



casa systems

5G LTE Network Extender 4 for Enterprise

User Guide v5.0

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Preface

About this Guide

The *5G LTE Network Extender 4 for Enterprise User Guide* is intended for system administrators, support engineers, and operators who are responsible for basic installation and configuration of Network Extender units. Users who perform these tasks should be familiar with the Apex hardware and software capabilities, as well as have experience with both 4G and 5G technologies. The following chapters are provided in this guide:

For information about	See
Getting Started	Chapter 1.
Installation	Chapter 2.
Web GUI	Chapter 3.
Configuration	Chapter 4.
Troubleshooting	Chapter 5.
Specifications	Chapter 6.
Optional Accessories	Chapter 7.
FAQs	Appendix A

Document Revision History

The revision history of this document is shown in the following table. For additional information on new functionality not yet covered in this guide, refer to the *Casa Systems – Apex eFemto Small Cell Release Notes*.

Revision	Released Date	Details
1.0	February 2023	Initial release
1.0	May 2023	Revised Web GUI art
3.0	July 2023	Misc changes from Casa team
4.0	September 2023	Misc changes from Verizon/Casa teams
5.0	November 2023	• Revised safety certification • PTP updates • Security changes • Added list of optional accessories • Modified PDPCP information

Corporate Facility

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Personal and Product Safety

The Network Extender safety information includes U.S. directives that you must follow. All applicable OSHA regulations and standards shall be followed.

The installation, maintenance, or removal of telecommunications equipment requires qualified, experienced personnel. Installation instructions are written for such installation personnel.

Site Safety

Site construction shall be design-approved and certified by engineers who have valid and up-to-date P.E. license approval with the National Society of Professional Engineers.

Workers shall evaluate site safety as per all applicable safety ordinances and requirements including, but not limited to OSHA, NFPA 70, and applicable building code requirements prior to, during, and after completion. Workers shall not conduct product work until and unless the site is in full safety compliance with associated regulatory requirements.

Materials

Workers shall use only approved materials that comply with applicable safety and environmental requirements. All materials shall be deployed in accordance with all applicable safety requirements, and according to manufacturer instruction. Workers shall not install any materials that are intrinsically unsafe, or have shipping, handling, or installation instructions that are intrinsically unsafe.

Electrical

The Network Extender contains hazardous energy levels as defined by UL 60950. Care must be taken as injury to personnel or damage to the equipment could result from mistakes. Maintenance should only be carried out by approved workers who have adequate training and understanding and are familiar with the required procedures and instructions.

In addition to all applicable safety requirements, workers shall abide by the latest edition of NFPA 70 national electrical code. Certified and licensed Electricians and Power Limited Technicians shall perform electrical work as required by applicable regulatory requirements.

All structural materials shall be grounded, and all input and outputs shall have built-in isolation from the network as per NFPA 70 standards and client-approved standards. All connectivity and input and output hardware ports that connect to external power sources shall be designed and installed to meet national safety and regulatory requirements.

Shipping, Transport, and Manual Handling

Worker shall assure they understand and abide by all associated regulatory and standards instruction applicable to shipping, transport and handling of product, including but not limited to OSHA and all associated documentation for product shipping, transport, and manual handling requirements.

Worker shall assure adequate and approved shipping, transport, and handling procedures are utilized to maintain safety.

Installation

Installation shall be carried out by trained and competent workers always observing all applicable safety rules and regulations.

Workers shall read, and understand the latest published installation documentation, and make sure all required workers, tools, and materials are approved and present prior to beginning any defined work task.

Workers shall also abide by the latest published installation documentation for general work procedures and guidance materials.

All relevant safety measures must be taken to ensure that equipment is not connected to live power and transmission sources during installation. Equipment must be correctly installed to meet the relevant safety standards and approval conditions.

Maintenance

Maintenance shall be carried out by trained and competent workers while always observing all applicable safety rules and regulations. Equipment covers shall not be removed while live power and/or transmission is connected unless specifically directed by a Casa published work instruction and as determined safe by all associated safety rules and regulations.

Environment

The product must be operated in an environment within the specified relative humidity and ambient temperature ranges.

Keep all liquids away from the equipment, as accidental spillage can cause severe damage.

Grounding

To comply with ANSI/NFPA70 and UL 60950, equipment must be connected to a safety grounding point via a permanent connection. Grounding points are located on the product for this purpose. Always connect the ground cable as per the latest published instructions before fitting other cables. The product must remain grounded continuously unless all system and power connections are removed.

If equipment is grounded through a cabinet or rack, make sure it is done so properly according to the latest published installation instructions.

Technical documentation

Casa Systems provides the following documentation set in PDF format, viewable using current versions of Adobe Reader®. The latest documentation and revisions are uploaded on a continued basis for Verizon customers.

Contact Verizon Support for assistance with downloading selected Casa documentation PDFs.

- *Casa Systems - 5G LTE Network Extender 4 for Enterprise User Guide* (this document)
- *Casa Systems - 5G LTE Network Extender 4 for Enterprise Install Reference Guide*

Support information

For detailed instructions and device information, visit:

www.verizon.com/support/4g-lte-network-extender-enterprise-basics/

Customer Support: 800-922-0204

Acronyms

3GPP	Third Generation Partnership Project
4G	Fourth Generation Wireless Systems
AMBR	Aggregate Maximum Bit Rate
APN	Access Point Name
ARP	Address Resolution Protocol
ARP	Allocation and Retention Priority
CP	Cyclic Prefix
CS	Circuit-Switched
CSG	Closed Subscriber Groups
DSCP	Differentiated Service Code Point
E-UTRAN	Evolved UMTS Terrestrial Radio Access Network
ECM EPS	Connection Management
eNB	E-UTRAN Node B
EMM	EPS Mobility Management
EPC	Evolved Packet Core
ESM	EPS Session Management
ESP	Encapsulating Security Payload
GBR	Guaranteed Bit Rate
GPRS	General Packet Radio Service
HO	Handover
IMEI	International Mobile Equipment Identity
IMS	IP Multimedia Subsystem
IMSI	International Mobile Subscriber Identity
IP	Internet Protocol
IPsec	Internet Protocol Security
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
L1	Layer 1 (physical layer)
L3	Layer 3 (network layer)
LB	Load Balancing
LTE	Long Term Evolution

MBR	Maximum Bit Rate
MIB	Master Information Block
MME	Mobility Management Entity
MSC	Mobile Switching Center
PLMN	Public Land Mobile Network
QCI	QoS Class Identifiers
QoS	Quality of Service
SCTP	Stream Control Transmission Protocol
TA	Tracking Area
TAI	Tracking Area Identifier
UDP	User Datagram Protocol
UE	User Equipment
UL	Uplink
VM	Virtual Machine

Safety Warnings



AC System: Disconnect AC power, before servicing.



RF Cable Installation: Installation shall be in accordance with the applicable parts of Chapter 8 of ANSI/NFPA 70.



Circuit Breaker: Branch circuit protection.

The power system must be equipped with external branch circuit protection that complies with NEC requirement and have a rating maximum of 20A. (Use UL-listed circuit breaker.)

Chapter 1. Getting Started

About this Chapter

This chapter provides Getting Started information for the 5G LTE Network Extender 4 for Enterprise eFemto. The following topics are covered in this chapter:

Topic	Page
Introduction	1-2
System Requirements	1-3
Network Extender 4 Basics	1-4

Introduction

This user guide introduces the 5G LTE Network Extender 4 for Enterprise eFemto designed to quickly enhance and extend the Verizon Wireless network experience for voice and data.

Figure 1-1. 5G LTE Network Extender 4 for Enterprise eFemto



This Network Extender provides the following features:

- This Network Extender is a simple-to-install device that provides enhanced in-building wireless service without having to change your existing 5G LTE mobile phone.
- This Network Extender allows users to easily install and configure the system by connecting to an existing broadband network.
- This Network Extender supports an embedded web server, which allows you to customize your device settings providing troubleshooting and operational data.

System Requirements

- This device supports Verizon Wireless mobile handsets which support 5G or LTE service with Advanced Calling turned on, as shown in Chapter 2, [Making a Call](#).
- Internet Access: This Network Extender requires an Internet connection to operate and must be connected to an available port on a router or modem with always-on Internet connection with a recommended bandwidth greater than 100mbps.

Note: A lower bandwidth configuration may impact the system performance and user experience.

- GPS signal: This Network Extender requires continuous GPS location to operate. Ensure the supplied GPS antenna is properly installed near or on a window with clear and open view of the sky. Sync LED should be green.
- Firewall modifications may be required to support the solution. Be sure to contact your IT administrator for the required changes. Please review the [Firewall Rules for Business](#) in Chapter 4. In the event that firewall changes are needed, please attempt to make these changes before calling into Customer Care.

Note: For more clarity on firewall settings, please see [Firewall Settings](#) in Chapter 4.

- The Network Extender supports IEEE 802.3ab Gigabit Ethernet Auto-Negotiation. Auto-Negotiation is a requirement of 802.3ab and may cause a speed and/or duplex mismatch if not fully enabled on the Network Extender switch/router port.

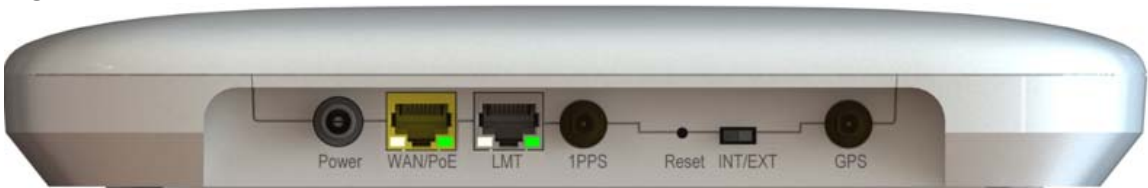
Casa recommends that full auto-negotiation be enabled on the user's router. If the Network Extender does not come into service as either 100/Full or 1000/Full or 2500/Full, the recommendation is to configure statically as either 2500/Full (if capable) or 1000/Full.

Note: If 100/Full is used, the Network Extender can go into service, but throughput will be limited.

Network Extender 4 Basics

This section will guide you through the basic features and functions of your Network Extender. [Figure 1-2](#) details the ports on the back of the Network Extender.

Figure 1-2. Network Extender 4 Ports



The RF Antenna of the Network Extender is embedded in the Front cover and 4 different external antenna ports (optional) are located on the top of the Network Extender.

The included GPS antenna is required for the automated setup process and is necessary in the event the mobile phone is used to call for emergency services while in the coverage area of the Network Extender. [Table 1-1](#) provides port information for the Network Extender.

The Network Extender has multiple, single color LEDs used to indicate the device connectivity status. Please refer to [Chapter 5, Troubleshooting](#) when attempting to troubleshoot the solution.

Table 1-1. Network Extender 4 Port Descriptions

Port Name	Function
Power	To connect Power Supply (12V DC).
WAN/PoE	To connect to a Power over Ethernet (PoE) and/or Wide Area Network (WAN) Port.
LMT	Local Monitoring Terminal Port to manage setting and display device status.
1PPS	Reserved for future use.
Reset	Factory Reset.

Table 1-1. Network Extender 4 Port Descriptions (continued)

Port Name	Function
INT/EXT	To select antenna INT (Internal)/EXT (External). Note: Refer to Chapter 6, Specifications for more information on Internal Antenna specifications. WARNING: Incorrect use of this switch may cause PA damage. Refer to INT/EXT Antenna Switch (page 2-22) for important information on the proper use of the INT/EXT switch.
GPS	To connect GPS antenna and receive GPS signal.

Chapter 2. Installation

About this Chapter

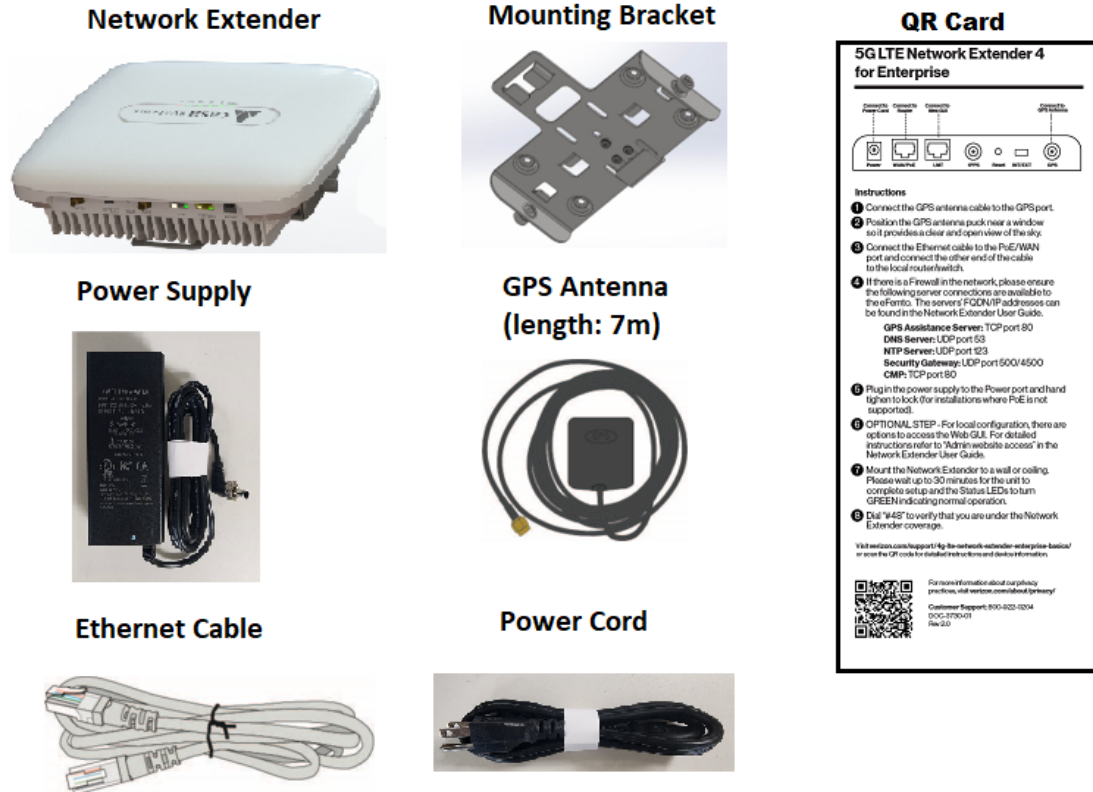
This chapter includes installation information for the 5G LTE Network Extender 4 for Enterprise eFemto. The following items are described in this chapter:

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Unpacking the Box

The following items are provided in the Network Extender box:

Figure 2-1. What's included in the box



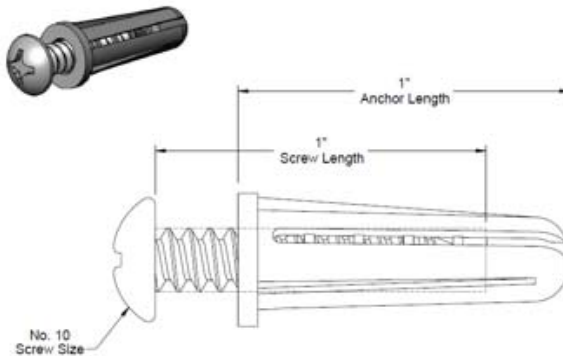
Optional Accessories

Optional Accessories are available for the Network Extender. Refer to [Chapter 7, Optional Accessories](#) in this guide for more information.

Required Fasteners (not provided)

The fasteners shown in [Figure 2-2](#) (Qty: 4) are required to mount the Network Extender to the wall.

Figure 2-2. Fasteners (not provided)



Coverage Area

The coverage area of the Network Extender varies based on many factors including; the layout and building materials of the location in which it is deployed. An open floor plan will allow for greater coverage as compared to an office space with many metal and/or concrete walls, which impede the cellular signal.

Use [Table 2-1](#) to estimate coverage area and recommended distance between network extenders when deploying more than one in a location.

Table 2-1. Coverage area

Building Layout	Approximate Range of Network Extender (radius)	Recommended distance between network extenders
Open	200 feet	320 feet
Medium	100 feet	170 feet
Dense	70 feet	120 feet

Note: Coverage area can vary depending on number and size of obstructions and building material types.

Building Layout

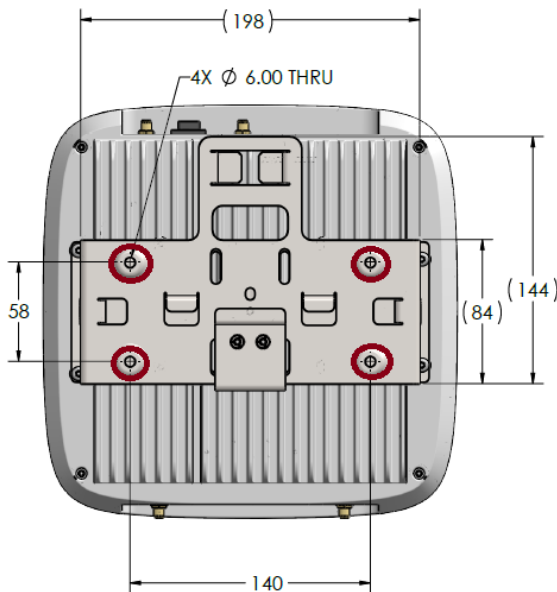
- Open: open layout with no or few internal walls.
- Medium: mixed layout with open and scattered walled offices.
- Dense: walled office layout with narrow hallways.

Installing the Wall Bracket

Marking the mounting position

Before placing the Network Extender, mark the position where it will be installed and also the positions where anchor bolts will be fixed using a pen or pencil. Mark the 4 holes using the bracket as a guide (see [Figure 2-3](#)).

Figure 2-3. Anchor locations

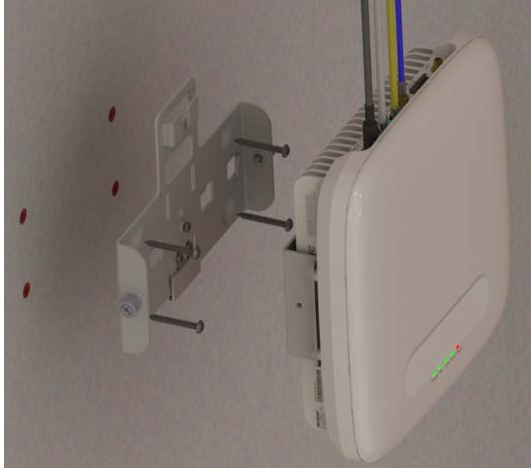


When anchoring on a wall, ensure the positions are marked as horizontal or vertical, as only a limited range of tuning is allowed for leveling after the system is mounted.

Securing the Mounting Bracket to the Wall

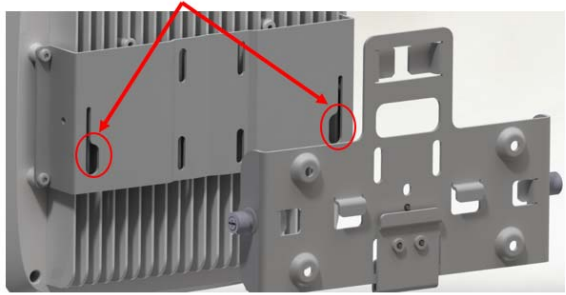
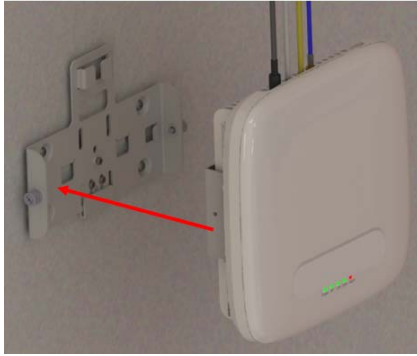
1. Attach the upper bracket to the wall/ceiling (see [Figure 2-4](#)).

Figure 2-4. Attach bracket



2. Align the tabs on the upper bracket with the opening on the lower bracket and push inward (see [Figure 2-5](#)).

Figure 2-5. Align tabs



3. Push downward to seat the unit (see [Figure 2-6](#)).

Figure 2-6. Seat the unit



4. Tighten the screw fasteners, one on each side (see [Figure 2-7](#)).

Figure 2-7. Tighten the fasteners



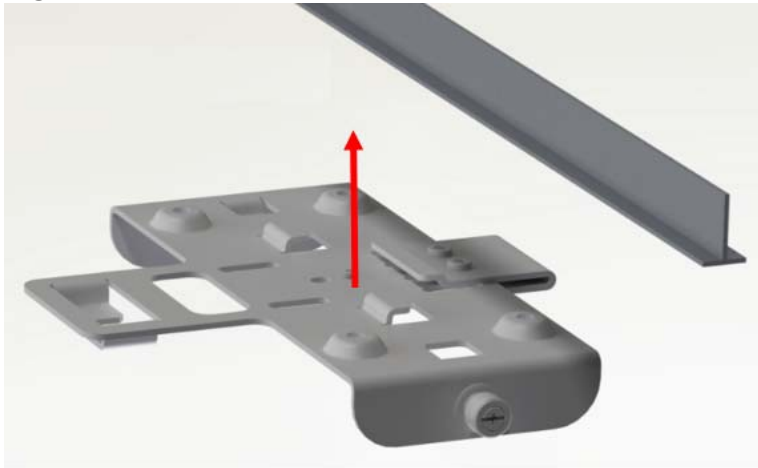
Securing the Mounting Bracket to a Dropped Ceiling

The following procedure details how to attach the Network Extender in a suspended ceiling application.

WARNING: Before installing the Network Extender to a dropped ceiling, the installer should ensure that the structure is secure and capable of supporting the weight of the Network Extender. Additional ceiling support hangers may be required to ensure a safe installation and all hangers used for installing the Network Extender should adhere to local building codes.

1. Push the upper bracket up against the bottom of the T-Rail (see [Figure 2-8](#)).

Figure 2-8. Push upper bracket



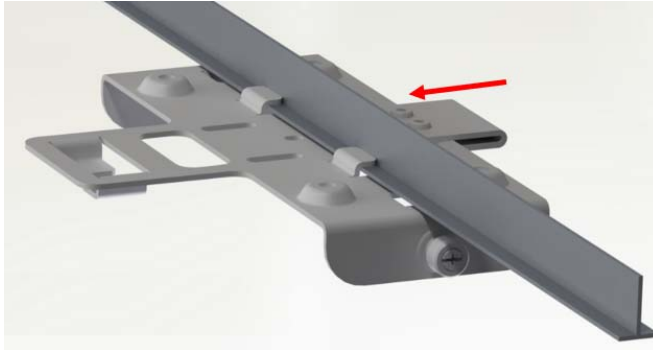
2. Push the upper bracket back against the T-Rail to engage the tabs (see [Figure 2-9](#)).

Figure 2-9. Engage tabs



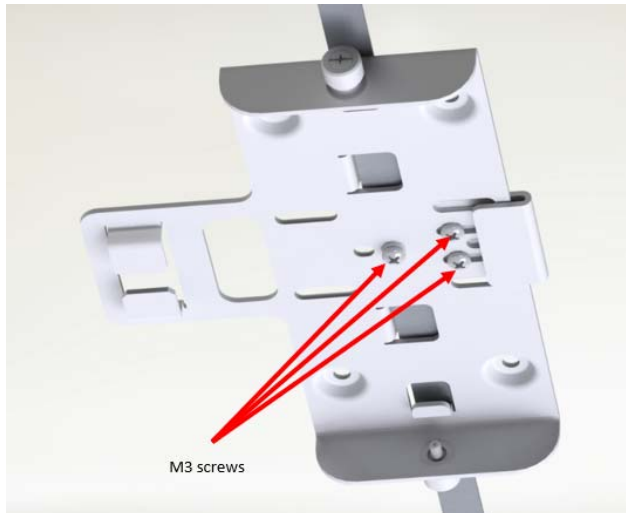
3. Push the clamp back against the T-Rail to engage tabs on both sides of the rail (see [Figure 2-10](#)).

Figure 2-10. Push clamp



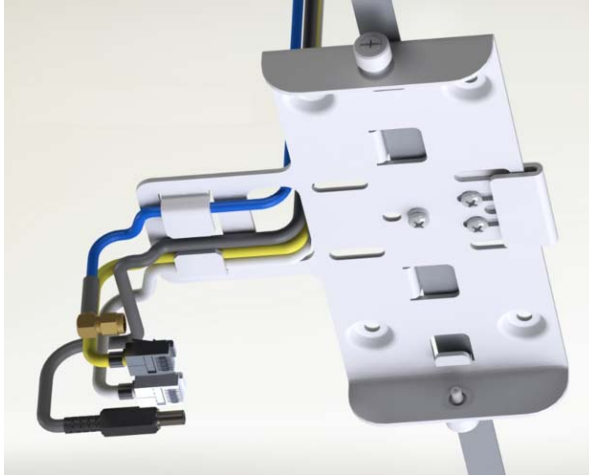
4. Tighten the three M3 screws to lock the clamp and the upper bracket onto the T-Rail (see [Figure 2-11](#)).

Figure 2-11. Tighten screws



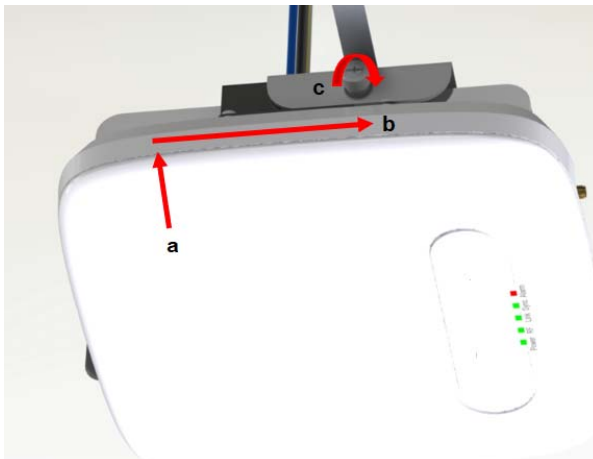
5. Route the cables in the cable management tabs (see [Figure 2-12](#)).

Figure 2-12. Route cables



6. Push the Network Extender up (a) and back (b) locking it into the upper bracket, then tighten the screw fasteners (c) on both sides (see [Figure 2-13](#)).

Figure 2-13. Push the unit

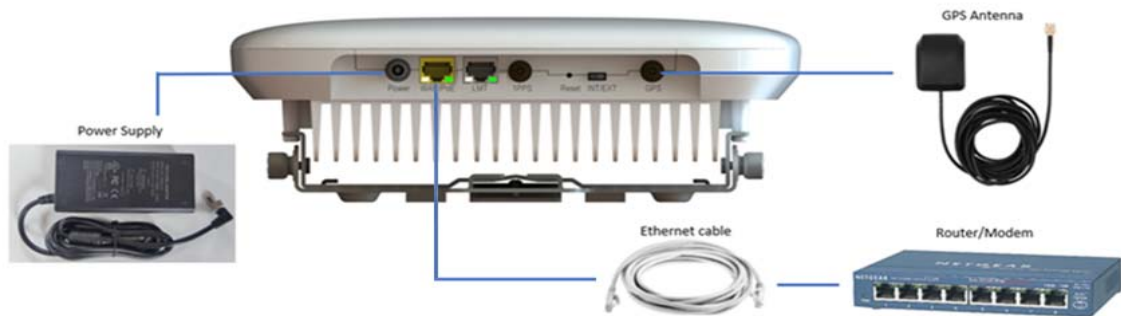


Connecting the Cables

The Network Extender unit can be connected to the network via an Ethernet connection. The Ethernet connection is plug-and-play.

1. Connect the GPS antenna cable to the GPS port on the unit (see [Figure 2-14](#)).

Figure 2-14. Network Extender 4 Connections



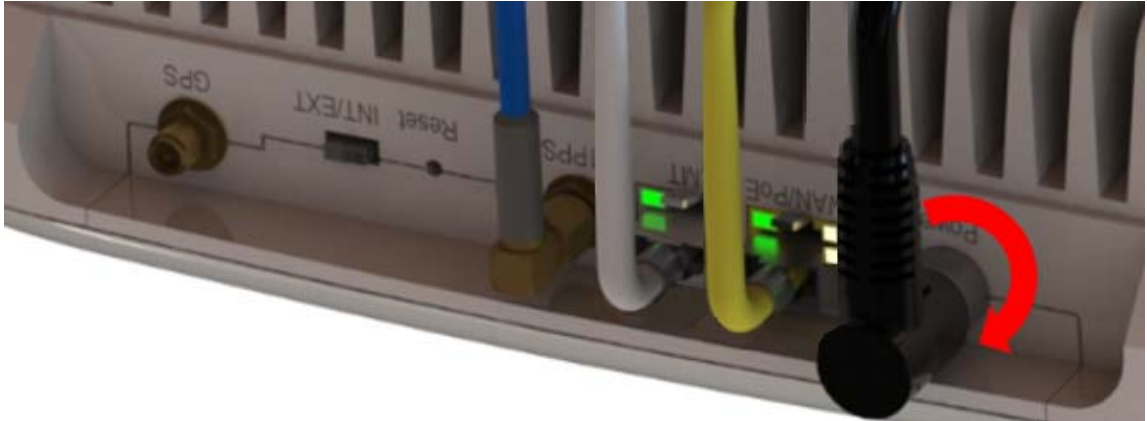
2. Position the GPS antenna puck near a window so it provides a clear and open view of the sky.

WARNING: The unit will not connect to the network if the GPS antenna fails to lock on its location.

3. Connect the Ethernet cable to the PoE/WAN port on the unit.
4. Connect the other end of the Ethernet cable to a port on the home router/switch or connect it to the Ethernet outlet that has service.

5. To install the power cable, it should be plugged in and twisted clockwise to secure the power cord in the lock position (see [Figure 2-15](#)).

Figure 2-15. Lock the power cable



Optional Mounting Configurations

The Network Extender can be mounted on a plenum above the ceiling (see [Figure 2-16](#)) or on a pole (see [Figure 2-17](#)).

Note: The mounting bracket cross bar (shown in [Figure 2-16](#)) is an accessory that is not included with the Network Extender and is shown for reference only.

Figure 2-16. Plenum above ceiling

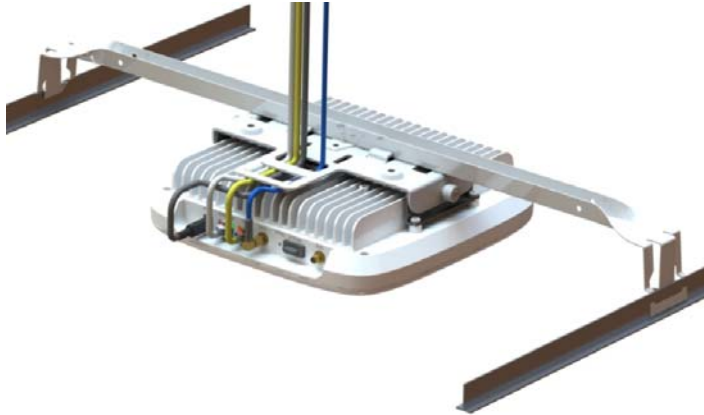


Figure 2-17. Pole mount installation



Startup Sequence

The following steps provide detail Network Extender states during the startup sequence. [Table 2-1](#) provides functional details for each status LED during the startup sequence.

Table 2-1. Status LED Functions

LED Function	Color	Status
Power		OFF: Power not detected.
		ON: All the power rails are present.
		Flashing: Unit booting or firmware upgrading.
4G		OFF: 4G Radio activity disabled, not transmitting and receiving.
		ON: 4G Radio activity enabled, unit transmitting and receiving.
5G		OFF: 5G Radio activity disabled, not transmitting and receiving.
		ON: 5G Radio activity enabled, unit transmitting and receiving.
Link		OFF: Ethernet link down.
		ON: Ethernet link up.
Sync		OFF: Synchronization not established with the GPS.
		ON: GPS synchronization complete.
		Flashing: Lost GPS synchronization.
Alarm		OFF: No alarms detected.
		Flashing: System critical alarm.

1. Powered-on and hardware initializing.

The Network Extender State: The device has been powered on and the system is performing hardware tests.

Note: The Network Extender is under an autonomous hardware test cycle. It is not possible to load or run any software, including the user Admin Website Page.

2. Hardware test completed and software loaded (“Boot Complete”).

The Network Extender State: The device has completed hardware initialization and loaded all software.

Admin Website State: The software is loaded. The Admin Website is accessible only from the LMT port.

Note: The device has completed its autonomous hardware tests and loaded all software. It will start the process of connecting to Verizon’s network and coming into service. See [Chapter 3, Web GUI](#) for information on how to log into the Network Extender Admin Web page.

3. Acquired IPv4 address (“Acquired an IP address”).

The Network Extender State: The device is running its software and has started to connect to the Verizon network.

The unit is configured by default to acquire a local IPv4 address from the local DHCP server.

Admin Website State: The Admin Website is accessible from the LMT and WAN ports.

4. Conducting DNS lookups (“Identifying the Initial Network”).

The Network Extender State: The device has acquired a local IPv4/IPv6 address from local DHCP. The next step is to conduct DNS lookups for the public FQDNs provisioned at the factory.

Admin Website State: The Admin Website is accessible.

Note: The Network Extender needs to resolve the FQDNs for A-GPS, and initial SeGW from the public DNS server.

5. GPS acquisition in progress (“Waiting for GPS position fix”).

The Network Extender State: The device is awaiting a GPS fix before progressing.

Admin Website State: The Admin Website is accessible.

Note: Until a GPS fix is provided, the device will not be able to continue and receive configuration information.

6. Attempting to reach the Initial SeGW (“Attempting to reach Initial network”).

The Network Extender State: The device has conducted DNS lookups for the public FQDNs provisioned at the factory and is trying to contact the initial SeGW.

Admin Website State: The Admin Website is accessible.

Note: This status details that the Network Extender has attempted to communicate with the SeGW.

7. Successfully reached the Initial SeGW (“Successfully reached the Initial network”).

The Network Extender State: The device has contacted the initial SeGW successfully.

Admin Website State: The Admin Website is accessible.

Note: Status details that the device can communicate with the SeGW, but the IPSec tunnel is still not established at this point.

8. VPN setup to Initial SeGW completed (“Authentication to Initial Network completed successfully”).

The Network Extender State: The device has brought up the IPSec tunnel with the initial SeGW.

Admin Website State: The Admin Website is accessible.

Note: This confirms that the device has set up a VPN connection with Verizon's network.

Note: Authentication failure during IPSec tunnel setup to Initial SeGW (“Authentication failure to Initial Network. Unit is not provisioned. Please contact Verizon Wireless Customer Care for further assistance”).

Note: Refer to [Chapter 5, Troubleshooting](#) for information on Alarm conditions.

The Network Extender State: The device has failed to set up a VPN tunnel with the initial SeGW with an explicit “Authentication Failure.”

Admin Website State: The Admin Website is accessible.

Note: This details that the device been notified it failed authentication with the Verizon Authentication server.

9. Connection with the management system (“Connecting to Initial Management Server”).

The Network Extender State: The device acquired location information and is connecting with the AeMS.

Admin Website State: The Admin Website is accessible.

Note: The device will be allocated a serving AeMS and possibly an alternate serving SeGW based on its location. It may re-establish IPSec to the new SeGW at this point if required. If not, it will contact the AeMS and request configuration information.

10. Software download in progress.

The Network Extender State: The device is assigned a AeMS and has been instructed to download new software.

Admin Website State: The Admin Website is accessible.

Note: The device will download the newest software and reboot. The process will start from the first steps again, but the GPS acquisition will occur much faster.

11. Configuration download in progress.

The Network Extender State: The device is communicating with the Verizon management system (AeMS) and may have received new software. It will need to complete the “Radio Environment Scan” before receiving additional configuration parameters.

Admin Website State: The Admin Website is accessible.

12. Operational status.

The Network Extender State: The device is in normal in-service operation and has completed all steps.

Admin Website State: The Admin Website is accessible.

Note: If the Alarm LED state is Red, this means an alarm condition has occurred. In this case, please refer to [Chapter 5, Troubleshooting](#) for more information on alarm codes.

Indoor GPS Antenna

The Network Extender receives timing information from the GPS. The Network Extender is required to be placed such that the GPS receiver has an unobstructed line of sight with at least 4 strong satellites in order for it to get a position fix during the booting process. Thereafter, the Network Extender is required to maintain sync with at least one satellite to be able to continue to monitor the position fix.

Without adequate GPS signal, the Network Extender cannot function properly. When positioning the Indoor GPS antenna, ensure that it is:

- Installed in a horizontal position.
- Adjacent to a window and in an open area. This ensures clear reception of the GPS signal.
- GPS antenna with 7m coax cable (included)

Note: Extended length GPS antenna cables and PTP servers are available, see Verizon Network Extender support page

This section outlines the installation and relocation of the indoor GPS antenna assembly.

1. Ensure that the Network Extender is turned off.
2. Connect the provided Indoor GPS antenna cable to the GPS port on the Network Extender.
3. Place the antenna near a window where the GPS signal is stronger. To help evaluate GPS signal quality in each location, a free smart phone application called “GPS Test” can be used.
4. Turn on the Network Extender to allow the detection of an available GPS signal.

Notes:

If GPS signal cannot be detected, reposition the GPS antenna and place it in a new location to receive a stronger signal. This new location should be located close to a window. In some cases, if the GPS signal indoors is very weak, an external outdoor GPS (not included) may need to be installed.

A GPS signal is required for proper operation and E911 service. If a GPS signal is not acquired after 30 to 60 minutes, please see [Chapter 4, Configuration](#).

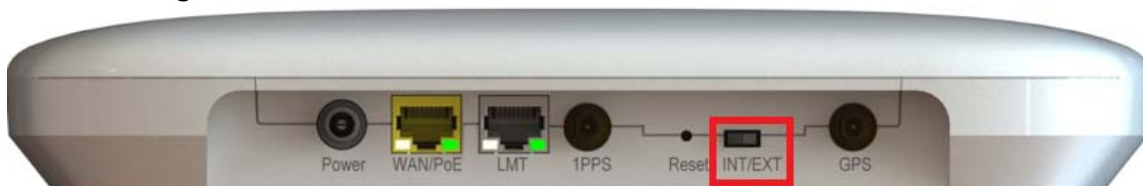
To see the status of the GPS acquisition, use the Admin website (Local) as shown in [Chapter 3, Web GUI](#).

INT/EXT Antenna Switch

The Network Extender provides a switch (INT/EXT) (see [Figure 2-18](#)) used to select an Internal or External Antenna for the Network Extender.

Note: Refer to [Chapter 6, Specifications](#) for more information on the INT/EXT Antenna port.

Figure 2-18.INT/EXT Switch



Setting the Network Extender to EXT without an external antenna connected will end with PA damage. Changing the switch during unit operation produces the same effect.

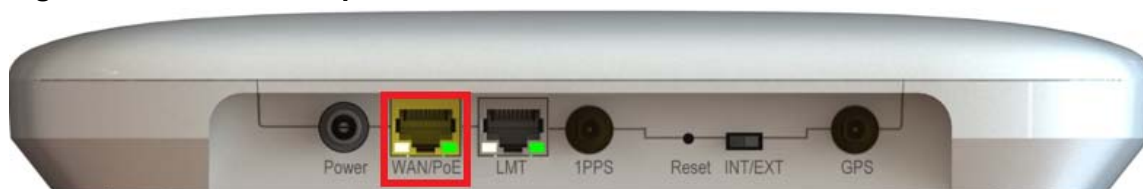
- INT means internal antennas are used.
- EXT is to use the connectors available in the back to connect external antennas/DAS.

Warning: The mechanical switch should be changed only when the unit is powered off or when the radio is disabled.

PoE Device

The Network Extender provides the ability to be powered with an ultra-high Power over Ethernet (Class 5 PoE++) source (see [Figure 2-19](#)).

Figure 2-19. WAN/PoE port



[Table 2-2](#) provides the recommended PoE specifications for the Network Extender.

Table 2-2. Recommended PoE Specifications

Characteristic	Recommendation
Maximum Output Power	60W
Output Current	960mA ~ 1.1A
Minimum Voltage	50V
Ethernet Output Interface Specification	CAT5e or better 4-pair powering: (Pin 3,4,5,6(+) Pins 1,2,7,8(-))

The Network Extender's PoE details are as follows:

Power class negotiation

- The eFemto is a Power Class 5 powered device (PD) being able to use Power Class 5 or higher PSEs. The eFemto fully complies with the IEEE 802.3bt standard supporting software-based power class negotiation using LLDP protocol. When the units is powered by 802.3bt or above, it will ask for 50W and when it is powered by 802.3at, it will report alarm and the radio will not be enabled.
- The maximum distance between PSE and the eFemto when powered by PoE is 100m as per standard. The eFemto provides the ability to detect if both PoE and AC power adapter are inserted and select the power source.
 1. The PoE and the AC power adapter can be plugged in at the same time on the eFemto.
 2. The AC Power will be the primary if it is plugged in.
 3. The eFemto does failover to AC power if PoE fails and AC Power will always continue to supply power.

Note: The device automatically detects POE power class, and disables the RF when there is not enough power for the device to operate.

The LED indicator on the Network Extender indicates errors associated with the PoE port (such as Alarm ID 30051 - Low DC Power). For more details on eFemto Alarms, refer to [Chapter 5, Troubleshooting](#).

Making a Call

Once the Network Extender is in service, your phone must be within 50 feet of the Network Extender to connect to the Network Extender and make calls.

To verify your Verizon phones are connected to the Network Extender:

- Make sure your Verizon Wireless mobile phone has the Advanced Calling feature turned on.
- Dial #48 from your mobile phone and listen for the following confirmation: “You are under Network Extender coverage ...”
- Some phones may show a home icon when you are under Verizon Network coverage.

Note: The Network Extender's coverage depends on environmental factors, such as physical structures and the strength of external cell towers.

To turn on Advanced Calling on your Verizon Wireless phone, follow the steps below for your device's operating system:

- Android™: Go to Settings > Advanced Calling and turn ON service.

Note: On some devices, it may be found in Wireless Calling, HD Voice or VoLTE call.

- Apple® iOS: Go to Settings > Cellular > Cellular Data Options > Enable LTE > Voice & Data. Additionally, on the “My Verizon” Mobile App, enable Advance Calling feature for your phones.
- Windows®: Go to Settings > Cellular+SIM > SIM settings and turn ON Advanced Calling.

Chapter 3. Web GUI

About this Chapter

This chapter contains detailed information regarding the 5G LTE Network Extender 4 for Enterprise Admin Website (Local) where you can monitor the device status and make changes to settings. The following topics are covered in this chapter:

Topic	Page
PC Requirements	3-3
Accessing the Network Extender GUI	3-3
Connect to the GUI via the Same Network	3-4
Connect to the GUI via the LMT Port	3-4
Logging into the Network Extender GUI	3-7
Changing the Administrator Password	3-8
Setting a User Password	3-8
Security Questions	3-9
Setting a Security Answer	3-9
Network Extender GUI Overview	3-10
Web GUI Header Bar	3-10
4G Service State Management	3-12
Network Extender Alarms	3-13
Dashboard	3-14
Operational Status	3-14
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Connected Devices	3-18
Performance	3-19
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Alarms	3-22
Settings	3-24
Network Settings	3-24
4G Advanced Settings	3-30
5G Advanced Settings	3-32
Sync & Time Settings	3-34
Certificate Management	3-35
User Settings	3-36
Device Tools	3-37
About	3-38
Support	3-38

PC Requirements

To access the Admin Website, a PC should satisfy the following conditions:

- Internet Explorer: 11 (Edge is recommended)
- Chrome: 35.0.1916.153 or higher version
- Firefox: 30.0 or higher version
- Safari: 7.0.2 or higher version
- Internet connection

Accessing the Network Extender GUI

There are two ways to access the Network Extender website GUI.

1. Connect to the GUI via the same network (refer to [Connect to the GUI via the Same Network](#) section in this Chapter).
2. Connect to the GUI via the LMT port (refer to [Connect to the GUI via the LMT Port](#) section in this Chapter).

Connect to the GUI via the Same Network

To connect to the Network Extender GUI, you need to know the Network Extender IP address and your computer needs to be connected to the same network of the Network Extender.

1. Use a computer connected to the same network as the Network Extender.
2. Open a browser.
3. Enter the IP address of the Network Extender into the address bar:

https://< IP address of Network Extender>

4. Go to [Logging into the Network Extender GUI](#) section in this Chapter.

Connect to the GUI via the LMT Port

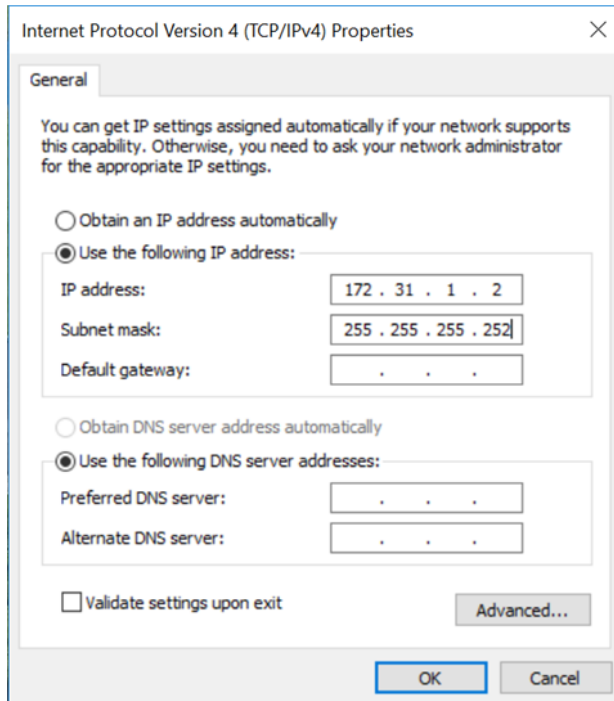
To connect to the Network Extender GUI, you will need to change your TCP/IPv4 settings to connect directly to the LMT port from your laptop, using an Ethernet cable.

To access settings and manage the Network Extender, login to the web interface by following these steps:

1. In Windows, search for the **Control Panel**.
2. On the Control Panel dialog, click **Network and Internet > Network and Sharing Center**.
3. Click the **Local Area connection** icon that represents your Ethernet connection.

4. Change the Internet Protocol Version 4 (TCP/IPv4) Properties for the local computer Ethernet connection as shown in [Figure 3-1](#), then click **OK**.

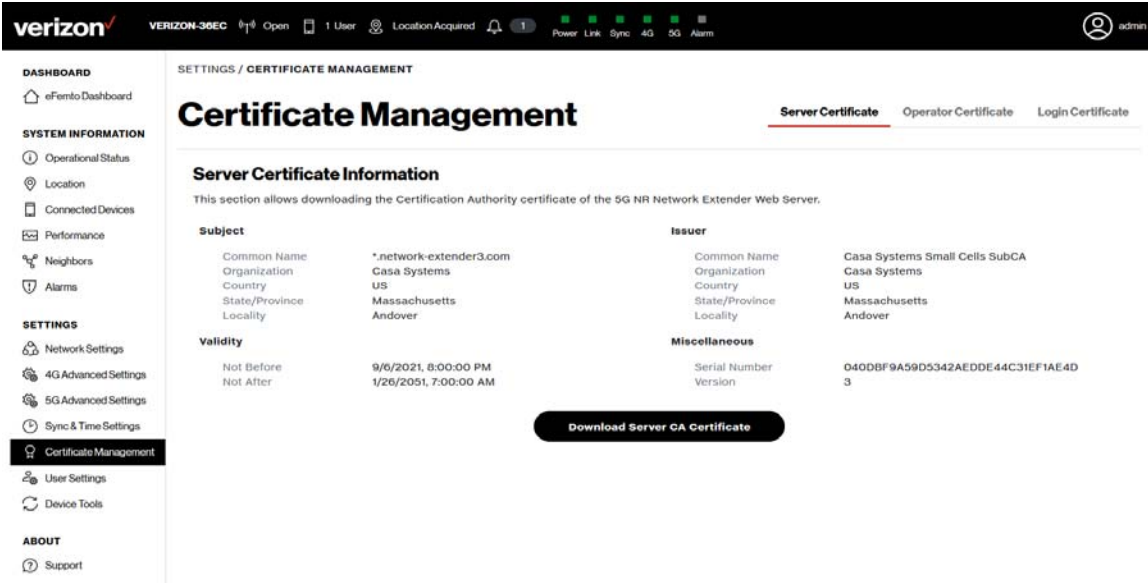
Figure 3-1. IPv4 (TCP/IPv4) Properties



5. Open Internet Explorer and enter <https://172.31.1.1/> into the address bar.
6. Click **Continue** and accept the self-signed Internet site certificate warning to launch the Network Extender 4 for Enterprise Admin Website.

Note: The device CA certificate can be downloaded from the Certificate Management page and added to trusted certificates in the Web browser to avoid future warnings (see [Figure 3-2](#)).

Figure 3-2. Certificate Management



7. Go to [Logging into the Network Extender GUI](#) section in this Chapter.

Logging into the Network Extender GUI

1. Once you are at the Welcome Page, enter the User and Password (see [Figure 3-3](#)).

The default administrator password is **VzWNetExtender4@ + last six digits of the MAC**. The MAC ID can be found on the label on the side of the Network Extender.

Example: VzWNetExtender4@213DA5

Note: The password is case-sensitive. Letters in the last six digits of the MAC ID should be UPPER case. The default password and all Network Extender settings can be set back to default by pressing the reset button located on the back of the Network extender for more than 10 seconds.

2. Click **Log in**.

Figure 3-3. The login page

5G NR Network Extender
verizon✓

User

Password

[Forgot your password?](#)

[Login with certificate](#)

[Log in](#)

Changing the Administrator Password

If the user is logging in using the default password, a warning pop-up window will be displayed, asking the user to set a new password. Clicking the OK button on the pop-up will navigate the user to the **Settings > Change Admin Password** page.

The Network Extender Change Password tab allows you to change the local Admin Password for the Network Extender. In the event of a lost password, insert a mini precision screwdriver or insulated tool into the RESET hole on the back of the Network Extender and hold for 10 seconds to reset the Network Extender to factory default settings.

Setting a User Password

Set a user password following the rules described below:

- The password should be between 8 and 64 characters long.
- The password shall include uppercase characters, lowercase characters, numbers and special characters (!, “, #, \$, %, &, *, ?, @).
- The password should include one special character.
- The password should not include more than three identical characters in a row (“111”, “aaa”, “CCC”).
- The password should include at least one lowercase letter, one uppercase letter and one number.
- The new password should not be identical to the current password.

Security Questions

Select a Security Question among the five given questions listed below:

- What is your date of birth (mmddyy)?
- What is your birthplace?
- What was your first car?
- What is your mother's maiden name?
- What is your pet's name?

Setting a Security Answer

Set a Security Answer that should be between 1 and 64 characters long.

Network Extender GUI Overview

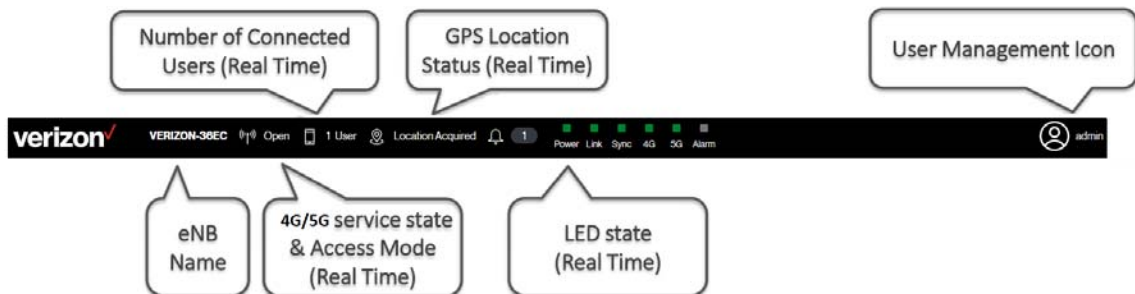
The Network Extender website GUI provides detail information on your Network Extender unit's status. You can also use the website to change settings. The Welcome page shows basic device information such as the Network Extender unit's MAC address, GPS location, device name, and IP address.

Web GUI Header Bar

The top of the Web GUI includes a Header Bar (see [Figure 3-4](#)) that provides contextual information which is dynamically updated by the Web GUI application in real time without the user's intervention.

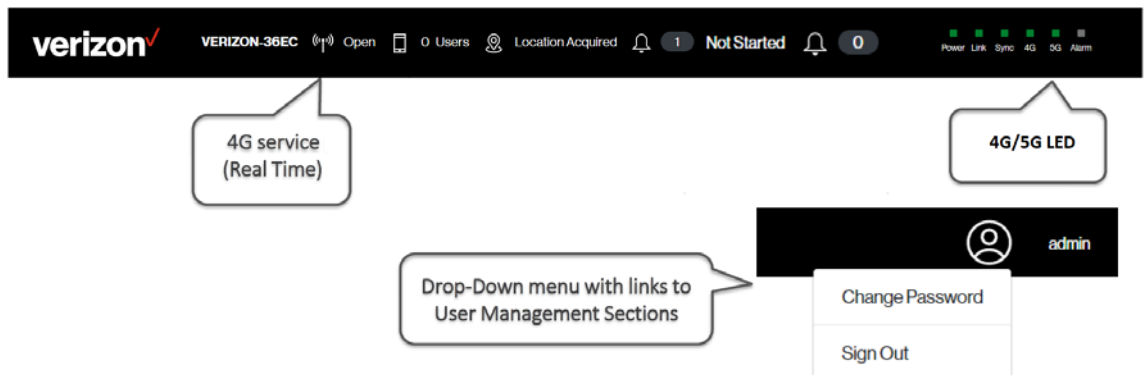
Header Bar information is common to all pages. The LEDs in the Header Bar show the same status as the physical LEDs on the Network Extender.

Figure 3-4. Header Bar



The Header Bar includes a shortcut to a drop-down menu providing access to the User Management sections and the ability to change the password and Sign Out (see [Figure 3-5](#)).

Figure 3-5. Header Bar drop-down menu



4G Service State Management

The Network Extender state management and operation mode is provided on the Header Bar and is maintained dynamically (see [Figure 3-6](#)). [Table 3-1](#) provides a short description for each Network Extender state.

Figure 3-6. Operational mode indicator



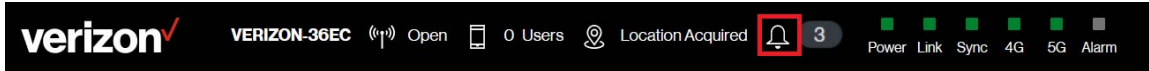
Table 3-1. Service States

Network Extender State	Description
NO SERVICE	LTE Service not active or stopped - No communication with the device or Critical Failure.
BOOT	LTE Service not active or stopped because the Network Extender device is booting.
ADMIN MODE	LTE Service not active or stopped because of ADMIN MODE activation.
OPEN	LTE Service active and OPEN Access Mode.
HYBRID	LTE Service active and HYBRID Access Mode.
CLOSED	LTE Service active and CLOSED Access Mode.

Network Extender Alarms

The alarms drop-down menu is accessible by clicking the alarm icon on the header bar (see [Figure 3-7](#)).

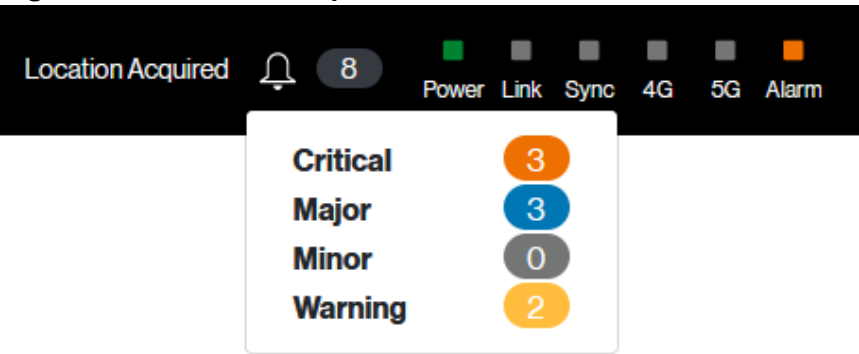
Figure 3-7. Alarm Icon



In this example (see [Figure 3-8](#)), the alarms drop-down menu shows the following alarms:

- 3 Critical Alarms
- 3 Major Alarms
- 0 Minor Alarms
- 2 Warning Alarms

Figure 3-8. Alarm drop-down menu

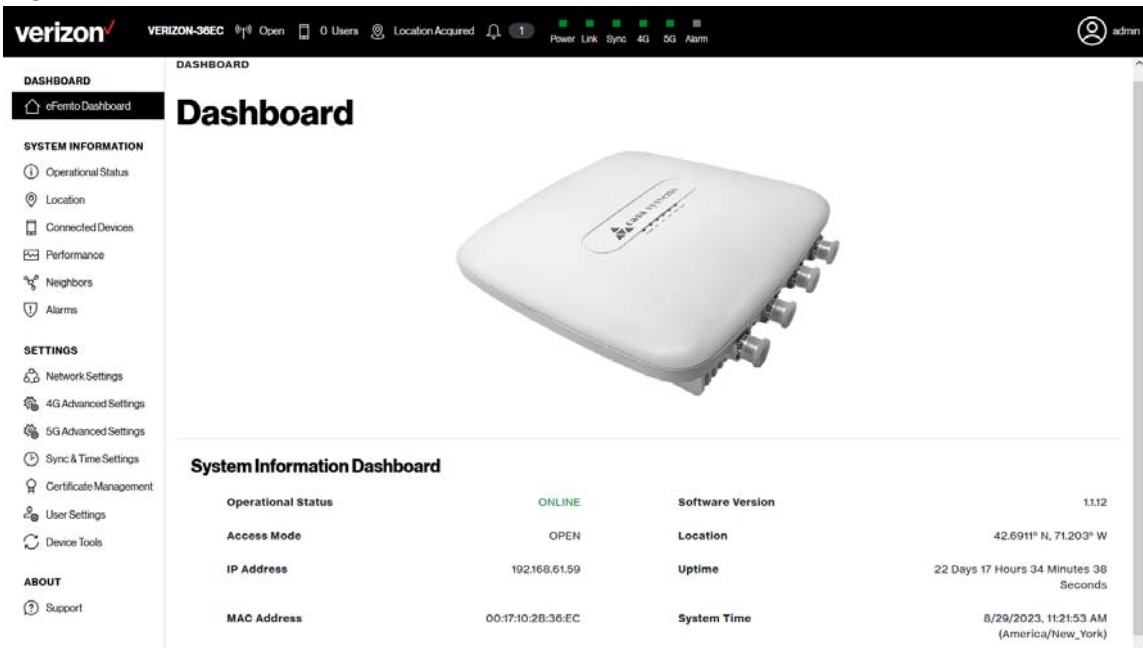


Dashboard

The Network Extender Dashboard (see [Figure 3-9](#)) provides both system information and Network Extender settings.

Refer to the following FAQ (in Appendix A) for detailed instructions:
[How to Verify the Device Access Mode](#)

Figure 3-9. Network Extender Dashboard



System Information Dashboard

Operational Status: Operational status of the Network Extender.

Access Mode: Access mode of the Network Extender.

IP Address: IP Address of the Network Extender.

MAC Address: MAC Address of the Network Extender.

Software Version: Latest version software loaded onto the Network Extender.

Location: GPS location of the Network Extender.

Uptime: Total time the Network Extender has been online.

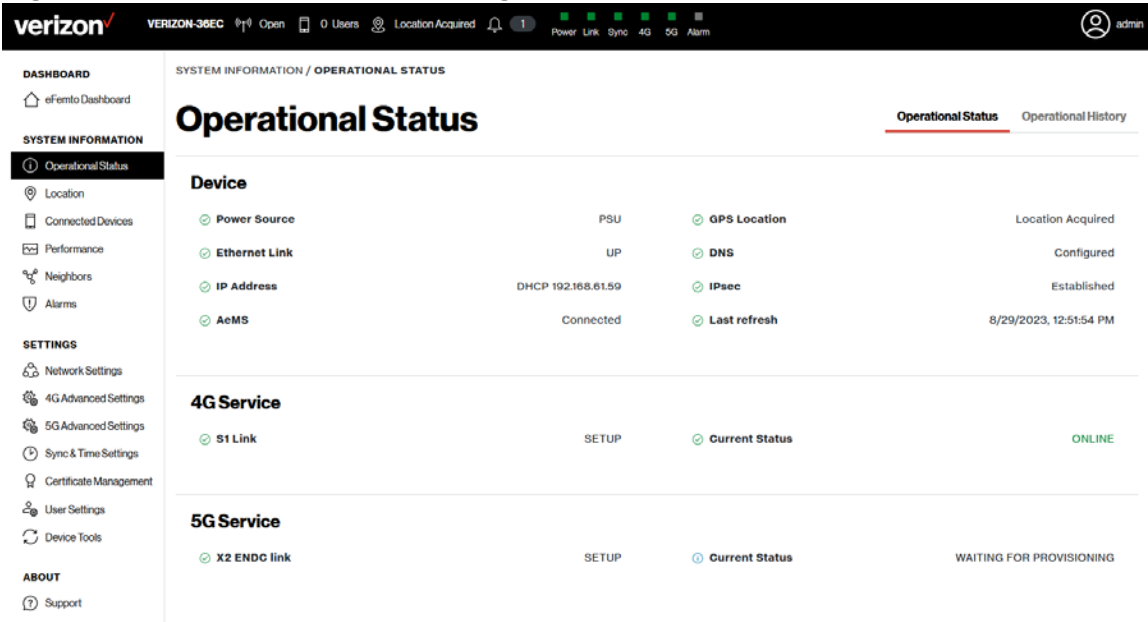
System Time: Date and time of the System which the Network Extender is connected.

Operational Status

The Operational Status page (see [Figure 3-10](#)) is a read only page and provides operational status for both the device and the 4G service.

Refer to the following FAQ (in Appendix A) for detailed instructions:
[How to Verify if the GPS Location was Acquired](#)

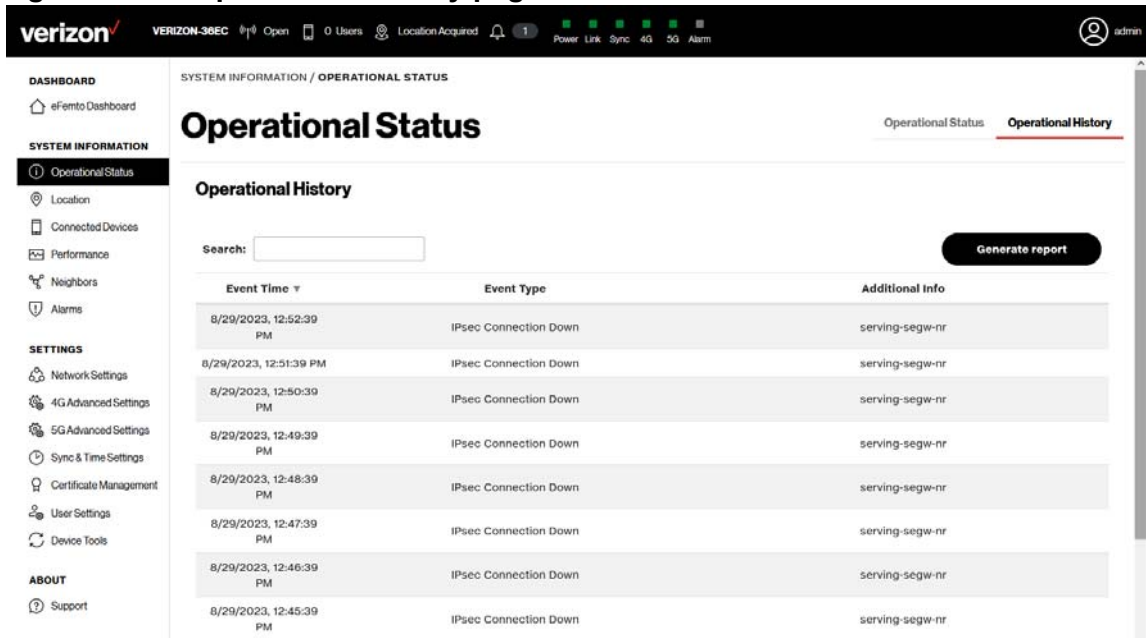
Figure 3-10. Operational Status page



Operational History

The Operational Status page is a read only page and provides operational history (see [Figure 3-11](#)).

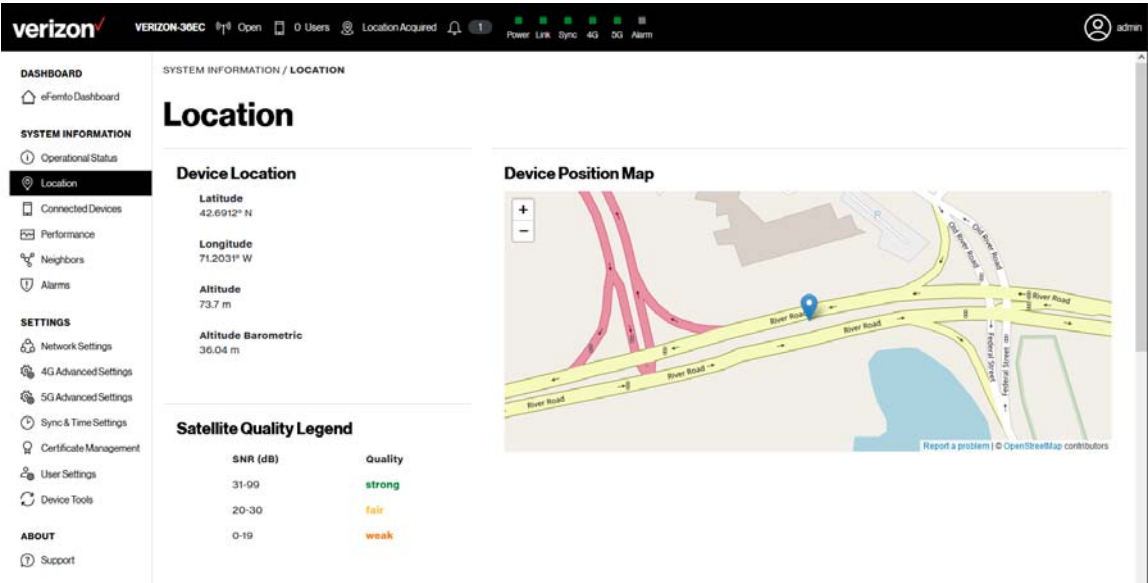
Figure 3-11. Operational History page



Location

The Location page is a read only page and provides specific location information for the device along with a position map (see [Figure 3-12](#)).

Figure 3-12. Location page

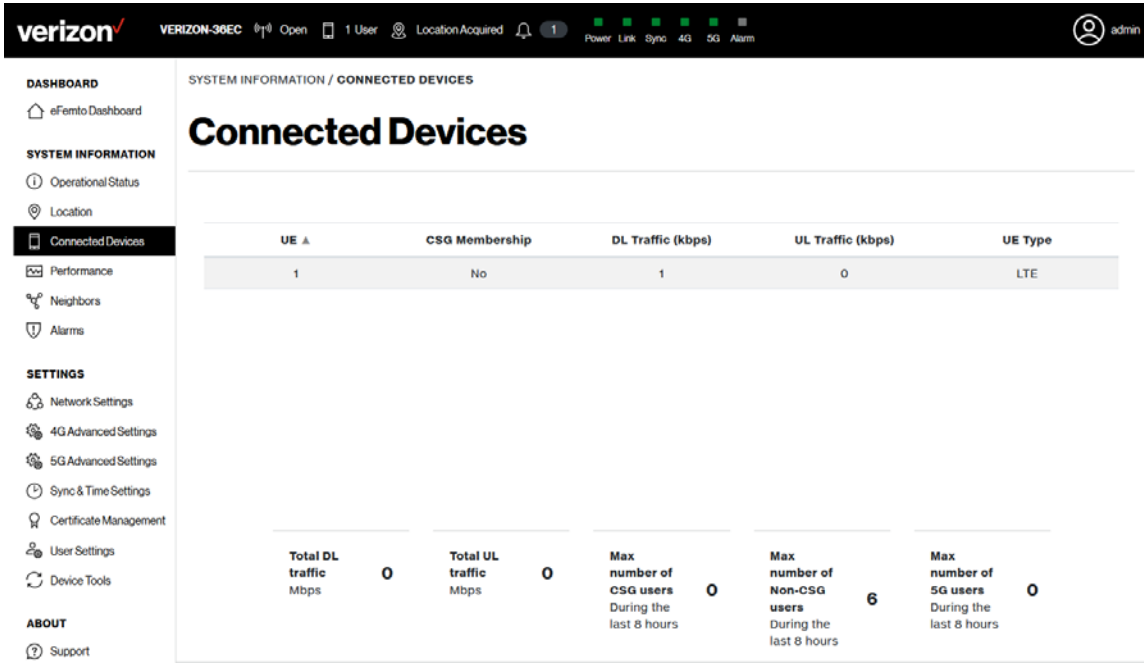


Connected Devices

The Connected Devices page is a read only page and provides specific information for all active UEs in the system (see [Figure 3-13](#)).

Refer to the following FAQ (in Appendix A) for detailed instructions:
[How to Check the Number of Connected Users](#)

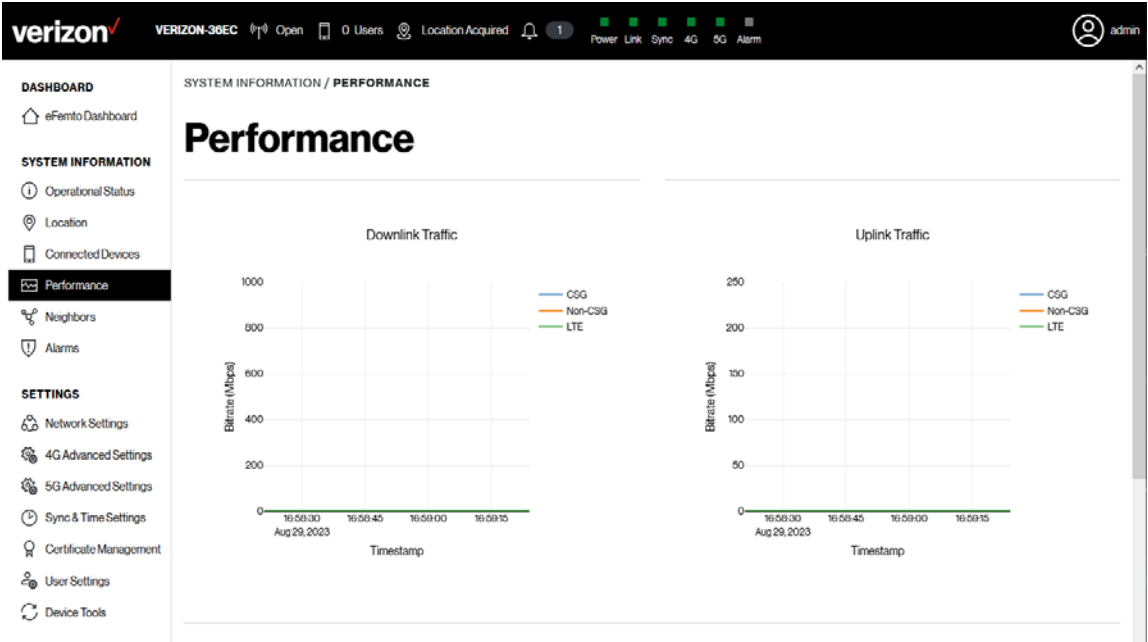
Figure 3-13. Connected Devices page



Performance

The Performance page is a read only page and displays traffic data for eNB Downlink and Uplink Traffic (see [Figure 3-14](#)).

Figure 3-14. Performance graphs

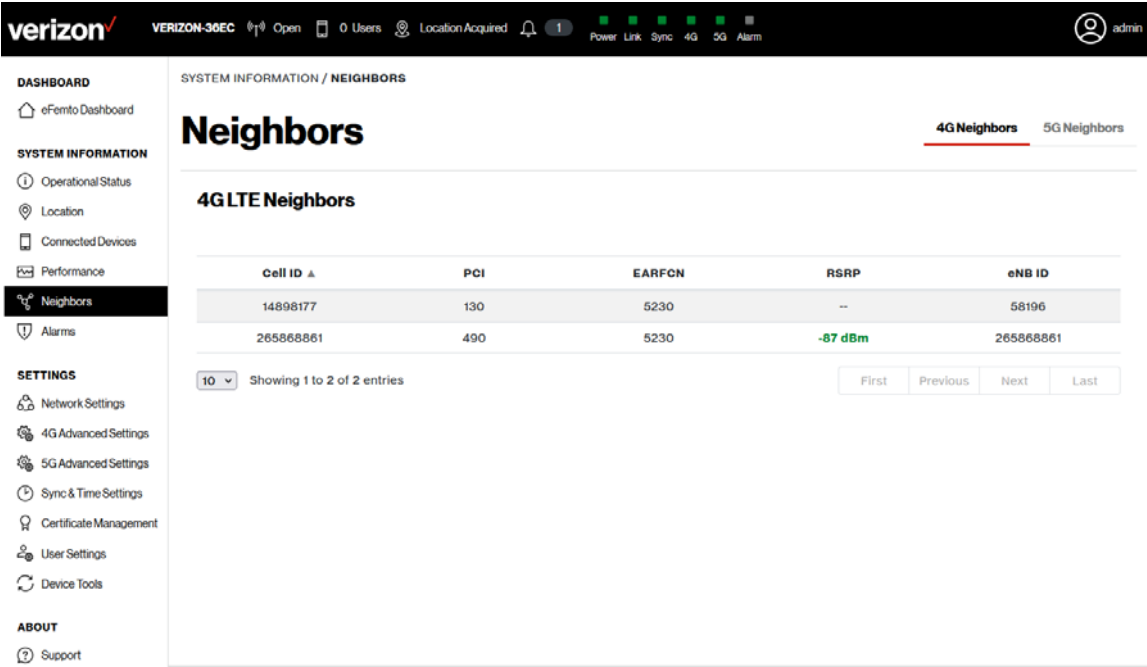


Neighbors

4G LTE Neighbors

The 4G LTE Neighbors page is a read only page and displays eNB information for small cells within radio range (see [Figure 3-15](#)).

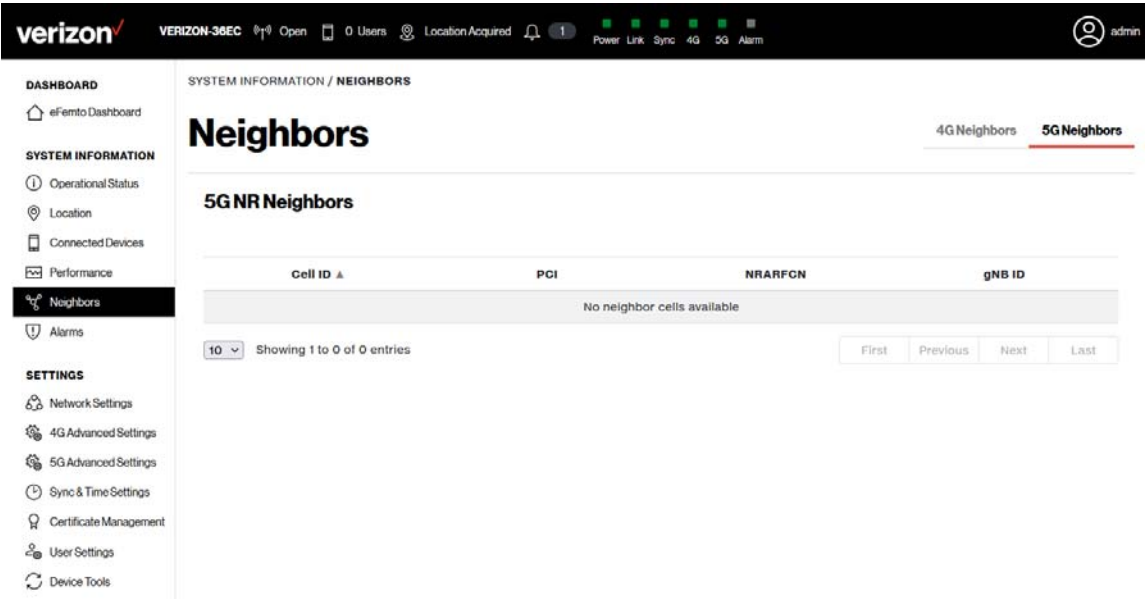
Figure 3-15. 4G LTE Neighbors



5G Neighbors

The 5G Neighbors page is a read only page and displays eNB information for small cells within radio range (see [Figure 3-16](#)).

Figure 3-16. 5G Neighbors



Alarms

The Alarms page is a read only page and displays Active Alarms data (see [Figure 3-17](#)) and Alarm History (see [Figure 3-18](#)).

Refer to the following FAQ (in Appendix A) for detailed instructions:
[How to Check the Active Alarms and Generate an Alarm Report](#)

Figure 3-17. Active Alarms page

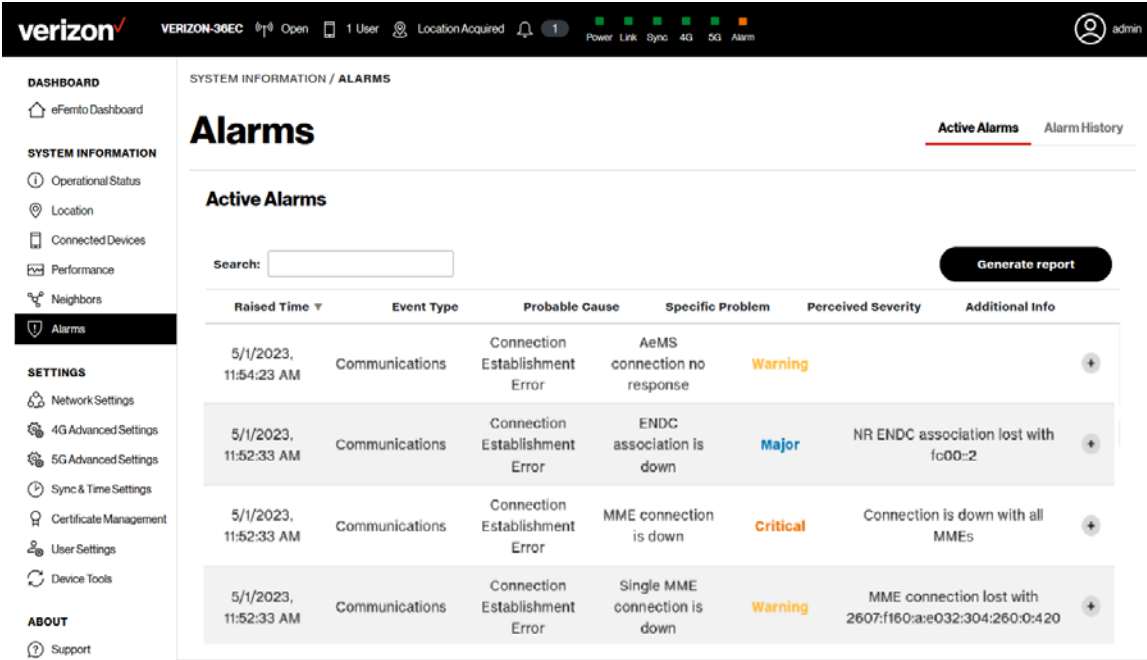


Figure 3-18. Alarm History page

verizon

VERIZON-38EC

Open

1 User

Location Acquired

1

Power

Link

Sync

4G

5G

Alarm

admin

DASHBOARD

eFemto Dashboard

SYSTEM INFORMATION

Operational Status

Location

Connected Devices

Performance

Neighbors

Alarms

SETTINGS

Network Settings

4G Advanced Settings

5G Advanced Settings

Sync & Time Settings

Certificate Management

User Settings

Device Tools

ABOUT

Support

SYSTEM INFORMATION / ALARMS

Alarms

Active Alarms

Alarm History

Alarm History

Search:

Generate report

Raised Time	Cleared Time	Event Type	Probable Cause	Specific Problem	Perceived Severity	Additional Info
8/29/2023, 4:58:34 PM	8/29/2023, 4:58:35 PM	Equipment	Loss of Synchronization	Synchronization lost with all sources	Major	
8/29/2023, 4:39:53 PM	8/29/2023, 4:39:54 PM	Equipment	Loss of Synchronization	Synchronization lost with all sources	Major	
8/29/2023, 4:36:10 PM	8/29/2023, 4:36:11 PM	Equipment	Loss of Synchronization	Synchronization lost with all sources	Major	
8/29/2023, 4:28:39 PM	8/29/2023, 4:28:42 PM	Equipment	Loss of Synchronization	Synchronization lost with all sources	Major	
8/29/2023, 4:15:11 PM	8/29/2023, 4:15:18 PM	Equipment	Loss of Synchronization	Synchronization lost with all sources	Major	
8/29/2023, 4:13:42 PM	8/29/2023, 4:13:45 PM	Equipment	Loss of Synchronization	Synchronization lost with all sources	Major	
8/29/2023, 4:02:31 PM	8/29/2023, 4:02:34 PM	Equipment	Loss of Synchronization	Synchronization lost with all sources	Major	

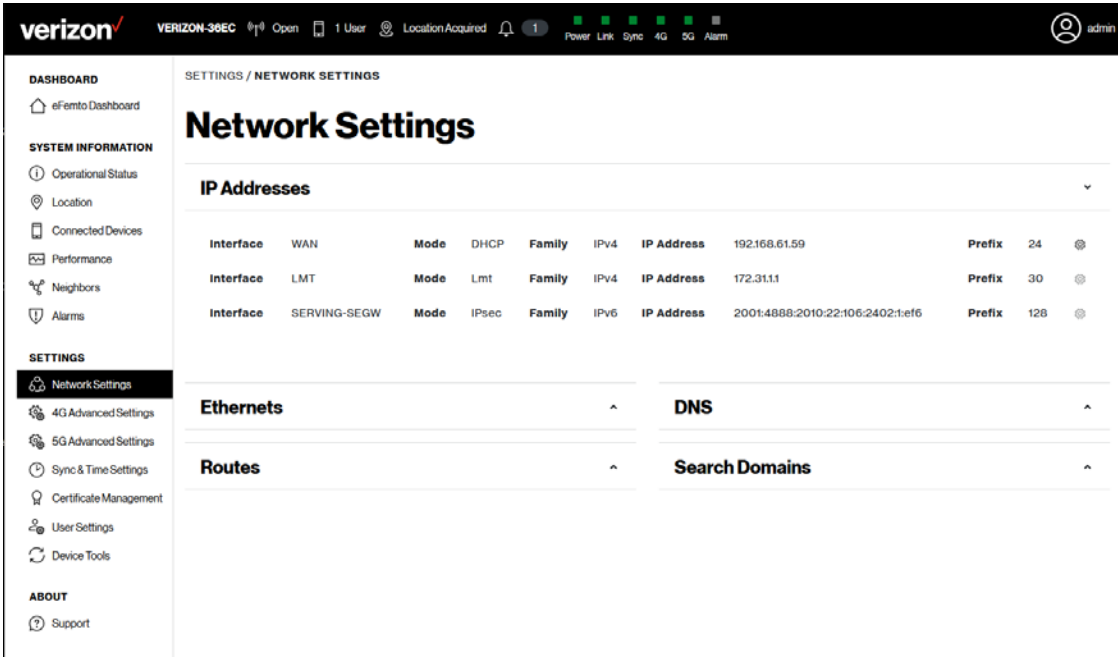
Settings

Network Settings

The Network Settings page (see [Figure 3-19](#)) displays the following:

- [IP Addresses](#),
- [Ethernets](#) information,
- [DNS](#) data,
- [Routes](#), and
- [Search Domains](#)

Figure 3-19. Network Settings page



IP Addresses

The IP Addresses section of the Network Settings page includes information on each Interface, Mode, Family, IP Address, and Prefix (see [Figure 3-20](#)).

Refer to the following FAQs (in Appendix A) for detailed instructions:

[How to Configure a Static IP Address](#)

Figure 3-20. IP Addresses

Network Settings

IP Addresses										
Interface	WAN	Mode	DHCP	Family	IPv4	IP Address	172.18.253.115	Prefix	24	
Interface	LMT	Mode	Lmt	Family	IPv4	IP Address	172.31.1.1	Prefix	30	
Interface	SERVING-SEGW	Mode	IPsec	Family	IPv6	IP Address	2607:f160:10:23f2::4f	Prefix	128	
Interface	SERVING-SEGW-NR	Mode	IPsec	Family	IPv6	IP Address	2607:f160:c:4136:ce:404:8:3	Prefix	128	

Ethernets					
Interface	WAN	MAC Address	00:17:10:2B:25:40	MTU	1448

DNS	
Search Domains	

Ethernets

The Ethernets section of the Network Settings page displays Ethernet information including Interface, MAC Address, and MTU settings (see [Figure 3-21](#)).

Refer to the following FAQs (in Appendix A) for detailed instructions:
[How to Adjust the MTU \(Maximum Transfer Unit\) Size](#)

Figure 3-21. Ethernets

Network Settings

IP Addresses

Interface	WAN	Mode	DHCP	Family	IPv4	IP Address	172.18.253.115	Prefix	24	
Interface	LMT	Mode	Lmt	Family	IPv4	IP Address	172.31.1.1	Prefix	30	
Interface	SERVING-SEGW	Mode	IPsec	Family	IPv6	IP Address	2607:f160:10:23f2::4f	Prefix	128	
Interface	SERVING-SEGW-NR	Mode	IPsec	Family	IPv6	IP Address	2607:f160:c:4136:ce:404:8:3	Prefix	128	

Ethernets

Interface	WAN	MAC Address	00:17:10:2B:25:40	MTU	1448	
-----------	-----	-------------	-------------------	-----	------	--

DNS

Search Domains

DNS

The DNS section of the Network Settings page displays DNS information including IP and Label for each active DNS (see [Figure 3-22](#)).

Refer to the following FAQs (in Appendix A) for detailed instructions:

[How to Add a DNS](#)

Figure 3-22. DNS

SETTINGS / NETWORK SETTINGS

Network Settings

IP Addresses

Interface	WAN	Mode	DHCP	Family	IPv4	IP Address	172.18.253.115	Prefix	24	⚙
Interface	LMT	Mode	Lmt	Family	IPv4	IP Address	172.31.1.1	Prefix	30	⚙
Interface	SERVING-SEGW	Mode	IPsec	Family	IPv6	IP Address	2607:f160:10:23f2::4f	Prefix	128	⚙
Interface	SERVING-SEGW-NR	Mode	IPsec	Family	IPv6	IP Address	2607:f160:c:4136:ce:404:8:3	Prefix	128	⚙

Ethernets

Interface	WAN	MAC Address	00:17:10:2B:25:40	MTU	1448	⚙
-----------	-----	-------------	-------------------	-----	------	---

Routes

DNS

IP	8.8.8.8	Mode	DHCP	⚙
IP	2607:f160:10:242c:ce:103:0:6	Mode	IPsec	⚙
IP	2607:f160:10:242c:ce:103:0:5	Mode	IPsec	⚙

Add DNS

Routes

The Routes section of the Network Settings page displays active route information (see [Figure 3-23](#)).

Figure 3-23. Routes

Network Settings

IP Addresses

Interface	WAN	Mode	DHCP	Family	IPv4	IP Address	172.18.253.115	Prefix	24	
Interface	LMT	Mode	Lmt	Family	IPv4	IP Address	172.31.1.1	Prefix	30	
Interface	SERVING-SEGW	Mode	IPsec	Family	IPv6	IP Address	2607:f160:10:23f2::4f	Prefix	128	
Interface	SERVING-SEGW-NR	Mode	IPsec	Family	IPv6	IP Address	2607:f160:c:4136:ce:404:8:3	Prefix	128	

Ethernets

Interface	WAN	MAC Address	00:17:10:2B:25:40	MTU	1448	
-----------	-----	-------------	-------------------	-----	------	--

Routes

From	default	To	default	Gateway	172.18.253.1	Mode	
------	---------	----	---------	---------	--------------	------	--

DNS

IP	8.8.8.8	Mode	DHCP	
IP	2607:f160:10:242c:ce:103:0:6	Mode	IPsec	
IP	2607:f160:10:242c:ce:103:0:5	Mode	IPsec	

Add DNS

Search Domains

Search Domains

The Search Domains section of the Network Settings page displays active domains (see [Figure 3-24](#)).

Refer to the following FAQs (in Appendix A) for detailed instructions:
[How to Add a Search Domain](#)

Figure 3-24. Search Domains

Network Settings

IP Addresses

Interface	WAN	Mode	DHCP	Family	IPv4	IP Address	172.18.253.115	Prefix	24	
Interface	LMT	Mode	Lmt	Family	IPv4	IP Address	172.31.1.1	Prefix	30	
Interface	SERVING-SEGW	Mode	IPsec	Family	IPv6	IP Address	2607:f160:10:23f2::4f	Prefix	128	
Interface	SERVING-SEGW-NR	Mode	IPsec	Family	IPv6	IP Address	2607:f160:c:4136:ce:404:8:3	Prefix	128	

Ethernets

Routes

DNS

Search Domains

Search Domains not configured

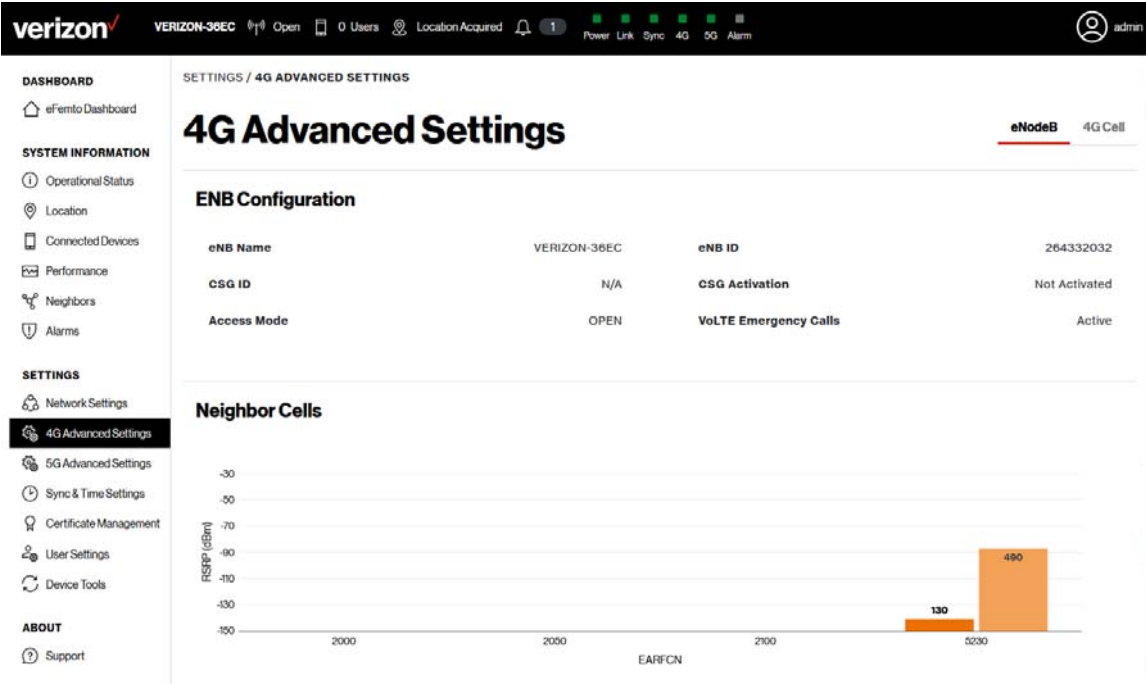
Add Search Domain

4G Advanced Settings

The 4G Advanced Settings page provides access to the ENB (eNodeB) Configuration page and Neighbor Cells activity (see [Figure 3-25](#)).

ENB (eNodeB) Configuration page

Figure 3-25. 4G Advanced Settings > ENB Configuration page



4G Cell configuration page

The 4G Cell configuration page (see [Figure 3-26](#)) provides read-only detailed information on the Primary Cell Radio Configuration as well as Transmission Power Configuration.

Refer to the following FAQs (in Appendix A) for detailed instructions:
[How to set Transmission Power \(Tx\).](#)

Figure 3-26. 4G Advanced Settings > 4G Cell configuration page

The screenshot displays the Verizon 4G Advanced Settings > 4G Cell configuration page. The interface includes a top navigation bar with the Verizon logo, status indicators (Power, Link, Sync, 4G, 5G, Alarm), and a user profile (admin). A left sidebar contains navigation options: DASHBOARD, SYSTEM INFORMATION, SETTINGS, and ABOUT. The main content area is titled '4G Advanced Settings' and features two tabs: 'eNodeB' and '4G Cell'. The '4G Cell' tab is active, showing the 'Primary Cell Radio Configuration' and 'Transmission Power Configuration' sections.

Primary Cell Radio Configuration

Primary PLMNID	311480	Cell ID	264332032
PCI	482	TAC	15102
Operating Band	Band 4	EARFCN	2100
DL Bandwidth	10 MHz	UL Bandwidth	10 MHz
Reference Signal Power	-10	RF Tx Status	On
Cell Barred	False	Administrative State	True

Transmission Power Configuration

Tx Power: 21 dBm

Enable Manual Power Selection: ☐

0 dBm ————— 24 dBm Recommended Tx Power

Tx Power
21 dBm
126 mW

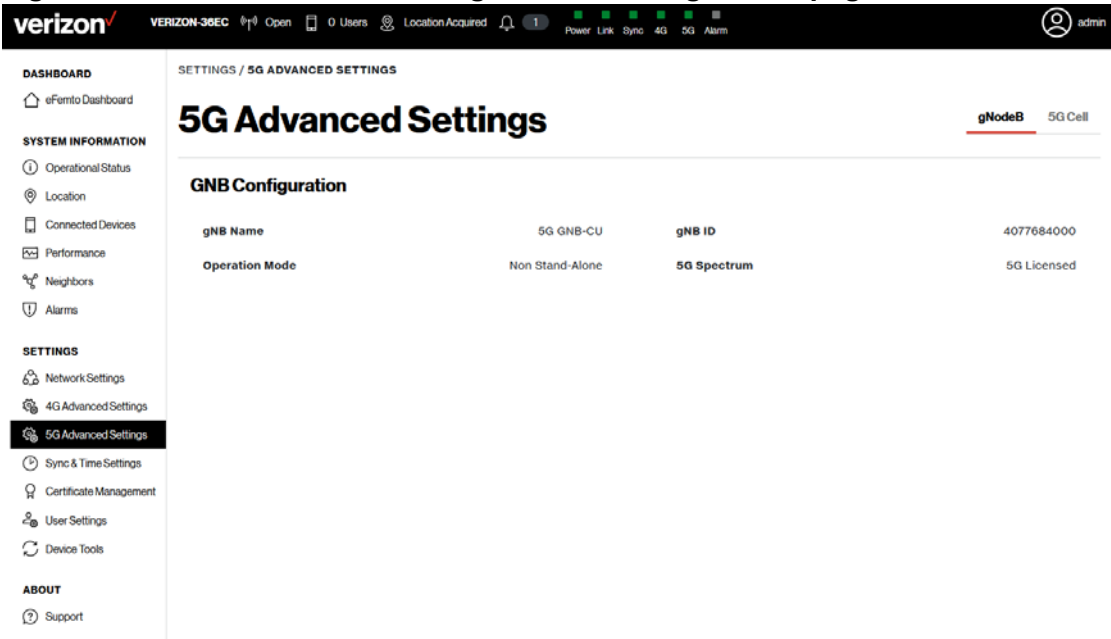
Set Tx Power

5G Advanced Settings

The 5G Advanced Settings page provides access to the GNB (gNodeB) Configuration page (see [Figure 3-27](#)).

GNB (gNodeB) Configuration page

Figure 3-27. 5G Advanced Settings > GNB Configuration page



5G Cell Configuration page

The 5G Cell Radio Configuration page (see [Figure 3-28](#)) provides read-only detailed information on the 5G Cell as well as Transmission Power Configuration.

Refer to the following FAQs (in Appendix A) for detailed instructions:

[How to set Transmission Power \(Tx\)](#)

Figure 3-28. 5G Advanced Settings > 5G Cell Radio Configuration page

The screenshot displays the Verizon 5G Advanced Settings interface. The top navigation bar includes the Verizon logo, status indicators (VERIZON-3GEC, Open, 0 Users, Location Acquired, 1), and a user profile (admin). The left sidebar contains a menu with categories: DASHBOARD (eFemto Dashboard), SYSTEM INFORMATION (Operational Status, Location, Connected Devices, Performance, Neighbors, Alarms), SETTINGS (Network Settings, 4G Advanced Settings, 5G Advanced Settings), and ABOUT (Support). The main content area is titled '5G Advanced Settings' and features a tab for '5G Cell'. Below this, the '5G Cell Radio Configuration' section lists various parameters in a table. The 'Transmission Power Configuration' section includes a slider for Tx Power, a toggle for 'Enable Manual Power Selection', and a summary box showing the current Tx Power.

5G Cell Radio Configuration			
Primary PLMNID	311480	Cell ID	65242944000
PCI	1002	TAC	10000
Operating Band	Band 77	NRARFCN	643334
DL Bandwidth	100 MHz	UL Bandwidth	100 MHz
TDD Configuration	DDDSUDDDD	RF Tx Status	Off
Cell Barred	True	Administrative State	False

Transmission Power Configuration

Tx Power: 27 dBm

Enable Manual Power Selection: ☐

7 dBm ————— 27 dBm Recommended Tx Power

Tx Power
27 dBm
501 mW

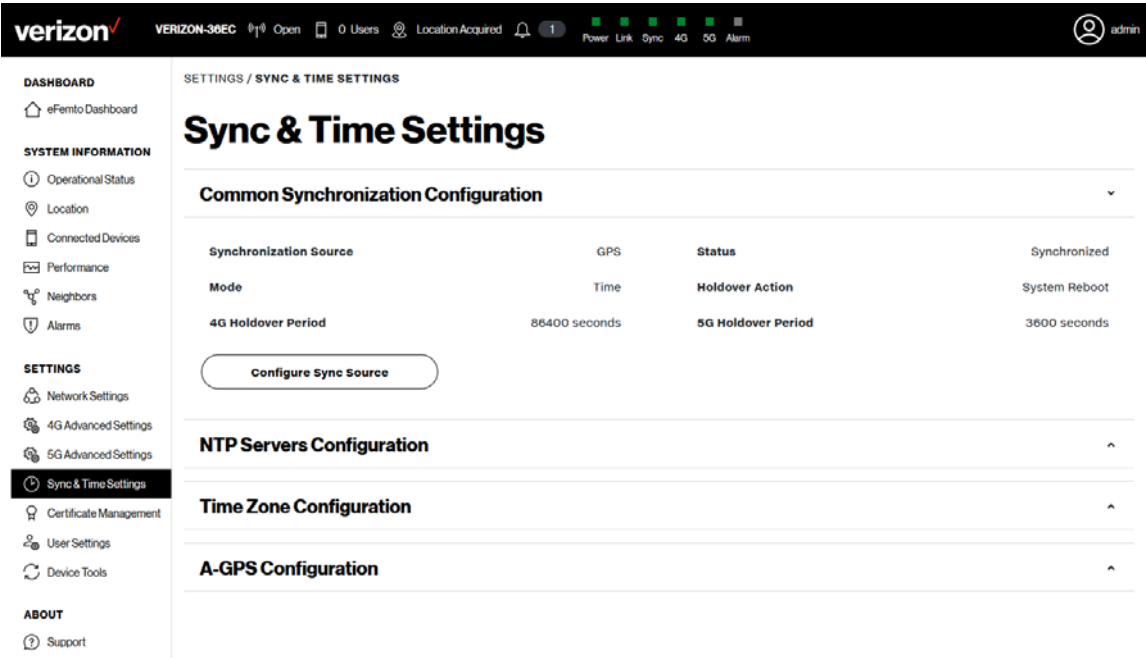
Set Tx Power

Sync & Time Settings

The Sync & Time Settings page displays Common Synchronization Configuration settings (see [Figure 3-29](#)).

Refer to the following FAQ (in Appendix A) for detailed instructions:
[How to Configure a New Synchronization Source](#)

Figure 3-29. Sync & Time Settings page



Certificate Management

The Certificate Management page displays Server Certificate Information for the select device (see [Figure 3-30](#)).

Figure 3-30. Server Certificate page

The screenshot displays the Verizon FEMTO 380C interface. The top status bar shows 'VERIZON-380C', signal strength, 'Open', '0 Users', 'Signal Lost', and various status icons (Power, Link, Sync, 4G, 5G, Alarm). The user is logged in as 'admin'.

The left sidebar contains the following menu items:

- DASHBOARD
 - Femto Dashboard
- SYSTEM INFORMATION
 - Operational Status
 - Location
 - Connected Devices
 - Performance
 - Neighbors
 - Alarms
- SETTINGS
 - Network Settings
 - 4G Advanced Settings
 - 5G Advanced Settings
 - Sync & Time Settings
 - Certificate Management**
 - User Settings
 - Device Tools
- ABOUT
 - Support

The main content area is titled 'Certificate Management' and includes tabs for 'Server Certificate', 'Operator Certificate', and 'Login Certificate'. The 'Server Certificate' tab is active.

Server Certificate Information

This section allows downloading the Certification Authority certificate of the 5G NR Network Extender Web Server.

Subject		Issuer	
Common Name	*.network-extender3.com	Common Name	Casa Systems Small Cells SubCA
Organization	Casa Systems	Organization	Casa Systems
Country	US	Country	US
State/Province	Massachusetts	State/Province	Massachusetts
Locality	Andover	Locality	Andover

Validity		Miscellaneous	
Not Before	9/6/2021, 8:00:00 PM	Serial Number	040DBF9A59D5342AEDDE44C31EF1AE4D
Not After	1/26/2051, 7:00:00 AM	Version	3

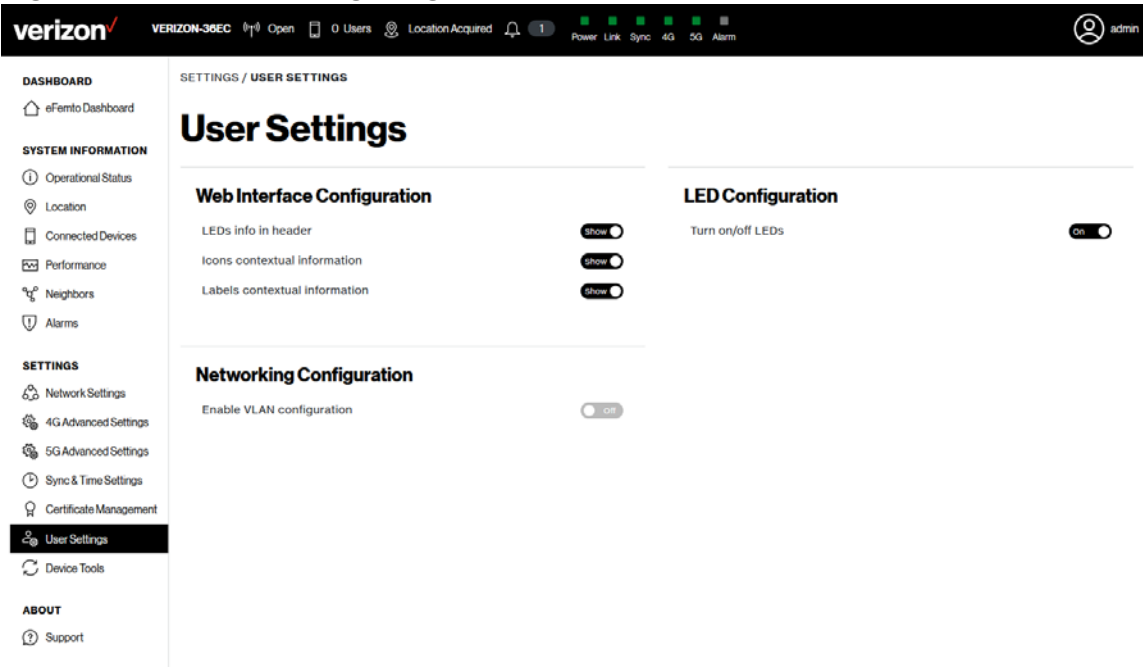
[Download Server CA Certificate](#)

User Settings

The User Settings page displays Web Interface Configuration, LED Configuration, and Network Configuration (see [Figure 3-31](#)).

Refer to the following FAQs (in Appendix A) for detailed instructions:
[How to Add a VLAN](#)

Figure 3-31. User Settings page

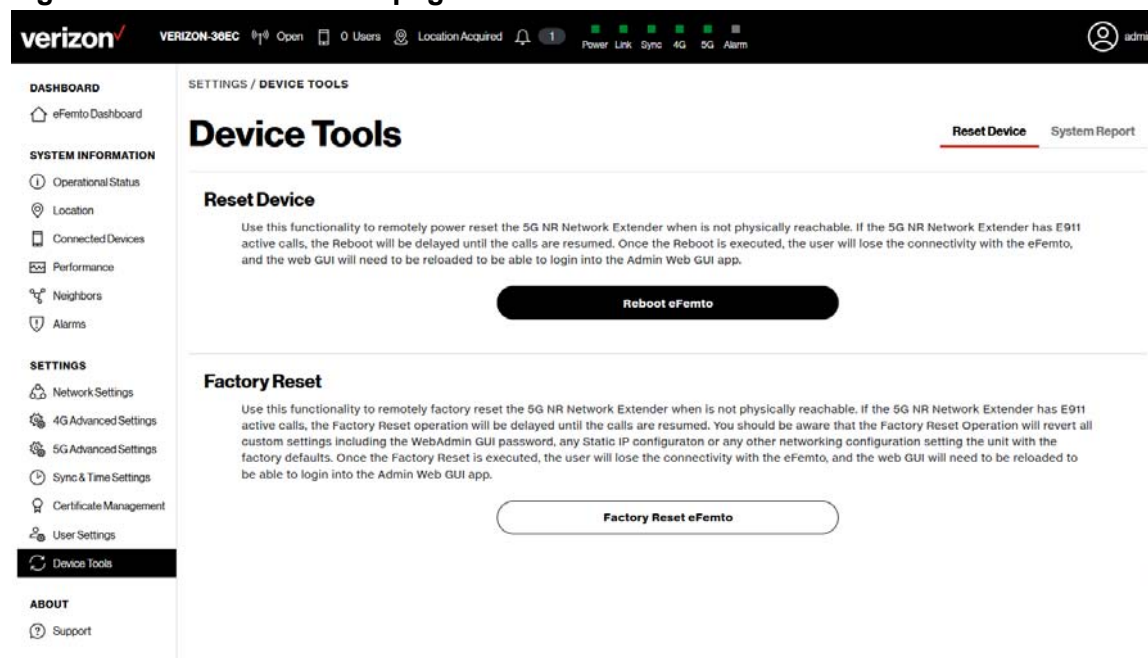


Device Tools

The Device Tools page provides the ability to reset the Network Extender device and perform a Factory Reset (see [Figure 3-32](#)).

Refer to the following FAQ (in Appendix A) for detailed instructions:
[How to Reboot or Factory Reset a Device](#)

Figure 3-32. Reset Device page

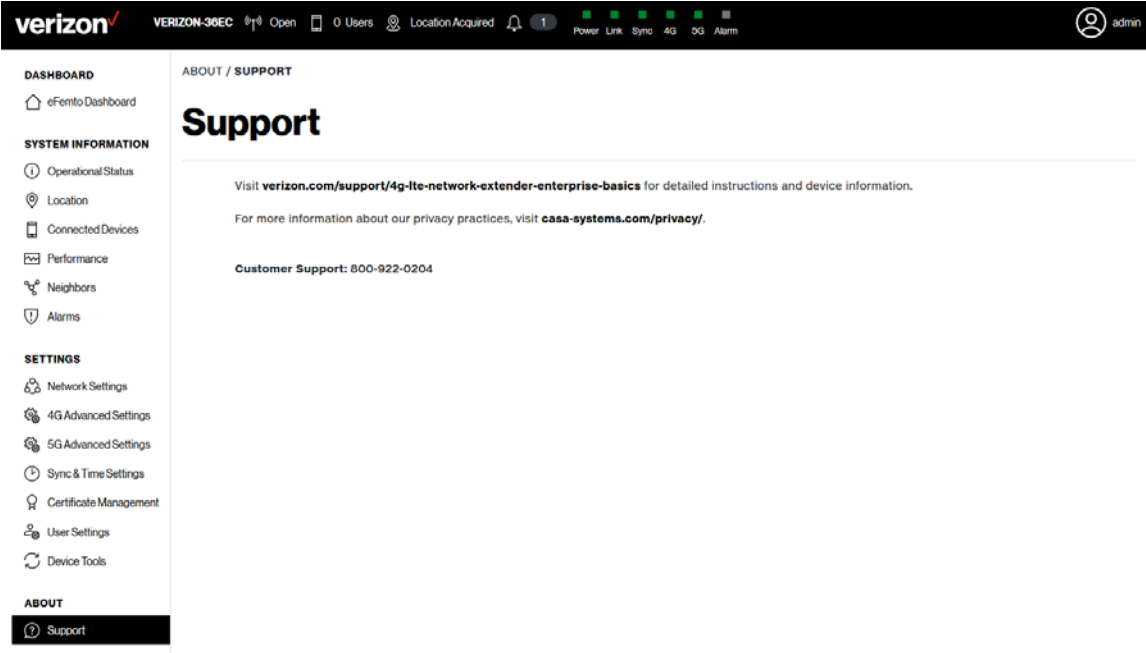


About

Support

The Support page provides contact information to obtain customer support (see [Figure 3-33](#)).

Figure 3-33. Support page



Chapter 4. Configuration

About this Chapter

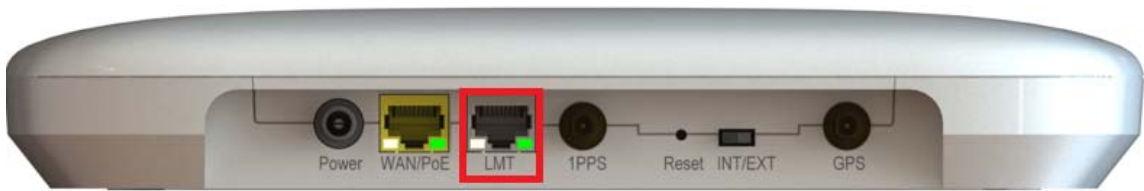
This chapter describes firewall settings for configuring the 5G LTE Network Extender 4 for Enterprise eFemto. The following topics are covered in this chapter:

Topic	Page
Firewall Settings	4-2
Firewall Rules for Business	4-5
CSG User Configuration	4-6

Firewall Settings

The Network Extender is designed to connect and automatically configure with minimal user involvement, though in some cases, depending on the firewall settings, some settings may need to be adjusted on the local LMT (see [Figure 4-1](#)).

Figure 4-1. LMT Port



[Table 4-1](#) provides details on the destination ports regarding the firewall settings that are applicable for network administrators.

Table 4-1. Destination Ports

Source	Destination	Protocol	Destination Port	Notes
Network Extender	GPS Assistance Server	TCP	80	
Network Extender	DNS Server	UDP	53	
Network Extender	NTP Server	UDP	123	
Network Extender	Verizon Security Gateway	UDP	500/4500	More than one port may be used for multiple device installation.
Network Extender	CMP	TCP	80	
Network Extender	Verizon Security Gateway	ESP/50	N/A	When NAT/PAT is not present.
Verizon SeGW	Network Extender	ESP/50	N/A	When NAT/PAT is not present.

Table 4-2 lists the IP addresses of each of the network elements that need to be included.

Table 4-2. Firewall Settings

Network Element	Comment	Fully Qualified Domain Name (FQDN)
GPS Server	-	http://xtrapath1.izatcloud.net http://xtrapath2.izatcloud.net http://xtrapath3.izatcloud.net
Security Gateway (SeGW)	The serving server will be automatically assigned.	sgw.vzwfemto.com The FQDN of the initial-SeGW is resolved by the public DNS server sgw-rcmdva83.vzwfemto.com sgw-chntvaav.vzwfemto.com sgw-wsbomagj.vzwfemto.com sgw-ynkrnyzl.vzwfemto.com sgw-wmtppaaa.vzwfemto.com sgw-esyrnyen.vzwfemto.com sgw-aurscoty.vzwfemto.com sgw-temqazkw.vzwfemto.com sgw-snvacanx.vzwfemto.com sgw-rdmewa22.vzwfemto.com sgw-azusca21.vzwfemto.com sgw-elsstx13.vzwfemto.com sgw-hsnotx08.vzwfemto.com sgw-tulyok13.vzwfemto.com sgw-chrxnclh.vzwfemto.com sgw-orlhfl01.vzwfemto.com sgw-alprgagq.vzwfemto.com sgw-omalnexu.vzwfemto.com sgw-hchlilmt.vzwfemto.com sgw-lenykscj.vzwfemto.com sgw-jhtwpadp.vzwfemto.com sgw-sfldmilr.vzwfemto.com

Table 4-2. Firewall Settings (continued)

Network Element	Comment	Fully Qualified Domain Name (FQDN)
CMP	-	cmp.securitycredentialing.com
NTP Server	The default NTP server is based on a pool.ntp.org. Different locations will get different IP addresses. The user needs to make sure the FQDN is allowed.	0.north-america.pool.ntp.org 1.north-america.pool.ntp.org

Firewall Rules for Business

Business networks protect their data and clients using a firewall. Depending on the firewall configuration, certain ports may need to be opened on the firewall to allow the Network Extender to come into service.

The Network Extender communicates to the Verizon Wireless Gateway over an Internet Protocol Security Protocol (IPSEC) encrypted tunnel. The use of Network Address Translation (NAT)/Port Address Translation (PAT) within the network will determine which firewall rules need to be opened.

The Network Extender will also access a DNS Server to obtain the IP Address of Verizon's Security Gateways and may access a DHCP Server for its IP addresses. Since this communication is generally done within the same subnet/network, these settings are not included in the firewall table. If they are required, they use the standard DNS and DHCP ports. DNS-UDP uses port 53. DHCP-BOOTP uses port 67.

The Network Extender enables the IT administrator to deploy the solution in almost any scenario. The embedded web server allows for flexible configurations.

CSG User Configuration

The following information is used to configure Closed Subscriber Group (CSG) mode for the Network Extender.

***Note:** CSG mode must be configured using the Verizon Portal “MyBiz” and configuration steps described below. CSG mode cannot be configured through the Network Extender Web GUI.*

CSG Modes

Open Mode

- Default, out of the box.
- Any Verizon UE within vicinity can attach to the Open Network Extender.

Hybrid Mode

- CSG subscribed members have priority over non-members.
- Non CSG subscribed members are allowed service only if resources are not used up by CSG members. Nonmembers can be pre-empted in favor of CSG members.

Closed Mode

- Network Extender resources are exclusively reserved for CSG subscribed MDNs.

Dependencies

- CSG capable mobile phone (2018 or newer Verizon certified phones).
- Verizon post-pay subscriber account.
- Profile-07 or newer SIM card.

Configuration Steps

1. To enable and/or manage CSG, the user must login to his/her Verizon account via MyVerizon or MyBiz portal.
2. Create a CSG Group ID.
3. Assign phone numbers to the CSG Group ID. Each phone can be assigned up to 10 CSG Group IDs.
4. Assign the CSG Group ID to the Network Extender. One CSG Group ID can be assigned to one or more Network Extenders.
5. Change CSG mode (Hybrid/Closed) for each Network Extender.

Chapter 5. Troubleshooting

About this Chapter

This chapter provides troubleshooting information for the 5G LTE Network Extender 4 for Enterprise eFemto including status LEDs and list of alarms. The following topics are covered in this chapter:

Topic	Page
Status LEDs	5-2
Alarm Troubleshooting	5-4

Status LEDs

Figure 5-1 shows the location of the status LEDs for the Network Extender.

Figure 5-1. Network Extender Status LEDs

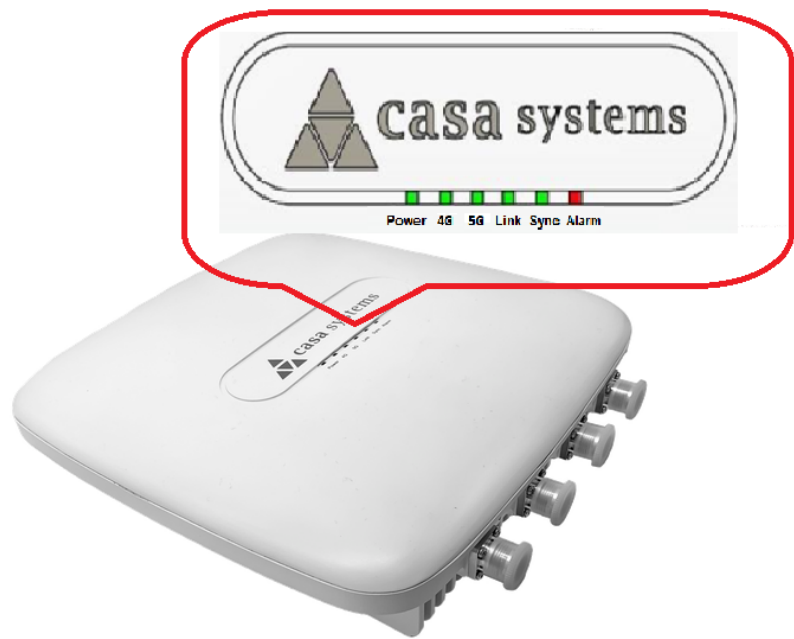


Table 5-1 provides functional details for each status LED applicable for network administrators.

Table 5-1. Status LED Functions

LED	Color	Function
Power		OFF: Power not detected.
		ON: All the power rails are present.
		Flashing: Unit booting or firmware upgrading.

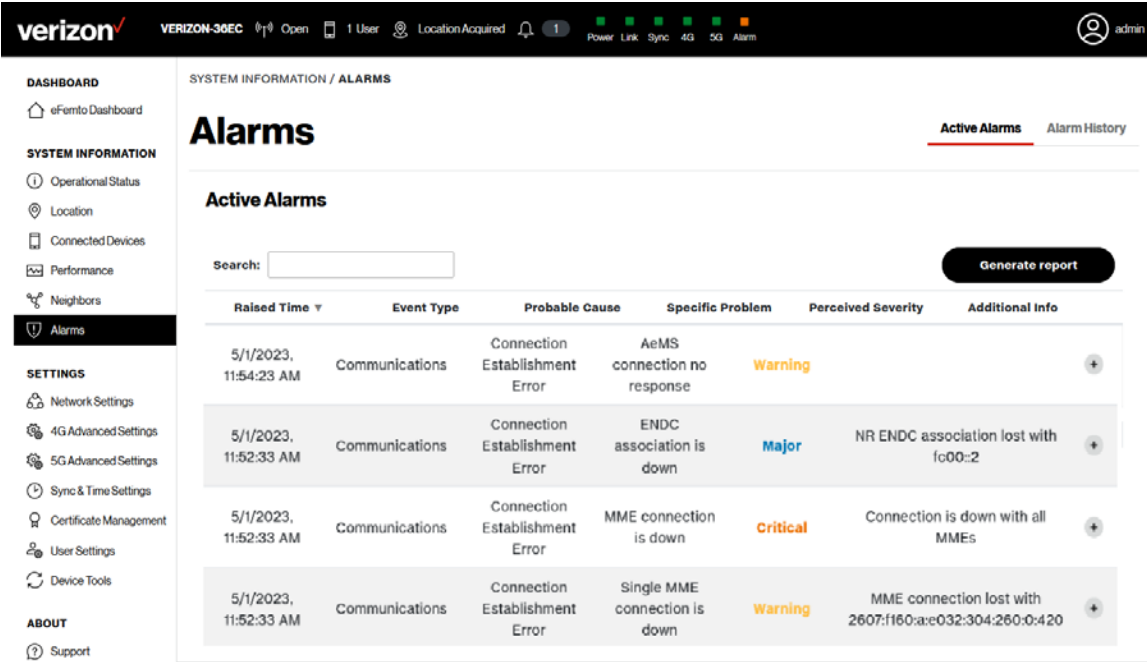
Table 5-1. Status LED Functions (continued)

LED	Color	Function
4G		OFF: 4G Radio activity disabled, not transmitting and receiving.
		ON: 4G Radio activity enabled, unit transmitting and receiving.
5G		OFF: 5G Radio activity disabled, not transmitting and receiving.
		ON: 5G Radio activity enabled, unit transmitting and receiving.
Link		OFF: Ethernet link down.
		ON: Ethernet link up.
Sync		OFF: Synchronization not established with the GPS.
		ON: GPS synchronization complete.
		Flashing: Lost GPS synchronization.
Alarm		OFF: No alarms detected.
		Flashing: System critical alarm.

Alarm Troubleshooting

The Web GUI provides a list of active alarms for the Network Extender. Access the list of active alarms from the Web GUI dashboard by clicking **Alarms** (see [Figure 5-2](#)). See [List of Network Extender 4 Alarms](#) for detailed information.

Figure 5-2. Web GUI Alarms page



List of Network Extender 4 Alarms

[Table 5-2](#) provides recommended troubleshooting steps used to address issues raised by the alarm IDs shown on the active alarms page.

Table 5-2. Alarm Troubleshooting

Alarm	Description	Recommendation	Unique Alarm ID (Code)
L3 not detected	LTE L3 software protocol stacks encountered an issue and 5G and/or LTE services are not available, the device shall resume normal operation after self-healing.	If the alert persists, please restart your device.	30001
L2 not detected	LTE L2 software protocol stacks encountered an issue and 5G and/or LTE services are not available, the device shall resume normal operation after self-healing.	If the alert persists, please restart your device.	30002
Flash memory usage	There is a temporary memory usage alert, but your device is still functioning correctly.	This alert should clear itself.	30004
MME connection is down	The device cannot communicate with Verizon's Network. Please check the LAN/Firewall settings, connectivity status and available bandwidth.	If the problem persists, please contact Verizon Wireless Customer Service.	30005
RRM overload	This alert should clear itself.	If the alert persists for a long time, please check the number of users in the "Connected Devices" tab and see the capacity section of the user guide.	30006
High CPU load	There is a temporary CPU load alert, but your device is still functioning correctly.	This alert should clear itself.	30008
High NACK level	This is related to RF quality issue, there is an excessive retransmission caused by an external source of interference.	Please check the radio environment.	30009

Table 5-2. Alarm Troubleshooting (continued)

Alarm	Description	Recommendation	Unique Alarm ID (Code)
Over-the-air synchronization lost	This is related to RF quality issue.	Please Check for availability of Verizon macro sites signal.	30010
GPS synchronization lost	There is an issue with the GPS.	Ensure open view of the sky. Reboot/power cycle the unit. If the issue persists, replace the unit.	30011
Cell synchronization failure	There is an issue with the GPS.	Ensure open view of the sky. LTE service may degrade if the unit operates for long period of time without synchronization.	30012
SCTP Failure	The device cannot communicate with Verizon's Network.	The device will reboot automatically and try establishing the connection again. If the problem persists, please contact Verizon Wireless Customer Service.	30013
Ethernet error	There is an issue with the Ethernet connection.	Power cycle the device to clear the issue. If symptom persists, the unit will need to be replaced.	30014
CPU Temperature Unacceptable	The device is over-heating.	Please locate the unit in an area with an ambient temperature between Operational Temperature range -10°C to 65°C (14°F to 149°F).	30015
PA Temperature Unacceptable	The device is over-heating.	Please locate the unit in an area with an ambient temperature between Operational Temperature range -10°C to 65°C (14°F to 149°F).	30016

Table 5-2. Alarm Troubleshooting (continued)

Alarm	Description	Recommendation	Unique Alarm ID (Code)
HTTP failed access	The device cannot communicate with Verizon's Network.	Please check the LAN/ Firewall settings, connectivity status and available bandwidth. If the problem persists, please contact Verizon Wireless Customer Service.	30017
OAM errors	Parameters not set properly.	Verify that all parameters are set per guideline.	30018
RAM memory full	The RAM memory is full.	Power cycle the unit to clear the fault.	30019
Threshold Crossed: RLF	Radio Link Failure.	Caused by high interference of weak signal.	30020
Threshold Crossed: Low SINR	Low SINR.	Check the radio environment.	30021
PA Biasing Failure	PA Biasing Failure.	Power cycle the device to clear the issue. If symptom persists, the unit will need to be replaced.	30022
PCI Collision	A neighboring Cell is operating on the same PCI/Frequency.	The unit will be assigned a different PCI by the Verizon's management system. No action needed.	30023
PCI Confusion	Two or more neighboring Cells are operating on the same PCI/Frequency.	The device is still functioning correctly, the Network Element management system shall resolve this alarm.	30024
L1 start timeout	Physical Layer (Layer 1) encountered an issue and 5G and/or LTE services are not available, the device shall resume normal operation after self-healing.	If the alert persists, please restart your device.	30026

Table 5-2. Alarm Troubleshooting (continued)

Alarm	Description	Recommendation	Unique Alarm ID (Code)
DSP or PHY Crash	Physical Layer (Layer 1) encountered an issue and 5G and/or LTE services are not available, the device shall resume normal operation after self-healing.	If the alert persists, please restart your device.	30027
Cell not synchronized	There is an issue with the GPS. Ensure open view of the sky.	LTE service may degrade if the unit operates for long period of time without synchronization.	30028
Synchronization lost with all sources	There is an issue with the GPS.	Ensure open view of the sky. LTE service may degrade if the unit operates for long period of time without synchronization.	30029
Invalid PHY or RF configuration	Parameters not set properly.	Verify that all parameters are set per guideline.	30030
System information configuration failure	Parameters not set properly.	Verify that all parameters are set per guideline.	30031
Single MME connection is down	The device is still functioning correctly. The device will retry automatically establishing the connection again.	This alert indicates that the device cannot communicate with one of Verizon Network's redundancy systems. If the problem persists, please contact Verizon Wireless Customer Service.	30034
IPsec tunnel down	The device cannot communicate with Verizon's Network.	Please check the LAN/Firewall settings, connectivity status and available bandwidth. If the problem persists, please contact Verizon Wireless Customer Service.	30035

Table 5-2. Alarm Troubleshooting (continued)

Alarm	Description	Recommendation	Unique Alarm ID (Code)
IPsec tunnel expiry	The device cannot communicate with Verizon's Network.	Please check the LAN/Firewall settings, connectivity status and available bandwidth. When the connection is re-established, the device will attempt to create a new tunnel automatically. If the problem persists, please contact Verizon Wireless Customer Service.	30036
IPsec IKE SA expiry	The device cannot communicate with Verizon's Network.	Please check the LAN/Firewall settings, connectivity status and available bandwidth. When the connection is re-established, the device will attempt to create a new tunnel automatically. If the problem persists, please contact Verizon Wireless Customer Service.	30037
Operator Certificate Expired	The device cannot communicate with Verizon's Network.	Please check the LAN/Firewall settings, connectivity status and available bandwidth. When the connection is re-established, the device will attempt to download certificate automatically from Verizon's Network. If the problem persists, please contact Verizon Wireless Customer Service.	30038

Table 5-2. Alarm Troubleshooting (continued)

Alarm	Description	Recommendation	Unique Alarm ID (Code)
Holdover Period Expiration	5G and/or LTE services are not available.	There is an issue with the GPS. Ensure open view of the sky. Reboot/power cycle the unit. If the issue persists, replace the unit.	30039
Administrative Reboot	This is a notification that the device was rebooted from Verizon's Management System.	No action needed.	30040
Forced Reboot	This is a notification that the device was rebooted from Verizon's Management System.	No action needed.	30041
Max MME connection attempts reached for all MME	The device cannot communicate with Verizon's Network.	The device will reboot automatically and try establishing the connection again. If the problem persists, please contact Verizon Wireless Customer Service.	30042
Reboot Loop	The device detected more than 5 continuous reboots in less than 30 minutes.	If the problem persists, please contact Verizon Wireless Customer Service.	30043
DNS Resolution Failure	The device cannot communicate with Verizon's Network.	Please check the LAN/Firewall settings and Review DNS server configuration, connectivity status and available bandwidth. If the problem persists, please contact Verizon Wireless Customer Service.	30044
TR069 Agent not detected	The device shall resume normal operation after self-healing.	If the alert persists, please restart your device.	30045
Watchdog not detected	The device shall resume normal operation after self-healing.	If the alert persists, please restart your device.	30046

Table 5-2. Alarm Troubleshooting (continued)

Alarm	Description	Recommendation	Unique Alarm ID (Code)
Critical configuration failure	Parameters not set properly.	Verify that all parameters are set per guideline.	30047
CMS server connection failure	The device cannot communicate with Verizon's Network.	Please check the LAN/ Firewall settings, connectivity status and available bandwidth. The device will reboot automatically and try establishing the connection again. If the problem persists, please contact Verizon Wireless Customer Service.	30049
AeMS connection no response	The device cannot communicate with Verizon's Network.	Please check the LAN/ Firewall settings, connectivity status and available bandwidth. The device will reboot automatically and try establishing the connection again. If the problem persists, please contact Verizon Wireless Customer Service.	30050
Low DC Power	PoE source is delivering up to Class 5.	Verify PoE device supports Class 5 and has sufficient power to feed the LTE Network extender device. Verify Ethernet cabling. If possible, change to a different switch port and wall patch panel socket.	30051

Table 5-2. Alarm Troubleshooting (continued)

Alarm	Description	Recommendation	Unique Alarm ID (Code)
Power Out of Range	PoE source is delivering up to Class 6.	Verify PoE device supports Class 6 and has sufficient power to feed the LTE Network extender device. Verify Ethernet cabling. If possible, change to a different switch port and wall patch panel socket.	30052
RX RACH Overload	A mobile phone is saturating the (RACH) channel.	Power cycle the device to clear the issue. If symptom persists, please contact Verizon Wireless Customer Service.	30053
RX PUCCH Overload	A mobile phone is saturating the (PUCCH) channel.	Power cycle the device to clear the issue. If symptom persists, please contact Verizon Wireless Customer Service.	30054
RX PUSCH Overload	A mobile phone is saturating the (PUSCH) channel.	Power cycle the device to clear the issue. If symptom persists, please contact Verizon Wireless Customer Service.	30055
GPS Antenna not connected	There is an issue with the GPS connector/ Antenna.	Ensure open view of the sky. Reboot/power cycle the unit. If the issue persists, replace the GPS Antenna.	30056

Table 5-2. Alarm Troubleshooting (continued)

Alarm	Description	Recommendation	Unique Alarm ID (Code)
Tampering detection	Unit cover has been removed.	This alarm is triggered when the cover of the unit is removed. Visually inspect the unit and contact Verizon Wireless Customer Service if the cover is not removed or damaged .	30057
Abnormal RSSI level	The received signal strength indicator (RSSI) level is below a threshold.	This is a warning that a poor radio signal strength is measured, but the device is still functioning correctly. No action is needed.	30058
IQ power out of range	Detected IQ power higher than a threshold in the transmission path.	The detected output power of the device is higher than the configured value. Reboot the device and if the problem persists contact Verizon Wireless Customer Service.	30059
RSI Collision	RSI conflict detected in the LTE network.	This alarm is triggered when an RSI conflict is detected by the device. No action is needed because SON automatically reconfigures the device with new, non-overlapping RSI.	30060
High Neighbor Interference	Radio interference detected from neighboring cells.	Use the manual band selection on the Web GUI to assign a different frequency to the Network Extender device. Navigate to advanced setting to change the Network Extender configuration.	30061

Table 5-2. Alarm Troubleshooting (continued)

Alarm	Description	Recommendation	Unique Alarm ID (Code)
Not Signed Upgrade Package	Software upgrade failed due to wrong non-signed upgrade file.	An upgrade using wrong non-signed file has been attempted. No action is needed; the upgrade is rejected by the device.	30062
Integrity Check Failure	Software upgrade failed due to corrupted file.	An upgrade using corrupted file has been attempted. No action is needed; the upgrade is rejected by the device. Upgrade should be reattempted to discard file corruption during transfer. If upgrade fails again, please contact Verizon Wireless Customer Service.	30063
Unable to get IP from DHCP	The unit failed to acquire a local IP address from the local DHCP server.	Verify the configuration of the LAN router and reboot if necessary to assign a valid IP to the device.	30064
Unable to get operator certificate from CMS server	The device cannot retrieve the operational Certificates from Verizon's Network.	Please check the LAN/Firewall settings, connectivity status and available bandwidth. The device will reboot automatically and try establishing the connection again. If the problem persists, please contact Verizon Wireless Customer Service.	30065
Clock synchronization problem	There is an issue with the GPS.	Ensure open view of the sky. LTE service may degrade if the unit operates for long period of time without synchronization.	30066

Table 5-2. Alarm Troubleshooting (continued)

Alarm	Description	Recommendation	Unique Alarm ID (Code)
Operator certificate expired	The device cannot communicate with Verizon's Network.	Please contact Verizon Wireless Customer Service.	30067
Operator certificate within renewal expiration window	The device detected the operator certificate is about to expire (validity under one month)	No action is needed. Unit will download new certificate from Verizon's Network.	30068
CMS server connection failure on certificate renewal	The device cannot communicate with Verizon's Network.	Please check the LAN/Firewall settings, connectivity status and available bandwidth. The device will reboot automatically and try establishing the connection again. If the problem persists, please contact Verizon Wireless Customer Service.	30069
CMS server authentication failure on certificate renewal	The device cannot communicate with Verizon's Network.	Please check the LAN/Firewall settings, connectivity status and available bandwidth. The device will reboot automatically and try establishing the connection again. If the problem persists, please contact Verizon Wireless Customer Service.	30070
OAM Proxy not detected	The OAM component used to interface the different protocol stack applications has crashed.	The unit is not manageable, its operation will be degraded and shall be rebooted.	30071
Operator certificate Issuer is not accepted by SeGW	The device cannot communicate with Verizon's Network.	Please contact Verizon Wireless Customer Service.	30072

Table 5-2. Alarm Troubleshooting (continued)

Alarm	Description	Recommendation	Unique Alarm ID (Code)
Connection failure for all NTP servers	The device cannot communicate with any of the configured NTP servers.	Please check the LAN/ Firewall settings, connectivity status and available bandwidth. The device will operate correctly if GPS signal is valid.	30073
GPS Antenna not connected on boot	There is an issue with the GPS connector/ Antenna.	Ensure open view of the sky. Reboot/power cycle the unit. If the issue persists, replace the GPS Antenna.	30074
Adapter not detected	The Web GUI adapter process running in the device is not detected by the self-healing agent.	No action required for clearing the alarm, the device self-healing agent will restart the Adapter process.	30075
Stack internal errors	Stack detect internal errors when disabling admin mode.	The device configuration shall be reviewed to correct the problem. If the alarm persists over time after that, contact your support service.	30076
L2 memory leak	Memory leak in L2 process	No action required for clearing the alarm, the self-healing agent will restore the service, restarting the process if it is possible or rebooting the device, clearing the alarm. If the alarm persists over time, contact your support service.	30077

Table 5-2. Alarm Troubleshooting (continued)

Alarm	Description	Recommendation	Unique Alarm ID (Code)
L3 memory leak	Memory leak in L3 process	No action required for clearing the alarm, the self-healing agent will reboot the device, clearing the alarm. If the alarm persists over time, contact your support service.	30078
Geolocking enabled	The Geolocking is enabled and the device radio is disabled.	The device deployment position cannot be modified and the position shall be located within the Operator coverage area. The small cell shall be operated in its original deployment location. If the problem persists, contact your support service.	30079
SAS not detected	The SAS process running in the device is not detected by the self-healing agent.	No action required for clearing the alarm, the self-healing agent will restore the service, restarting the process if it is possible or rebooting the device, clearing the alarm. If the alarm persists over time, contact your support service.	30080

Table 5-2. Alarm Troubleshooting (continued)

Alarm	Description	Recommendation	Unique Alarm ID (Code)
NR Rest Agent not detected	The NR Rest Agent process running in the device is not detected by the self-healing agent.	No action required for clearing the alarm, the self-healing agent will restore the service, restarting the process if it is possible or rebooting the device, clearing the alarm. If the alarm persists over time, contact your support service.	30081
ENDC association is down	ENDC association is down.	No action required for clearing the alarm. If the alarm persists over time, contact your support service.	30082

Chapter 6. Specifications

About this Chapter

This chapter provides specifications related to the 5G LTE Network Extender 4 for Enterprise eFemto. The following specifications are included in this chapter:

Topic	Page
Key Specifications	6-2
Physical and Environmental Information	6-3
Supported Services	6-4
Indoor GPS Antenna Specifications	6-5
LTE RF Antenna Specifications	6-6
5G NR RF Indoor Antenna Specifications	6-6
Security Specifications	6-7

Key Specifications

Table 6-1. Key Specifications

Item	Details
HW Model	5G LTE Network Extender 4 for Enterprise
Band	LTE: B4/B13/B66 NR: N48/N77(C-Band)
Conducted Output Power	LTE: 2x +21dBm NR: 2x +27dBm
RF Chains	2T2R (LTE) + 2T2R (NR)
MIMO	2x2 MIMO DL
iBW	LTE: 20MHz NR: 100MHz
OBW	LTE: 20MHz NR: 100MHz
Highest Modulation	256QAM DL/64QAM UL
RX Noise Figure	<6dB
Backhaul Options	100M/1GE/2.5GE RJ-45
Sync	Primary: GPS Secondary: IEEE 1588V2
Number of Users/Cell	64 concurrent users - 64 LTE users / 64 NR users
Power Input	100V-240V AC input with AC/DC adapter / POE++ Type 3

Physical and Environmental Information

Table 6-2. Physical and Environmental Information

Item	Details
Power Consumption	<50W with full capacity
Volume/Dimension (w/ bracket)	4.7L / 263mm x 255m x 84mm
Weight	3.1kg
Operation Temperature Range	0 to 50 degree C
Storage Temperature Range	-40 to 70 degree C
Cooling	Natural convection
Ingress Protection	IP50
Operating Humidity	8% to 95% non-condensing
Altitude	-197 to 13,000 feet
Fire Test	UL2043

Supported Services

Table 6-3. Supported Services

Item	Details
Supported Services	Supported services include: SON: Hybrid SON support with dSON and cSON; dSON agent can work with or without cSON and supports using a real-time interface through X2 or TR-069; SON macro integration supported through X2-GW, X2-Proxy or direct connection. TR-069: TR-069 agent supports TR-196v2 and TR-181 data models. CSG: <u>Open Mode</u> (Default, out of the box): Any VzW UE within vicinity can attach to the Open Femto Cell. <u>Hybrid Mode:</u> - CSG subscribed members have priority over non-members. - Non CSG subscribed members are allowed service only if resources are not used up by CSG members. Nonmembers can be pre-empted in favor of CSG members. <u>Closed Mode:</u> Network Extender resources are exclusively reserved for CSG subscribed MDNs.

Indoor GPS Antenna Specifications

Table 6-4. Indoor GPS Antenna Specifications

Item		Specification
Patch Antenna	Frequency Range	1.575.42 +/- 1.023MHz
	Gain @ Zenith	>/= 3dBi
	I/O Impedance	50Ohms
LNA	Gain	28 +/- 2dBi
	Noise Figure	< 1.5dB
	Voltage	3 to 5V
	Current	</= 20mA
	Impedance	50 Ohms
Cable	Type	RH174
	Length (except connector)	7m
	Attenuation	8dB
Connector	Type	SMA Male
Size	L x W x H	46 x 38 x 14mm
Environment	Operating Temperature	-35C to +75C
	Humidity	8 to 95%
Color	Antenna & Cable	Black
Etc.	Mount	3M sticker attached

LTE RF Antenna Specifications

Table 6-5. LTE RF Antenna Specifications

Item	Specification
Frequency	• 745-756 MHz • 777-787 MHz • 1710-1780 MHz • 2110-2200 MHz
Gain	1dBi (B13)/5dBi (B4/B66)
VSWR	< 2.5:1
Impedance	50 Ohms
Connector	SMP

5G NR RF Indoor Antenna Specifications

Table 6-6. 5G NR RF Indoor Antenna Specifications

Item	Specification
Frequency	3550 - 3980 MHz
Gain	7.5dBi
VSWR	< 2.5:1
Impedance	50 Ohms
Connector	SMP

Security Specifications

Table 6-7. Security Specifications

Item	Specifications
Key Management	PKI: IKEv2 key management, certificate-based authentication.
Secure Hash Algorithms	SHA2-256 encryption
Secured WAN Interface Web Server	- Supports HTTP / HTTPS - Supports OpenSSL 1.1 and TLS 1.3
Radio Interface Encryption	Supports: - AES-128 - SNOW3G-128 - NULL (NEA2/NEA1/NEA0 for NR and EEA2, EEA1 and EEA0 for LTE respectively)
Security protocol	IPSEC: AES, 3DES

Chapter 7. Optional Accessories

About this Chapter

This chapter includes information on third party accessories that may be used with the 5G LTE Network Extender 4 for Enterprise. These accessories may be ordered through the Verizon MyBiz portal. The following accessories are included in this chapter:

Topic	Page
Long GPS Cable Assembly (SKU: LCBLE100Q)	7-2
Description	7-2
Configuration Suggestions	7-3
Specifications	7-7
PTP Network Time Server (SKU: APEXGPSV22)	7-5
Description	7-5
Configuration Suggestions	7-6
Specifications	7-7

Long GPS Cable Assembly (SKU: LCBLE100Q)

Description

The Network Extender can get timing and location information from a GPS. The Network Extender is required to be placed such that the GPS receiver has an unobstructed line of sight with at least 4 strong satellites for it to get a position fix during the booting process. Thereafter, the Network Extender is required to maintain sync with at least one satellite in order to be able to continue monitoring the position fix and timing accuracy.

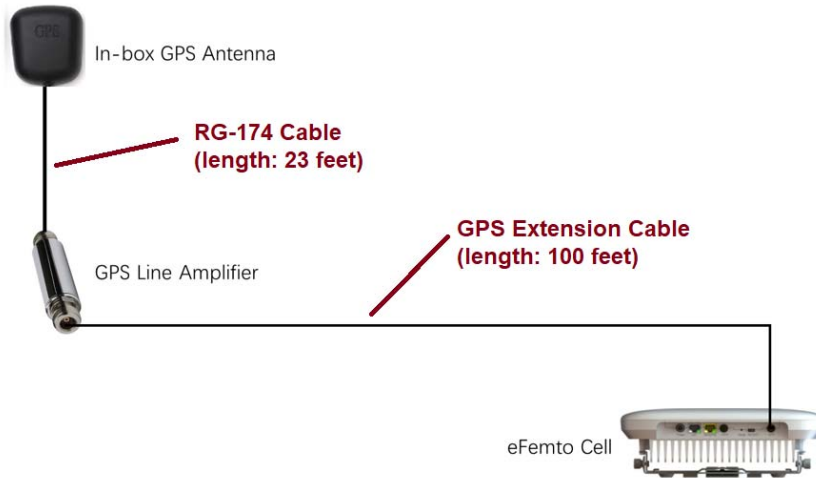
A GPS antenna cable is provided with the Network Extender. In the event that the provided cable is not long enough to provide a clear and open view of the sky, this optional cable may be used as described in this section.

This accessory is compatible with 4G LTE Network Extender 3 for Enterprise and 5G LTE Network Extender 4 for Enterprise. It is also compatible with Tallysman TW125B GPS Line Amplifier.

Configuration Suggestions

This 100' cable assembly can be used for Network Extender installations where the GPS antenna and the Network Extender must be separated by long distances. A line amplifier may also be required in these installations. The assembly includes SMA-Male connectors on both ends (see [Figure 7-1](#)).

Figure 7-1. GPS with Extension GPS cable & Line Amplifier



Specifications

Table 7-1. Cable 100 Specifications

Item	Details
Part Number	LCBLE100Q
Description	Extension GPS cable length 100ft
Cable Type	RG-174 low loss cable, shielded, 50 Ohms, black
Connector Type	SMA male on both sides
Insertion Loss	$\leq 47\text{dB @ } 1.575\text{GHz} \pm 10\text{MHz}$
VSWR	$< 1.3 @ 1.575\text{GHz} \pm 10\text{MHz}$
Pull Force of Plug	$> 25\text{LBS}$
Operating Temperature	-40 to 80C

Table 7-2. GPS Antenna Specifications

Item	Details
GPS Antenna	In-box active GPS antenna with 23ft RG-174 cable
GPS Line Amplifier (Option)	Device amplifying the GPS signal received from the GPS antenna (used to compensate the GPS signal loss caused by the extension cable). Compatible part number: Tallysman TW125B

PTP Network Time Server (SKU: APEXGPSV22)

Description

Verizon PTP Network Time Servers (VZ2) are available for use with Verizon's Enterprise Network Extenders where coordination of events at multiple locations is required.

The VZ2 supplies accurate time for computers and timekeeping devices on the network. The VZ2 supports Precision Time Protocol (PTP). It uses an active GPS antenna to maintain the current time as broadcast by United States GPS satellites. The VZ2 provides time & location for up to 5 Network Extender 4 devices, via an IP network connection.

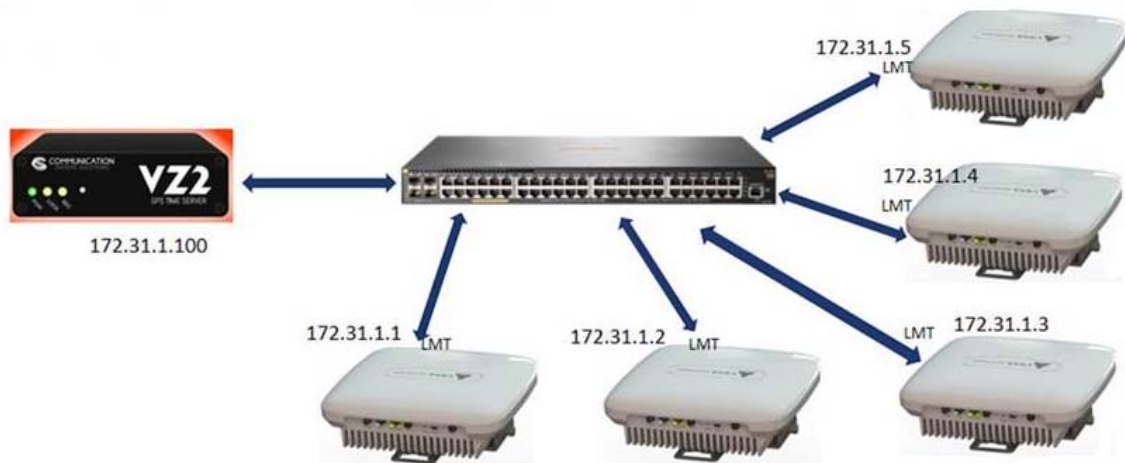
The eFemto cell gets time and location from the VZ2, when it cannot establish GPS itself. This is done through an IP network connection. This accessory is compatible with 4G LTE Network Extender 3 for Enterprise and 5G LTE Network Extender 4 for Enterprise.

Configuration Suggestions

When the installation has more than two Network Extenders within 300ft and cannot get a strong enough GPS signal using the available GPS antenna cables, it is recommended to deploy the GPS timing server to provide precise timing and location information (refer to [Figure 7-2](#)).

- The PTP server connects to a switch and each eFemto connects to the switch via the LMT port.
- The Web GUI allows the customer to configure a different static IP for the LMT port.
- The switch is dedicated for PTP traffic to avoid introducing additional time jitter.

Figure 7-2. PTP Configuration Example



Specifications

Table 7-3. GPS Timing Server Specifications

Item	Details
Part Number	ApexGPSV22
Description	GPS Time Sever Point to Point Protocol
Protocol	IEEE1588-2008 PTP Protocol
Server Time Level	Stratum 1/Clock Class 6
PTP Server Time Precision	Better than +/-1.5us + network jitter
Holdover time	15 minutes
Capacity	Provide Timing and Location service to MAX 5 eFemto cells
Ethernet Speed	10M/100M auto sensing network interface
Ethernet Interface	RJ-45
Networking	Static or DHCP IPv4 addressing. Standard browser interface for setup.
Power Interface	12V DC with in-box AC/DC adapter
LED Indications	Power, GPS signal lock, and 1PPS
Rear Connections	• Power • Cat5 Ethernet • Serial • Dual USB • GPS antenna via SMA

Item	Details
Support GPS antenna	+3.3V and +5V active GPS antennas with internal jumper setting
GPS Sensitivity	-165dBm
GPS Antenna Connection	1575.42MHz (L1 Band)
Cold Start	@-125dBm typically 33 seconds
Active Patch Antenna	• LNA +20dB • NF: 1.5dB • DC voltage: 2.7-6V • Cable: 5m RG-174 cable with SMA male
Operation Temperature	0-70C
Humidity	0-95%
Altitude	-304m to 18,000m
Mechanical Dimensions	• Main Body: 5" x 4.2" x 1.3" • GPS Antenna: 1.57" x 1.89" x 0.51"
Compliance	FCC part 15B, CE

Appendix A. FAQs

About this Appendix

This Appendix provides the following Frequently Asked Questions (FAQs) for the 5G LTE Network Extender 4 for Enterprise eFemto.

Topic	Page
Dashboard FAQs	A-3
How to Verify the Device Access Mode	A-3
System Information FAQs	A-4
How to Verify if the GPS Location was Acquired	A-4
How to Check the Number of Connected Users	A-5
How to Check the Active Alarms and Generate an Alarm Report	A-6
How to Generate a System Report	A-7
Settings FAQs	A-8
How to Adjust the MTU (Maximum Transfer Unit) Size	A-8
How to Configure a Static IP Address	A-9
How to Add a DNS	A-10
How to Add a Search Domain	A-11
How to Manually Adjust the 4G Cell Transmission Power	A-12
How to Change the 4G Band Class/Operating Channel	A-13
How to Change 4G (LTE) Operation Mode	A-14
How to Change 5G Band Class/Operating Channel	A-15
How to Manually Adjust the 5G Cell Transmission Power	A-16
How to Configure a New Synchronization Source	A-17
How to Select an ePTP Server to Provide Timing and Location	A-18
How to Set the LMT IP Address	A-20
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Topic	Page
How to Reboot or Factory Reset a Device	A-23
CSG mode FAQs	A-24
Where can the user manage the CSG function?	A-24
Will the user be able to determine which CSG IDs are associated with the phone?	A-24
Can the user specify a particular CSG ID number?	A-24
How many CSG ID can be assigned to a Network Extender?	A-24
Will the CSG ID be changed if a Network Extender changed its CSG mode from Hybrid to Closed or vice versa?	A-24
Will different CSG mode impacts E911 calls?	A-24

Dashboard FAQs

How to Verify the Device Access Mode

This procedure provides step-by-step instructions to verify the Network Extender Access Mode. Refer to [Figure A-1](#) for all steps.

1. From the main Dashboard, click **eFemto Dashboard**.
2. On the Dashboard, under System Information Dashboard, verify the **Access Mode** of the Network Extender (selections include: Open, Hybrid, or Close).

Figure A-1. Access Mode

DASHBOARD

eFemto Dashboard

SYSTEM INFORMATION

Operational Status

Location

Connected Devices

Performance

Neighbors

Alarms

SETTINGS

Network Settings

4G Advanced Settings

5G Advanced Settings

Sync & Time Settings

Certificate Management

User Settings

Device Tools

ABOUT

Support

DASHBOARD

Dashboard

Step 1



System Information Dashboard

Step 2

Operational Status	ONLINE	Software Version	1.1.12
Access Mode	OPEN	Location	42.9832° N, 71.3333° W
IP Address	172.18.253.115	Uptime	14 Hours 39 Minutes 28 Seconds
MAC Address	00:17:10:2B:25:40	System Time	5/4/2023, 12:22:58 PM (UTC)

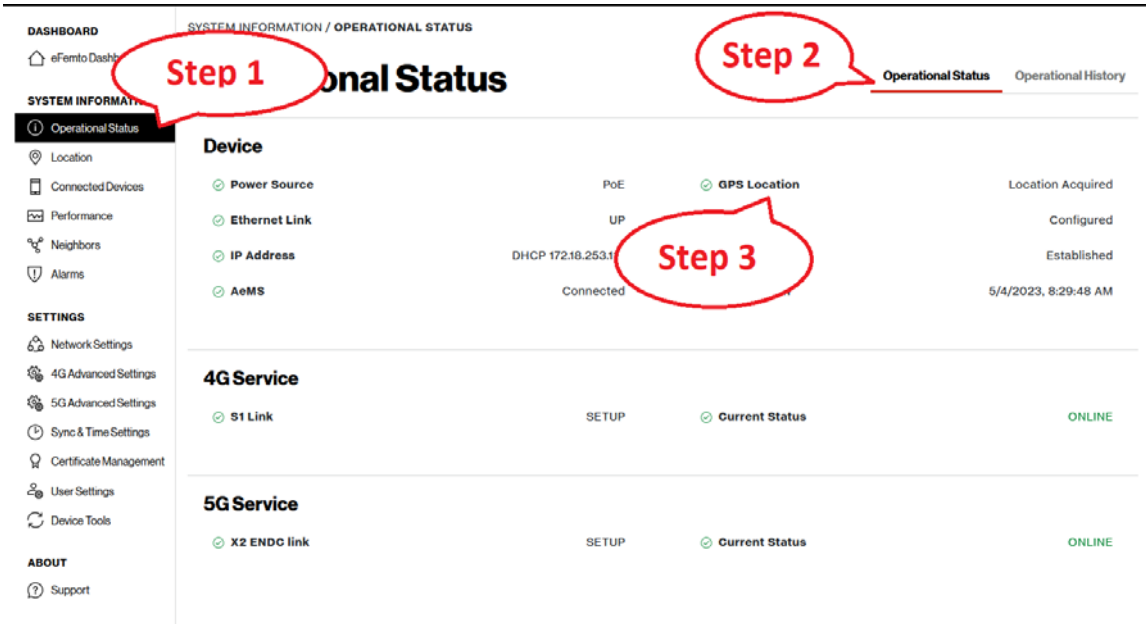
System Information FAQs

How to Verify if the GPS Location was Acquired

This procedure provides step-by-step instructions to verify if the GPS location was acquired by the Network Extender. Refer to [Figure A-2](#) for all steps.

- 1. From the main Dashboard, click **System Information > Operational Status**.
- 2. On the upper right corner of the page, click **Operational Status**.
- 3. Under Device (Operational Status), verify the **GPS Location** (Location Acquired is shown).

Figure A-2. GPS Location

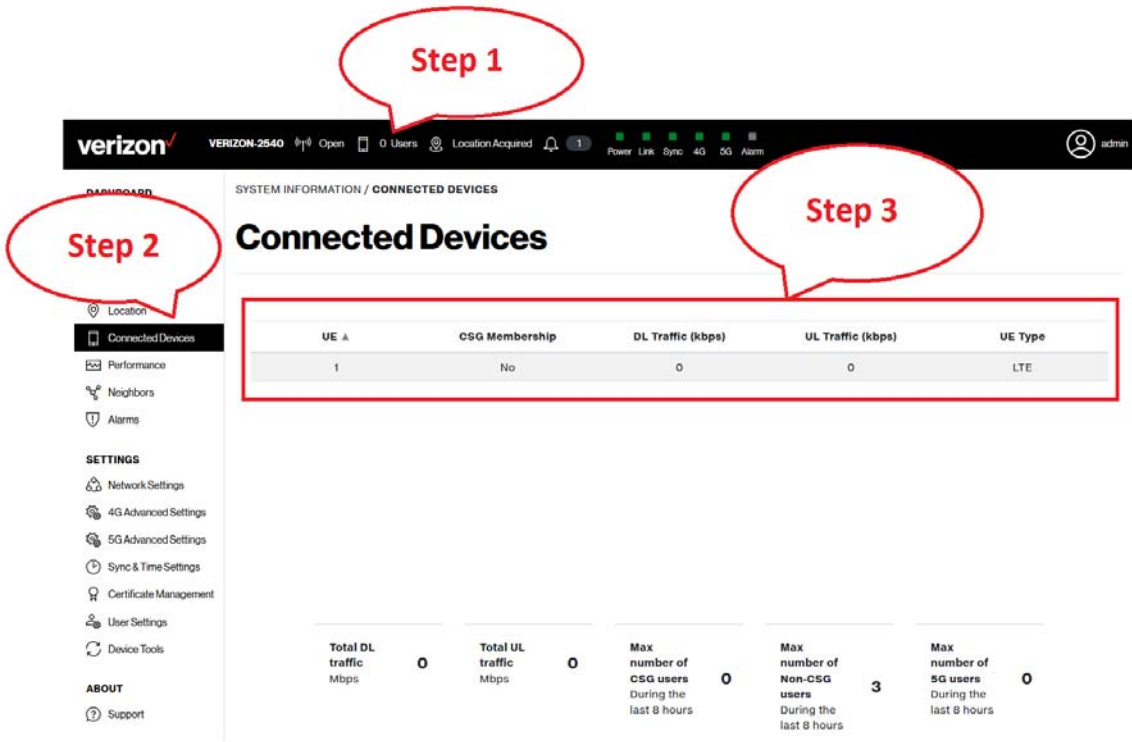


How to Check the Number of Connected Users

This procedure provides step-by-step instructions to check the number of connected users to the Network Extender. Refer to [Figure A-3](#) for all steps.

1. The number of active users is displayed in the Web GUI header.
2. From the main Dashboard, click **System Information > Connected Devices**.
3. Under Connected Devices, the active UEs are displayed.

Figure A-3. Connected Devices

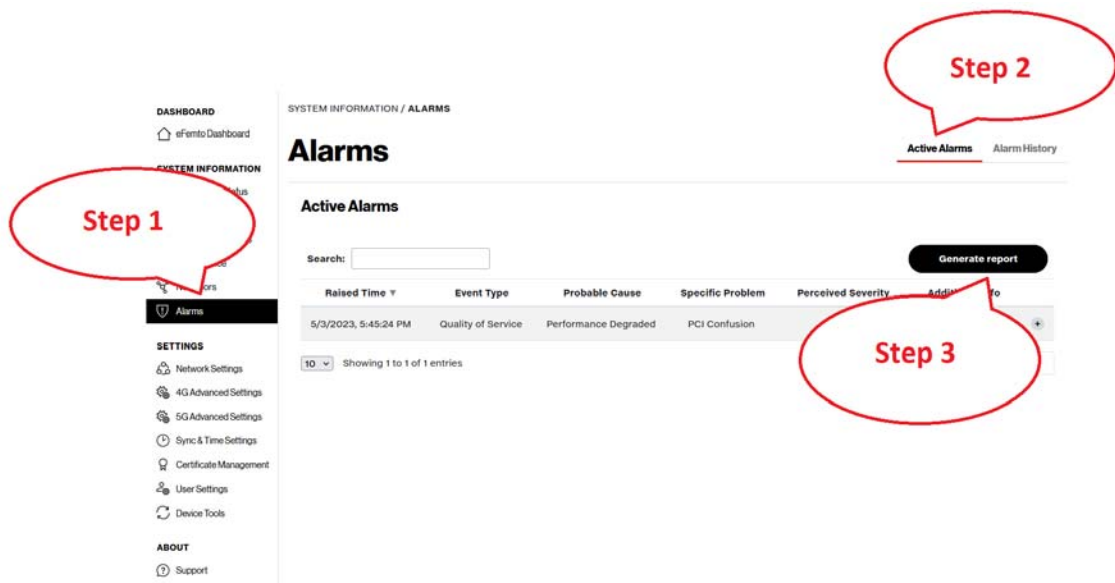


How to Check the Active Alarms and Generate an Alarm Report

This procedure provides step-by-step instructions to check the active alarms and generate an alarm report for the Network Extender. Refer to [Figure A-4](#) for all steps.

1. From the main Dashboard, click **System Information > Alarms**.
2. On the upper right portion of the page, click **Active Alarms** to display a list of active alarms.
3. Click **Generate report** to generate an alarm report.

Figure A-4. Network Extender Alarms

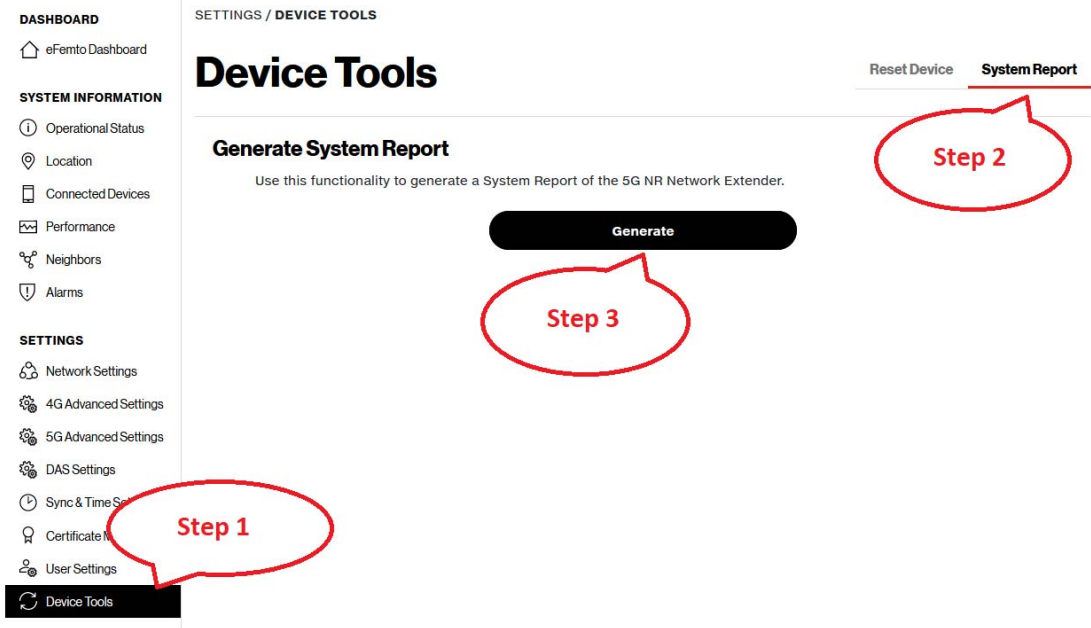


How to Generate a System Report

This procedure provides step-by-step instructions to generate a system report for the Network Extender. Refer to [Figure A-5](#) for all steps.

1. From the main Dashboard, click **Settings > Device Tools**.
2. On the upper right portion of the page, click **System Report**.
3. Click **Generate** to generate a system report.

Figure A-5. Device Tools System Report



Settings FAQs

How to Adjust the MTU (Maximum Transfer Unit) Size

This procedure provides step-by-step instructions to adjust MTU (maximum transfer unit) size for the Network Extender. Refer to [Figure A-6](#) for all steps.

1. From the main Dashboard, click **Settings** > **Network Settings**.
2. Under Ethernets, select the interface.
3. Click the icon next to MTU.
4. On the Configure Ethernet dialog, use the up/down arrows to adjust the MTU size as needed.
5. Click **Confirm action**.

Figure A-6. Adjust MTU size

The screenshot displays the 'Network Settings' page. The left sidebar shows the navigation menu with 'Network Settings' selected. The main content area is divided into 'IP Addresses' and 'Ethernets' sections. The 'Ethernets' section contains a table with columns for Interface, WAN, MAC Address, and MTU. The MTU column for the 'SERVING-SEGW-NR' interface shows a value of 1448 and a circular icon next to it. A red speech bubble labeled 'Step 1' points to the 'Network Settings' menu item. Another red speech bubble labeled 'Step 2' points to the 'Ethernets' section. A third red speech bubble labeled 'Step 3' points to the MTU icon in the table. A fourth red speech bubble labeled 'Step 4' points to the 'Configure Ethernet' dialog box, which is open and shows the MTU field set to 1448. A fifth red speech bubble labeled 'Step 5' points to the 'Confirm action' button in the dialog box.

Interface	WAN	Mode	DHCP	Family	IPv4	IP Address	Prefix	24
LMT		Mode	Lmt	Family	IPv4	IP Address	Prefix	30
SERVING-SEGW		Mode	IPsec	Family	IPv6	IP Address	Prefix	128
SERVING-SEGW-NR		Mode	IPsec	Family	IPv6	IP Address	Prefix	128

Ethernets

Interface	WAN	MAC Address	MTU
SERVING-SEGW-NR		00:17:10:2B:25:40	1448

Configure Ethernet

Name: WAN MTU: 1448

Bandwidth limit(Mbps) (0 to disable): 0

Confirm action Dismiss action

How to Configure a Static IP Address

This procedure provides step-by-step instructions to configure a static IP address for the Network Extender. Refer to [Figure A-7](#) for all steps.

1. From the main Dashboard, click **Settings** > **Network Settings**.
2. Under IP Addresses, select the icon next to the specific IP Address that requires a change.
3. On the **Configure WAN IP Address** dialog, under Mode, select either **DHCP** or **Static**.
4. Click **Confirm** action.

Figure A-7. Configuring the Static IP Address

The screenshot displays the 'Network Settings' page with four steps highlighted by red callouts:

- Step 1:** Points to the 'Settings' menu in the left sidebar, specifically the 'Network Settings' option.
- Step 2:** Points to the edit icon (a circle with a pencil) next to the WAN interface in the 'IP Addresses' table.
- Step 3:** Points to the 'Mode' dropdown menu in the 'Configure WAN IP Address' dialog, which is set to 'DHCP'.
- Step 4:** Points to the 'Confirm action' button in the 'Configure WAN IP Address' dialog.

Network Settings Interface Details:

IP Addresses Table:

Interface	Mode	Family	IP Address	Prefix
WAN	DHCP	IPv4	172.18.253.115	24
LMT	Limit	Family	IPv4	172.31.11
SERVING-SEG-W	IPsec	Family	IPv6	2607:f60:10:23f2::4f
SERVING-SEG-W-NR	IPsec	Family	IPv6	2607:f60:c4136:ce404::

Ethernets Table:

Interface	WAN	MAC Address	MTU
		00:17:10:2B:25:40	1448

DNS Section:

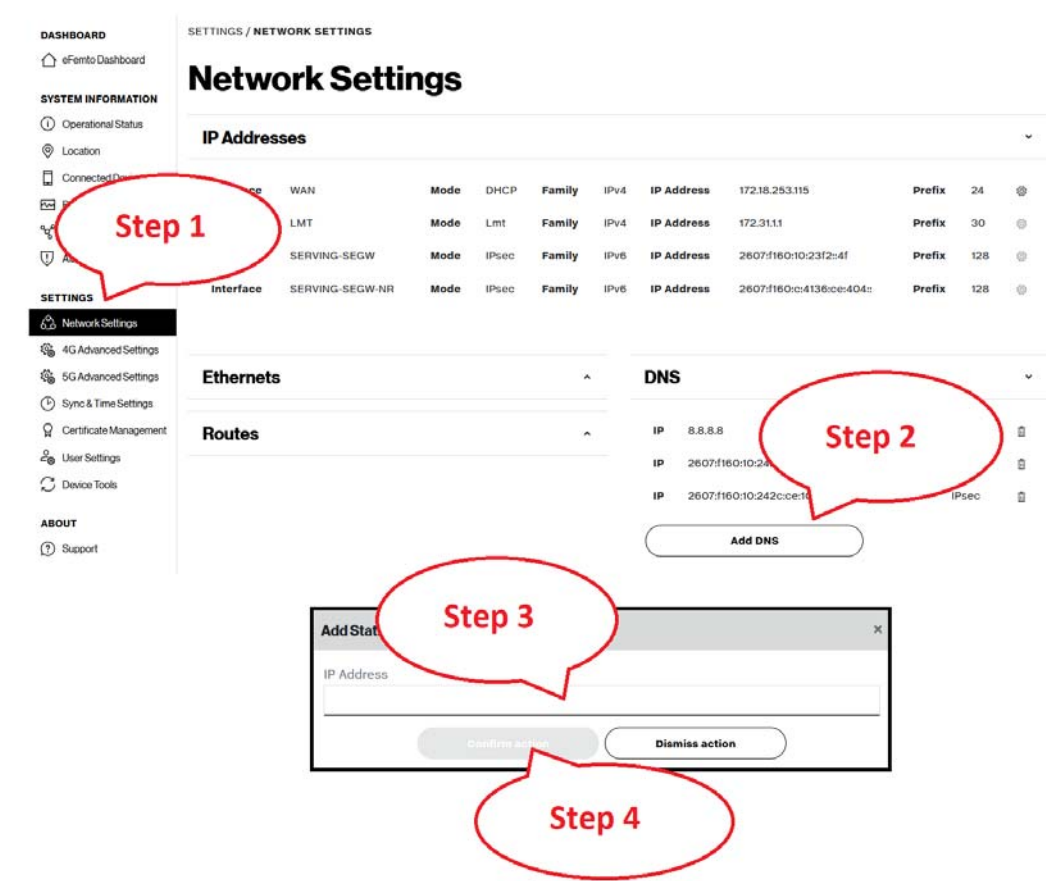
Search Domains

How to Add a DNS

This procedure provides step-by-step instructions to add a DNS for the Network Extender. Refer to [Figure A-8](#) for all steps.

- 1. From the main Dashboard, click **Settings > Network Settings**.
- 2. Under DNS, click **Add DNS**.
- 3. On the **Add Static DNS** dialog, enter the DNS IP Address.
- 4. Click **Confirm action**.

Figure A-8. DNS Settings

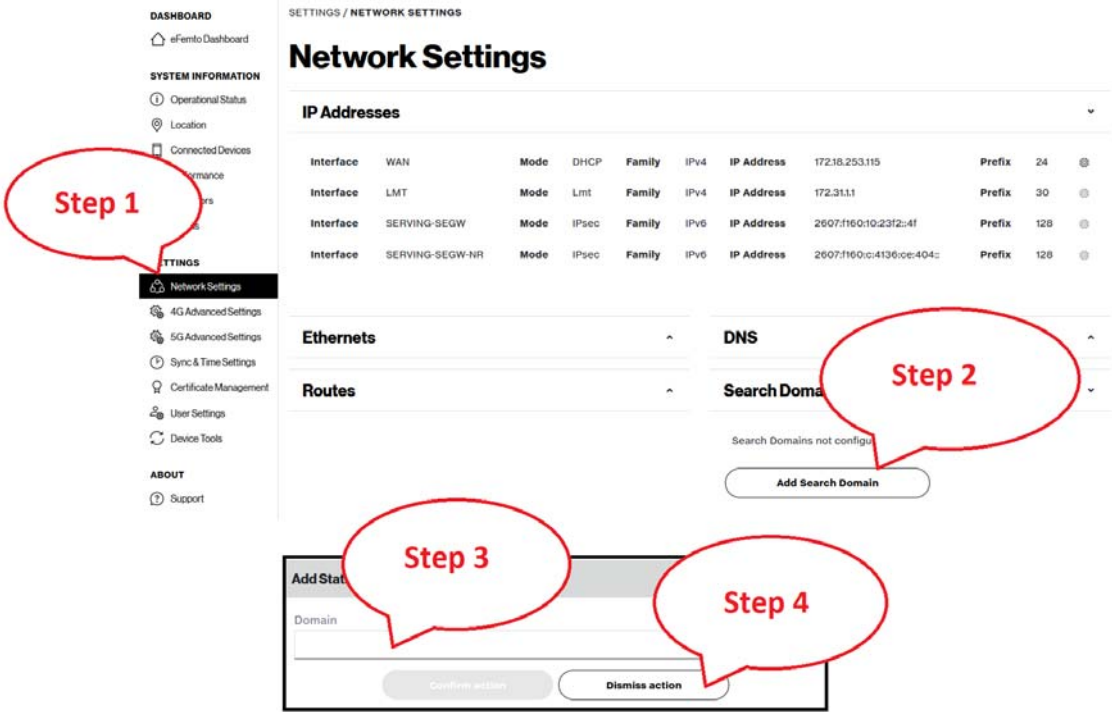


How to Add a Search Domain

This procedure provides step-by-step instructions to add a Search Domain for the Network Extender. Refer to [Figure A-9](#) for all steps.

1. From the main Dashboard, click **Settings > Network Settings**.
2. Under Search Domains, click **Add Search Domain**.
3. On the **Add Static Search Domain** dialog, enter the Domain Address.
4. Click **Confirm action**.

Figure A-9. Search Domains



How to Manually Adjust the 4G Cell Transmission Power

This procedure provides step-by-step instructions to Manually Adjust the 4G Cell Transmission Power. Refer to [Figure A-10](#) for all steps.

1. From the main Dashboard, click **Settings** > **4G Advanced Settings**.
2. On the upper right corner of the 4G Advanced Settings page, select **4G Cell**.
3. Under Transmission Power Configuration, move the slider (left or right) to set Manual Power as required.
4. Click **Set Tx Power**.

Figure A-10. 4G Advanced Settings

The screenshot shows the '4G Advanced Settings' page. On the left is a sidebar menu with '4G Advanced Settings' highlighted. The main content area is titled '4G Advanced Settings' and has a tab '4G Cell' selected. It is divided into two sections: 'Primary Cell Radio Configuration' and 'Transmission Power Configuration'.

Primary Cell Radio Configuration

Primary PLMNID	311480	Cell ID	265876231
PCI	500	TAC	15865
Operating Band	Band 66	EARFCN	66586
DL Bandwidth	20 MHz	UL Bandwidth	20 MHz
Reference Signal Power	-11	RF Tx Status	On
Cell Barred	False	Administrative State	True

Transmission Power Configuration

Tx Power: 23 dBm

Enable Manual Power Selection: ☒

A slider is shown with '0 dBm' on the left and '24 dBm Recommended Tx Power' on the right. The slider is currently positioned at 23 dBm. A 'Set Tx Power' button is located below the slider.

Step 1: Points to the '4G Advanced Settings' menu item in the sidebar.

Step 2: Points to the '4G Cell' tab in the top right corner.

Step 3: Points to the 'Enable Manual Power Selection' toggle switch.

Step 4: Points to the 'Set Tx Power' button.

How to Change the 4G Band Class/Operating Channel

This procedure provides step-by-step instructions to Manually change the 4G Band Class/Operating Channel. Refer to [Figure A-11](#) for all steps.

1. From the main Dashboard, click **Settings** > **4G Advanced Settings**.
2. Click **4G Cell**.
3. Click in the gear icon which opens the Primary Cell Radio Configuration dialog.
4. From the drop-down menu select the desired operational channel.
5. Click **Confirm action** to apply the changes and reboot the device.

Figure A-11. Select a new Operating channel

The screenshot displays the '4G Advanced Settings' page. The left sidebar contains a navigation menu with sections: DASHBOARD, SYSTEM INFORMATION, SETTINGS, and ABOUT. The 'SETTINGS' section is expanded, showing '4G Advanced Settings' as the selected option. The main content area is titled '4G Advanced Settings' and includes a 'Cell Configuration' table and a 'Transmission Power Configuration' section. Five red callouts with white text indicate the following steps:

- Step 1:** Points to the '4G Advanced Settings' option in the left sidebar.
- Step 2:** Points to the '4G Cell' tab in the top right corner.
- Step 3:** Points to the gear icon in the top right corner.
- Step 4:** Points to the 'Primary Cell Radio Configuration' dialog box, specifically to the dropdown menu showing 'Band 13 - EARFCN 5230 - 10 MHz Bandwidth'.
- Step 5:** Points to the 'Confirm action' button in the 'Primary Cell Radio Configuration' dialog box.

The 'Cell Configuration' table lists the following details:

Primary PLMNID	Cell ID
311480	502
Band 13	EARFCN
10 MHz	UL Bandwidth
-11	RF Tx Status
False	Administrative State
	True

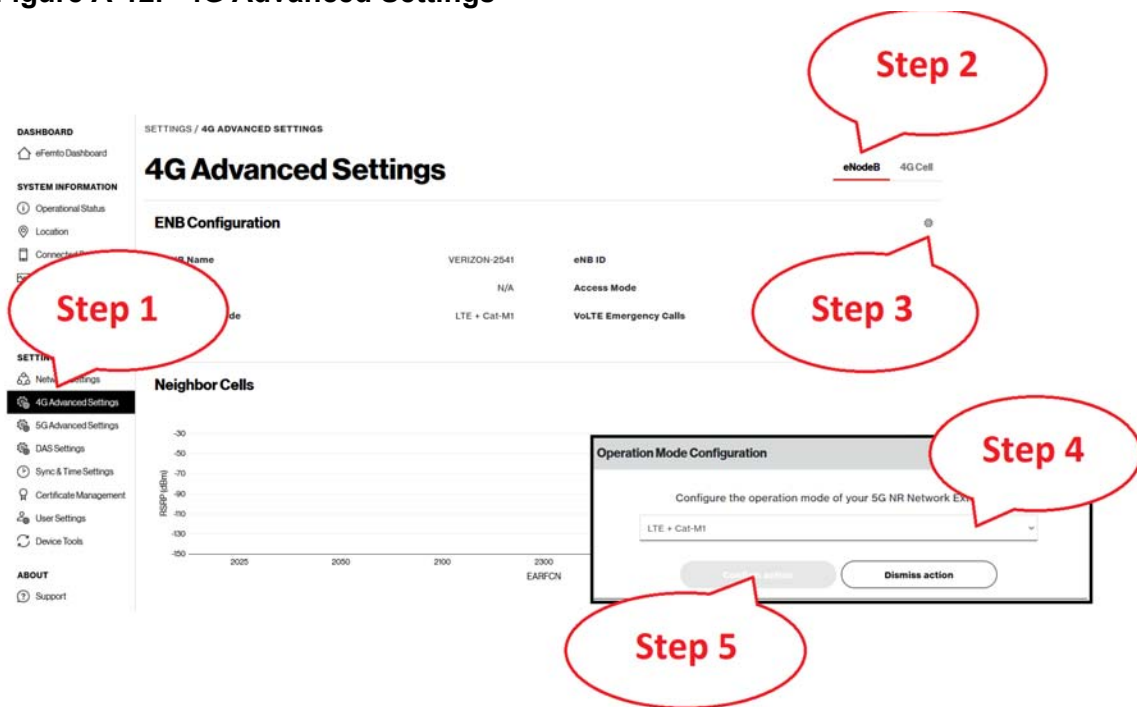
The 'Transmission Power Configuration' section shows a 'Tx Power' slider ranging from 0 dBm to 24 dBm, with a 'Set Tx Power' button. It also includes an 'Enable Manual Power Selection' toggle and a 'Tx Power' box showing '20 dBm' and '100 mW'.

How to Change 4G (LTE) Operation Mode

This procedure provides step-by-step instructions to Manually Adjust the 4G Cell Band Class/Operating Channel. Refer to [Figure A-12](#) for all steps.

1. From the main Dashboard, click **Settings** > **4G Advanced Settings**.
2. Click **eNodeB**.
3. Click the gear icon which opens the Operation Mode Configuration dialog.
4. From the drop-down menu, choose between **LTE** or **LTE + Cat-M1** modes.
5. Click **Confirm action** to apply the changes and reboot the device.

Figure A-12. 4G Advanced Settings

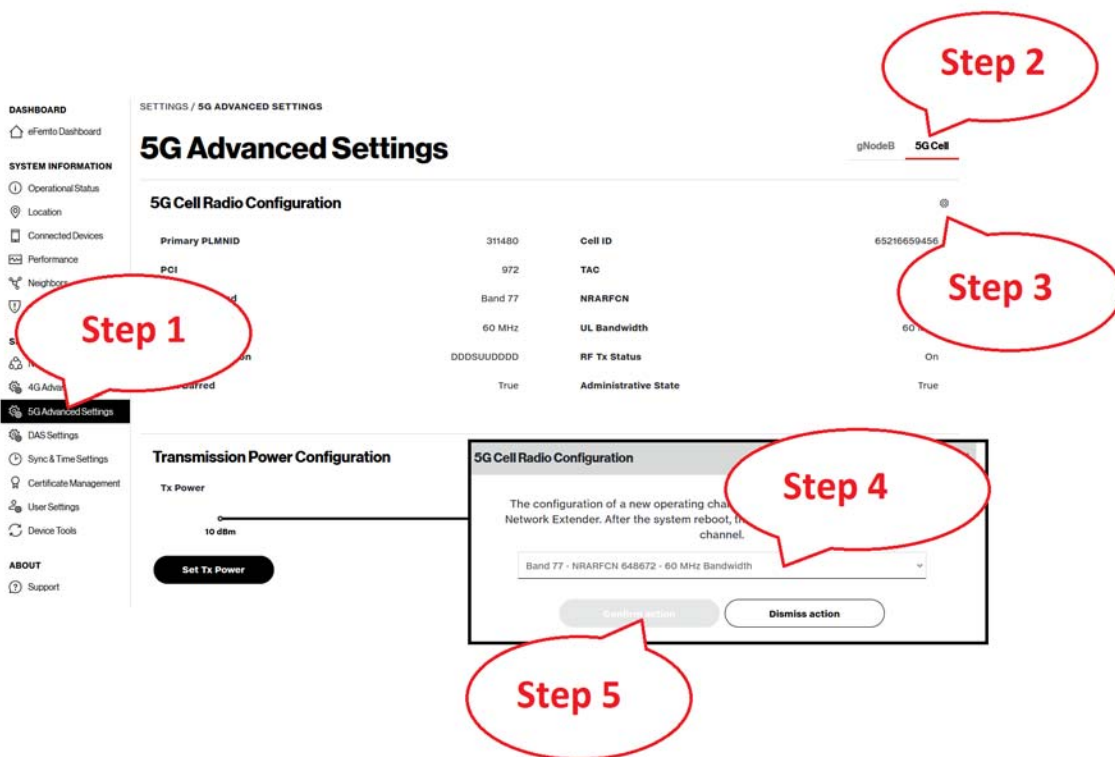


How to Change 5G Band Class/Operating Channel

This procedure provides step-by-step instructions to Manually Adjust the 5G Cell Band Class/Operating Channel. Refer to [Figure A-13](#) for all steps.

1. From the main Dashboard, click **Settings** > **5G Advanced Settings**.
2. Click **5G Cell**.
3. Click the gear icon which opens the 5G Cell Radio Configuration dialog.
4. On the 5G Cell Radio Configuration dialog, select the operating channel from the drop-down menu.
5. Click **Confirm action** to apply the changes and reboot the device.

Figure A-13. 5G Advanced Settings



How to Manually Adjust the 5G Cell Transmission Power

This procedure provides step-by-step instructions to Manually Adjust the 5G Cell Transmission Power. Refer to [Figure A-14](#) for all steps.

1. From the main Dashboard, click **Settings** > **5G Advanced Settings**.
2. On the upper right corner of the 5G Advanced Settings page, select **5G Cell**.
3. Under Transmission Power Configuration, move the slider (left or right) to set Manual Power as required.
4. Click **Set Tx Power**.

Figure A-14. 5G Advanced Settings

The screenshot shows the '5G Advanced Settings' page. The left sidebar contains a menu with '5G Advanced Settings' highlighted. The main content area is divided into two sections: '5G Cell Radio Configuration' and 'Transmission Power Configuration'.

Step 1: Points to the '5G Advanced Settings' option in the left sidebar.

Step 2: Points to the '5G Cell' tab in the top right corner of the settings page.

Step 3: Points to the 'Enable Manual Power Selection' toggle switch in the 'Transmission Power Configuration' section.

Step 4: Points to the 'Set Tx Power' button at the bottom of the 'Transmission Power Configuration' section.

The '5G Cell Radio Configuration' table shows the following details:

5G Cell Radio Configuration			
Primary PLMNID	311480	Cell ID	65217262048
PCI	1003	TAC	10000
Operating Band	Band 77	NRARFCN	640672
DL Bandwidth	60 MHz	UL Bandwidth	60 MHz
TDD Configuration	DDDSUUD000	RF Tx Status	On
Cell Barred	True	Administrative State	True

The 'Transmission Power Configuration' section shows a slider for 'Tx Power' ranging from 7 dBm to 27 dBm. The current value is 27 dBm. A box on the right indicates 'Tx Power 27 dBm 501 mW'. The 'Enable Manual Power Selection' toggle is turned on.

How to Configure a New Synchronization Source

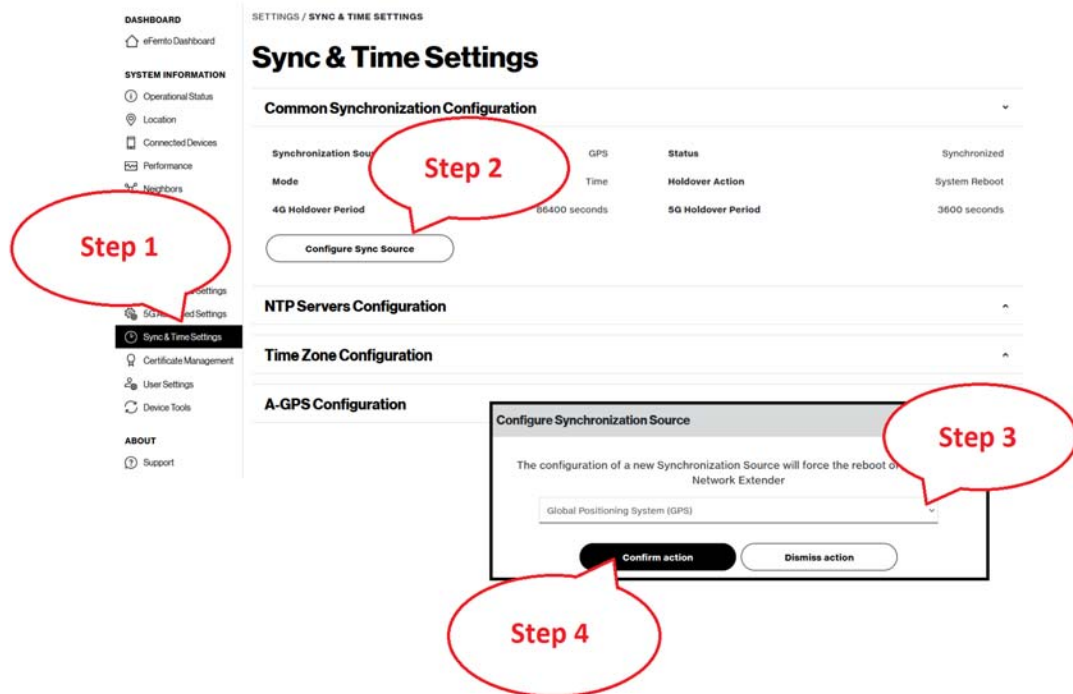
This procedure provides step-by-step instructions to Configure a new Synchronization Source. Refer to [Figure A-15](#) for all steps.

1. From the main Dashboard, click **Settings > Sync & Time Settings**.
2. On the Sync & Time Settings dialog, click **Configure Sync Source**.
3. On the Configure Synchronization Source dialog, using the drop-down arrow, select either a GPS or IEEE v1588v2 synchronization source.

Note: The configuration of a new Synchronization Source will force the reboot of your 5G NR Network Extender.

4. Click **Confirm action**.

Figure A-15. Synchronization Source



How to Select an ePTP Server to Provide Timing and Location

The PTP server accessory is custom built to provide both location and timing to the Network Extender. The PTP server can be connected to the eFemto4 LMT port directly. If multiple units are to be connected, a regular switch without Boundary Clock should be used to connect each eFemto to the PTP via the LMT port (refer to [How to Set the LMT IP Address](#)). It is highly recommended to use a dedicated switch for PTP traffic to avoid introducing additional time jitter.

Activity Prerequisites

- The CSS ePTP server should running alarm free, able to see satellites and has a 3D fix.
- Configure PTP server with IP address 172.31.1.100

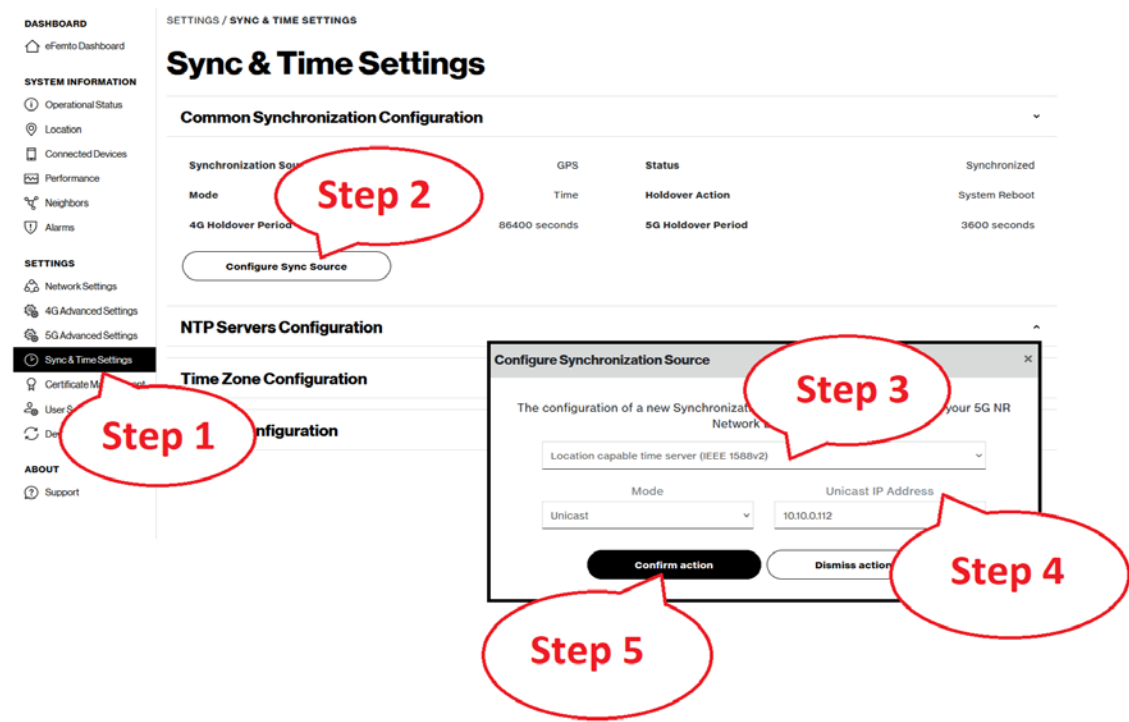
Setup Procedure

The following procedure provides step-by-step instructions to select a location capable time server. Casa supports only a specific PTP server optimized for Femtos. Refer to [Figure A-16](#) for all steps.

1. From the main Dashboard, click **Settings > Sync & Time Settings**.
2. Click **Configure Sync Source**.
3. On the Configure Synchronization Source dialog, from the drop-down menu choose Location capable time server (IEEE 1588v2).
4. Under Mode, select Unicast, and enter the PTP server Static IP Address.

5. Click **Confirm** action to apply the changes and reboot the device.

Figure A-16. PTP Configuration

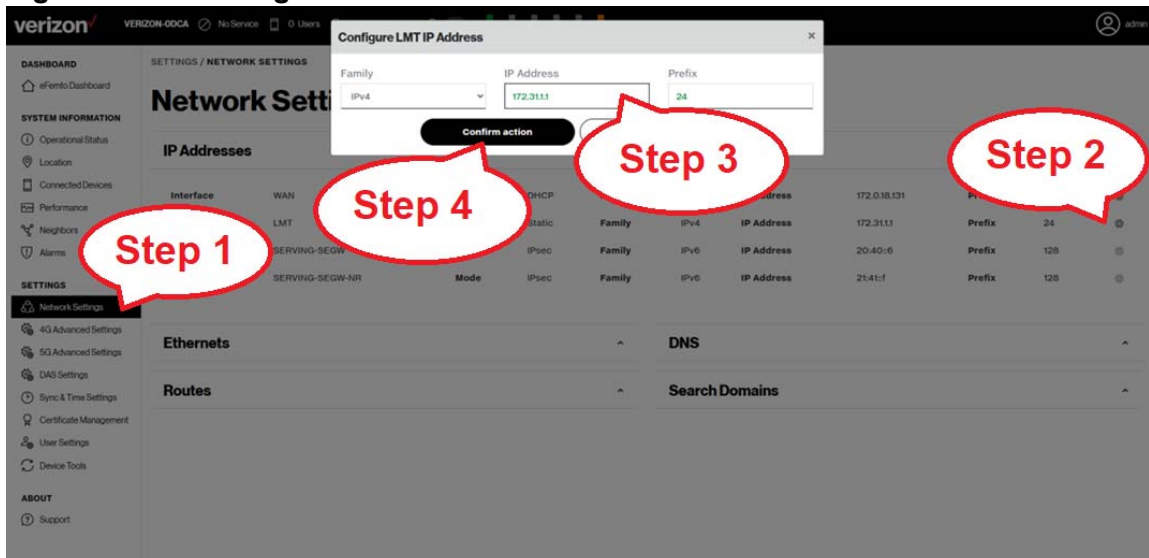


How to Set the LMT IP Address

The LMT IP address can be configured using the Web GUI (refer to Figure A-17 for all steps).

1. From the main Dashboard, click **Settings** > **Network Settings**.
2. Click the gear icon for the selected Interface which opens the Configure LMT IP Address dialog.
3. Enter the **IP Address** of the LMT. The Network Extender can only connect to a PTP server with an IP Address of 172.31.1.2-254. If multiple eFemtos are to be connected, each eFemto needs to be configured using a different IP Address (such as 172.31.1.X).
4. Click **Confirm action** to apply the changes and reboot the device.

Figure A-17. Configure the LMT IP Address

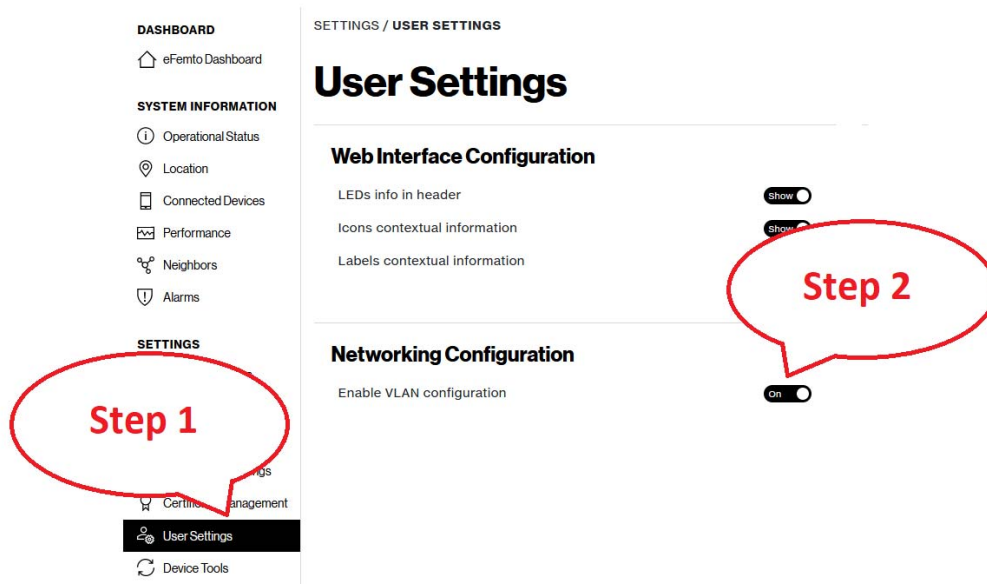


How to Add a VLAN

This procedure provides step-by-step instructions to configure a VLAN.

1. From the main Dashboard, click **Settings > User Settings** (see [Figure A-18](#)).
2. Under Network Configuration, click **On** for Enable VLAN configuration (see [Figure A-18](#)).

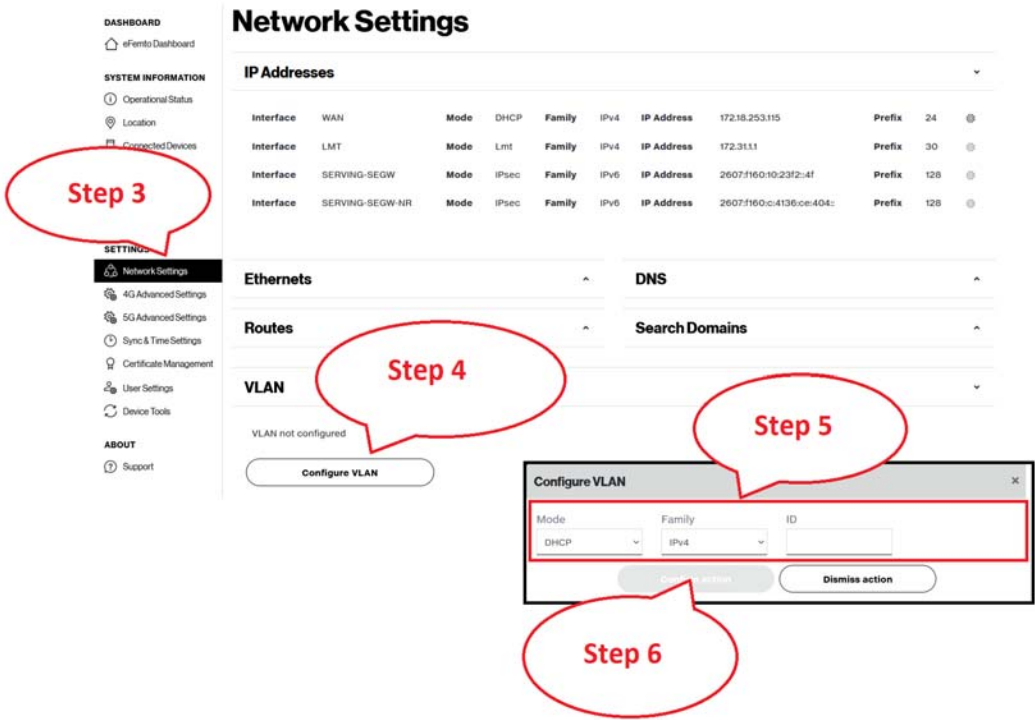
Figure A-18. Enable VLAN Configuration



3. Click **Network Settings** (see [Figure A-19](#)).
 4. Click **VLAN > Configure VLAN** (see [Figure A-19](#)).
 5. On the Configure VLAN dialog, set **Mode** (DHCP or Static), **Family**, and **ID**. This action will reboot the unit (see [Figure A-19](#)).
- If using DHCP, check that the unit can get IP address after reboot.
 - If not using DHCP, try to ping the unit static WAN IP from another device in the same VLAN.

6. Click **Confirm** action (see [Figure A-19](#)).

Figure A-19. Configure VLAN



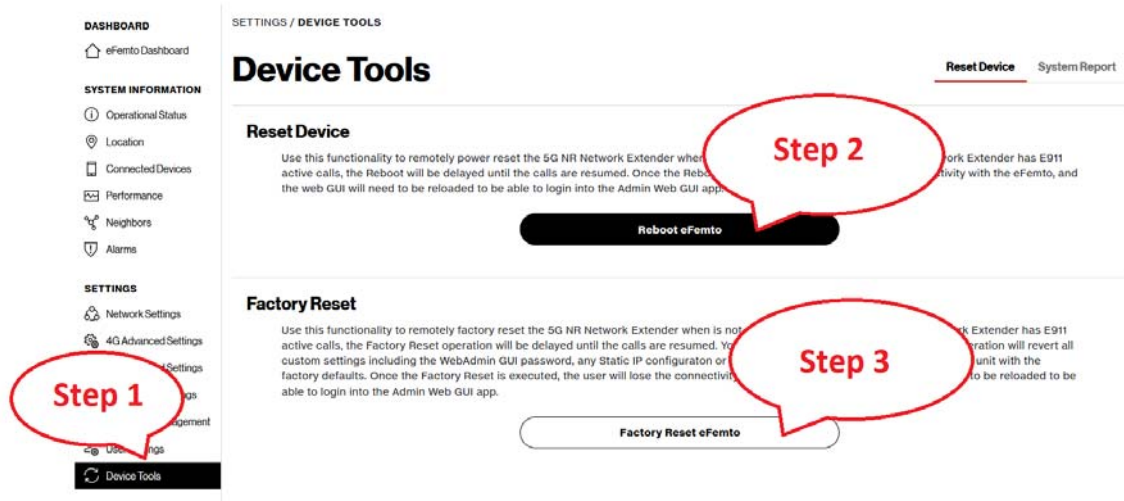
7. Go to [How to Configure a New Synchronization Source](#) to complete the procedure.

How to Reboot or Factory Reset a Device

This procedure provides step-by-step instructions to Reset the Device or perform a Factory Reset. Refer to [Figure A-20](#) for all steps.

1. From the main Dashboard, click **Settings** > **Device Tools**.
2. To reset the Network Extender, on the Device Tools page, click **Reboot eFemto**.
3. To reset the Network Extender to Factory Settings, on the Device Tools page, click **Factory Reset eFemto**.

Figure A-20. Device Tools



CSG mode FAQs

Where can the user manage the CSG function?

User will be able to manage the CSG function of the Network Extender via MyVerizon or MyBiz portal.

Will the user be able to determine which CSG IDs are associated with the phone?

User will have to login to the MyVerizon or MyBiz portal to view/manage the phone numbers associate with CSG IDs. There is no way to determine the assigned CSG IDs from the phone.

Can the user specify a particular CSG ID number?

No. The system assigns a CSG ID. However, the user can specify the name of the CSG group.

How many CSG ID can be assigned to a Network Extender?

Only one CSG ID per Network Extender. However, the Network Extender can be re-assigned a different CSG ID if necessary.

Will the CSG ID be changed if a Network Extender changed its CSG mode from Hybrid to Closed or vise versa?

No. The Network Extender keeps the same CSG group and ID but only change the mode.

Will different CSG mode impacts E911 calls?

No. Emergency E911 calls are supported regardless of CSG membership. Emergency active calls on the Network Extender CANNOT be pre-empted nor redirected.



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5G LTE Network Extender for Enterprise User Guide

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