FWC-122HG-35 Quick Installation Guide

The FWC-122HG-35 CPE should be pole mounted outdoors and aligned with its antenna facing the nearest LTE eNodeB.

This Guide is current as of firmware version 01.02.01.033.

SPECIFICATIONS

MECHANICAL & REGULATORY		
Dimension	13.4" x 13.4" x 2.95" (340 x 340 x 75mm)	
Weight	4.41lbs (2kg)	
PoE	802.3at	
Power	Input: Universal range 100~240VAC	
	Output: 56VDC	
Reset/Reboot Button	Tact Switch	
Survival Wind Speed	>124mph (200km/h)	
Operating Humidity	5% to 95%	
Operational Temperature	-40°F to 131°F (-40°C to 55°C)	
MTBF ODU	300,000 at 131°F (55°C)	
LTE	EN 301 908-13 V11.1.1	
CBSD	Category B, FCCID MXF-WLTGG12248H	
Safety	EN/UL 60950-1 & EN/UL 60950-22	
EMC	EN 301 489-1 / -4 / -17 / -24	
Environmental	IP67	
NETWORKING & OAM		
LTE BB ASIC	GDM7243A (GCT Semiconductor)	
LTE RF ASIC	GRF7243A (GCT Semiconductor)	
Ethernet Ports	802.3, IEEE 802.3u, IEEE 802.3ab	
LED Indicators	Signal Strength / LAN / SIM	
SIM Function	1.8V, 3V SIM and USIM card, 2FF	
PIN/PUK Code	Yes	
Stack	IPv4, IPv6, Dual	
NAT/Dynamic NAT	Yes	
Router Mode	Yes	
Bridge Mode	Yes	
Tunnel Mode	GRE, L2TP, IPsec, PPTP (Available per request)	
DCHP Server in LAN	Yes (253 Clients)	
DNS Relay	Yes	
DDNS Client	Yes	
VPN Pass-Through –	Yes	
IPSec/PPTP/L2TP		
UPNP	Yes	
HTTP Server	Yes	
ALG Support (FTP/SIP/)	Yes	
Networking Debug/Testing	IPerf, Ping, Traceroute	
RADIO SPECIFICATION		
Peak Throughput	DL 440 Mbps (Config 2-7); UL 30Mbps (Config 2-7)	
Corrier Aggregation	DL 2CC up to 20MHz each (w. DL 4x4)	
Carrier Aggregation	UL 2CC or Diversity or TM2 + 64 QAM	
Frequency Band	TDD LTE Bands 42, 43, 48	
Transmit Power	Up to +23 dBm	
Tx Power Dynamic Range	63 dB	

Receiver Sensitivity	-95 dBm		
Channel Bandwidth/Carrier	10, 20 MHz		
N41N4Q	DL MIMO 2x2 / 4x4 / 8x4		
NIINO	UL 1x2 (with diversity); UL 1x2 CA; UL 2x2		
LTE Compliance	3GPP Release 12 (Category 12/13/15 PHY Rate		
	supported)		
DEVICE MANAGEMENT & SECURITY			
WEB	Yes		
SNMP	Yes		
TR-069 and TR-0143	Yes		
FOTA Upgrade	Yes		
System Log/Diagnostic	Yes (Chipset embedded tool)		
L2/L3 Firewall	Basic/Port Forwarding/Port		
	Trigger/DMS/Remote/WAN Ping/Remote Web		
	Access Control		

BI

MOUNTING CPE

Using Mounting Bracket



- 1. Thread the M10*100mm bolt through a spring washer, flat washer, and the bracket holes. Hold it up on one side of the pole.
- 2. With the connectors facing downwards, hold up the CPE on the other side of the pole. Ensure that the bolts are matching up with the threads on the back of the CPE.
- 3. Tighten the bolts.

Using Adjustable Mounting Bracket (Optional)

1. Thread the M10*20mm bolt through a spring washer, flat washer and the bracket holes, and tighten the bolts to the back of CPE.

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2. Thread the M10*100mm bolt through a spring washer, flat washer and the holes of bracket A. Attach the bracket A to the other side of the pole and through both holes of the bracket B on either side, and tighten the bolts.



 With the connectors facing downward, assemble the two brackets together. Thread the M10*20mm bolts through a spring washer, flat washer and the bracket holes



4. Adjust to required angle (a 10 degree adjustable tilt) and tighten the screws.

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CONNECTORS



CONNECTING CABLES



Connect RJ45 to PC (LAN Connector)

LED INDICATORS

LED name	Location	Color	LED Behavior	Status Indication
LED List				
	•••			
	•••••			
MAIN power	•00	Blue	ON	Power On
	00000		OFF	Power Off
Ethernet status OOC	000	Yellow	Steady ON	Detect Ethernet Device Connected
	00000		Blinking	N/A
			OFF	No Ethernet action
SIM status	000	Green	Steady ON	SIM Detected
			Blinking when On- hook	PUK / PIN Code
			OFF	No SIM Detected
LTE Status LED :	Link Status		When CPE is power on, e link status ; change upo	each LED indicates each n customer requirement
LTE 1	000	Blue	Steady ON	SINR < 7
LTE 2	000	Blue	Steady ON	7dB <u><</u> SINR < 11dB
LTE 3	000	Blue	Steady ON	11dB <u><</u> SINR < 18dB
LTE 4	000	Blue	Steady ON	18dB <u><</u> SINR < 23dB
LTE 5		Blue	Steady ON	23dB <u><</u> SINR

WEBUI CONFIGURATION

Connect a laptop to the Ethernet port of the CPE power adaptor (see CONNECTING CABLES). Set it to an IP on the **192.168.15.0/24** network as the CPE works in bridge mode by default and an IP address won't be automatically assigned.

NOTE: Remember to click "**Apply**" to commit any of the changes made and save to the CPE device. You may be required to reboot the CPE for the changes to take effect.

Login to WebUI

- Open the Web browser (Ex: Internet Explorer, Firefox or Chrome) and enter the default IP address of CPE, which is : <u>https://192.168.15.1</u>
- 2. Enter default USERNAME/PASSWORD: administrator / _BLiNQ_
- 3. The above credentials should give you Superuser privileges, which will be needed to make most of the changes in the WebUI.

Restore Default Settings

If the CPE has been used before, reset it to default.

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- 1. Go to Management > Restore Default
- 2. Click on "Restore" button under "Restore Default Settings"

Software Version

Ensure that the CPE is running approved SW version. If not, please upgrade the SW.

- 1. Go to **About** page on the CPE WebUI to verify the current software/firmware version (under "**Firmware Version**")
- Get BLiNQ's latest SW release from the link below, and proceed to load the build onto the unit by following the procedure outlined in this guide. <u>https://app.box.com/s/ff3v5plt15s9cgs36pea1n6i0e8b7orm</u>
- 3. Navigate to Management > Software
- 4. Click "Browse" to select the IPKG file to upload, and then click "Upgrade" to install the selected file. The Upgrading window will pop up. Once the upgrade is completed, the CPE will reboot in order to load the new software. The IPKG file you have uploaded will be shown on the page, under "Device Software Version".

Cell Selection

By using the **Cell Selection** feature, you can lock the CPE to a certain frequency for faster connection as the scanning process would be avoided. Keep in mind that this would make the CPE connect <u>only</u> to this frequency.

- 1. In the WebUI, go to LTE > Cell Selection
- 2. Choose "Dedicated EARFCN" under Scan Mode
- 3. Enter the desired EARFCN/Frequency under Type

<u>PDN</u>

You can specify an APN name for network attach or simply use it in Auto mode.

- 1. Go to LTE > Default PDN on the WebUI
- Use the dropdown menu on APN for Network Attach to select either Auto or Manual, keeping in mind that you will need to specify an APN name for it when using Manual mode.

Multiple PDN

Multiple PDN is a great way to separate different network services.

- 1. Navigate to LTE > Multiple PDN
- 2. **Click on "Add +"** to create rule.
- 3. Select either IPv4 or IPv6 (under PDN Type)
- 4. Enter APN Name. This field needs to be filled.
- 5. The type of authentication is determined by the user's service provider.

Cell Detect

Cell Lock is used to lock the CPE into a specific cell. The CPE will only connect to the specific cell that is defined in the list.

- 1. Navigate to LTE > Cell Detect on the WebUI
- 2. Under "Lock Specific Cell", select either "Cell Lock" or "Cell lock on PCI only" from the drop down menu on "Lock Type". Click on the "Add" button to add

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a new rule to lock onto a specific cell using **DL-EARFCN and PCI** or with only **PCI**. You will see a new line on the page.

 Fill in the DL-EARFCN (Downlink EUTRA Absolute Radio-Frequency Channel Number) and PCI (Physical Cell Identity) of the cell that you want to lock on to.

NOTE: You can lock up to 10 specific cells.

Network - WAN Seting (NAT Mode)

This section shows the configuring of "NAT Mode"

Please note that changing the "**Operation Mode**" needs a reboot of CPE to take effect.

- 1. Go to Network > WAN Setting
- 2. Choose "NAT Mode" from the dropdown menu under Operation Mode
- WAN MTU is the Maximum Transmission Unit. The size of a single packet can only be as large as the value in this line. If the size of the packet exceeds MTU, the packet would be fragmented.
- 4. Choose either Automatically or Static under Connection Mode
 - a. **Automatically**: CPE will automatically acquire configuration information from DHCP server
 - Static: You will have to enter all the information manually.
 You can only enter the values of DNS1 and DNS2 only when the connection mode is Static.

<u>Network – WAN Setting (Bridge Mode)</u>

This section shows the configuring of "Bridge Mode"

- 1. Go to Network > WAN Setting
- 2. Choose "Bridge Mode" from the dropdown menu under Operation Mode
- 3. Note that CPE needs to reboot for operation mode change to take effect
- 4. Then, choose either Automatically or Static under Connection Mode
 - a. **Automatically**: CPE will automatically acquire configuration information from DHCP server
 - Static: You will have to enter all the information manually.
 You can only enter the values of DNS1 and DNS2 only when the connection mode is Static.

<u>Monitoring – Diagnostic Tools</u>

The FWC-122HG-35 CPE has built-in tools - "**ping**" and "**traceroute**". Use these tools to test internet connectivity after the installation is complete.

- "ping" is used to test if CPE can reach an IP address by sending the ICMP "ECHO_REQUEST" packet and receiving the ICMP "ECHO_RESPONSE" packet.
- "traceroute" records all the relay points from CPE to an IP address. The result of "ping" and "traceroute" will be presented in "Diagnostic Result".
- 1. Go to Monitoring > Diagnostic Tools
- Set up the parameters of the test (Diagnostic Type, Protocol Type, IP Address/Domain, Max Hops) If you are doing a ping, set the Ping Count, Packet Size and Ping Timeout too.
- 3. Click on "Start" under Status to run the test.

4. Results of the test will be shown under "Diagnostic Result"

Signal Reference Table

Use the table below as a guide for your CPE values.

RSRP Value	RSRP Quality
>-90dbm	Excellent
-90 dbm to -105 dbm	Good
-106 dbm to -115 dbm	Fair/Average
< -115 dbm	Poor
SINR Value	SINR Quality
>13.5	Excellent
10.5 - 13	Good
5 - 10.5	Fair/Average
<5	Poor

CBSD CONFIGURATION

Optional Parameters

- 1. Enable GPS (optional)
 - a. Go to: GPS > Settings > Enable
- 2. Change Time Zone (optional)
 - Go to: Management > Time Settings and modify "Time Zone" and "Auto adjust for Daylight Saving Time" accordingly

Enable CBSD and Enter User ID & SAS URL

- 1. In the WebUI, go to LTE > CBRS > Basic
- 2. Make sure that CBSD is enabled under "Operation Mode"
- 3. Enter your company User ID under "Basic Information"
- 4. Enter SAS Server URL under "Basic Information"

Configure CBSD Installation Parameters

You will need to decide if you will be using Multi-Step Registration or Single Step Registration when configuring CBSD installation parameters.

Multi-Step Registration

- The CPE will connect (via LTE) and obtain IP address from EPC
- The CPE will unsuccessfully try to register to SAS because installation parameters are not configured yet
- Align the CPE until you get the best RF signal from eNB
- Once you are satisfied with the CPE's position, <u>collect Installation</u> <u>Parameters</u> and provision them in the tool used for communication <u>with SAS</u>
 - \circ \quad This could be SAS WebUI, or the SW your company developed.
 - For this to work, there has to be an alternate way to connect to this tool (e.g. LTE via your phone); the CPE will not transfer user data until it gets authorized by SAS

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Single Step Registration

- The CPE will connect (via LTE) and obtain IP address from EPC
- The CPE will check if it has uploaded valid installation parameters
 - If it does not, it will not try to connect to SAS
- If it does, it will try and potentially connect to SAS
- Align the CPE until you get the best RF signal from eNB
- Once you are satisfied with the CPE's position, open the program provided by BLiNQ (CPI Signed Data Generator) and:
 - 1. Enter installation parameters
 - 2. Point the program to your CPI certificate
 - 3. Enter the password required to read CPI certificate (you should have received this password along with the certificate)
 - Click on "Generate". This will create a file in format MXF-WLTGG12248H_<CPE CBSDID>.txt in the same folder where the program is
 - Upload the file to the CPE WebUI by going to LTE > CBRS > Basic, ensuring that Single Step Registration type is selected, clicking the "Upload" button and guiding the WebUI to the proper directory on your computer.

CPE Installation Tuning

You will need to decide if you will be using Multi-Step Registration or Single Step Registration when configuring CBSD installation parameters.

- Configure the computer to obtain address through DHCP
- Ensure that computer gets IP address on the data PDN
- Perform speed test to ensure link quality is satisfactory o If the performance is NOT satisfactory, realign CPE
- If the performance is improved by moving the CPE, update the installation parameters
 - For Multi-Step: update installation parameters on SAS
 - For Single-Step: update installation parameters using external program and upload the new file to the CPE
- For Multi-Step: reboot the CPE so it can get authorized with new installation parameters
 - If there are changes in installation parameters for Single-Step, the CPE will automatically re-register to SAS using the new parameters
- Repeat above steps until obtaining satisfactory performance

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