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.
Hotspot

- Coffee shop or small office
Recommendation

Small home or apartment

- ESR-1221 EXT
  - 200mW Power

- ESR-9753
  - 150Mbps Router

- ESR-9752
  - 300Mbps N Router

- ERB-9250
  - Range Extender

Multimedia and Gaming

- ESR-9850
  - 300Mbps Gigabit N Router

- ESR-7750
  - 300Mbps Dualband N Router

- ESR-9855G
  - Gaming Router

- Cost effective solutions

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

Long Range Data Communications Systems
USB Clients

Small home or apartment

- EUB-3701 EXT
  Removable Antenna
- EUB-9703
  150Mbps

Long Range

High Power

- EUB-362 EXT
  200mW
- EUB9603H
  600mW
- EUB-9706
  300Mbps N
- EUB-9801
  300Mbps Dualband N

802.11n
Business Class Models

Higher RF transmit power and sensitivity.

Power over Ethernet capability
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
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
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
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.
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.
Recommendation

Dual Radio AP
- EOR-7750
- EOA-7530
- EOA-7535
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
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
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.