning EnGenius Wi-Fi Networks



# Basic Terminology

- **Access Point (AP)**  
Allows wireless client devices such as laptops to connect to a wireless network using Wi-Fi.
- **Client Bridge (CB)**  
A device that connects an Ethernet network or device directly to a wireless access point

# Basic Terminology Cont.

- **Ad-Hoc (point-to-point) Mode**

In ad-hoc mode, each client, is peer-to-peer, and requires no access point.

- **Infrastructure (point-to-multipoint) Mode**

The infrastructure mode requires the use of an access point (AP). In this mode, all wireless communications between clients are through the AP no matter the location of the AP.

# Basic Terminology Cont.

- **RF Site Survey**

A site visit to run tests to determine the presence of RF interference and identify optimum installation locations for access points preferably with a spectrum analyzer.

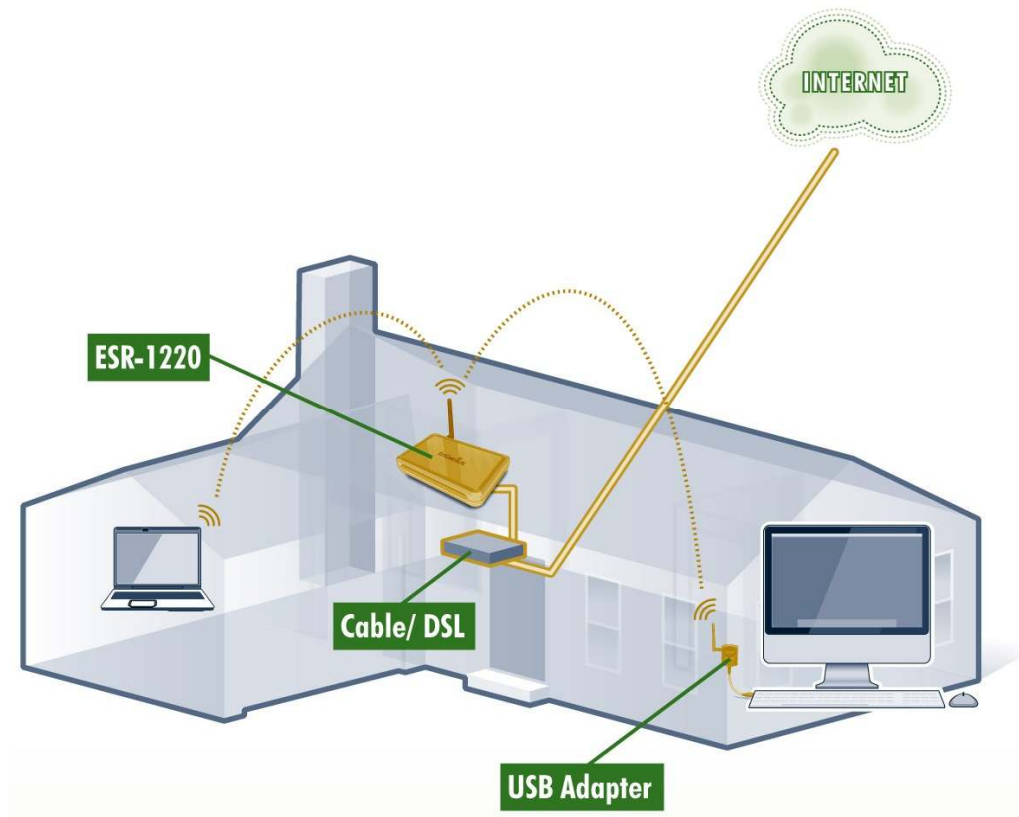
Other considerations are user density and bandwidth requirements.

# Wi-Fi Standards

- **802.11b**  
2.4GHz, 11Mbps throughput, DSSS modulation
- **802.11a**  
5GHz, 54Mbps throughput, OFDM modulation
- **802.11g**  
2.4GHz, 54Mbps throughput, OFDM modulation
- **802.11n**  
2.4GHz and 5GHz, 300Mbps throughput, MIMO and Spatial Multiplexing, 20-40MHz channels

# Wireless Home Network

- Small to medium sized home.

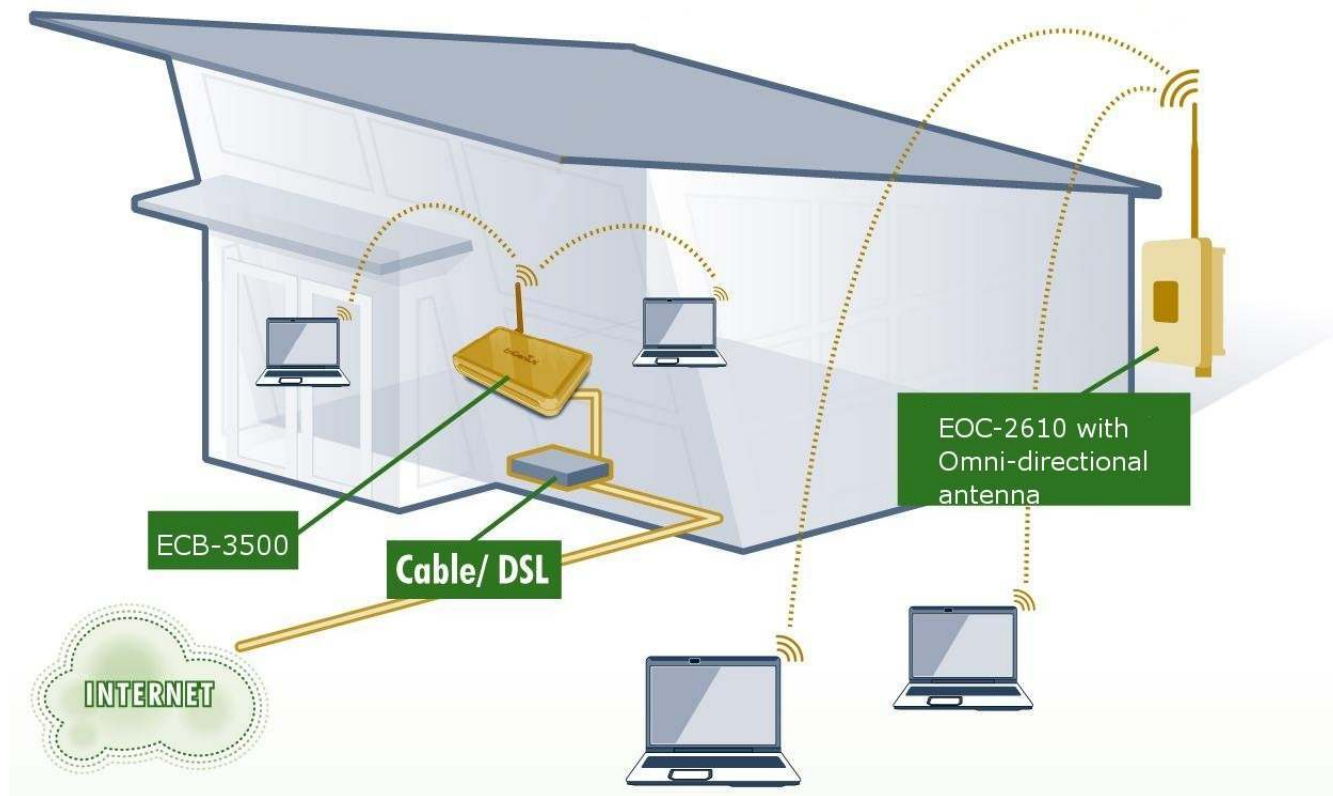


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# Hotspot

- Coffee shop or small office



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# Recommendation

## Small home or apartment



ESR-1221 EXT  
200mW Power



ESR-9753  
150Mbps Router



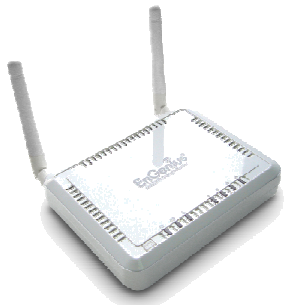
ESR-9752  
300Mbps N Router



ERB-9250  
Range Extender

- *Cost effective solutions*

## Multimedia and Gaming



ESR-9850 300Mbps  
Gigabit N Router



ESR-7750 300Mbps  
Dualband N Router



ESR-9855G  
Gaming Router

- *Enhanced MIMO radio technology for extended range and speed Secure Push-Button Setup*
- *802.11E QoS optimizes multimedia streaming*
- *Easy to use installation wizard for quick setup*

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# USB Clients

Small home or apartment



EUB-3701 EXT  
Removable Antenna



EUB-9703  
150Mbps

Long Range

High Power

802.11n



EUB-362 EXT  
200mW



EUB9603H  
600mW



EUB-9706  
300Mbps N



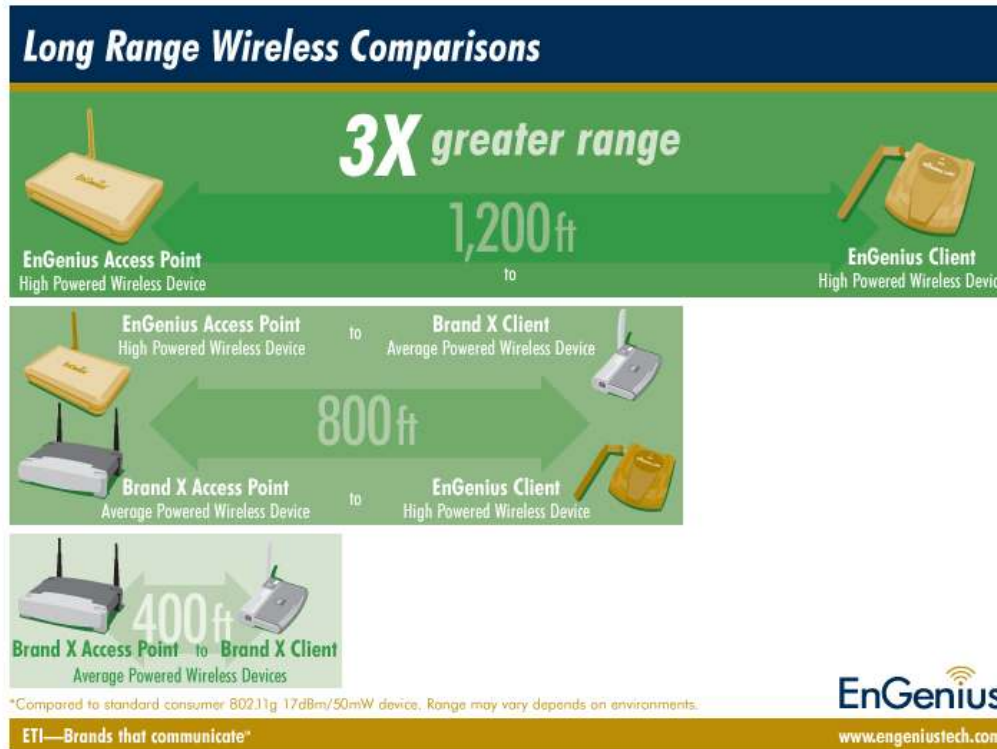
EUB-9801  
300Mbps  
Dualband N

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# Business Class Models

Higher RF transmit power and sensitivity.



Power over Ethernet capability

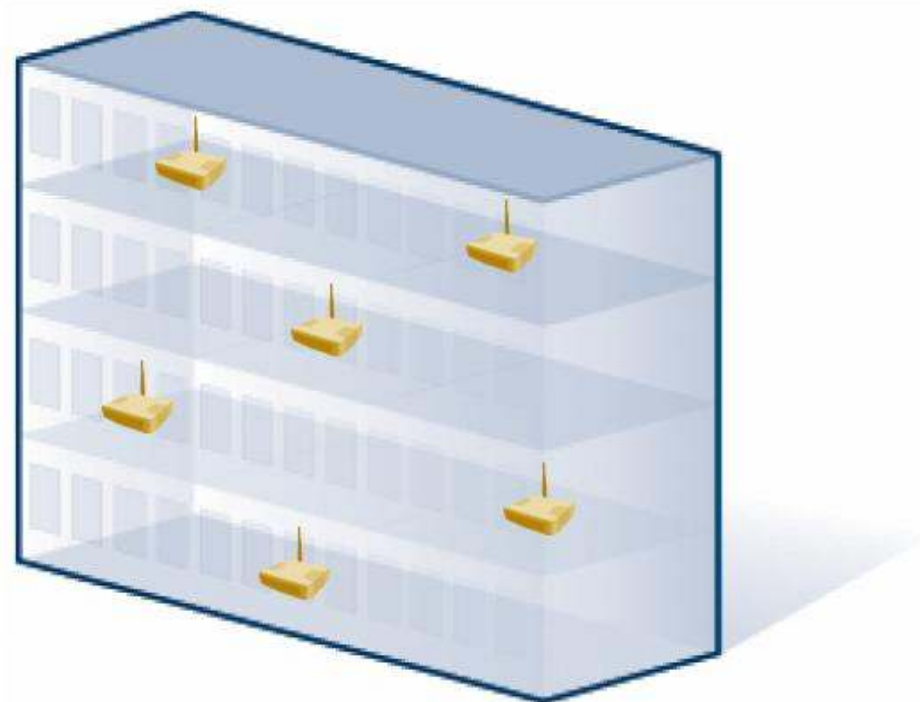
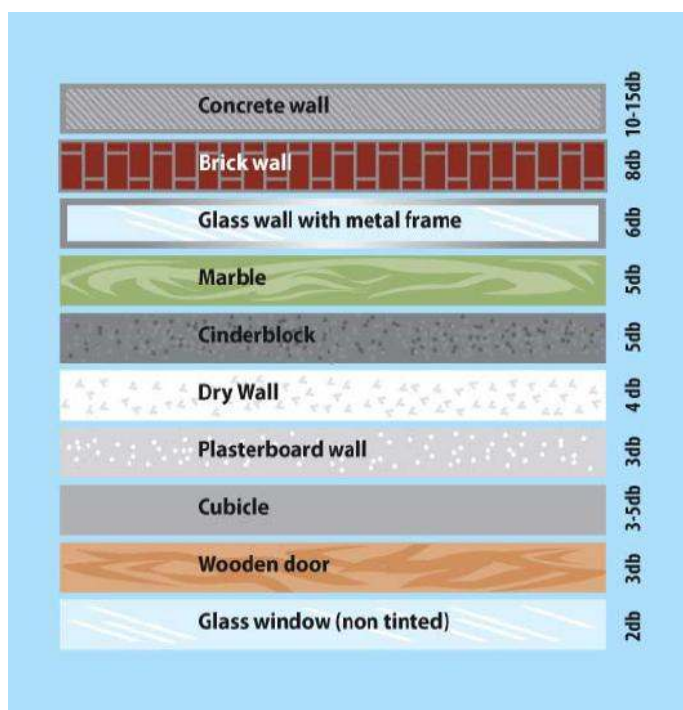


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# Larger Coverage Areas

- High transmit power and receive sensitivity means less APs.
- dB Loss is a function of material
- Brick or concrete walls: 15 rooms per AP.
- Drywall: 25 rooms per AP



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# Recommendation

High powered 802.11g AP

- EAP-3660
- ECB-3500



802.11n AP

- EAP-9550
- ECB-9500



# ECB-3500

- 802.11g
- 600mW RF output
- Dual diversity antenna
- 802.3af PoE compatible
- Multiple SSID (AP mode)
- Supports VLAN tagging
- WMM QoS
- 7 operation modes



# EAP-3660

- 802.11g
- 600mW RF output
- Discreet enclosure design
- 4dBi internal antenna
- 802.3af PoE compatible
- Multiple SSID (AP mode)
- Supports VLAN tagging
- WMM QoS



# ECB9500

- 802.11n
- Gigabit Ethernet port
- 802.3af PoE compatible
- Multiple SSID (AP mode)
- Supports VLAN tagging
- WMM QoS
- 7 operation modes



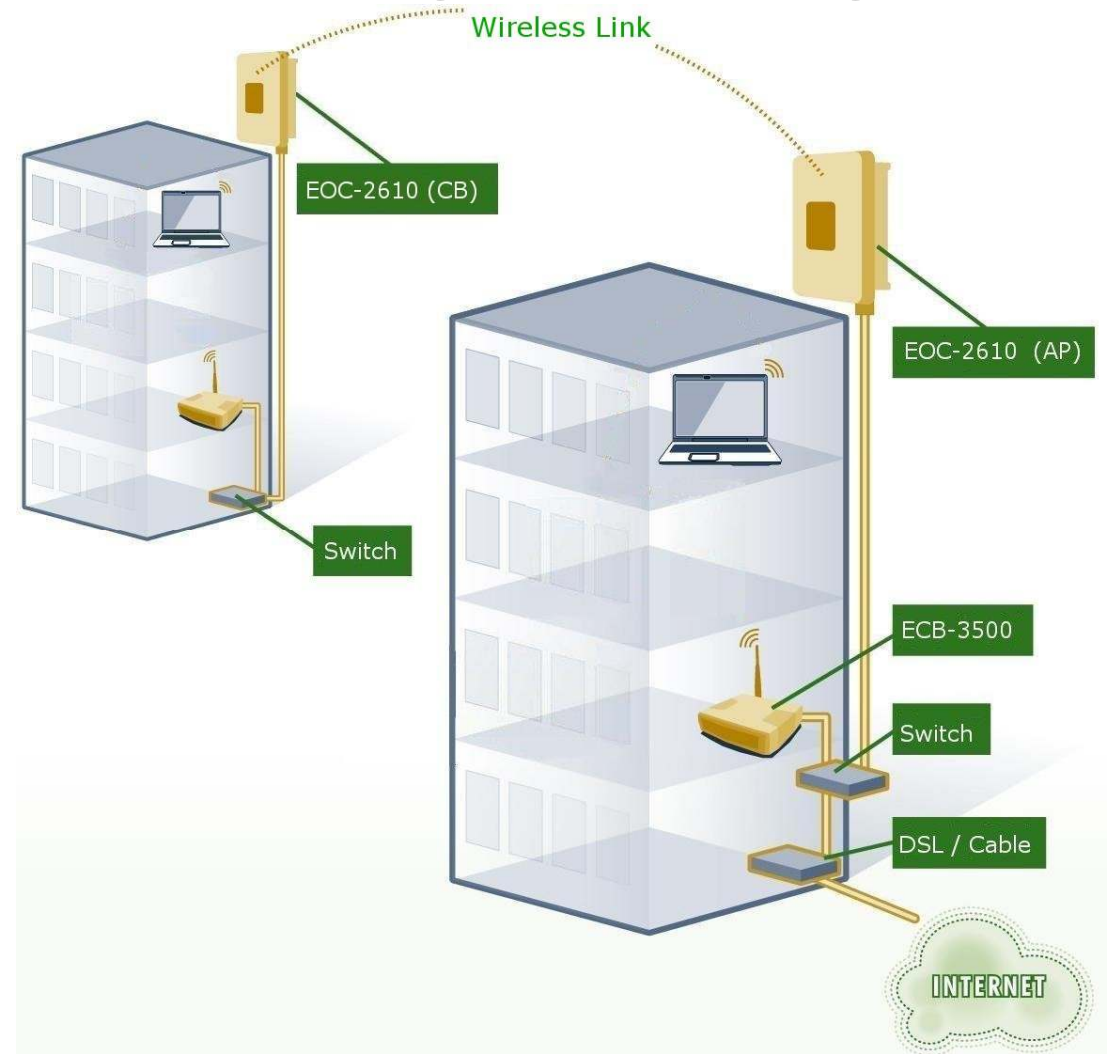
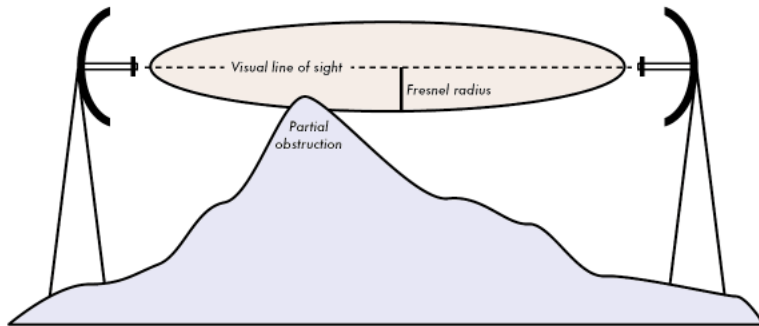
# EAP9550

- 802.11n
- Discreet enclosure design
- 4dBi MIMO smart antenna
- 802.3af PoE compatible
- Multiple SSID (AP mode)
- Supports VLAN tagging
- WMM QoS



# Point-to-Point Long Range

- Directional antennas
- Clear line of sight



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# Recommendation

802.11g Outdoor AP/CB

- EOC2611P

802.11a Outdoor AP/CB

- EOC-5610



# EOC2611P

- IP65 rated outdoor enclosure
- 802.11g
- 600mW RF output
- 24V PoE
- 10dBi Selectable Vertical or Horizontal Polarity
- RP-SMA external antenna connector (hardware switch)
- Metal clamp for mounting



# EOC-5610

- IP65 rated outdoor enclosure
- 802.11a/g
- 600mW RF output
- 5dBi 2.4GHz, 13dbi 5GHz  
internal antenna
- 24V PoE
- RP-SMA external antenna  
connector (hardware switch)
- Metal clamp for mounting



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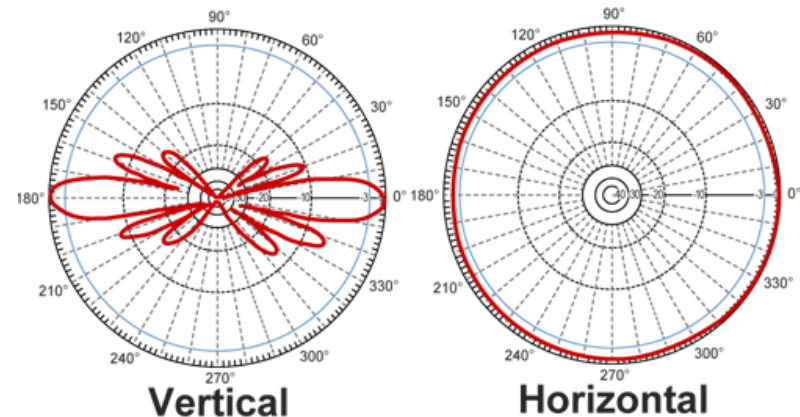
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# Antenna Options

How the device is used determines what kind of antenna is needed.

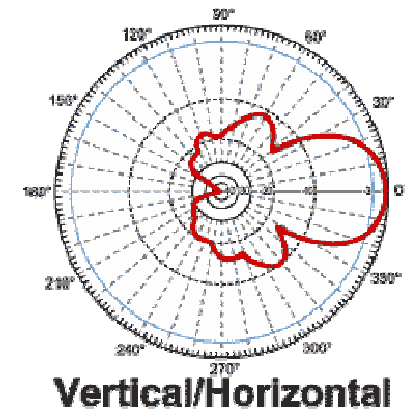
## Omni-Directional

- Best used where AP and clients are at the same elevation
- Flat, circular radiation pattern



## Directional

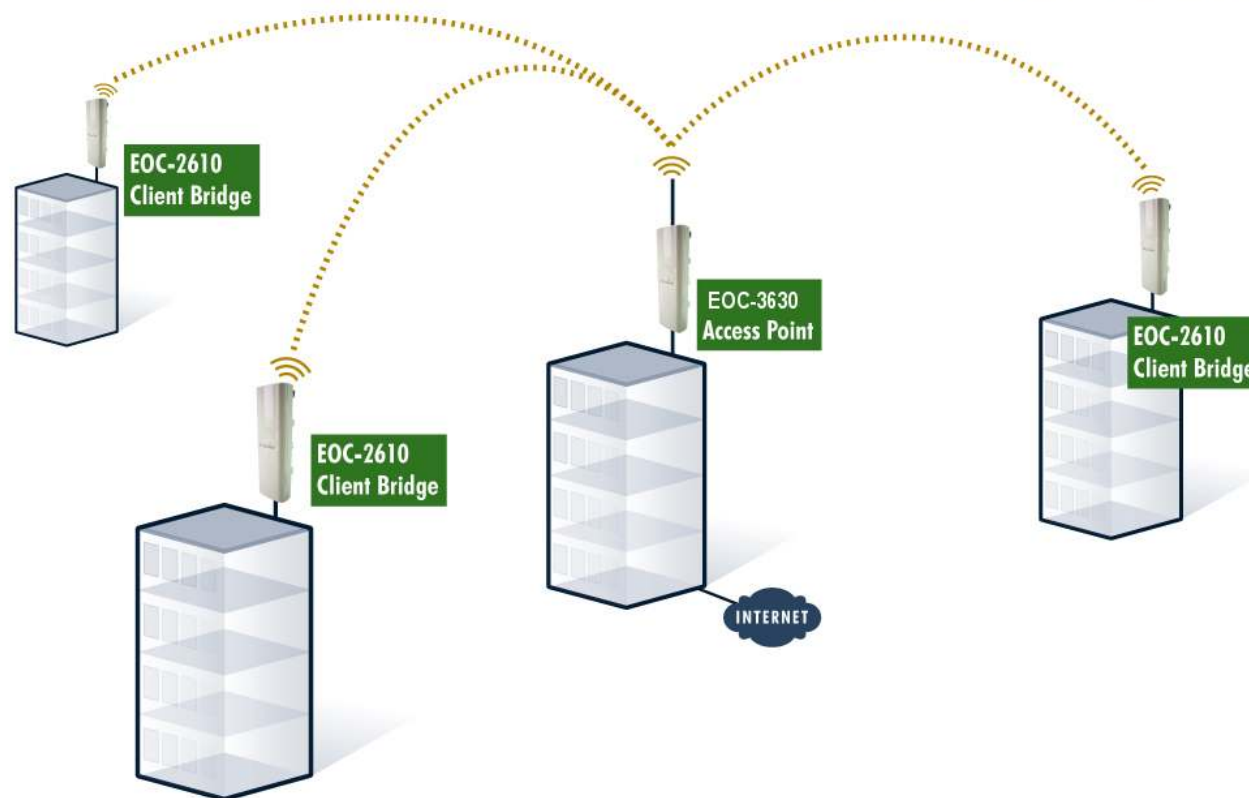
- Key to long range links
- Focused beam width
- Can go miles with **clear line of sight**



# Point-to-Multipoint Outdoor

- Omni-directional antenna on AP
- Directional antennas on CBs.

OUTDOOR POINT-TO-MULTIPOINT

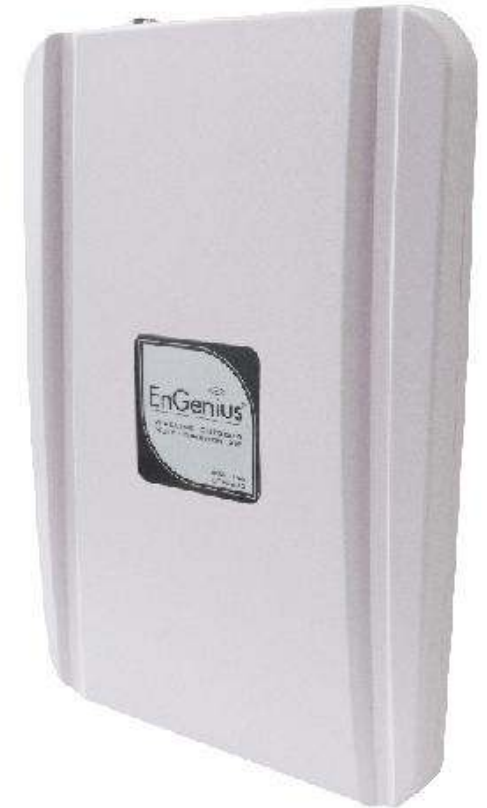


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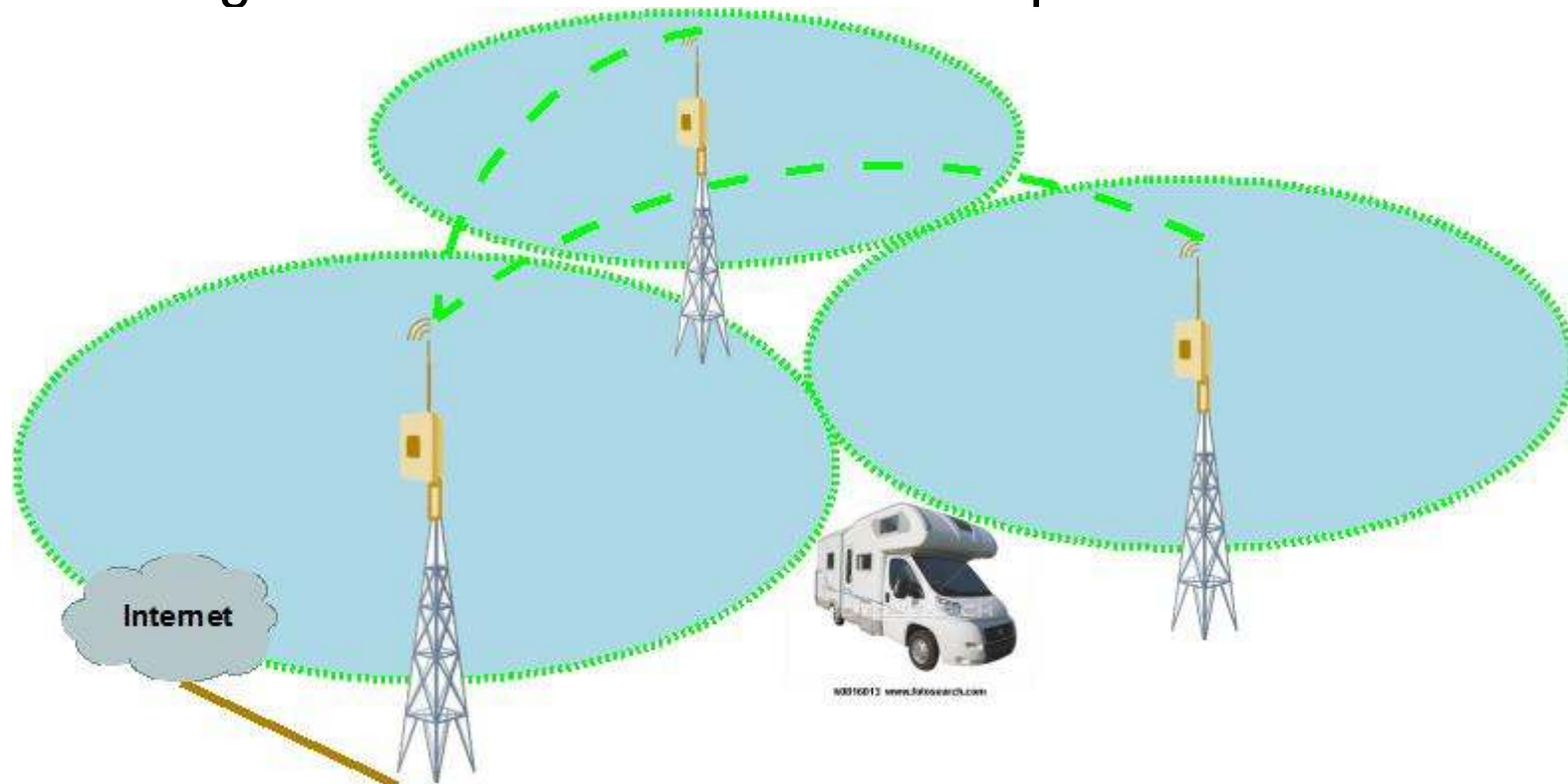
# EOA-3630

- IP65 rated outdoor enclosure
- 2.4GHz 600mW
- Type-N RF Connector
- 24V PoE
- Wall or mast bracket



# Outdoor Hospitality

- RV Parks, Marinas, Campuses
- Dual Radio Repeaters to separate backhaul traffic
- Running data cables is not an option.



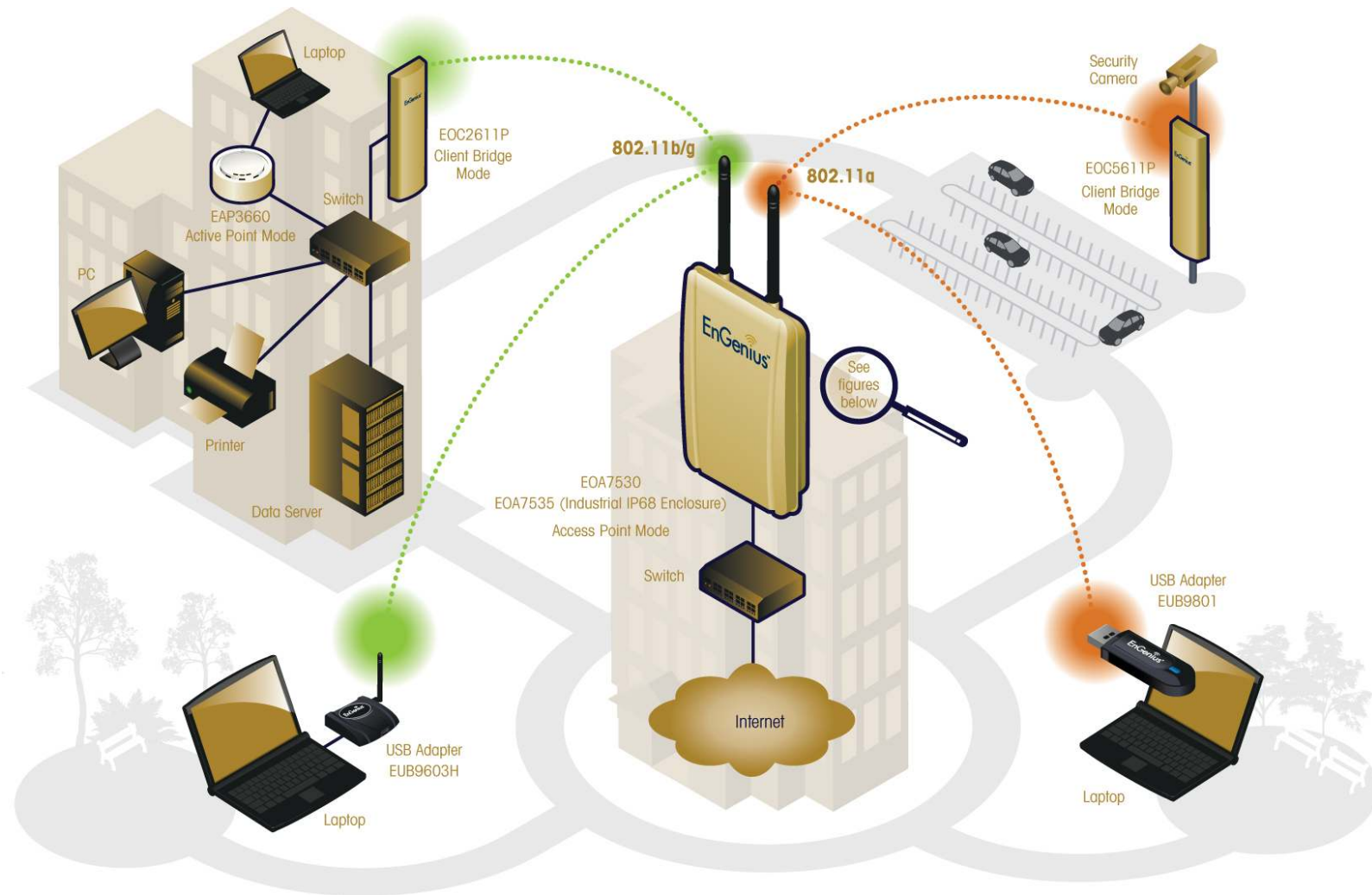
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# Recommendation

## Dual Radio AP

- EOR-7750
- EOA-7530
- EOA-7535



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# EOR-7750

- IP65 rated outdoor enclosure
- Radio 1
  - 2.4GHz / 5GHz 600mW
  - Type-N Connector
- Radio 2
  - 2.4GHz 802.11n
  - 6dBi internal antenna
- 24V PoE
- Wall or mast bracket



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# EOA7530

- IP65 rated outdoor enclosure
- Radio 1
  - 5GHz 600mW
  - Type-N Connector
- Radio 2
  - 2.4GHz 600mW
  - Type-N Connector
- 48V PoE
- Wall or mast bracket



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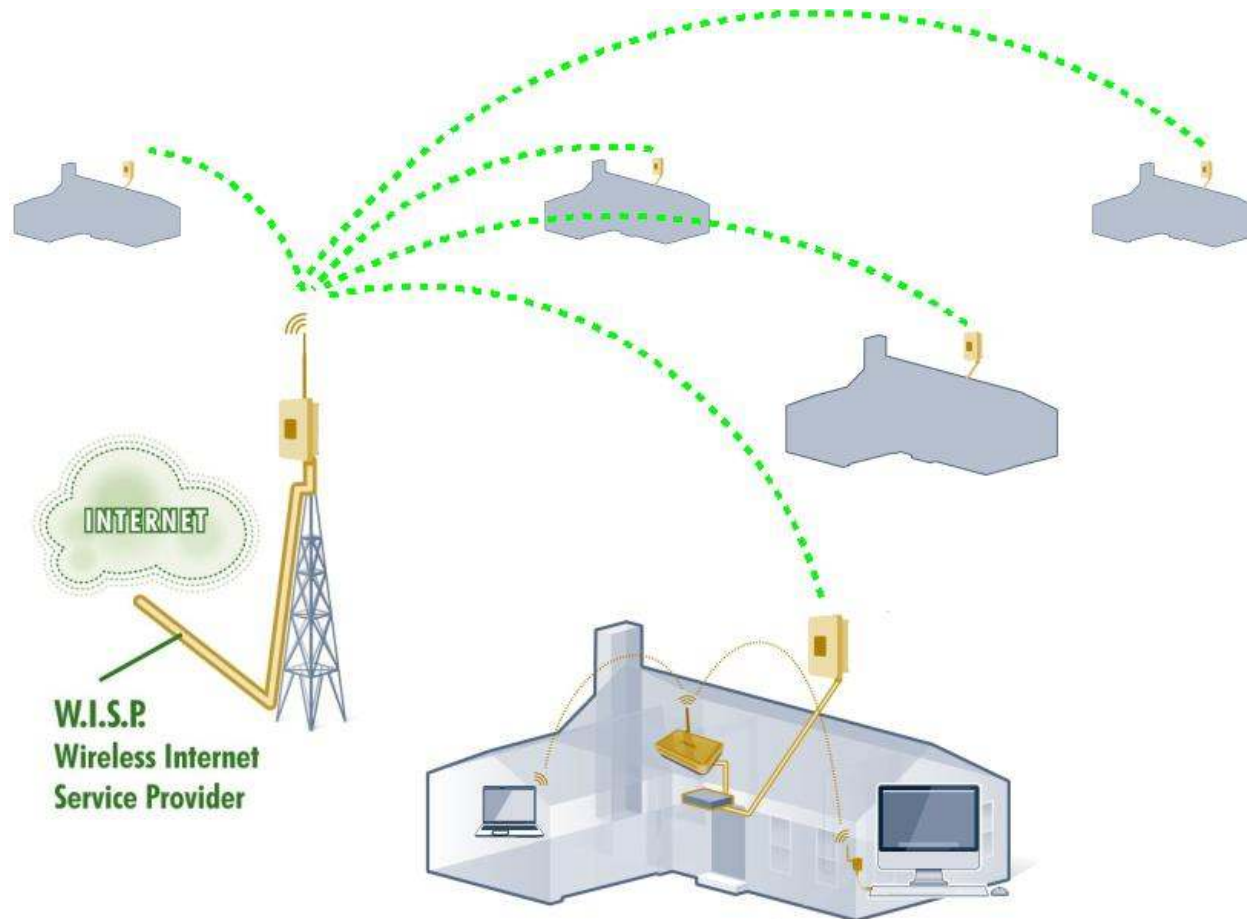
# EOA7535

- IP68 rated outdoor enclosure
- Radio 1
  - 5GHz 600mW
  - Type-N Connector
- Radio 2
  - 2.4GHz 600mW
  - Type-N Connector
- 48V PoE
- Ethernet Surge Arrestor
- RF Lightning Protector
- Wall or mast bracket



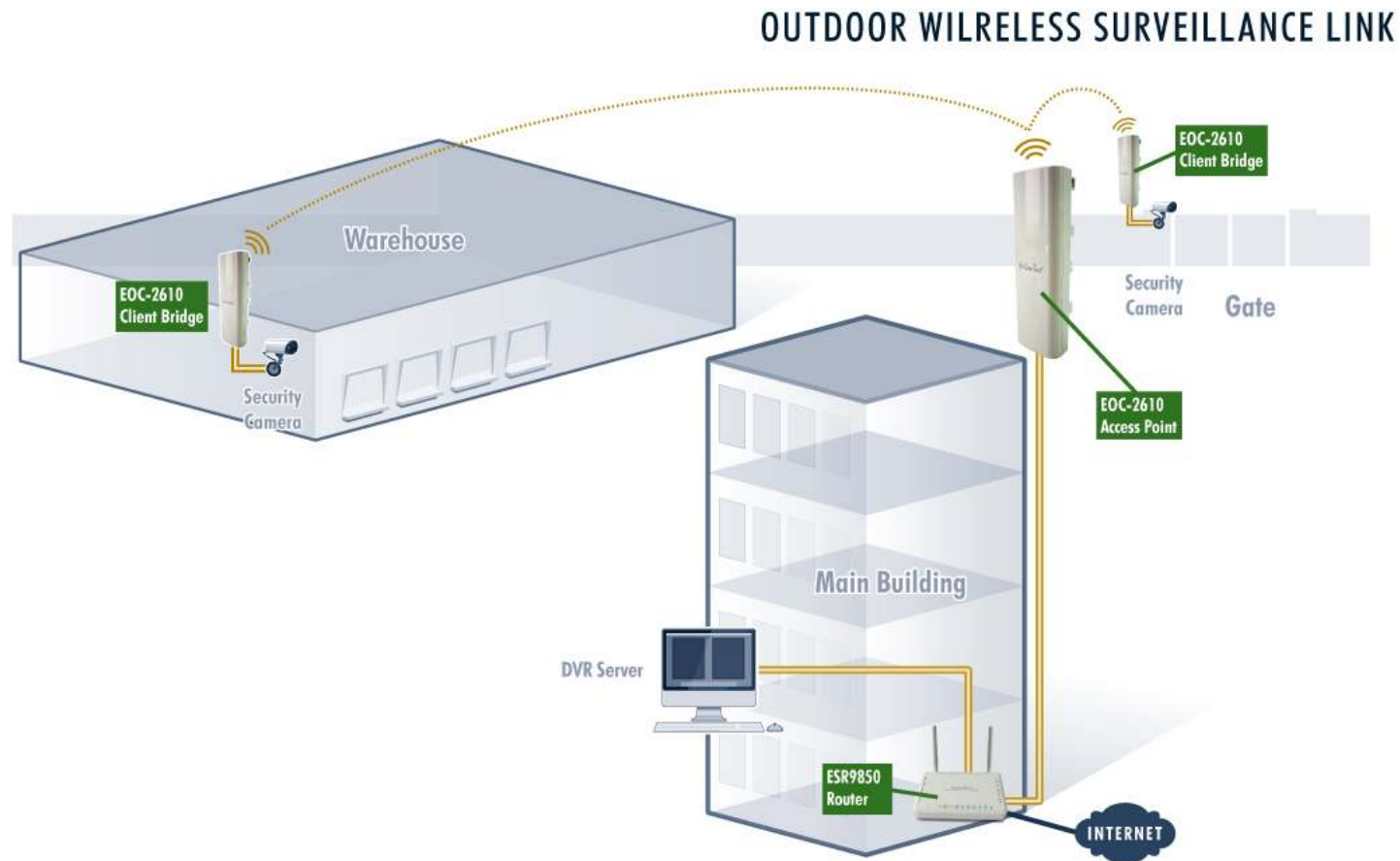
# Applying Concepts for WISP

- EOC2611P configured in client bridge mode deployed as CPE devices



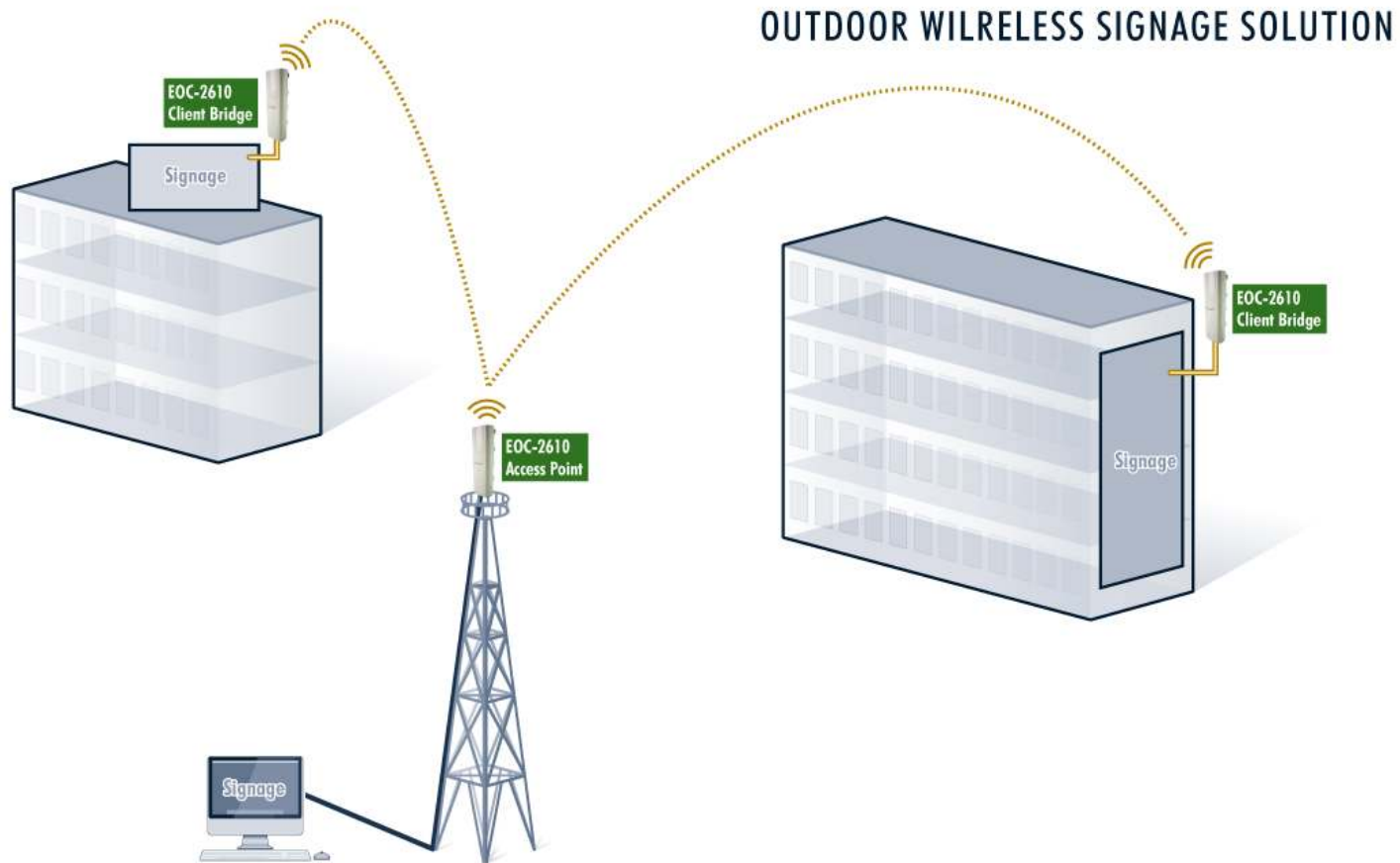
# Applying Concepts for IP Security Cameras

- EOC2611P configured in client bridge mode for security cameras.



# Applying Concepts to Any Ethernet Device

- EOC2611P configured in client bridge mode to connect different types of Ethernet devices.



## Various Client Bridge Examples

- Client bridge mode to connect different types of Ethernet devices to an AP.



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