



Atom 5 dBi CPE User Manual

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About This Document

This document is intended for users and installers of the Baicells Atom 5 dBi Indoor Customer Premise Equipment (CPE). The information covers how to install, set up, and use the indoor CPE for broadband wireless access to Long-Term Evolution (LTE) carrier networks.

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1. Introduction

The Baicells Atom 5 dBi Indoor 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


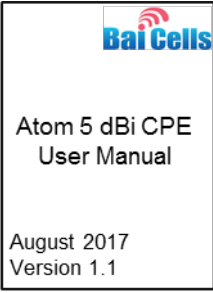


The user-friendly, plug-and-play design behind the Atom CPE makes it quick and easy to install, configure, and use. And because it is carrier-grade equipment, the CPE is built for endurance and the ability to adapt newer LTE technologies as they evolve.

2. Parts List

Refer to Table 2-1 for a list of the components that you should receive with the Baicells Atom 5 dBi Indoor CPE. You will need standard tools to install the device.

Table 2-1: Parts

Item	Quantity	Picture
Atom 5 dBi Indoor CPE	1	
12V/1A Power Adaptor	1	
User Manual (this document)	1	

3. Description

The Baicells Atom 5dBi Indoor CPE is a powerful, standards-based device designed to connect seamlessly to any standard TD-LTE base station operating on the same band, 40, 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 5 dBi Indoor CPE



On the back of the CPE are various interfaces and ports (Figure 3-2). Some models allow you to use external antennas to increase signal strength, which are connected to the top back ports as shown on the right unit in Figure 3-2. The LEDs on the front are shown more closely in Figure 3-3. Both the LEDs and the interfaces are explained in Table 3-1.

Figure 3-2: Back Interfaces



Figure 3-3: LED Indicators

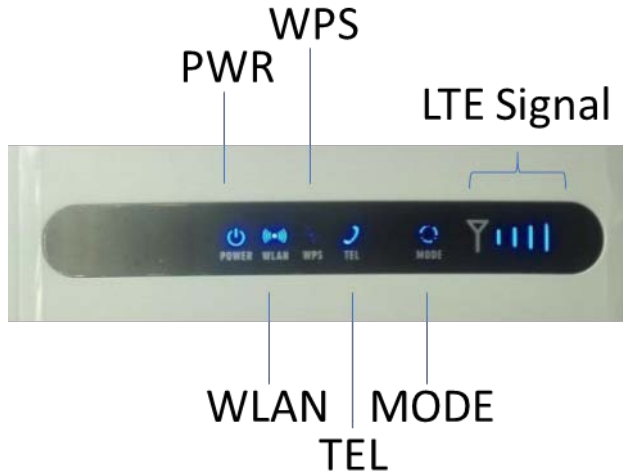


Table 3-1: LEDs and Interfaces

	Description	Color	Status	Meaning
Front and Back LEDs:				
PWR	Power indicator	Blue	Off	No power supply
			Steady on	Power is on
WLAN	Wireless LAN (WiFi) indicator	Blue	Off	WiFi is disabled
			Blinking	WiFi data is being transmitted
			Steady on	WiFi is enabled
WPS	WiFi Protected Setup indicator	Blue	Off	WPS is disabled
			Blinking	WiFi terminal is being accessed
			Steady on	WPS is enabled
Tel1 – Tel2	Telephone / voice communications indicator	Blue	Off	No connection with the voice server
			Blinking 1/second	Registering with the voice server
			Blinking 2/section	Connection with the voice server has been established
			Steady on	Connected to the voice server
MODE	Network mode indicator	Blue	Off	No LTE network access
			Blinking	Scanning for LTE connection
			Steady on	Connected to LTE network
LTE Signal	1, 2, 3, or 4 bars to indicate connection	Green	All off	Signal is too weak to connect

	status and signal strength. The more bars, the stronger the signal between the CPE and a cell site.		Steady on	Bars will light steadily according to signal strength
(Back) LAN 1-4	Local Area Network Ethernet connection indicators	Green	Off	Ethernet connection is not established
			Steady on	Ethernet connection is normal
			Blinking	Ethernet interface data is being transmitted
Back Interfaces:				
Power Switch	On/off power switch			
Power Port	Power adaptor plug-in port			
Tel 1-2 Ports	2 RJ-11 ports for voice, fax, POS, or other VoIP functions under conditions of software support			
LAN 1-4 Eth Ports	4 RJ-45 Local Area Network Ethernet ports			

Two special status indications are explained in Table 3-2.

Table 3-2: Special Status Indicators

Status Indicator	Description
Firmware Upgrade	The WLAN + WPS lights will flash simultaneously when the CPE software is being upgraded
Reset Process	When the CPE is being reset (rebooted), all indicator lights except the LTE signal icons will be lit

In addition, there are buttons and a card slot on the sides of the unit, as shown in Figure 3-4. These are explained in Table 3-3.

Figure 3-4: Sides of CPE Unit**Table 3-3: Side Buttons and Card Slot**

Name	Description
Restore Button	Press down the Restore button for at least 10 seconds to restore the CPE to its factory settings
WPS	WiFi Protected Setup (security)
WiFi	Turn on/off the WiFi function
USIM Slot	1.8V/3.0V Universal Subscriber Identity Module (USIM)

4. Installation

Follow the steps below to install the Atom 5 dBi indoor CPE.



Attention: Make sure the CPE is turned **off** before you insert or remove the SIM card. Otherwise, the CPE and SIM card may be damaged.

1. Insert the SIM card into the USIM slot on the side of the unit.
Note: To remove the SIM card, press down on the card and the card will pop up.
2. Insert the power adaptor, and turn the unit on. The power indicator should light up to indicate an operating power supply. If you have any problem with the unit or the power adaptor powering on the CPE, please contact your vendor.
3. Wait for 1 minute. If the MODE and LTE Signal Strength indicators flash simultaneously, it indicates that the SIM card did not connect to the device or is invalid. Please contact your vendor or service provider to validate the card or to provide a new SIM card.
4. If the MODE light flashes, it means the device is searching for or registering with the LTE network. If the device connects to the LTE network normally, the MODE indicator will remain on and the LTE Signal Strength indicators will reflect the LTE signal strength (1, 2, 3, or 4 bars). If the device cannot connect to the LTE network, the MODE indicator will begin blinking. If this is the case, please contact your vendor or service provider.
5. The WLAN indicator will show whether the wireless LAN (WLAN) / WiFi is enabled. If WiFi is enabled, mobile phones and laptops should be able to connect to the LTE network via WiFi. The WiFi Service Set Identifier (SSID) to look for and use is "Airtouch-8783". No password is required the first time the device is used.
6. PCs and laptops can also be connected to the CPE using Ethernet cables to the LAN ports.

5. Basic Configuration

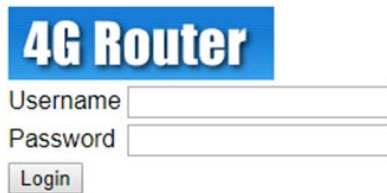
To configure the Atom CPE, you will access the Web-based CPE GUI application. Follow the steps provided to log in and complete the minimal configuration requirements for the CPE to operate. For more detailed configuration information, refer to the *Baicells Configuration and Network Administration Guide*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

5.1 Log in and Change Password

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

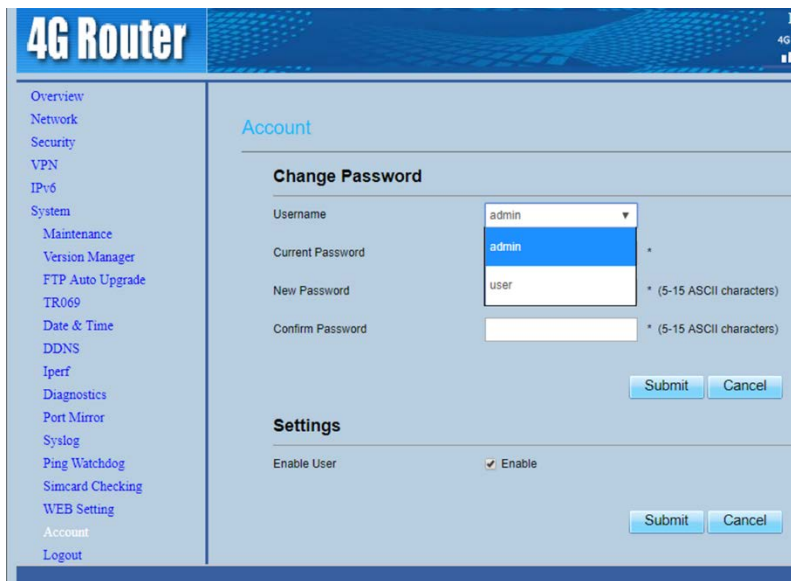
1. Turn the CPE power on.
2. Open a Web browser, and in the address bar type in <http://192.168.1.1> and then press **Enter**. The login window should appear as shown in Figure 5-1.

Figure 5-1: Log in to CPE GUI



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).

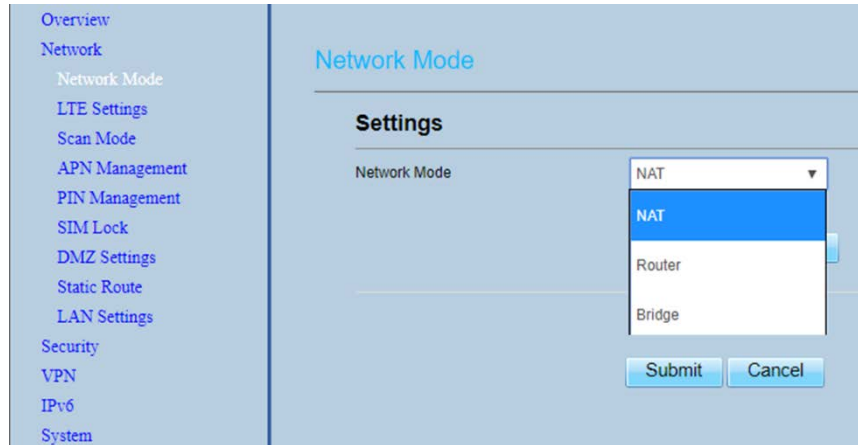
Figure 5-2: Change Account Information



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



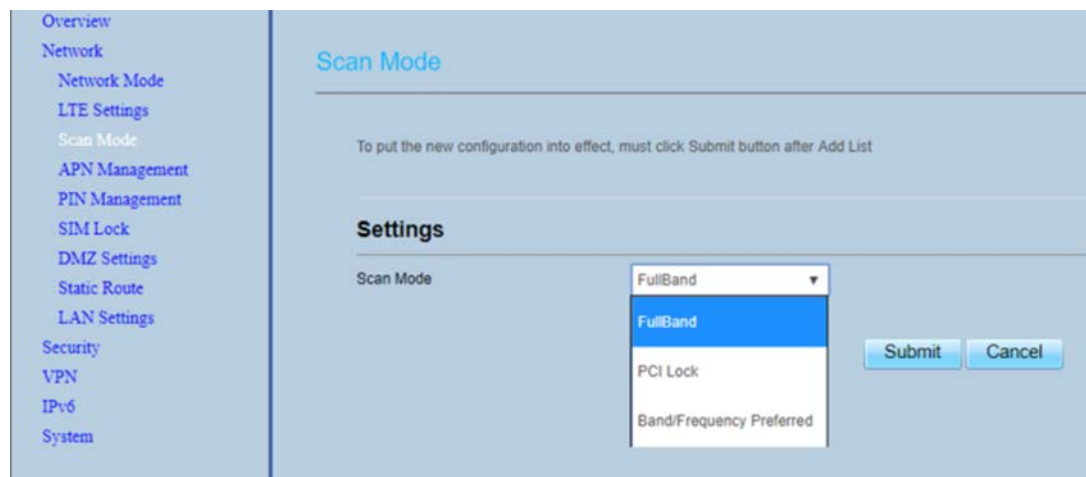
2. To manually connect the CPE to the LTE network, choose **Manual** connect and click on **PLMN** for Public Land Mobile Network to scan all available networks and to select a specific LTE network to connect to. Select **Connect** to connect the network. Use the Disconnect button to disconnect from 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 with the 'PCI Lock' option selected. The interface includes a left-hand navigation menu with categories like Overview, Network, Security, and System. The main content area is titled 'Scan Mode' and contains a 'Settings' section where 'Scan Mode' is set to 'PCI Lock'. Below this is a table for 'PCI Lock' with columns for Index, EARFCN, PCI, and Operation. A second 'Settings' section allows for configuring specific EARFCN and PCI values.

Scan Mode

To put the new configuration into effect, must click Submit button after Add List

Settings

Scan Mode: PCI Lock

Submit Cancel

PCI Lock

Add List

Index	EARFCN	PCI	Operation

Settings

EARFCN:

PCI: * 0-503

Add Cancel

Figure 5-7: Band/Frequency Preferred Settings

The screenshot shows the 'Scan Mode' configuration page with the 'Band/Frequency Preferred' option selected. The interface is similar to Figure 5-6, but the 'Scan Mode' dropdown is set to 'Band/Frequency Preferred'. The 'Band Select' section has radio buttons for 'Band 42' (selected) and 'Band 43'. The 'Band Display' dropdown is set to '42'. Below is a table for 'Band/Frequency Preferred' with columns for Index, EARFCN, and Operation. A second 'Settings' section allows for configuring the EARFCN value.

Scan Mode

To put the new configuration into effect, must click Submit button after Add List

Settings

Scan Mode: Band/Frequency Preferred

Submit Cancel

Band/Frequency Preferred

Band Select: Band 42, Band 43

Band Display: 42

Add List

Index	EARFCN	Operation

Settings

EARFCN: 41590

Add Cancel

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

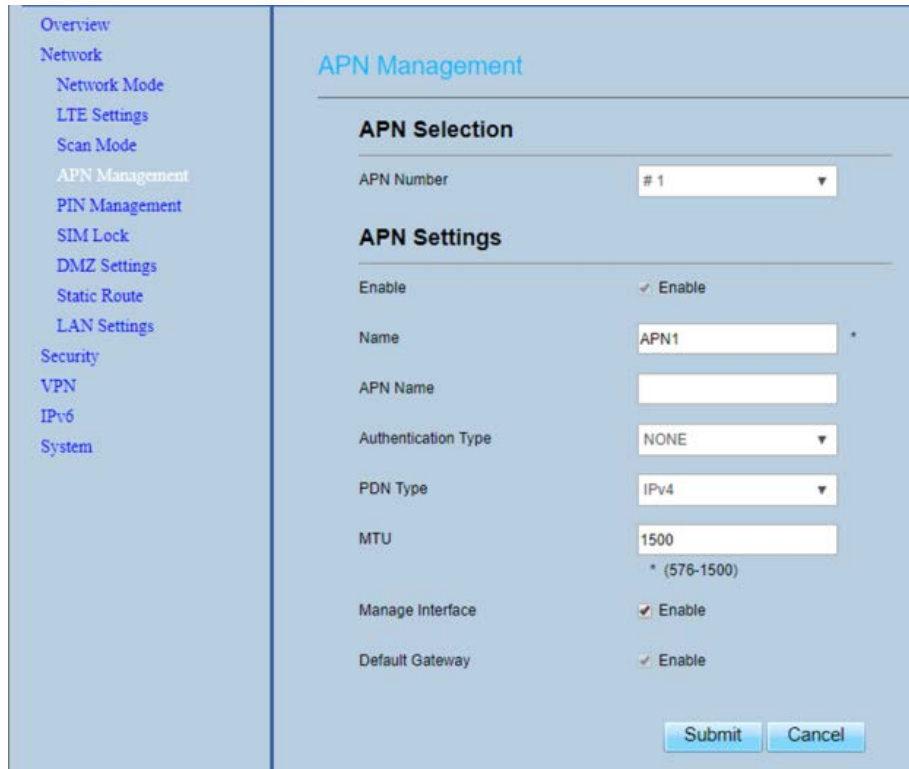


Table 5-1: APN Management Settings

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

	<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"> • CHAP – stands for Challenge-Handshake Authentication Protocol, where the base station will authenticate itself to the CPE through an authenticating entity
PDN Type	Select the type of Packet Data Network (PDN) the base station can use when communicating with this CPE: IPv4, IPv6, or IPv4v6
MTU	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
Manage Interface	To enable a management interface to this base station, select the check box next to Enable.
Default Gateway	To enable a default gateway to this base station, select the check box next to Enable.

Appendix A: Specifications

A-1: Basic Specifications

Item	Description
LTE Standard	3GPP Release 9
Ethernet LAN Ports	4 RJ-45 port 10/100 auto-sensing, auto-MDX, PoE
Voice	2 FXSRJ-11 ports with fax connectivity (T.38 Fax over IP)
LED Indicators	Power/WLAN/WPS/TEL/Mode/LTE signal/LAN
USIM	1.8V/3V 2FF
Restore Button	Tactile button. Press the restore button for at least 10 seconds to restore the CPE to its factory settings
Power Supply	Input: Universal range 100V to 240V AC
Dimension	6.5" (H) 7.25" (W) x 2 5/8" (D) 16.5 cm (L) x 18.4 cm (W) x 6.6 cm (D)
Weight	< 1 lb (0.4 kg)
Battery	External battery: Talk time 3 hrs, Standby time 8 hrs
Color	Pantone white C

A-2: RF Specifications

Item	Description
LTE Mode	TDD LTE
Frequency Bands	<ul style="list-style-type: none"> • Band 40 • Band 41 • Band 42 (3400MHz~3600MHz) • Band 43 (3600MHz~3800MHz)
Channel Bandwidth	5 MHz /10 MHz /15 MHz /20 MHz
MAX Output Power	23 dBm (200mW)
Max Throughput	DL 110 Mbps UL 20 Mbps
Receive Sensitivity	-94 dBm
Antenna Gain	5 dBi

A-3: Software Specifications

Item	Description
Language Settings	English
Network Mode	Bridge / NAT
SIM	<ul style="list-style-type: none"> • PIN management • SIM lock

Item	Description
Network Connection Setup	<ul style="list-style-type: none"> • Create, delete, and edit APNs • Set up dial-up connection automatically • Set up dial-up connection manually
LTE Scan Mode	<ul style="list-style-type: none"> • Full band • Cell lock • Band / Frequency preferred
VPN	<ul style="list-style-type: none"> • Support VPN passthrough • Support PPTP tunnel mode
NAT	<ul style="list-style-type: none"> • Port forwarding • Port trigger • DMZ • UPnP
Statistics	<ul style="list-style-type: none"> • LAN Link status • Transmit / Receive traffic • Run time

A-4: Device Management Specifications

Item	Description
Maintenance	<ul style="list-style-type: none"> • Date and time setting • Reset • Restore factory settings • Restore/Back up configuration file • Local upgrade • FOTA upgrade
TR069	Enable or disable TR069 Management
Port Mirror	Enable or disable the port mirror function
Syslog	Syslog function - can send logs to the PC via LAN
Diagnostics	Ping and trace route

A-5: Environmental Specifications

Item	Description
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%

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/>