

ESTEEM

Wireless Modems

ESTeem MODEL 195Eg USER'S MANUAL

Manual Revision 2.5
June 2008



Electronic Systems Technology, Inc.

ESTeem MODEL 195Eg USER'S MANUAL

Manual Revision 2.5

Firmware Version 302.8.102 and above

June 2008

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415 North Quay Street
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BEFORE YOU BEGIN

Thank you and congratulations on your purchase of the ESTEem Model 195Eg Wireless Ethernet Radio Modem! This manual was written to help both the first time and advanced user of the 195Eg configure the radio modem for your application. If this your first time configuring the 195Eg and you would like to get going as soon as possible, we recommend using the *195Eg Quick Start Guide* provided with the modem. A copy of the guide is listed in the appendix of this manual for your reference.



The ESTEem 195Eg is a very versatile wireless Ethernet networking device. To keep the manual usably short, many of the application descriptions and programming details assume the user has a good working knowledge of the following network concepts:

- General Ethernet networking and the configuration of LAN topologies
- Common Ethernet terminology and acronyms
- TCP/IP network protocol structure and how to configure TCP/IP networks and subnets
- How to identify and set the TCP/IP address on your computer
- Have administrator privileges to the computer and network you are configuring
- If using routing protocols, you must be able to identify and configure the network routers, gateways and firewalls
- You must be familiar with using web browser software such as Internet Explorer, Netscape or Mozilla

If you are unfamiliar with any of the above networking concepts, you may need to contact your network administrator for assistance.

MODEL 195Eg OVERVIEW

The ESTEem Model 195Eg is an IEEE 802.11g protocol compatible wireless LAN transceiver that can be used to build a Wireless Local Area Network (WLAN) for line-of-sight distances to 13 miles for fixed base and 5 miles for mobile applications. The 195Eg can provide RF data rates up to 54 Mbps and can have an optional serial port for legacy RS-232 devices. The Model 195Eg is also downward compatible with IEEE 802.11b protocol networks. The IEEE 802.11 WLAN was designed to look and feel like any IEEE 802 wired LAN. The Model 195Eg is a very sophisticated networking device that can be configured for multiple modes of operation depending upon the needs of the wireless and wired LAN system. The following configuration modes are provided as an overview of the basic network types, as all possible network configurations can not be listed. For further help in selecting the correct network type, please contact Customer Support at 509-735-9092.

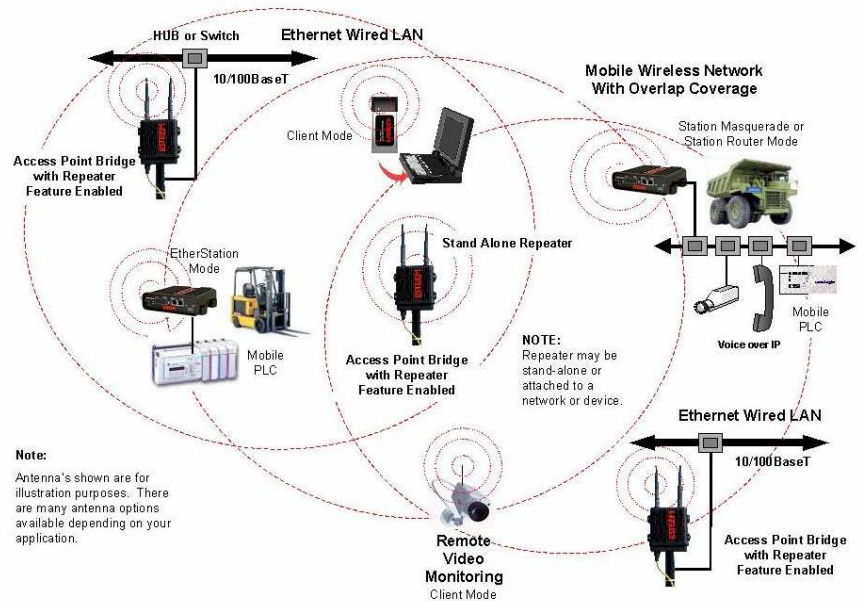


Figure 1- Access Point Bridge Diagram

MODEL 195Eg CONFIGURATION MODES

The Model 195Eg can be configured for multiple modes of operation without any changes to the hardware:

Access Point Modes

1. **Access Point Bridge Mode.** When the Model 195Eg is configured as an Access Point it will provide a wireless bridge from a hardwired Local Area Network (LAN) to laptops, office computers, Personal Digital Assistants (PDA's), video cameras, PLC's, etc. that have integral or external 802.11g or 802.11b wireless devices or other Model 195Eg modems in client modes. Multiple Access Point Bridge modems can be physically connected to the same network (LAN) or through a radio link using the Access Point Repeater mode to provide overlapping, seamless Ethernet communication for mobile devices. The ESTeem Model 195Eg in Access Point Bridge mode will pass all network traffic between connected devices including global network broadcasts. See Figure 1.

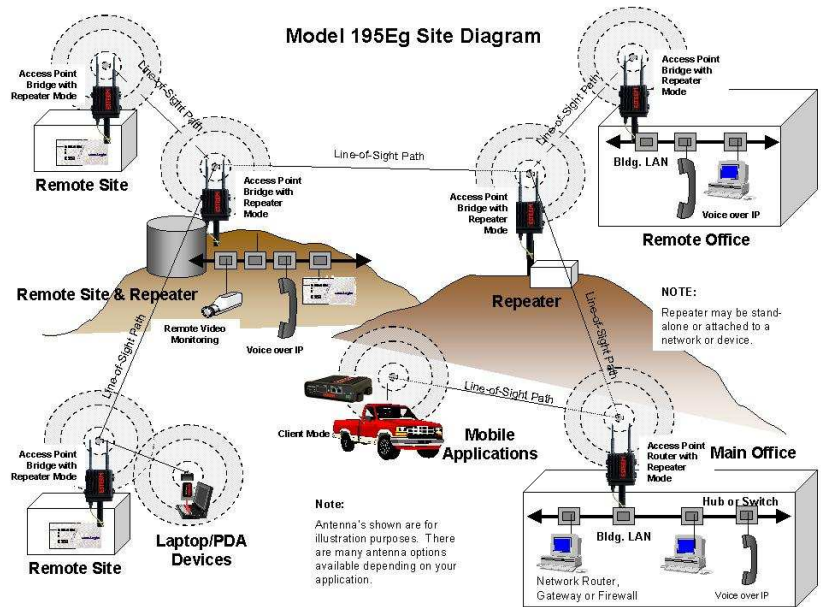


Figure 2 – Repeater Mode Diagram

2. **Access Point Router Mode.** In this mode the ESTeem Model 195Eg will function as a router between the wired Ethernet network, connect to the 195Eg's Ethernet port, and the wireless network of 802.11g/b clients and other 195Eg's in repeater peer mode. As in all standard router configurations, the wireless and wired Ethernet networks will need to be on separate subnets. To communicate from the wired Ethernet network to devices on the wireless network, a separate router (in addition to the Model 195Eg) is required. The 195Eg in Access Point Router mode will pass network traffic for connected devices but will block global network broadcasts from the wired network. This mode of operation should be used instead of the Access Point Bridge mode when a separation between networks is required or the ESTeem is connected to larger LAN Networks that will continuously send global network broadcasts (Figure 2).

3. **Access Point Masquerade Mode.** The Access Point Masquerade mode is a special use of the Access Point mode where the Model 195Eg will connect 802.11g or 802.11b wireless devices as clients into a single static IP address on a wired network. Data requests from the wireless network will be processed through the Access Point Masquerade 195Eg, but any request from the wired Ethernet network to devices on the wireless network will

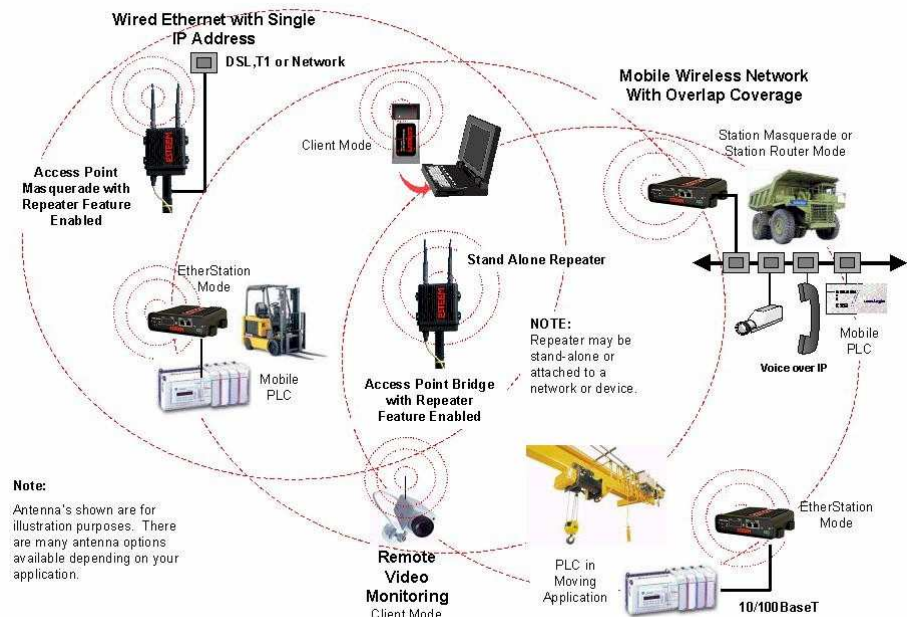


Figure 3- Access Point Masquerade Diagram

be rejected similar to the operation of a “firewall”. The 195Eg will hide all the IP addresses connected on the wireless link. You should use this mode of operation if Model 195Eg is connected directly to the Internet with a static IP address (DSL, T1, etc.) and you want the wireless clients to access the information through the Model 195Eg (Figure 3). This mode should also be used for attaching the Model 195Eg to a network where few IP addresses are available or a firewall for the wireless clients is required.

4. **Access Point Repeater.** The Access Point Repeater is a unique enhancement of the 802.11g Access Point mode only available the ESTeem Model 195Eg. The Access Point Repeater can be used with any of the above Access Point modes. With this repeater feature enabled, the Model 195Eg Access Points do not have to be hardwired together on the same physical LAN to provide seamless Ethernet communication for roaming 802.11g/b Clients. In addition to greatly extending the Access Point canopy range, the Model 195Eg will also bridge any Ethernet device or Ethernet network connected to the unit over this same wireless Ethernet network. This mode gives the user the features of a point to multi-point bridge network but also allows 802.11g/b Client devices or the Model 195Eg in the Client mode to simultaneously roam under the network canopy.
5. **Self-Healing Mesh Network.** If multiple Access Point Repeater routes are configured to the same destination ESTeem, the 195Eg will create a “self-healing” mesh network by automatically re-routing data through alternate paths to reach its destination if the primary path is inoperable. The routing and priority of alternate paths is completely user configurable. See Figure 4.

Station (802.11g Client) Modes

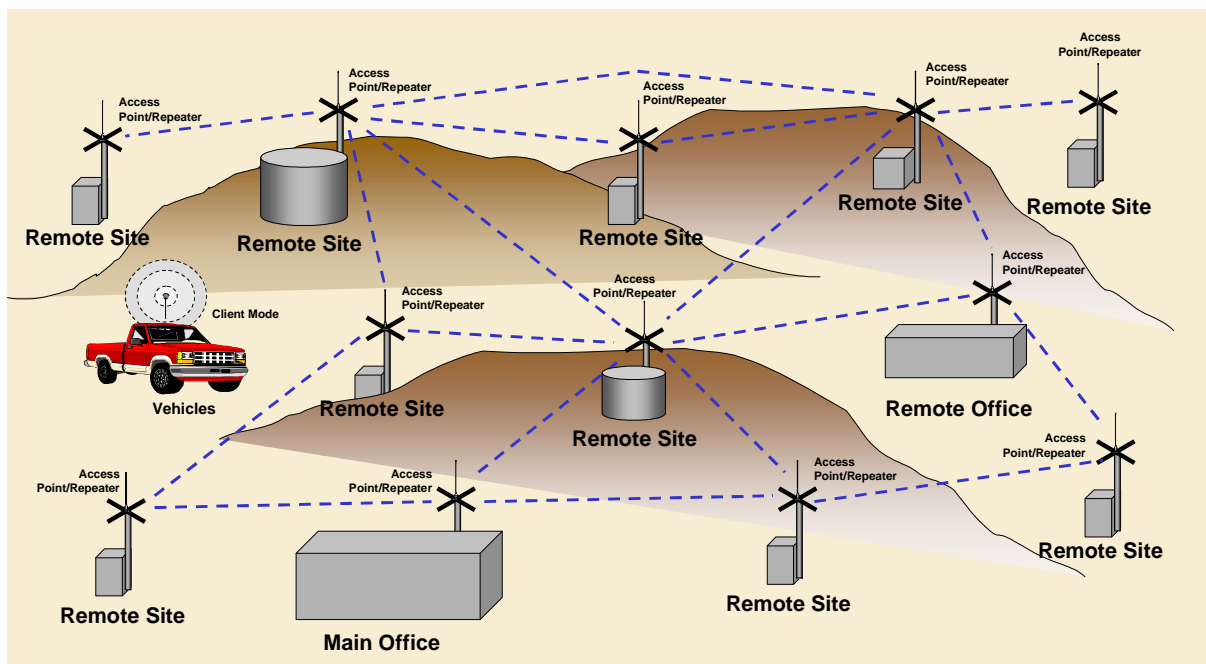


Figure 4 – Mesh Network Diagram

6. **EtherStation Mode.** This is a unique feature of the Model 195Eg when used in any Access Point network. When the 195Eg is configured in the EtherStation Mode and attached to a single Ethernet Device, the Model 195Eg will emulate an 802.11g PCMCIA wireless card in functionality for communication as an 802.11g client. The 195Eg will seamless roam under the radio canopy of Access Point and can provide greatly increased range over a Wireless LAN Card for mobile Ethernet devices such as vehicles, forklifts, cranes, etc (Figures 1-3).
7. **Station Router Mode.** The Station Router mode will also function as an 802.11g client, similar to EtherStation, but will allow multiple Ethernet devices to be connected to a single 195Eg (Figure 3). The 195Eg will function as a router between the wireless client mode and the wired Ethernet devices connected to the Ethernet port. Similar in configuration to the Access

Point Router mode, the wireless and wired Ethernet networks will need to be on separate subnets. To communicate from wireless network to devices on the wired Station Router network, a separate router (connected to the Ethernet side of the Access Point) is required. This mode would be used where multiple Ethernet devices will be connected to a single Model 195Eg in a mobile client application and the connected Ethernet devices will need to be accessible from the Access Point's LAN network.

8. **Station Masquerade Mode.** The Station Masquerade Mode is another mode where multiple devices will be connected to a single ESTeem in a mobile or Client application, but unlike the Station Router mode, the Station Masquerade will consolidate all connected Ethernet devices to a single IP address on the network. The devices connected to the Station Masquerade 195Eg will be able to access information from both the wireless and wired LAN, but will be inaccessible the other way similar in application to a firewall. This mode would be used where multiple Ethernet devices will be connected to a single Model 195Eg in a mobile application and the IP addresses for each device will be hidden from the LAN connected to the Access Point. See Figure 3.
9. **Serial Applications (Optional).** The ESTeem 195Eg can optionally be installed with an RS-232 data port for serial data applications run over the broadband link (Figure 5). The serial over broadband network can be used in a point-to-point or point-to-multi-point application for networking serial (RS-232c) devices, providing serial connections to legacy hardware in a new Ethernet network or providing for high-bandwidth devices (such as Video or Voice over IP) in an existing serial network. Installing the serial port option also provides a second 10/100 Base-T Ethernet port that can be used to connect a second Ethernet device without requiring a HUB/Switch or can be configured as an external Router port.

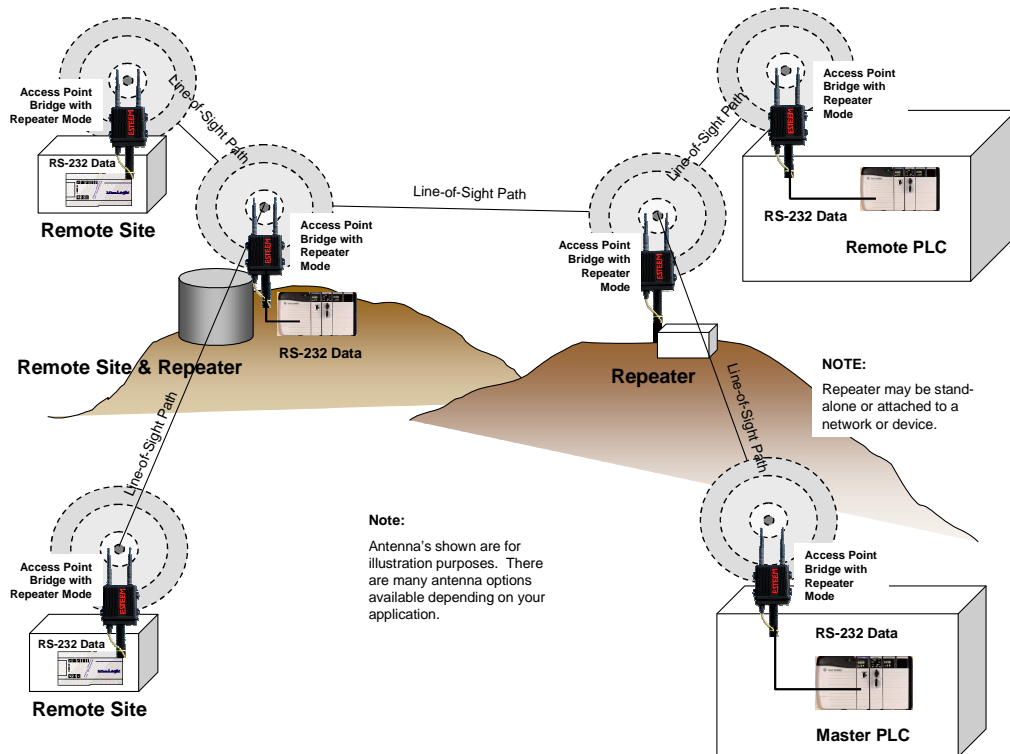


Figure 5 – Multi-point Serial Diagram

To begin setup of your wireless Ethernet network you must first configure the Model 195Eg for the mode desired. Chapter 2 will show several examples of the different modes of operation to help select the correct mode for your application.

MODEL 195Eg ACCESS POINT BRIDGE DIAGRAMS

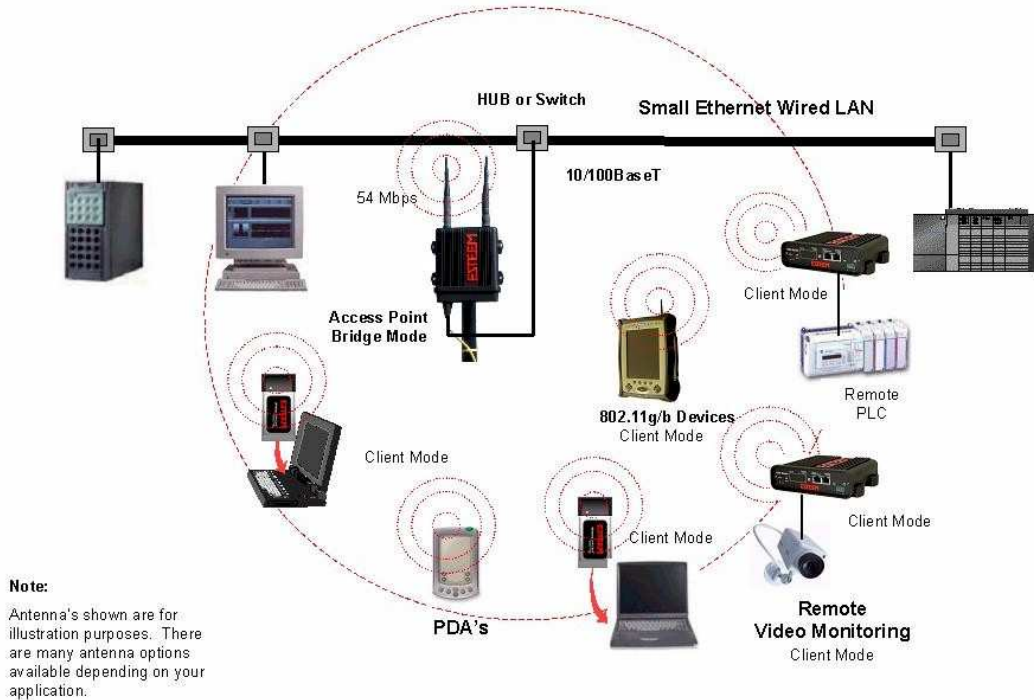


Figure 1: Single Access Point Bridge Diagram

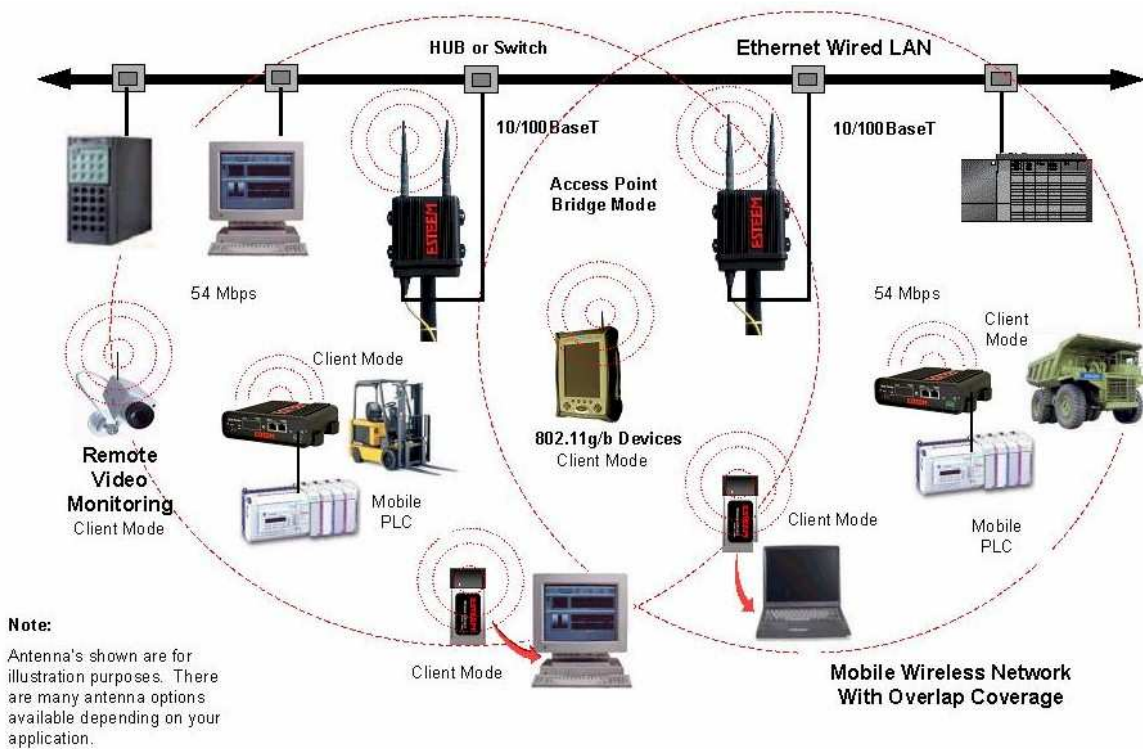


Figure 2: Multiple Access Point Bridge (Overlapping Coverage) Diagram

MODEL 195Eg ACCESS POINT ROUTER DIAGRAM

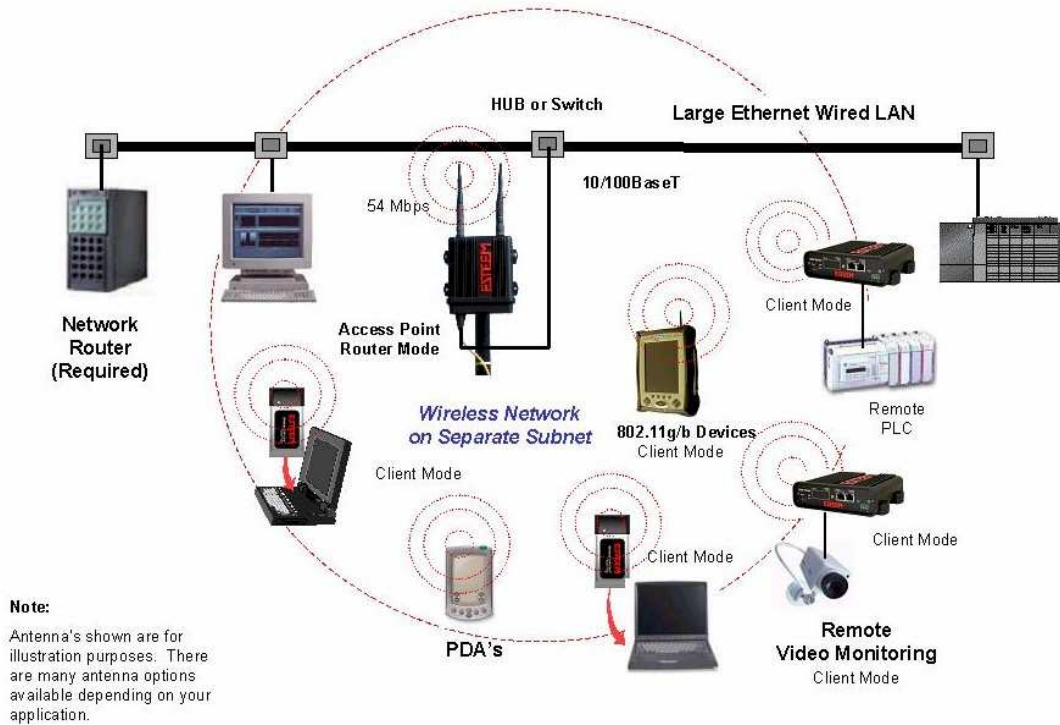


Figure 3: Access Point Router Diagram

MODEL 195Eg ACCESS POINT MASQUERADE DIAGRAM

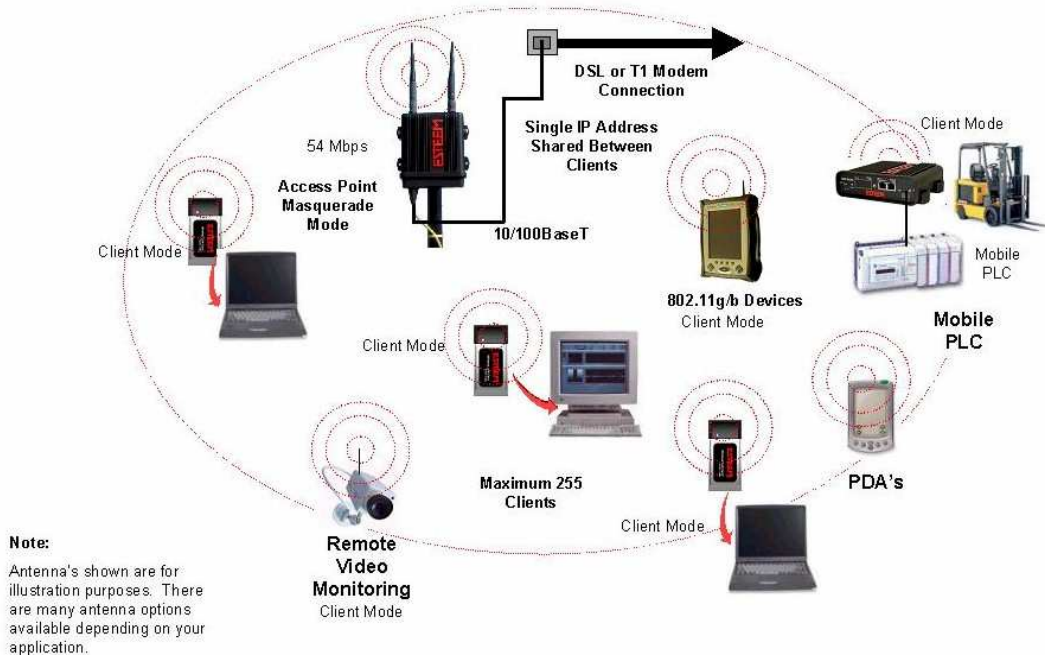


Figure 4: Access Point Masquerade Diagram

MODEL 195Eg ACCESS POINT REPEATER AND CLIENT CONFIGURATION DIAGRAMS

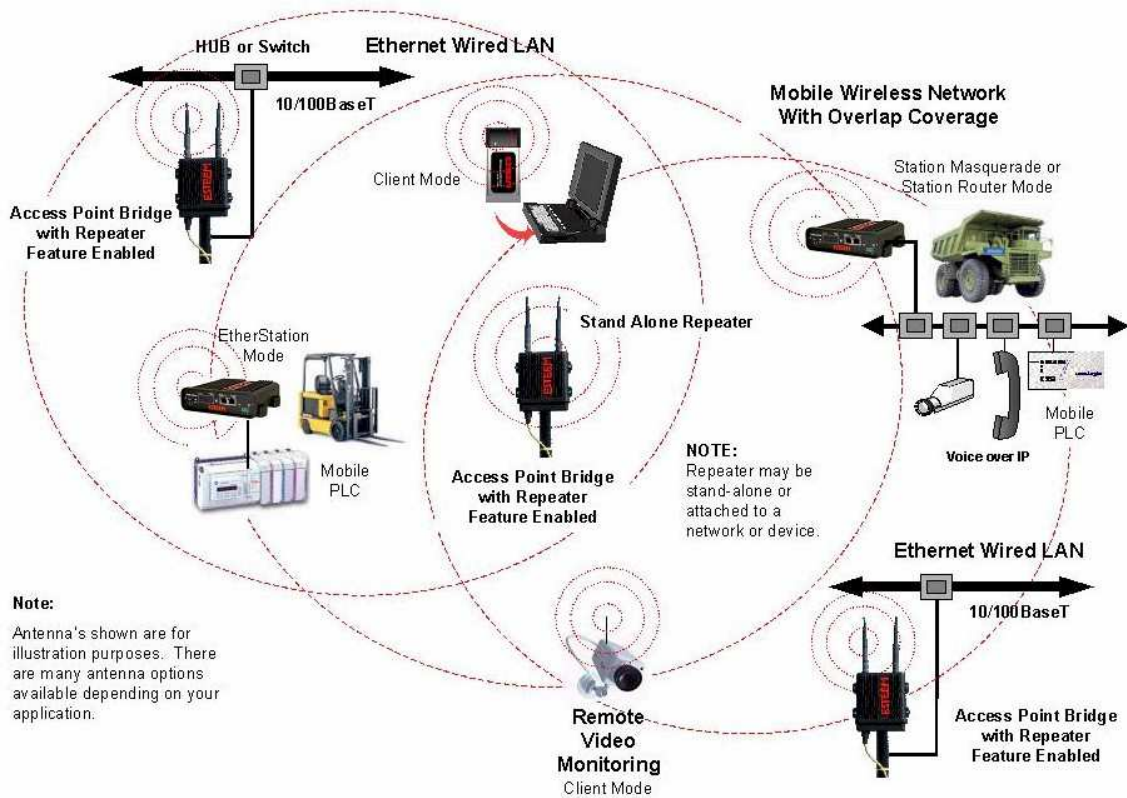


Figure 5: Access Point Bridge Repeater with Clients Diagram

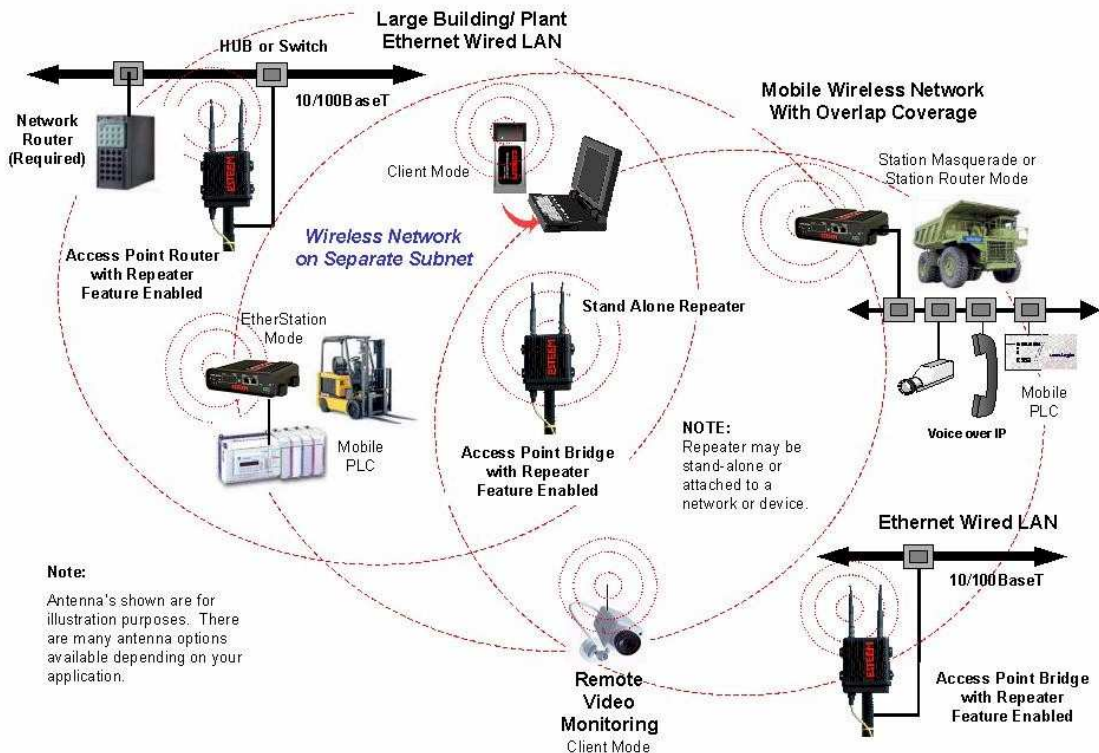


Figure 6: Access Point Router Repeater with Clients Diagram

MODEL 195Eg ACCESS POINT REPEATER AND CLIENT CONFIGURATION DIAGRAMS (Cont.)

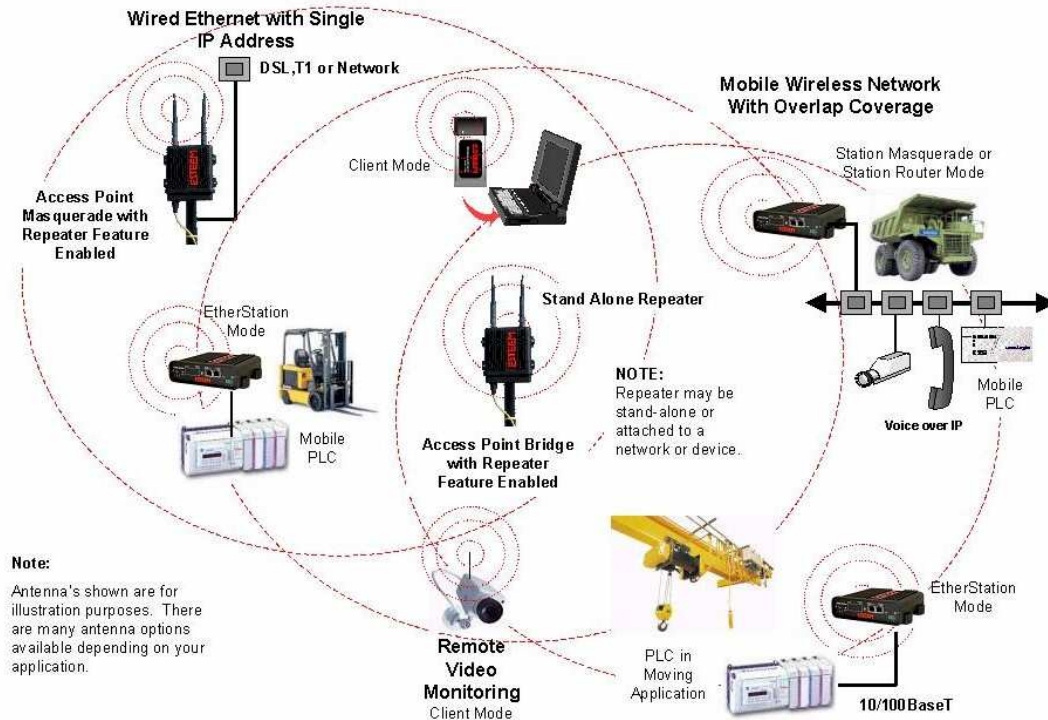


Figure 7: Access Point Masquerade Repeater with Clients Diagram

MODEL 195Eg BUILDING TO BUILDING CONFIGURATION DIAGRAMS

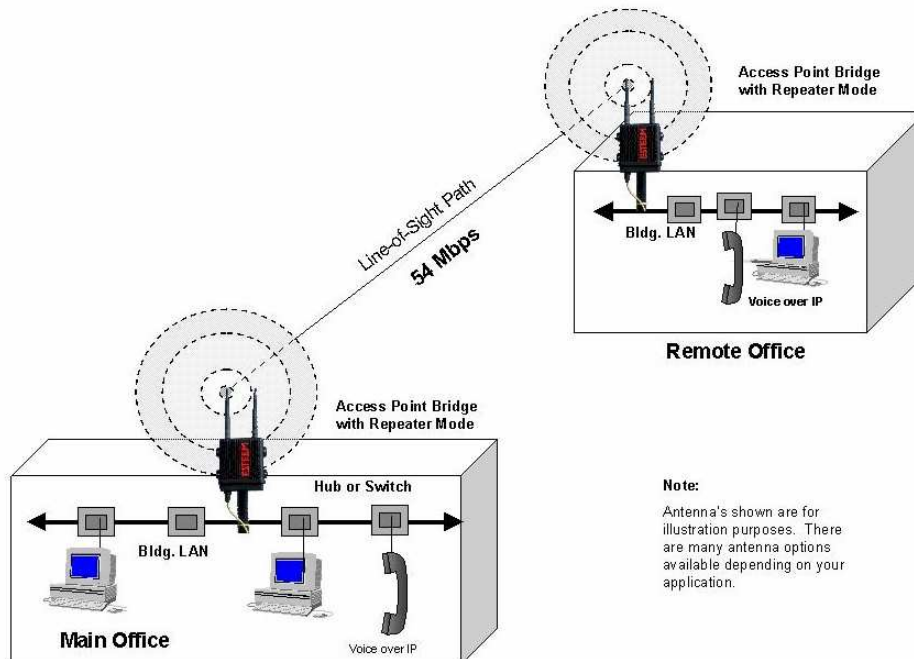


Figure 8: Building to Building Configuration Diagram

MODEL 195Eg BUILDING TO BUILDING CONFIGURATION DIAGRAMS (Cont.)

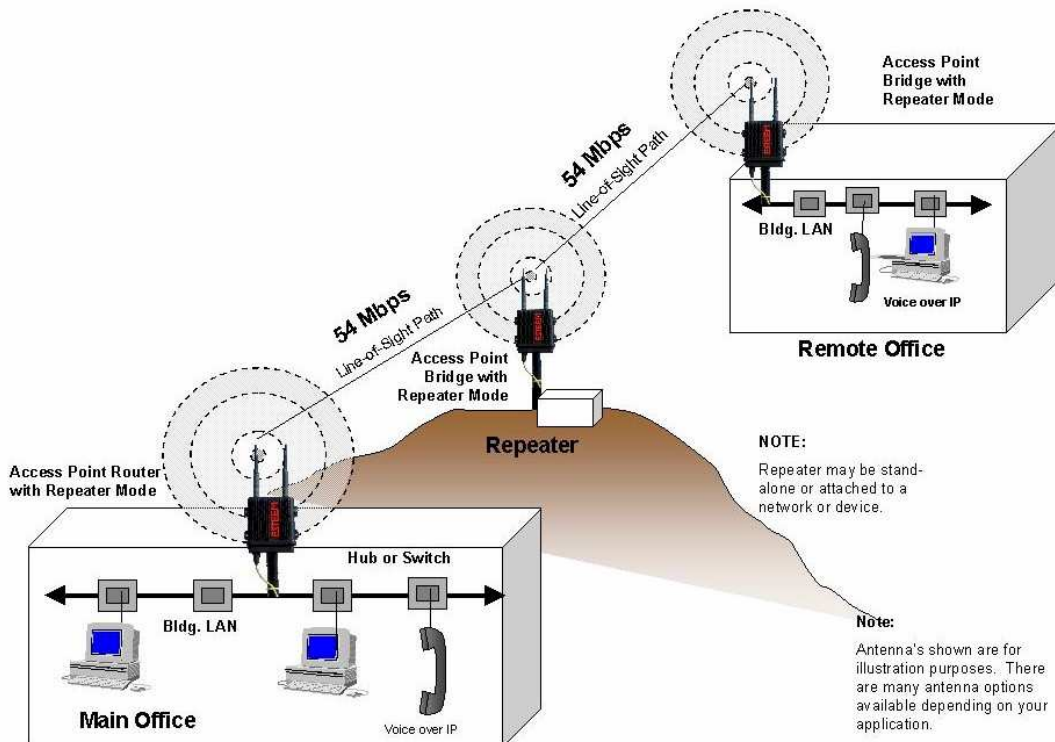


Figure 9: Building to Building with Repeater Diagram

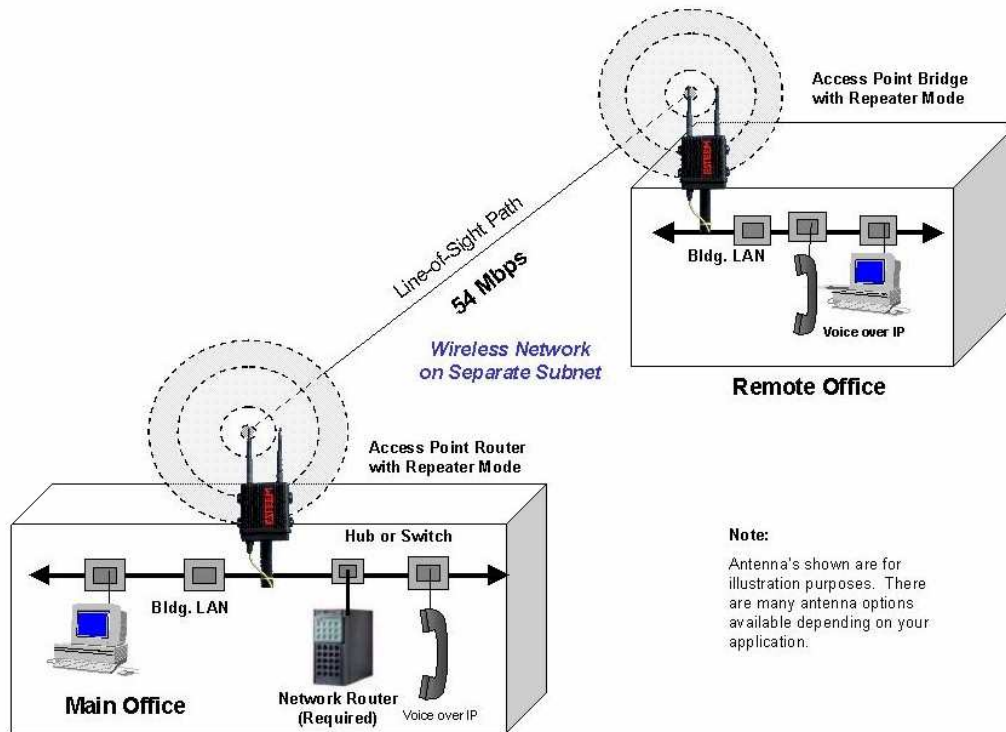


Figure 10: Building to Building Router Diagram

MODEL 195Eg COMPLETE BRIDGE SYSTEM CONFIGURATION DIAGRAMS

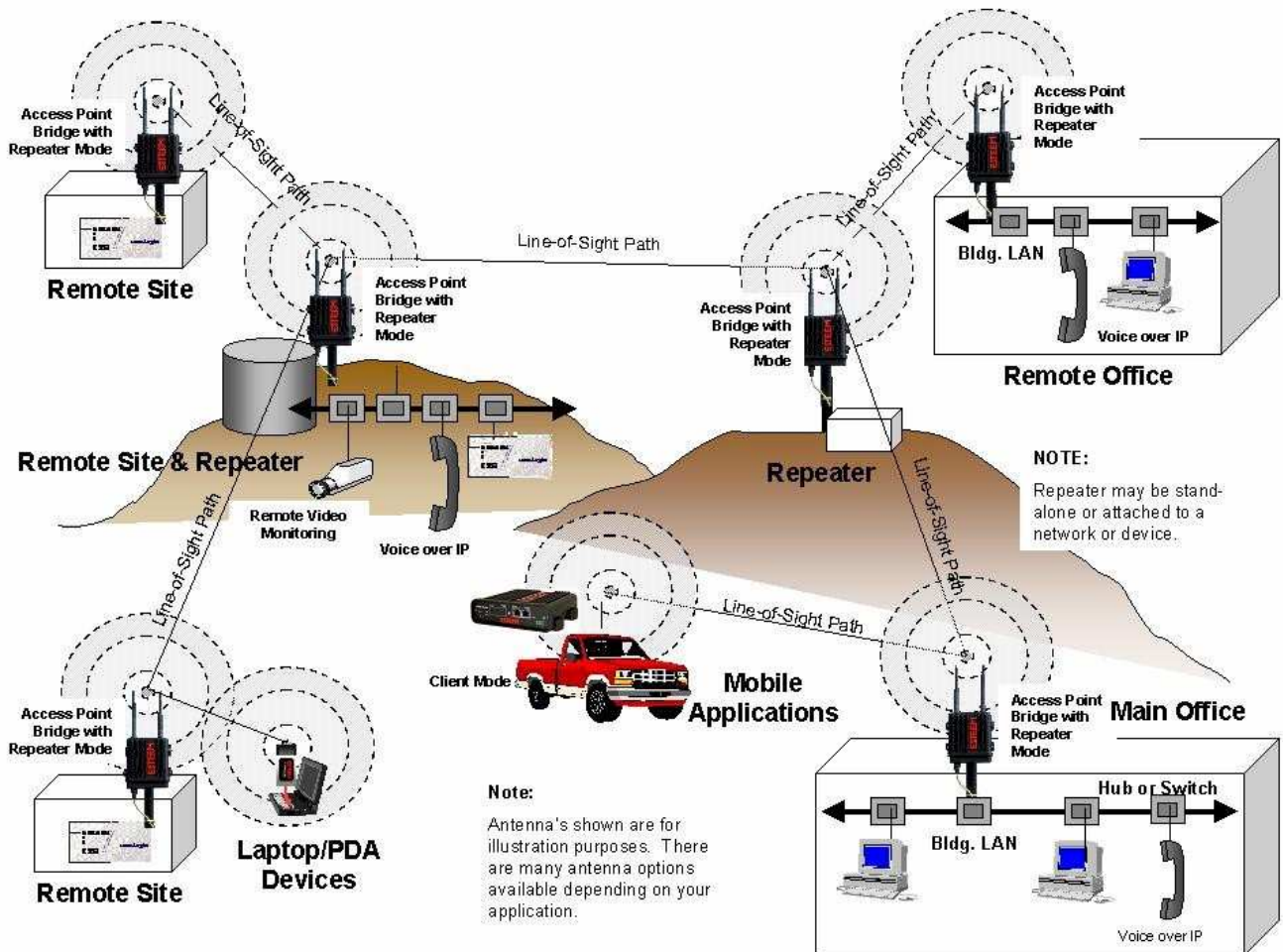


Figure 11: Complete Bridge Network Solutions Diagram

MODEL 195Eg COMPLETE ROUTER SYSTEM CONFIGURATION DIAGRAMS

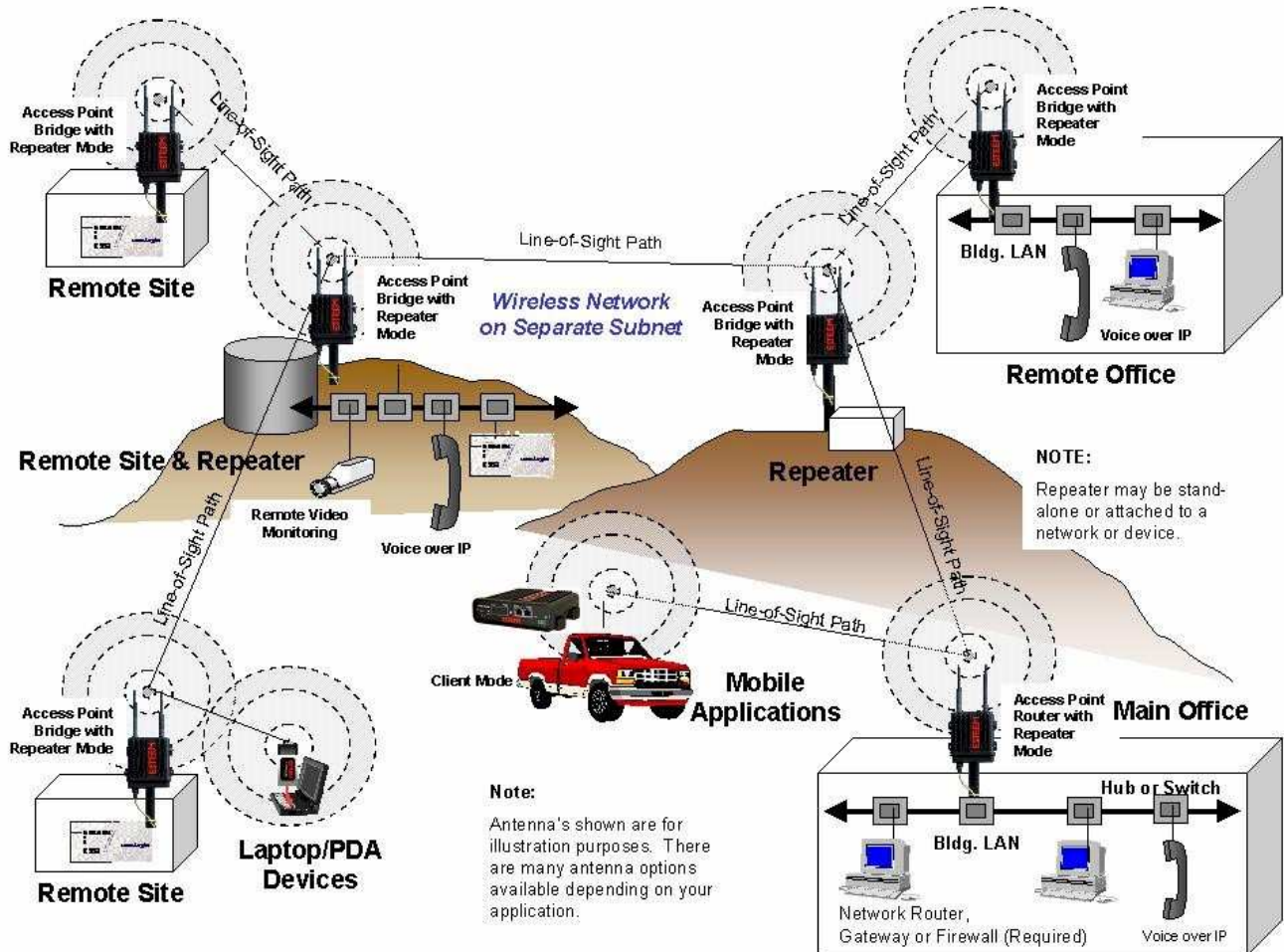


Figure 12: Complete Router Network Solutions Diagram

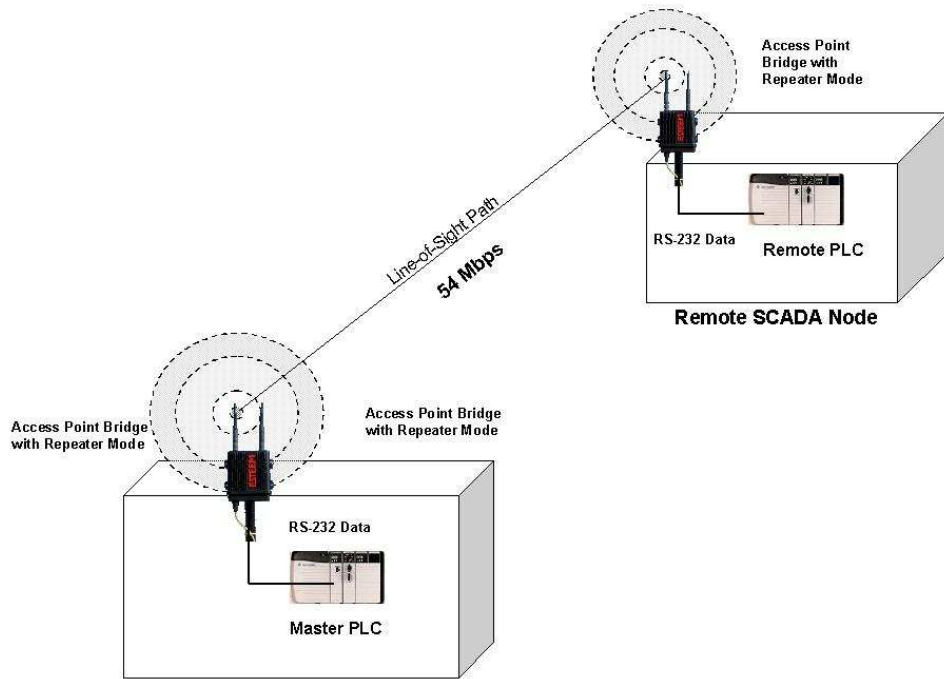


Figure 13: Point to Point Serial Diagram

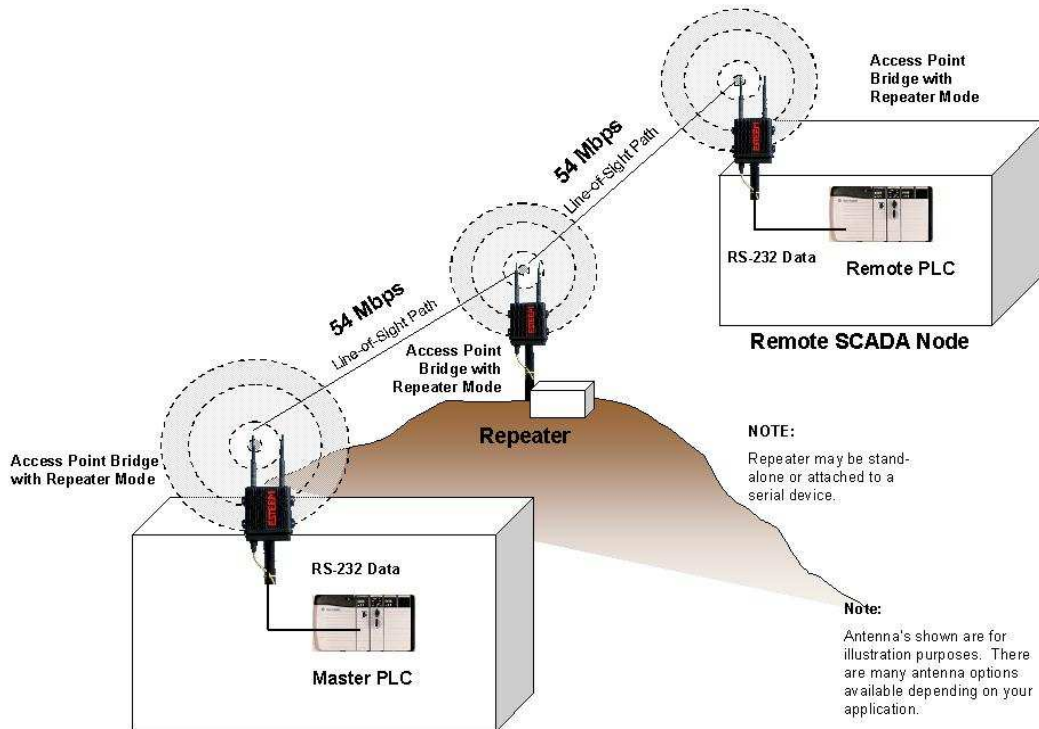


Figure 14: Point to Point With Repeater Serial Diagram

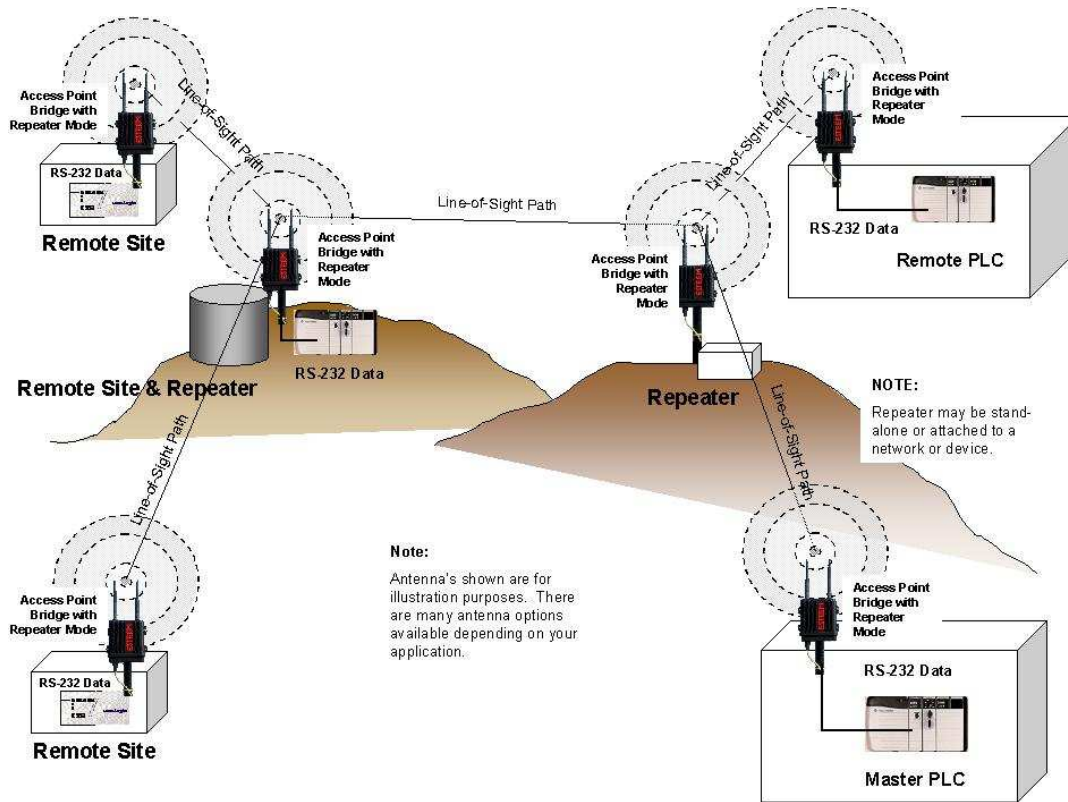


Figure 15: Multi-point Serial Diagram

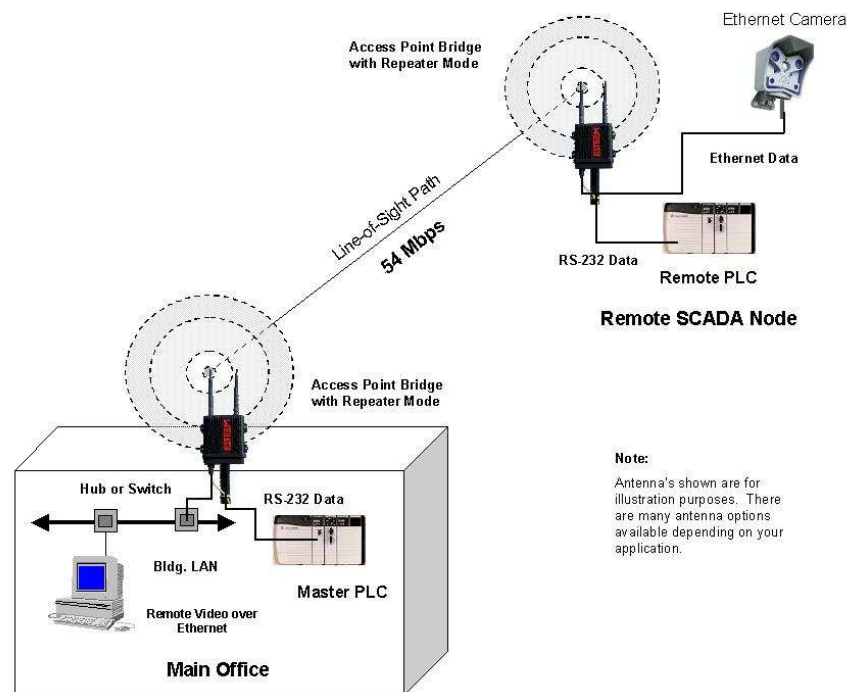


Figure 16: Ethernet and Serial Diagram