

# **Atom ID0406-6.5**

## **User Manual**

February 2018

Version 1.4

## About This Document

This document is intended for installers and users of the Baicells Atom ID04/ID06-6.5 user equipment (UE). The information covers how to install, set up, and use the indoor UE for broadband wireless access to Long-Term Evolution (LTE) carrier networks.

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## Revision Record

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## 1. Introduction

The Baicells Atom ID04/D06-6.5 indoor user equipment (UE) is part of the Baicells broadband wireless access system that integrates with carrier networks based on Long-Term Evolution (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 indoor UE serves as a gateway between the user's computers or other smart devices and the carrier network by communicating wirelessly with the operator's LTE eNodeB's (eNB) at cell sites located in the region (Figure 1-1). The eNBs communicate with the carrier network, providing the user with internet access.

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

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





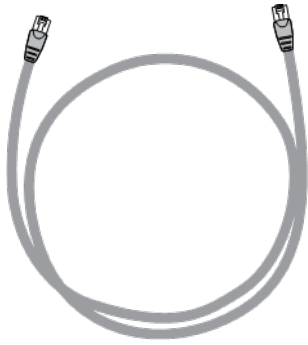
Some of the key features of the Atom indoor UE include the following. Exact specifications vary by model: (Refer to [Appendix A](#) for details.)

- Supports standard LTE network FDD and TDD network modes:
  - FDD band 7
  - TDD bands 34, 38, 40, 41, 42, 43, and 48
- Complies with 3GPP standards
  - Atom ID04-6.5: Release 9 CAT 4
  - Atom ID06-6.5: Release 10 CAT 6/7
- Ethernet interface:
  - Atom ID04-6.5: 10/100 Mbps Ethernet
  - Atom ID06-6.5: 10/100/1000 Mbps Ethernet
- Atom ID06-6.5 provides VoIP communications, with fax and point-of-sale (POS) equipment connectivity using RJ-11 interface
- IEEE 802.11b/g/n Wi-Fi, 2.4 GHz
- Cell lock, SIM lock, and Pin lock supported
- Local and Web based user GUIs; network management through BaiCells CloudCore Operations Management Console (OMC)
- User-friendly LED indicators

## 2. Parts List

Refer to Table 2-1 for a list of the components that you should receive with the Baicells Atom ID04/06-6.5. You will need standard tools to install the device.

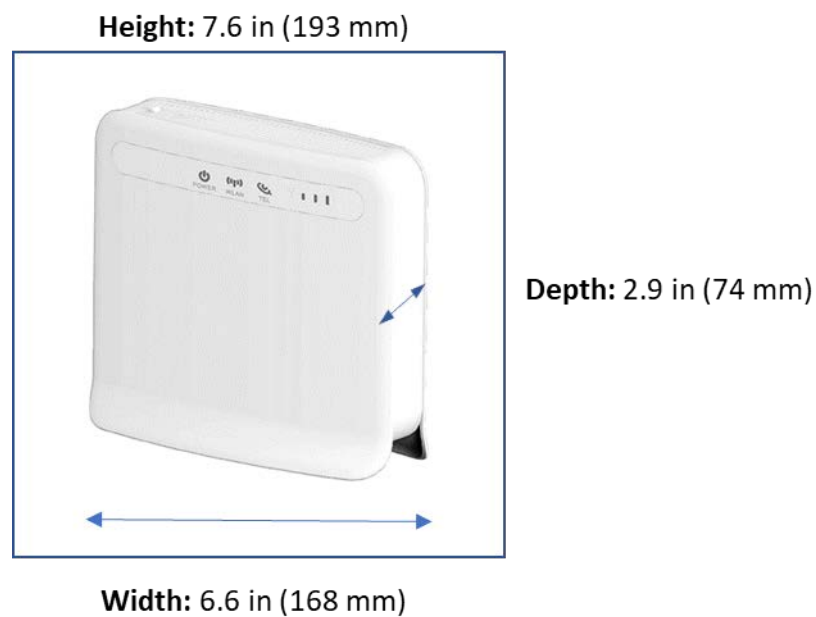
**Table 2-1: Parts**

Item	Quantity	Picture
Atom ID04/06-6.5 unit	1	
DC-5V Power Adaptor	1	
RJ-45 Ethernet Cable	1	
User Manual	1	-

### 3. Description

The Baicells Atom indoor user equipment (UE) is a small, standards-based device designed to connect seamlessly to the operator's standard LTE eNB operating on the same band. Different UE models support different frequencies. Refer to Figure 3-1 and the technical details in [Appendix A](#).

**Figure 3-1: Dimensions**



In addition to LED indicators on the front and back of the units, there are various interfaces on the top and back (Figure 3-2). The LEDs are described in Table 3-1, and the interfaces are explained in Table 3-2.



Figure 3-2: LEDs and Interfaces

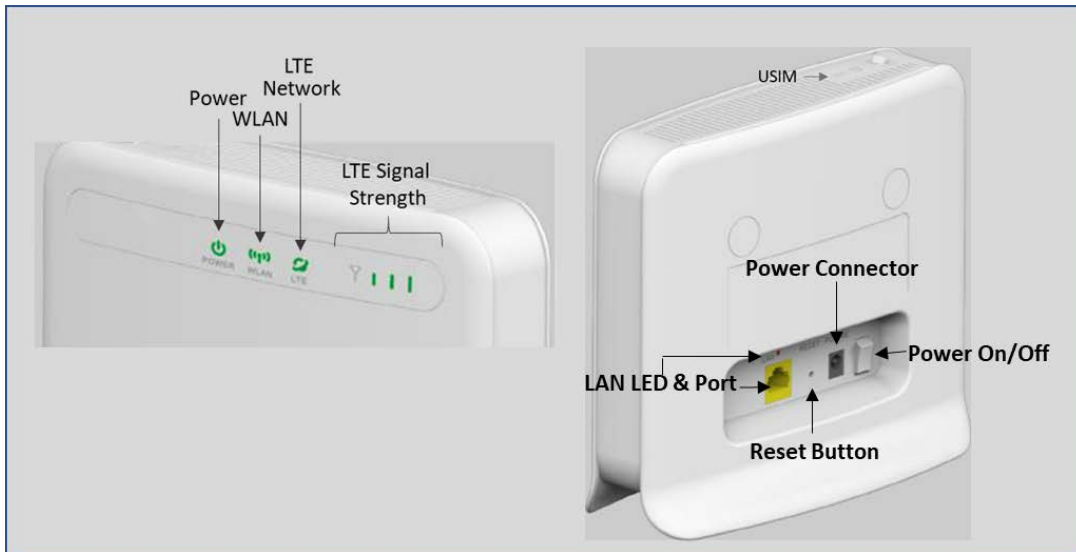


Table 3-1: LEDs

LEDs vary by model – not all models will have all of the LEDs listed below.

Identity	Description	Status	Meaning
Power	Power indicator	OFF	No power supply
		Steady On	Power is on
Wi-Fi or WLAN	Wireless LAN (Wi-Fi) status indicator	Steady On	Wi-Fi function is enabled
		Blinking	Data is being transmitted or received through using Wi-Fi
		OFF	Wi-Fi function is disabled
SYS or LTE Network	LTE network status indicator	OFF	No LTE internet connection
		Steady On	LTE network connection established
LTE Signal Strength	1, 2, 3, or 4 bars to indicate LTE network connection status and signal strength. The more bars, the stronger the signal between the Atom unit and a network cell.	All OFF	Signal is too weak to connect to the LTE network
		Steady On	The unit is connected to the LTE network. Bars will light steadily according to signal strength.
		Blinking	The unit is scanning the LTE network.
Software upgrade or restore to factory settings			
Tel (Atom ID06-6.5 only)	Voice telephone interface indicator	Off	VoIP not registered with the voice server
		Steady on	VoIP registered with a voice server
LAN (back of unit)	Ethernet indicator	Off	No Ethernet connection
		Steady on	Ethernet connection is normal
		Blinking	Ethernet data is being transmitted

**Table 3-2: Interfaces**

Interfaces vary by model – not all models will have all of the interfaces listed below.

Interfaces	Description
USIM	Universal Subscriber Identity Module card slot. 1.8V/3.0V USIM 2FF
LAN	One to four RJ-45 ports, LAN, 10/100 auto-sensing, auto-MDX interface to connect to computer or other network devices (e.g., hub or switch). Compatible with IEEE 802.3/802.3u standards.
RESET	Press the reset button for 1 second to reset the unit. Press the reset button for over 10 seconds to restore the unit to its factory settings.
DC-5V Power Connector	Port to attach the power adaptor provided with the unit
Power Switch	Power on/off
POTS-RJ11	RJ-11 telephone port(s). Used for phone / fax / POS, providing VoIP functions under conditions of software support.

## 4. Installation

Follow the steps below to install the ID04/06-6.5 unit.

---

**⚠ ATTENTION: Make sure the unit is turned off before you insert or remove the USIM card. Otherwise, the unit and USIM card may be damaged.**

---

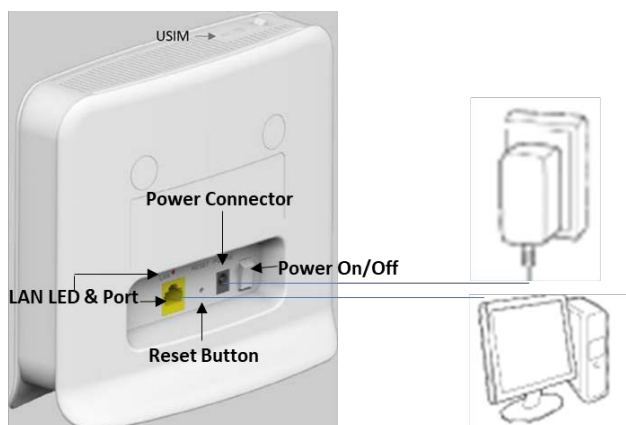
1. Insert the USIM card: Open the protective cover of the USIM card slot on the top of the Atom unit, and insert the USIM card into the slot (Figure 4-1). Then, close the protective cover.

**Figure 4-1: USIM**



2. Connect the cables (Figure 4-2):
  - a. LAN: Connect one end of the RJ-45 Ethernet cable to the LAN interface on the unit, and the other end to the computer.
  - b. Power: Connect the DC-5V power adaptor to the power connector and electrical outlet.
  - c. Turn the power switch to ON.

**Figure 4-2: Cables**



3. Connect to the network:
  - a. Open a Web browser, and in the address bar type <http://192.168.254.1> (or <http://192.168.1.1> if on older firmware than V1.0.3) and press **Enter**.

- b. Enter the default user name (**admin**) and password (**admin**), and select **Login**. In the upper right corner of the GUI window you should see LTE network signal strength indicators (described in [Table 3-1](#) LEDs). The bars should be in “steady on” state. Refer to Table 4-1.

**Table 4-1: LTE Signal Strength**

	1, 2, 3, or 4 lighted bars indicate LTE network connection status and signal strength. The more bars, the stronger the signal between the Atom unit and a network cell.
	If the Atom unit cannot detect a wireless signal, or if the signal is very weak (e.g., only 1 bar), try moving the unit closer to a window, higher up and away from other radiating or blocking objects. Otherwise, contact your service provider for assistance.

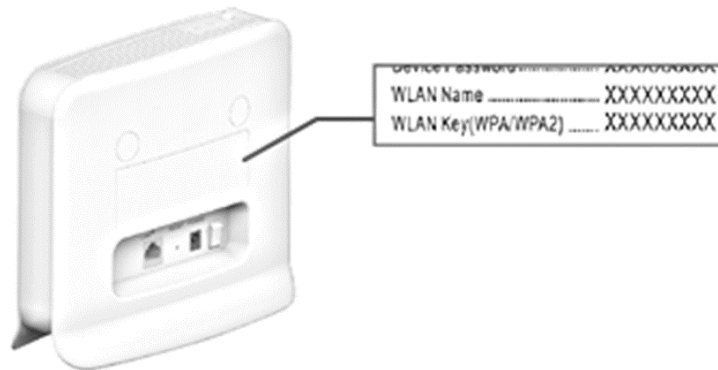
4. Connect Wi-Fi:

- a. Ensure that the computer or other smart device has Wi-Fi (WLAN) enabled.
- b. When the Wi-Fi (or WLAN) LED on the unit shows “steady on”, per [Table 3-1](#) LEDs, it is functional.

NOTE: Wi-Fi/WLAN function can be enabled or disabled through the Web GUI.

- c. Looking at the label on the back of the Atom unit, record the WLAN Name and WLAN KEY (WPA/WPA2) values (Figure 4-3).

**Figure 4-3: Label**



To avoid unauthorized user access to the Wi-Fi/WLAN, using the Web GUI modify the WLAN Name and WLAN Key (WPA/WPA2) information supplied by your service provider. These fields are case-sensitive. On your Wi-Fi enabled computer and other smart devices, you can then look for the new Wi-Fi/WLAN network name.

## 5. Basic Configuration

To configure the Atom user equipment (UE), you will access the local or Web-based GUI application. Follow the steps provided to log in and complete the minimal configuration requirements for the UE to operate. For more detailed configuration information, refer to the *Baicells Configuration and Network Administration Guide* on the [Baicells support](#) website.

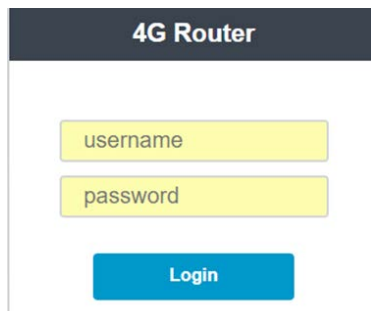
**NOTE:** If your service provider pre-configured the device using a CloudKey, the device may already be configured in the network. CloudKey is described in [Appendix B](#).

### 5.1 Log in and Change the Password

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

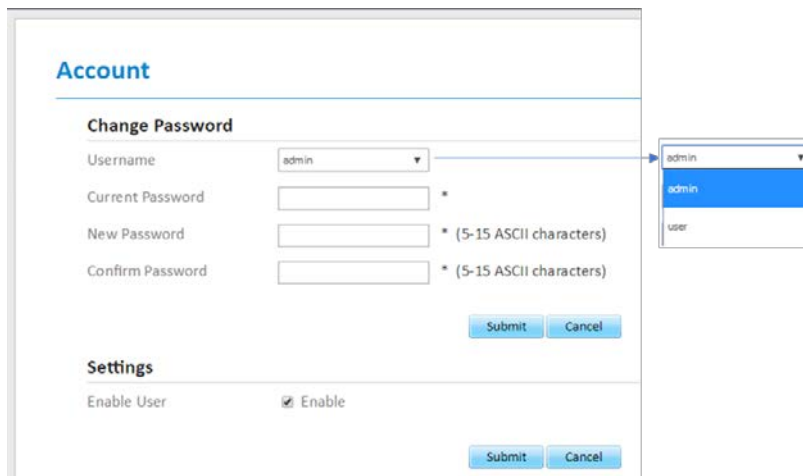
1. Switch on the UE power.
2. Open a Web browser, and in the address bar type <http://192.168.254.1> (or <http://192.168.1.1> if on older firmware than V1.0.3) and then press **Enter**. The login window should appear as shown in Figure 5-1.

**Figure 5-1: Log in to UE GUI**



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

**Figure 5-2: Change Account Information**

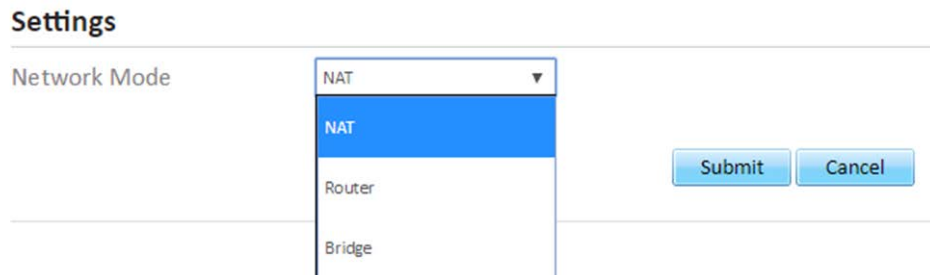


## 5.2 Configure Network Mode

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

### Network Mode



**Settings**

Network Mode

NAT

NAT

Router

Bridge

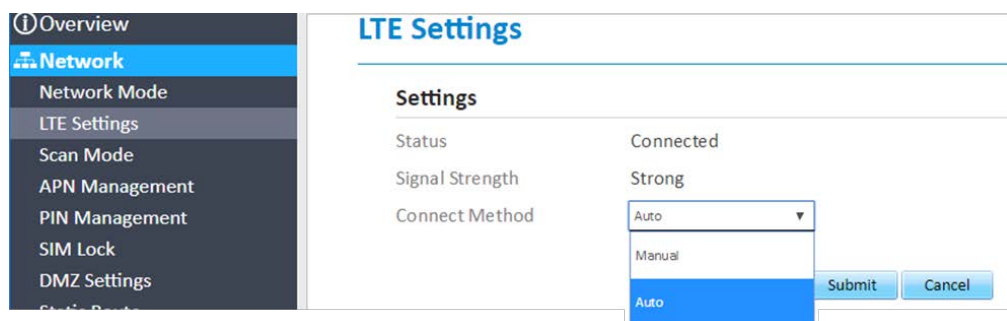
Submit Cancel

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 UE 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



**Overview**

**Network**

Network Mode

LTE Settings

Scan Mode

APN Management

PIN Management

SIM Lock

DMZ Settings

**LTE Settings**

**Settings**

Status Connected

Signal Strength Strong

Connect Method

Auto

Manual

Auto

Submit Cancel

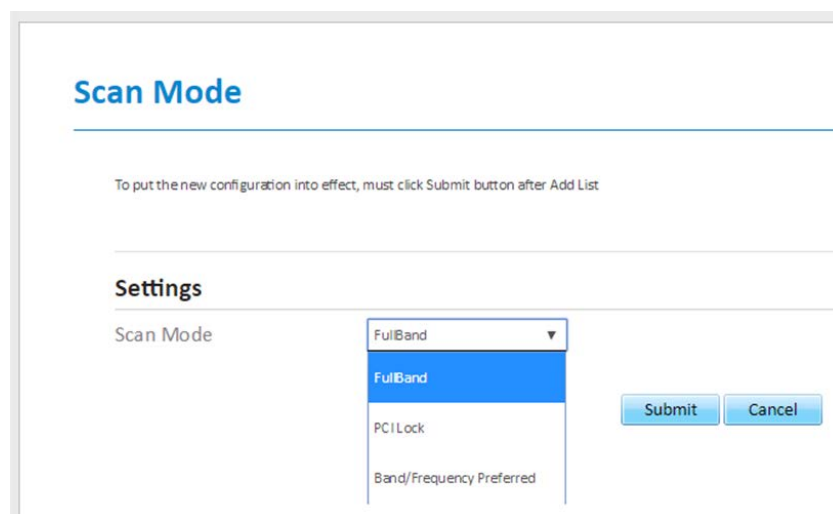
2. To manually connect the UE to the LTE network, choose **Manual** connect and click on **PLMN** for Public Land Mobile Network to scan all available networks and to select a specific LTE network to connect to. Select **Connect** to connect the network. Use the Disconnect button to disconnect from the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

## 5.4 Configure Scan Mode

The Scan Mode setting determines which frequencies the UE'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 UE 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 eNB 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 UE will routinely scan all channels in the band. The band is dependent on the model of UE 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 UE will scan the list for eNodeBs with the PCI and EARFCN combination before locking on to one of them.
- Band/Frequency Preferred – You can specify which band(s) the UE 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

### Scan Mode

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

---

#### Settings

Scan Mode

---

#### PCI Lock

Index	EARFCN	PCI	Operation
-------	--------	-----	-----------

---

#### Settings

EARFCN  \*

PCI  \* 0~503

Figure 5-7: Band/Frequency Preferred Settings

### Scan Mode

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

---

#### Settings

Scan Mode

---

#### Band/Frequency Preferred

Band Select  Band 42  
 Band 43

Band Display

Index	EARFCN	Operation
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---

#### Settings

EARFCN



## 5.5 Configure APN Management

Under **Network > APN Management**, you will configure up to 4 eNBs with which this UE may connect. APN is an acronym for Access Point Name. An access point, in this case, is another term for an eNB. 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

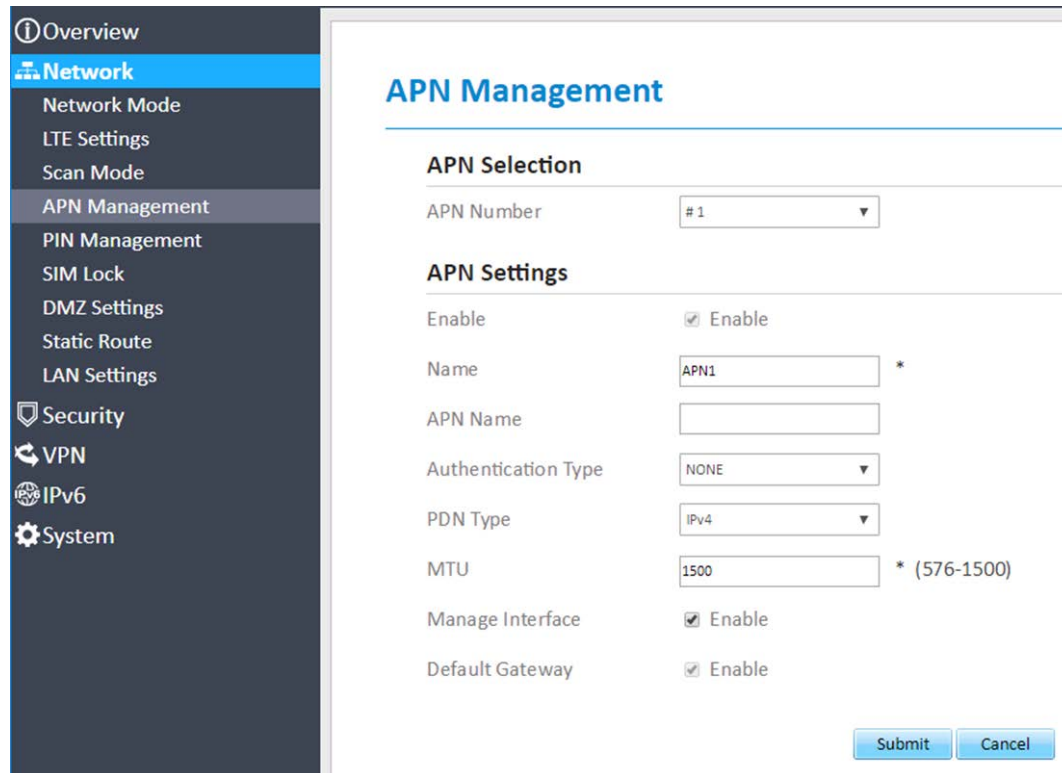


Table 5-1: APN Management Settings

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 eNB configuration
<b>Authentication Type</b>	Select the type of authentication required for this eNB: <ul style="list-style-type: none"> <li>• None – the eNB is not required to authenticate itself to the UE</li> <li>• PAP – stands for Password Authentication Protocol, where the eNB will authenticate itself to the UE using a</li> </ul>

	<p>static user name and password</p> <ul style="list-style-type: none"><li>• CHAP – stands for Challenge-Handshake Authentication Protocol, where the eNB will authenticate itself to the UE through an authenticating entity</li></ul>
<b>PDN Type</b>	Select the type of Packet Data Network (PDN) the eNB can use when communicating with this UE: 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 eNB can communicate in a single transaction. The range is 576 to 1500 bytes.
<b>Manage Interface</b>	To enable a management interface to this eNB, select the check box next to Enable.
<b>Default Gateway</b>	To enable a default gateway to this eNB, select the check box next to Enable.

## Appendix A: Technical Specifications

### Basic Specifications

Item	Description
LTE Standard	ID04-6.5: 3GPP Release 9, CAT 4 ID06-6.5: 3GPP Release 10, CAT 6/7
Ethernet LAN Port	One RJ-45 port: ID04-6.5 is 10/100 and ID06-6.5 10/100/1000 auto-sensing, auto-MDX
LED Indicators	Power / SYS or LTE (Tel) / LTE Signal / WLAN
POTS Port	ID06-6.5 only: Plain Old Telephone Service (POTS) through one RJ-11 interface
USIM	1.8V/3V 2FF
Restore Button	Tactile button. Press for at least 10 seconds to restore the UE to factory settings.
Power Switch	On/Off
Power Supply	Input: Universal range 100V to 240V AC Output ID04-6.5: 5VDC, 2A Output ID06-6.5: 12VDC, 1.5A
Battery	Customization
Dimensions (HxWxD)	7.6 x 6.6 x 2.9 in / 193x168x74 mm
Weight	14 oz (400 g)

### RF Specifications

Different models support different frequencies, antennas, and carrier aggregation configurations.

Item	Description
LTE Mode	FDD/TDD
Channel Bandwidth	5 / 10 / 15 / 20 MHz
MAX Output Power	ID04-6.5: 23 dBm $\pm$ 2 dBm ID06-6.5: 23 dBm $\pm$ 2 dBm per transmit antenna
Frequency Bands	<ul style="list-style-type: none"> <li>• ID04-6.5: <ul style="list-style-type: none"> <li>○ FDD Bands 7/38</li> <li>○ TDD Bands 40/41, 42/43/48</li> </ul> </li> <li>• ID06-6.5: <ul style="list-style-type: none"> <li>○ FDD Bands 34/38/39/40/41</li> <li>○ TDD Bands 3/7/20, 3/8/28, 42/43/48</li> </ul> </li> </ul>
TXRX	ID04-6.5: 1T2R ID06-6.5: 1T4R, 2T4R (uplink enhanced)

Carrier Aggregation	Atom ID06-6.5 only: 2CC CA
Antenna Gain	6.5 dBi @ 3.x GHz 5 dBi @ 2.x GHz 4 dBi @ 1.x GHz 3 dBi @ sub-1 GHz
Peak Rate	<ul style="list-style-type: none"> <li>• ID04-6.5: <ul style="list-style-type: none"> <li>○ FDD - DL 100 Mbps, UL 50 Mbps</li> <li>○ TDD - DL 100 Mbps, UL 10 Mbps (2:7)</li> </ul> </li> <li>• ID06-6.5: <ul style="list-style-type: none"> <li>○ FDD DL 300 Mbps, UL 75 Mbps</li> <li>○ TDD DL 220 Mbps, UL 15 Mbps (2:7)</li> </ul> </li> </ul>
Modulation	<ul style="list-style-type: none"> <li>• ID04-6.5: <ul style="list-style-type: none"> <li>○ UL: QPSK, 16QAM</li> <li>○ DL: QPSK, 16QAM, 64QAM</li> </ul> </li> <li>• ID06-6.5: <ul style="list-style-type: none"> <li>○ UL: QPSK, 16QAM, 64QAM</li> <li>○ DL: QPSK, 16QAM, 64QAM</li> </ul> </li> </ul>
Receive Sensitivity	-94 dBm @ QPSK, 20 MHz, 25°C
Antenna Type	Internal omni
Polarization	Linear, vertical
Antenna Efficiency	> 70%
Isolation	N/A
VSWR	≤ 2
Horizontal Beamwidth (3 dB)	N/A
Vertical Beamwidth (3 dB)	N/A

## Wi-Fi Specifications

Item	Description
Standard	IEEE 802.11b/g/n
Channel Bandwidth	20/40 MHz
Frequency	2.4 GHz
TXRX	2T2R
MIMO	2x2
Peak Rate	<ul style="list-style-type: none"> <li>• 802.11b: 11 Mbps</li> <li>• 802.11g: 54 Mbps</li> <li>• 802.11n: 300 Mbps</li> </ul>
Modulation	DSSS/CCK, OFDM
Receive Sensitivity	<ul style="list-style-type: none"> <li>• -64 dBm @ 65 Mbps, typical for 802.11n</li> <li>• -65 dBm @ 54 Mbps, typical for 802.11g</li> <li>• -76 dBm @ 11 Mbps, typical for 802.11b</li> </ul>

Max Output Power	17 ±3dBm
Antenna Type	Internal omni
Antenna Gain	2 dBi
Active Users	32

## SW Specifications

Item	Description
Network Mode	NAT / Bridge / Tunnel
IP Protocol	IPv4 / IPv6
SIM	<ul style="list-style-type: none"> <li>• PIN management</li> <li>• SIM lock</li> </ul>
Network Connection Management	Auto / Manual
LTE Scan Mode	Full band scan, frequency lock
WLAN	<ul style="list-style-type: none"> <li>• WPS</li> <li>• MSSID Isolation</li> <li>• VLAN</li> </ul>
VPN	<ul style="list-style-type: none"> <li>• ID04-6.5: L2TP, GRE, PPTP, L2 VxLAN</li> <li>• ID06-6.5: L2TP L2/L3, GRE L2/L3</li> </ul>
NAT	Port forwarding, port trigger, DMZ, ALG
Statistics	<ul style="list-style-type: none"> <li>• LTE status/connection time/system up time</li> <li>• Device status</li> <li>• DHCP client list</li> <li>• Wi-Fi station list</li> <li>• LTE status</li> <li>• Firewall status</li> </ul>
Firewall	<ul style="list-style-type: none"> <li>• IP/MAC/URL filter</li> <li>• Access control</li> <li>• Block port scanner / SYN flood</li> <li>• SPI filter</li> </ul>
Network Management	<ul style="list-style-type: none"> <li>• ID04-3.5: TR069</li> <li>• ID04-6.5: TR069, SNMP</li> <li>• ID06-6.5: TR069, TR104, SNMP</li> </ul>
Diagnostics	<ul style="list-style-type: none"> <li>• TCP dump</li> <li>• Ping</li> <li>• Trace route</li> </ul>
Maintenance	<ul style="list-style-type: none"> <li>• Date and time setting</li> <li>• Reboot</li> <li>• Restore factory settings</li> <li>• Restore / back up configuration files</li> <li>• Firmware upgrade locally or OTA</li> </ul>
System Logs	<ul style="list-style-type: none"> <li>• Operating</li> </ul>

Item	Description
	<ul style="list-style-type: none"> <li>• Run-time</li> <li>• Filter/select/display/export</li> </ul>
Antenna Selection	ID06-6.5: Customization

## Environmental Specifications

Item	Description
Operating Temperature	14°F to 113°F, -10°C to 45°C
Storage Temperature	-4°F to 158°F, -20°C to 70°C
Operating Humidity	5% to 95%

## Voice Specifications (Atom ID06-6.5 Only)

Item	Description
VoIP	<ul style="list-style-type: none"> <li>• Dual-APN</li> <li>• SIP ALG</li> <li>• G711 fax pass-through</li> <li>• T38 fax relay</li> </ul>

## Global Part Numbers

Model	Description
EG2011B-M3	Atom Indoor 6dBi UE CAT 6/7, 2T4R, Bands 40/41
EG2013B-M11	Atom Indoor 6dBi UE CAT 6/7, 2T4R, Bands 42/43/48
EG2030C-M1	Atom Indoor 6dBi UE CAT 4, 1T2R, Bands 40/41
EG2030C-M2, EG2012C-M2	Atom Indoor 6dBi UE CAT 4, 1T2R, Bands 42/43
EG2230C-M10	Atom Indoor 6dBi UE CAT 4, 1T2R, Bands 7/38
EG2030C-M11	Atom Indoor 6dBi UE CAT 4, 1T2R, Bands 42/43/48

## Appendix B: CloudKey

More recent releases of UE firmware (for example, version 1.0.8) allow the operator to pre-configure the UE using the Baicells CloudCore Operations Management Console (OMC). The operator enters their CloudKey account information in the UE Web GUI or through the OMC, as follows.

### UE GUI:

Log in to the UE GUI for the device.

1. Click on the **System** tab located on the left.
2. Click on **TRO69**.
3. Enter the operator's CloudKey information in the box marked **CloudKey**. (The operator's CloudKey information is shown in the top right corner of their CloudCore account. Each CloudKey is unique to each operator.)
4. Click on **Submit**, and once the UE attaches to the eNB the UE will appear in the OMC Monitor window. A reboot is not required for this field to take effect.

### OMC:

Alternatively the operator can use the OMC Device Manager function to add the UE.

1. Log in to your OMC account.
2. Click on **System > Device Management**.
3. Click +Add in the top right corner.
4. A popup window will appear. Enter the UE's MAC address, and the UE device will be added to the operator's account.

## Appendix C: 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/>