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## CPE INSTALLATION MANUAL

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TABLE OF  
CONTENTS

INTRODUCTION

INSTALLATION  
PLANNING

INSTALLATION  
PROCEDURES

PARTS LIST

TROUBLE-  
SHOOTING

### TOPICS:

[Site Requirements](#)  
[Clearwire Site Survey Sheet](#)  
[Required Tools and Equipment](#)  
[Cable Selection](#)

### SITE REQUIREMENTS:

- General. Each subscriber site must meet the following criteria:
  - Located within the Basestation coverage area (this can be determined by the network manager using the Network Propagation Tool).
  - Has a suitable location for antenna mounting (usually a rooftop or tower, at a minimum of height of 3 meters ) with Line of Sight (LOS) to the base station.
  - Provides a suitable location for the IDU for connection to the customer LAN, with standard power outlet (95-250VAC, 47 - 63 Hz) available.
- **Initial Site Check.** The Clearwire network manager performs the initial site check using the Network Propagation Tool. If the subscriber site is within the coverage area, the network manager provides the following information to the installer:
  - Bearing and range from subscriber site to base station.
  - Probable antenna type.

### RF EXPOSURE FOR ACCESSIBLE ANTENNA



**WARNING:** For compliance with the RF exposure requirements regulated by the FCC (Federal Communications Commission), the separation distance of more than 2 meters shall be maintained between the transmitter, and any part of the user's body.

- **Site Survey.** The installer performs a site survey with the appropriate client contact. You'll need permission from the building manager or owner regarding the antenna and IDU locations, and the RF cable run between the two. Record the appropriate information on the Clearwire [Site Survey Sheet](#).
  1. Identify the IDU installation location. Keep in mind these considerations:
    - a. There must be an AC outlet within 6 feet.
    - b. The RF cable must be run to the antenna.
    - c. The IDU must be connected to the customer's LAN.
  2. Perform a radio test to confirm a link to the ISP. NOTE: the IDU must be configured with the proper IDU IP address, subnet mask, Sector assignment, Tx and Rx channels and maintenance mode must be disabled. See the IDU configuration section in chapter 3 of this manual
    - a. Set up a test antenna of the same type recommended by the network manager as close as possible to the selected antenna location.
    - b. Connect the antenna to the test IDU. Using a GPS receiver or magnetic compass, point the antenna toward the bearing of the base station.
    - c. Power up the test IDU and check the front panel LEDs. Normal Blue LEDs should be indicated with no FAULT LEDs. A good link should be indicated. If not, try any or all of the following;
      1. Slowly rotate the antenna to maximize signal strength.
      2. Move the antenna location to avoid interference or obstructions. This may include raising the antenna height.
      3. Perform the Antenna Null Steering procedure (see appendix I)
      4. Try to establish a link to a different base station, if available.
      5. Try a higher gain antenna type.
    - d. Once a solid link is indicated contact the Network manager to confirm and asses the quality of the link.
  3. Identify the antenna installation location. Install the Outdoor Unit and Antenna for Compliance with FCC RF Safety Regulations at a minimum height of 3 meters. The Outdoor Unit is mechanically and permanently secured to the antenna as one complete assembly. The whole assembly is, at all times, required to be installed on the roof of the building, pointing outward, or on an antenna tower or mast located outside of the building.
  4. The installation shall be performed by professional installers in accordance with Clearwire's procedures. The installer should note that while the Clearwire Access Server System is a metropolitan area multiple access networking system, the CPE end equipment is to be *used exclusively for fixed, point-to-point operations*. Consider the following while planning a CPE installation:
    - a. Maximize antenna performance by keeping clear of obstructions.
    - b. Minimize visual impact.
    - c. Identify RF cable run and building entry point with aesthetics and system performance in mind.
  5. Map out the RF cable run. Identify drilling locations, conduit runs, drop ceilings, etc. as needed. Determine the minimum length of cable required.

## REQUIRED TOOLS AND EQUIPMENT:

The CPE installer should have the following tools and equipment:

- Site Survey Equipment – Test IDU, both antenna types (high gain reflector, and panel), connecting cables, GPS locator or magnetic compass, cell phone or radio, electrical extension cord.
- Antenna Installation Equipment – Common hand tools including a drill, assorted wrenches and screwdrivers, necessary safety equipment, non metal, non conductive ladder, caulk and other sealing material.
- Site Configuration Equipment - laptop computer or PC with JET terminal emulation application.
- Cable cutting and stripping tools, Connector crimping tool and weatherproofing kits for RG6U.

## CABLE, CONNECTORS AND TOOLS:

The Cable used on the G2CPE is of the RG6U type cable, specifically Belden 5339B5. This type is recommended due to the low DC resistance over length and consistent loss specifications at the IF frequencies. This cable can be installed in a continuous run of 10 to 300 feet. The cable is to be made (cut to length and ends installed) on-site. Under no circumstances should RG59U cable be used. The Outside diameter is wrong for the specified connector, the loss at IF frequencies varies from manufacturer to manufacturer and the DC resistance is too high for longer runs.

The Connector specified to be used is Thomas and Belts "Snap N Seal", part number SNS6. This connector was selected for ease of use and environmental integrity.

The coax tool used for the coax preparation and connector installation can be obtained from Augut. The part number is Augut LRC IT1000. The Bottom end of the tool is used to strip and prepare the coax, and the top is used to crimp the Snap N Seal connector onto the coax.

## INSTALLATION NOTES:

Each end of the coax should be prepared using the tool. When installing the connector, push the connector onto the end of the coax until the center insulator is flush with the bottom of the "F" Barrel. This will allow the center conductor to be flush with the outside (end) of the barrel. The connector can then be placed into the Crimping tool. Be sure to advance the crimp to the line indicated on the tool. This will assure a waterproof seal around the coax.

**WARNING: DO NOT SPLIC THE CABLE.** If a cable run is too short – the cable should be replaced with a run that is long enough to be made without splices

## Clearwire™ SITE SURVEY SHEET

Subscriber/Site Name:			
Street Address:			
Subscriber Contact	Name:	Phone:	
Building Contact	Name:	Phone	
ANTENNA			
Sketch Location:		Describe Location:	
Antenna Type:	<input type="checkbox"/> High Gain Panel	<input type="checkbox"/> High Gain Reflector	<input type="checkbox"/> Low Gain Panel
Bearing to Base Station: _____		Distance to Base Station: _____	
Signal Path Obstructions:			
IDU		Describe Location:	
Sketch Location:		Distance from Cable Entry to IDU: _____	
		Distance from IDU to PC/Server/Hub/Router: _____	
		110 VAC Available? _____	
		Plug Strip Required: _____	
		Shelf Required: _____	
		Notes:	
RF CABLE		Building Cable Entry:	
Sketch Cable Run:		Distance From Antenna to Cable Entry:	
		IDU Location Cable Entry:	
		Distance from Building Entry to IDU Location:	
		Distance from IDU Cable Entry to IDU:	
		Total Cable Length: _____	
Clearwire® Installer	Name:	Phone:	Date: