

# **Atom 11 dBi Outdoor CPE**

## **User Manual**

August 2017

Version 1.1

## About This Document

This document is intended for users and installers of the Baicells Atom 11 dBi Outdoor Customer Premise Equipment (CPE). The information covers how to install, set up, and use the outdoor CPE for broadband wireless access to Long-Term Evolution (LTE) carrier networks.

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## Revision Record

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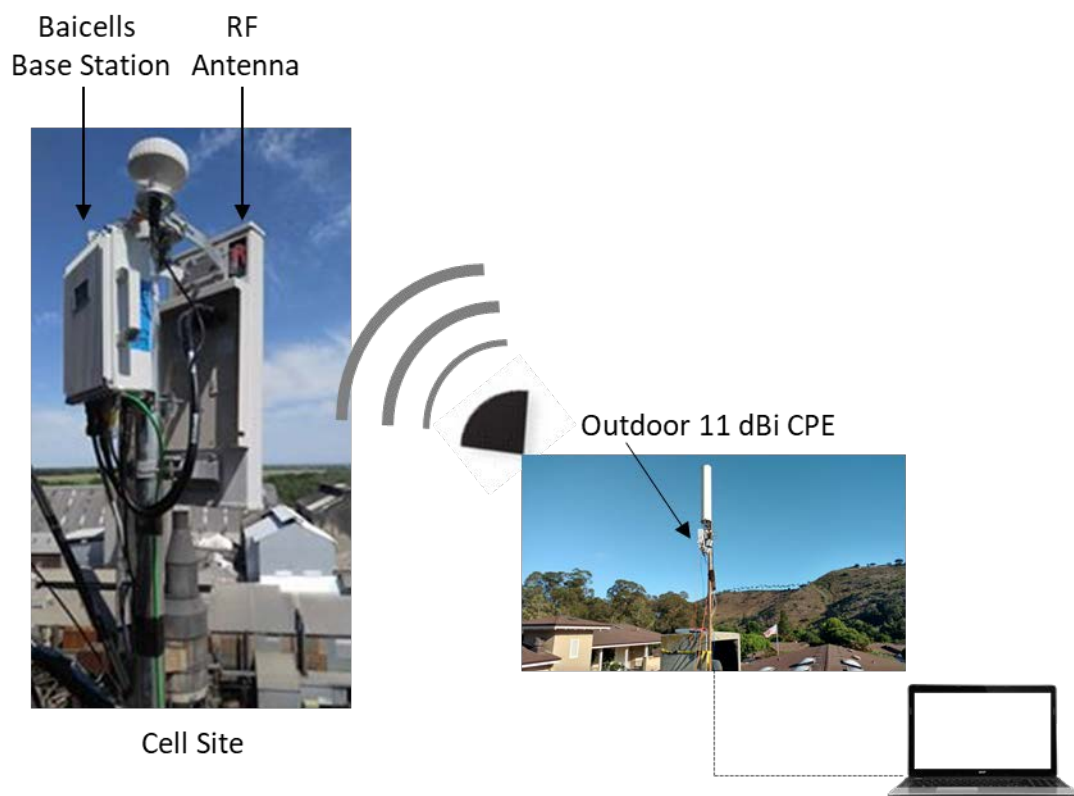
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# 1 Introduction

The Baicells Atom 11 dBi Outdoor Customer Premise Equipment (CPE) is part of the Baicells broadband wireless access system that integrates with carrier networks based on 3G Time Division Duplex Long-Term Evolution (TDD-LTE) technology. The BaiCells system allows telecom operators, service providers, and enterprises to bring broadband data and voice services to customers or employees, even in challenging environments such as rural locations.

The Atom CPE serves as a gateway between the user's computers or mobile devices and the carrier network by communicating wirelessly with TDD-LTE base stations at cell sites located in the region (Figure 1-1). The base stations communicate with the carrier network, providing the user with internet access.

**Figure 1-1: Baicells Broadband Wireless Access System**




The user-friendly, plug-and-play design behind the Atom CPE makes it quick and easy to install, configure, and use. And because it is carrier-grade equipment, the CPE is built for endurance and the ability to adapt newer LTE technologies as they evolve.

## 2 Parts List

Refer to Table 2-1 for a list of the components that you should receive with the Baicells Atom 11 dBi Outdoor CPE. You will need standard tools, Ethernet cable, and RJ-45 connectors to cable the outdoor unit to the indoor LAN equipment. The cable length will depend on where the CPE will be placed externally.

**Table 2-1: Parts**

Item	Quantity	Picture
Atom 11 dBi Outdoor CPE	1	
12V/1A Power Adaptor	1	
PoE Combiner	1	
User Manual (this document)	1	

### 3 Description

The Baicells Atom 11 dBi Outdoor CPE is a powerful, standards-based device designed to connect seamlessly to any standard TDD-LTE base station operating on the same band - 41, 42, or 43. The hardware unit is a small, sleek device (Figure 3-1), yet ruggedized for the most challenging outdoor environments.

Figure 3-1: Atom 11 dBi Outdoor CPE



Looking further at the CPE (Figure 3-2) you will see LED indicators and interfaces on the bottom of the unit. The LEDs and interfaces are explained in Table 3-1.

Figure 3-2: Interfaces



**Table 3-1: LEDs and Interfaces (I had to guess at these; there was no user manual previously)**

Item	Description	Status	Meaning
<b>Power</b>	CPE power	On or off	Power to the CPE is on if lit
<b>LTE Signal</b>	LTE network signal	1, 2, or 3 bars	LTE network connection status and signal strength. The more bars lit up the stronger the signal.
<b>LAN</b>	Local Area Network	On or off	Data is being transmitted through the LAN
<b>Reset</b>	Reset button	N/A	Press the button for at least 10 seconds to reset the CPE to its default factory settings
<b>SIM Card</b>	Subscriber Identity Module card slot	N/A	Each subscriber has a unique identification card that allows the subscriber to access the operator's network
<b>POE</b>	Power Over Ethernet connector	N/A	POE is the type of power supply to the CPE

## 4 Installation

Follow the steps below to install the outdoor CPE.

1. Plug one end of a standard Ethernet cable into the PoE connector on the bottom of the CPE. Plug the other end into the Ethernet connector on the side of the PoE combiner. Refer to Figure 4-2.

2. Follow the instructions on the SIM card.



**Attention:** Do not power on the CPE while installing or uninstalling the SIM card. Doing so could damage the card and the CPE.

3. Connect the power adaptor to the PoE combiner, and plug the adaptor into an electrical outlet. The LED on the adapter interface should appear as shown in Figure 4-2. Note that the PoE combiner has an additional LAN port for direct connection to a laptop or other device.

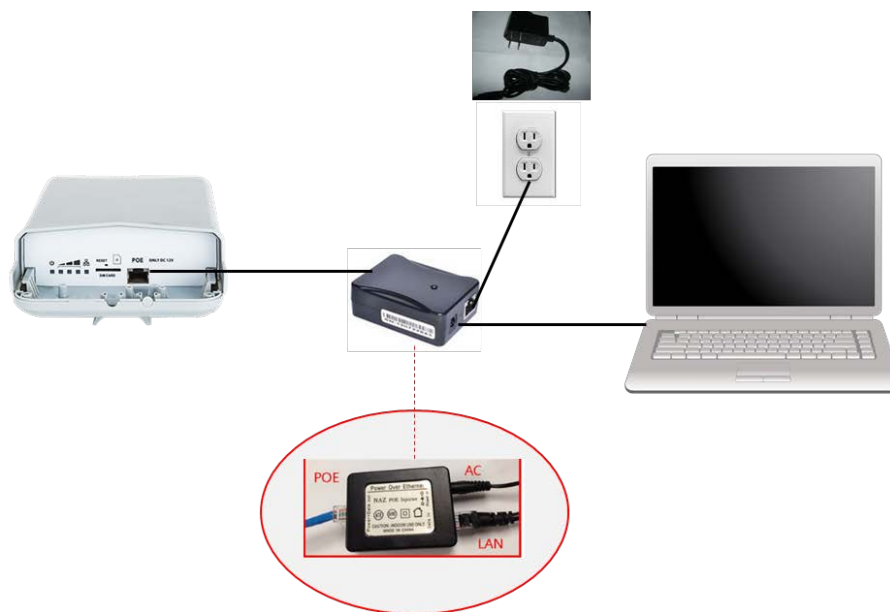


Figure 4-2: CPE Installation



## 5 Basic Configuration

To configure the outdoor CPE, you will access the CPE GUI application. Follow the steps provided in this section to log in and complete the minimal configuration requirements for the CPE to operate. For more detailed configuration information, refer to the *Baicells Configuration and Network Administration Guide* on the Baicells support website.

### 5.1 Log in and Change the Password

Follow the steps below to access and log in to the CPE GUI application.

1. Ensure the CPE is powered on.
2. Open a Web browser, and in the address bar type in <http://192.168.1.1> and then press **Enter**. The login window should appear as shown in Figure 5-1.

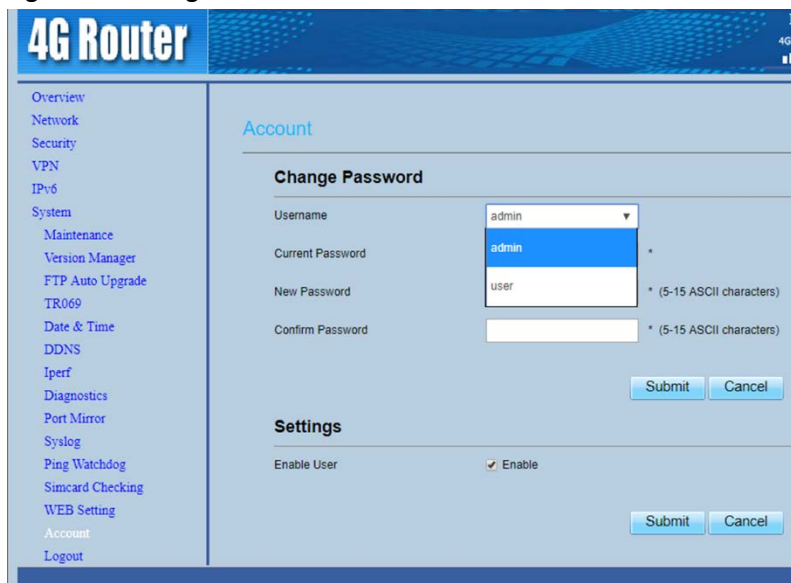
Figure 5-1: Log in to CPE GUI



The screenshot shows the login interface for the 4G Router. It features a blue header with the text "4G Router". Below the header, there are two input fields: "Username" and "Password". A "Login" button is positioned below the password field.

3. Enter the default user name (**admin**) and password (**admin**), and click on the **Login** button.
4. After you log in, you should change the default password to a secure password. You can find the account fields under **System > Account > Change Password** (Figure 5-2).

Figure 5-2: Change Account Information

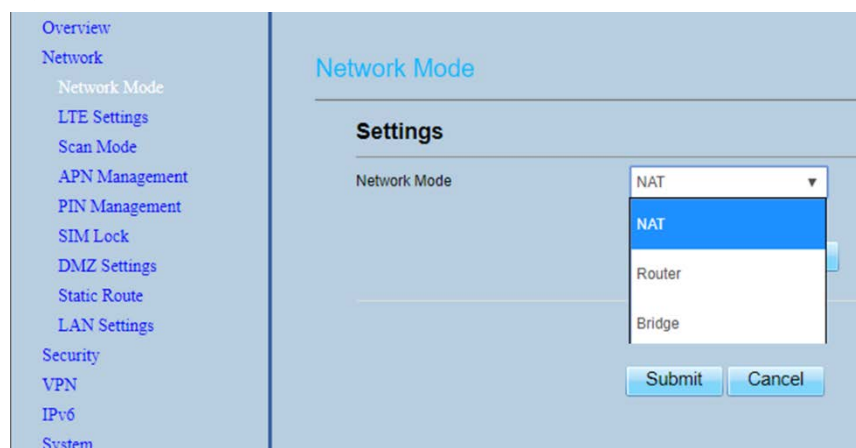


The screenshot displays the "Change Password" page within the 4G Router GUI. The page has a blue header with "4G Router" and a navigation menu on the left. The main content area is titled "Account" and contains a "Change Password" section. This section includes four input fields: "Username" (a dropdown menu with "admin" selected), "Current Password" (a text field with "admin" entered), "New Password" (a text field with "user" entered), and "Confirm Password" (an empty text field). Each password field has a "\*" icon indicating a password strength indicator. Below these fields are "Submit" and "Cancel" buttons. A "Settings" section below contains an "Enable User" checkbox, which is checked and labeled "Enable". Another "Submit" and "Cancel" button pair is located at the bottom right of the settings section.

## 5.2 Configure Network Mode

1. Choose **Network > Network Mode**. Choose either Network Address Translation (NAT), Router, or Bridge mode (Figure 5-3) according to your LTE network setup.

**Figure 5-3: Network Mode**

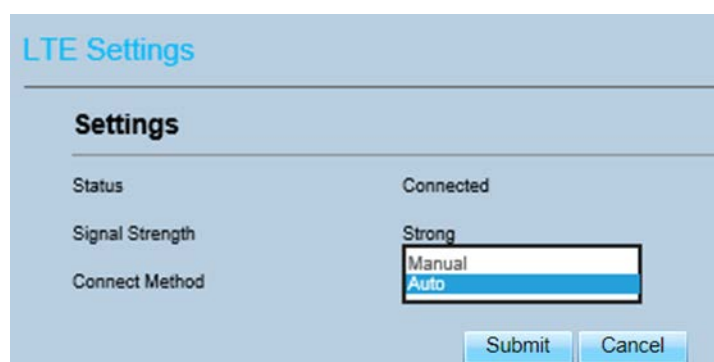


2. Click on **Submit** to save your selection.

## 5.3 Configure LTE Connection Setting

1. Choose **Network > LTE Settings** to choose the LTE connection setting for this CPE as either Auto connect or Manual connect (Figure 5-4) to the LTE network. If you choose Auto connect, click on **Submit** to save your selection. If you choose Manual connect, go to step 2.

**Figure 5-4: LTE Settings**



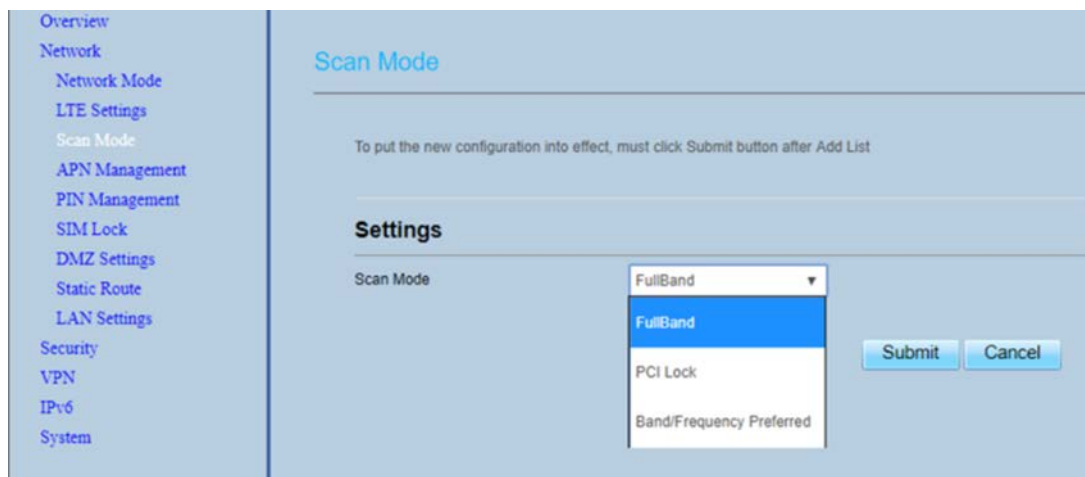
2. To manually connect the CPE to the LTE network, choose **Manual** connect and click on **PLMN** for Public Land Mobile Network to scan all available networks and to select a specific LTE network to connect to. Select **Connect** to connect the network. Use the Disconnect button to disconnect from the selected network.

## 5.4 Configure Scan Mode

The Scan Mode setting determines which frequencies the CPE's routine scan of available frequencies will cover. Scanning is a process of tuning to a specific frequency and measuring the simplest signal quality [e.g., Received Signal Strength Indication (RSSI)]. As part of the cell selection and reselection process, the CPE performs the scan first and then selects a small number of candidate cells to go through the next step of measuring and evaluating signals to select the best base station to serve it.

Go to **Network > Scan Mode**, and select either FullBand, PCI Lock, or Band/Frequency Preferred, as shown in Figure 5-5. The options are explained beneath the figure. Click on **Submit** to save the configuration.

**Figure 5-5: Scan Mode**



- FullBand – The CPE will routinely scan all channels in the band. The band is dependent on the model of CPE being used. Click on **Submit** after selecting this option.
- PCI Lock – Allows you to select the specific E-UTRA Absolute Radio Frequency Channel Number (EARFCN) and Physical Cell Identifier (PCI). After selecting PCI Lock, click on **Submit**. This will open the PCI Lock Settings window (Figure 5-6). After entering the information, click on **Add** to save the list. You can add more than one PCI Lock list. The CPE will scan the list for base stations with the PCI and EARFCN combination before locking on to one of them.
- Band/Frequency Preferred – You can specify which band(s) the CPE will scan. After selecting Band/Frequency Preferred, click on **Submit**. This will open a settings window (Figure 5-7). Select the band by checking the check box next to it, and click on **Add List**. The window will display the EARFCN field. Select the desired EARFCN from the drop-down list, and then click on **Add** to add the list.

Figure 5-6: PCI Lock Settings

The screenshot shows the 'Scan Mode' configuration page. On the left is a navigation menu with categories: Overview, Network (Network Mode, LTE Settings, Scan Mode, APN Management, PIN Management, SIM Lock, DMZ Settings, Static Route, LAN Settings), Security (VPN, IPv6, System). The main content area is titled 'Scan Mode' and includes a note: 'To put the new configuration into effect, must click Submit button after Add List'. Under the 'Settings' section, 'Scan Mode' is set to 'PCI Lock'. There are 'Submit' and 'Cancel' buttons. Below this is the 'PCI Lock' section with an 'Add List' button. A table with columns 'Index', 'EARFCN', 'PCI', and 'Operation' is shown. Underneath is another 'Settings' section with input fields for 'EARFCN' and 'PCI' (with a range of 0-503). 'Add' and 'Cancel' buttons are at the bottom.

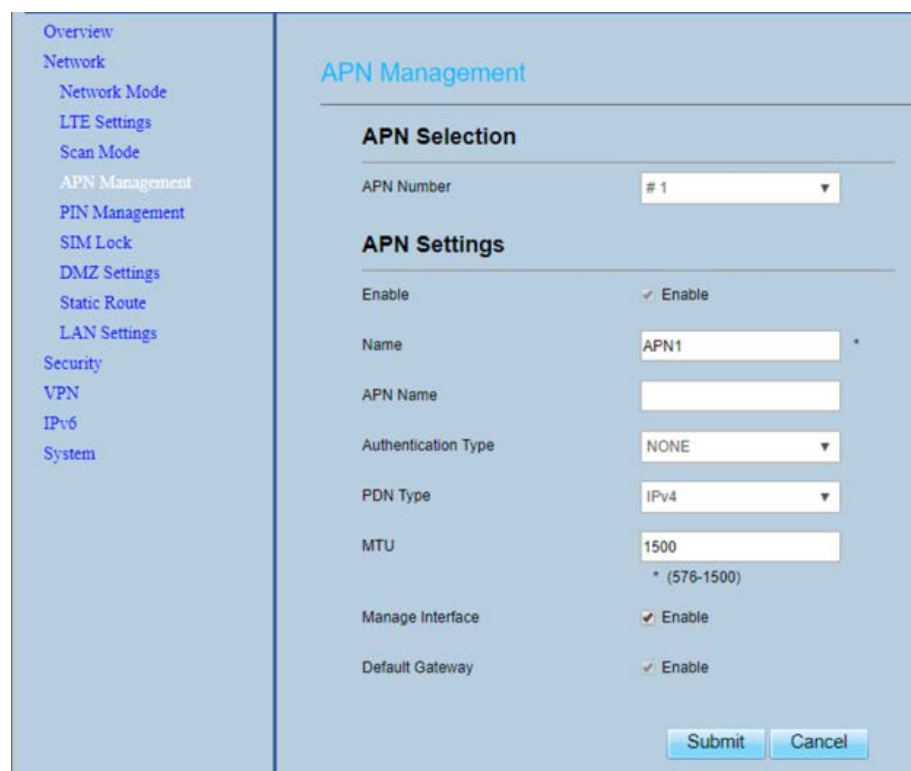
Figure 5-7: Band/Frequency Preferred Settings

The screenshot shows the 'Scan Mode' configuration page for 'Band/Frequency Preferred'. The navigation menu is the same as in Figure 5-6. The main content area is titled 'Scan Mode' with the same note. Under the 'Settings' section, 'Scan Mode' is set to 'Band/Frequency Prefer'. There are 'Submit' and 'Cancel' buttons. Below is the 'Band/Frequency Preferred' section with 'Band Select' options for 'Band 42' (checked) and 'Band 43'. 'Band Display' is set to '42'. There is an 'Add List' button. A table with columns 'Index', 'EARFCN', and 'Operation' is shown. Underneath is another 'Settings' section with an 'EARFCN' dropdown menu set to '41590'. 'Add' and 'Cancel' buttons are at the bottom.

## 5.5 Configure APN Management

Under **Network > APN Management**, you will configure up to 4 base stations with which this CPE may connect. APN is an acronym for Access Point Name. An access point, in this case, is another term for a base station. Refer to Figure 5-8 and Table 5-1 concerning the parameters. Click on **Submit** to save your data.

**Figure 5-8: APN Management Settings**



**Table 5-1: APN Management Settings**

Field Name	Description
APN Selection	
<b>APN Number</b>	Select the APN number – 1, 2, 3, or 4
APN Settings	
<b>Enable</b>	Select the check box next to Enable to enable this APN
<b>Name</b>	Required field: Enter a name for this APN
<b>APN Name</b>	Enter the name of this APN, as defined in the base station configuration
<b>Authentication Type</b>	Select the type of authentication required for this base station: <ul style="list-style-type: none"> <li>• None – the base station is not required to authenticate itself to the CPE</li> <li>• PAP – stands for Password Authentication Protocol,</li> </ul>

	<p>where the base station will authenticate itself to the CPE using a static user name and password</p> <ul style="list-style-type: none"><li>• CHAP – stands for Challenge-Handshake Authentication Protocol, where the base station will authenticate itself to the CPE through an authenticating entity</li></ul>
<b>PDN Type</b>	Select the type of Packet Data Network (PDN) the base station can use when communicating with this CPE: IPv4, IPv6, or IPv4v6
<b>MTU</b>	Required field: Enter the Maximum Transmit Unit (MTU), which is the size of the largest network layer protocol data unit (PDU) that the base station can communicate in a single transaction. The range is 576 to 1500 bytes
<b>Manage Interface</b>	To enable a management interface to this base station, select the check box next to Enable.
<b>Default Gateway</b>	To enable a default gateway to this base station, select the check box next to Enable.

## Appendix A: Technical Specifications

Item	Description
LTE Standard	3GPP Release 9
Duplex Mode	TDD
Frequency Bands	41, 42, 43
Channel Bandwidth	5, 10, 15, and 20 MHz
Frequency	3.5 GHz
Output Power	23 dBm (200mW)
Receive Sensitivity	-94 dBm
Ethernet	1 RJ-45 Ethernet port, 10/100 auto-sensing, auto MDX
LED Indicators	Power, LTE signal, LAN
Antenna	11 dBi
Max Throughput	DL 110 Mbps, UL 20 Mbps
USIM	1.8/3.3V 2FF
Environmental Protection	IP65
Operating Temperature	-40°F to 131°F -40°C to 55°C
Storage Temperature	-40°F to 158°F -40°C to 70°C
Operating Humidity	5% to 95%
Power	Power over Ethernet (PoE)
Dimensions	9 ½ in (H) x 5 3/8 in (W) x 2 7/8 in (D) 24 cm x 13.6 cm x 7.3 cm
Weight	< 1 lb (0.4 kg)

## Appendix B: FAQs

If you have questions, please check the list of frequently asked questions (FAQs) on the Baicells support website or the Facebook support forum.

- Baicells support website - <https://na.baicells.com/support/>
- Baicells support forum on Facebook - <https://www.facebook.com/groups/baicellsoperatorsupportgroup/>