WILSONPRO™
A Wilson Electronics Brand

ENTERPRISE 1398

In-Building Cell Signal Amplifier with
Multi-Tower Targeting (MTT) Technology

Installation Guide

NEED HELP?

wilsonpro.com

866.294.1660

Index

Package Contents

Enterprise 1398 SKU 460072

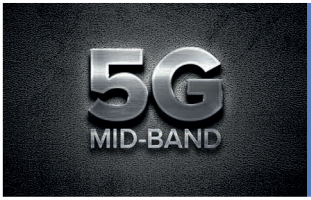
Enterprise 1398 Amplifier (wall mount), External Hinged Antenna & Power Supply

Enterprise 1398 SKU 461072

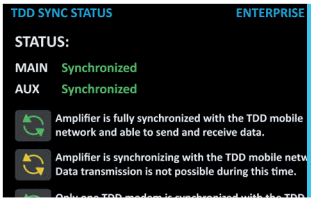
Enterprise 1398 Amplifier (rack mount), External Hinged Antenna & Power Supply

Enterprise 1398

In-Building Cell Signal Amplifier System



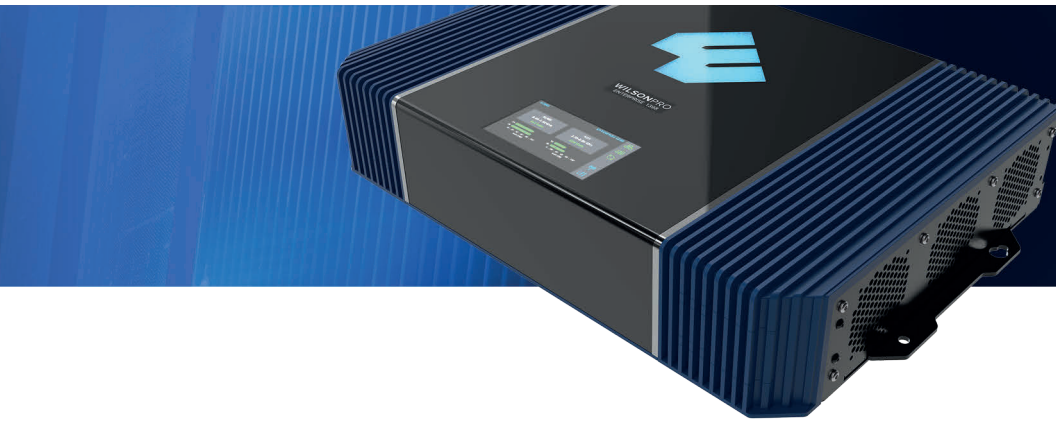
Optimized mid-band 5G (3.45-3.98 GHz) in any building (excludes CBRS frequencies).



After configuration, the Time Division Duplex (TDD) automatically syncs to the carrier network.

2X 200 MHz filtered, independent frequency paths supporting up to 400 MHz of total bandwidth (or 200 MHz 2x2 MIMO).

Install as a standalone unit or add-on to existing WilsonPro systems.



The **Enterprise 1398** is the newest C-band 5G amplifier solution from WilsonPro. The enterprise-grade amplifier is compatible with the mid-band 5G frequency operating at 3.45 - 3.98 GHz and is an excellent upgrade for existing WilsonPro systems to support additional 5G coverage. After configuring the Enterprise 1398's TDD modem, it will automatically synchronize, instantly amplifying the C-band signal and requires no additional backhaul to extend 5G right away. With included SDF, you target a specific network to amplify. The Enterprise 1398 provides dual paths, supporting 2x2 MIMO (200MHz). Alternatively, each path can be configured to amplify different frequencies (providing 400 MHz total bandwidth). The amplifier requires indoor and outdoor C-band antennas and 50-ohm coaxial cable with N-type connectors. Fits a standard (2U) rack. Carrier approval is required to operate this repeater.

Key Features

WilsonPro Cloud: Remote system monitoring. Connects to WilsonPro Cloud service via internal, pre-activated LTE modem or Ethernet.

Extended Dynamic Range (XDR) for continuous connectivity: XDR lets the Enterprise 1398 system work with an incoming signal and never shuts down due to a strong outside signal.

TDD Synchronization: After configuration, the Time Division Duplex automatically syncs the 1398 to the carrier network which instantly amplifies C-band signal and requires no additional backhaul to extend 5G right away.

Remote Connected Monitoring: Get immediate notification if the 1398 stops working or if band conditions change.

Onboard Software for Intelligent Control: The amplifier is automatically controlled by onboard software, ensuring connectivity throughout large spaces and multi-story buildings. The amplifier will adjust its gain level up or down as required by the conditions of the immediate signal environment.

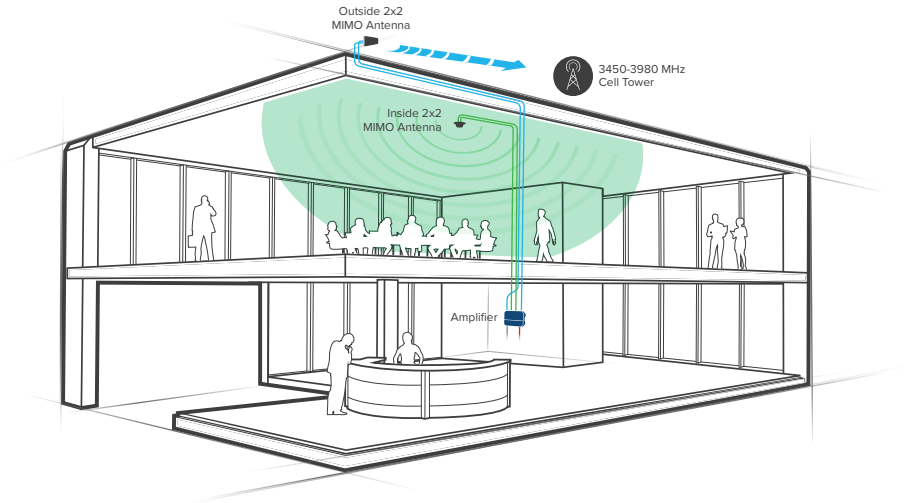
Additional Flexibility: Offers 2 x 200 MHz filtered, independent frequency paths supporting up to 400MHz of total bandwidth (or 200MHz 2x2 MIMO).

Color LCD Touch Screen: The Enterprise 1398 system utilize a color LCD touch screen, for assessing amplifier performance and viewing amplifier configuration.

Installation Diagram

2x2 MIMO

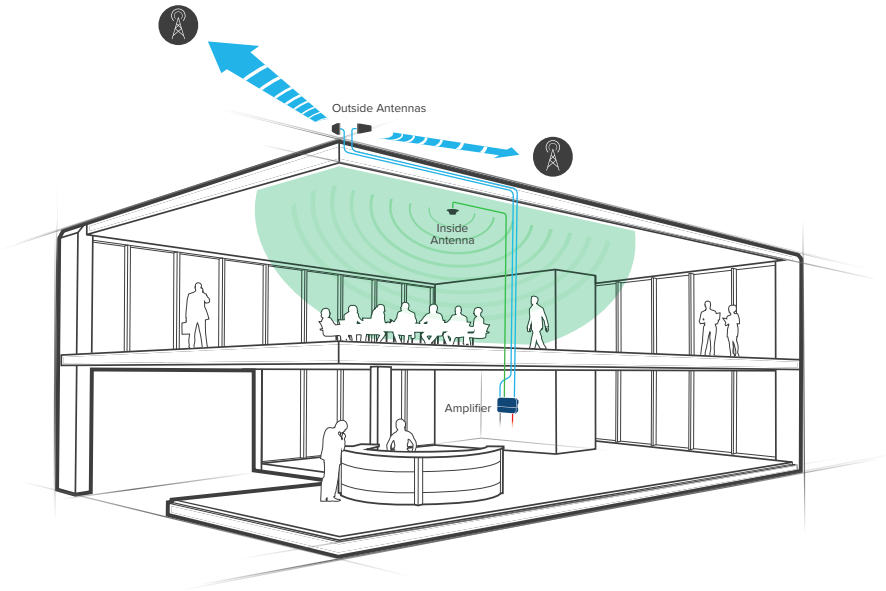
Both MAIN and AUX paths amplifying the same frequencies for enhanced data rates. 200 MHz total bandwidth.



Note: A Wilson Lightning Surge Protector is recommended for all building installations. Make sure the protector is installed outside the building at point of entry connected to a suitable ground and in line between the Outside Antennas and the Signal Amplifier.

SISO

Both MAIN and AUX paths each amplifying distinct frequencies (200 MHz each path) for up to 400MHz total bandwidth.



Note: A Wilson Lightning Surge Protector is recommended for all building installations. Make sure the protector is installed outside the building at point of entry connected to a suitable ground and in line between the Outside Antennas and the Signal Amplifier.

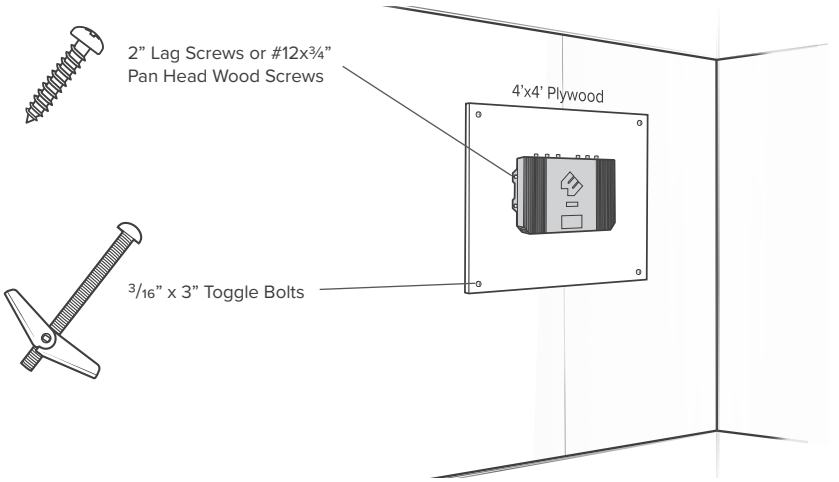
Mounting Specifications

Wall Mounting Installation

(for most situations)

Fasten a sheet of 4'x4'x ¾" plywood utilizing 4 x 3/16"x 3" toggle bolts with a minimum tensile rating of 35 lbs, then use 4x #12 x¾" Pan Head Wood Screws or ½" x 2" lag screws to secure the booster to the plywood.

Before assembling and mounting on the wall mount, please reference the below diagram:

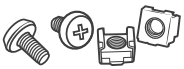


WARNING: Proper installation environment to reduce risks related to the environment, the unit must be installed indoors only. It is the consumer's responsibility to ensure that structural engineering requirements for potential seismic activity are met per your local requirements. This may require wall reinforcement. Do not install near sources of high heat or steam or where condensation is likely to occur, such as near air conditioners. Inspect mounting location conditions to ensure proper wall thickness and no signs of moisture or molding, etc. Do not install on a structure that is prone to vibration or movement. The unit must be plugged into an earthed outlet ONLY.

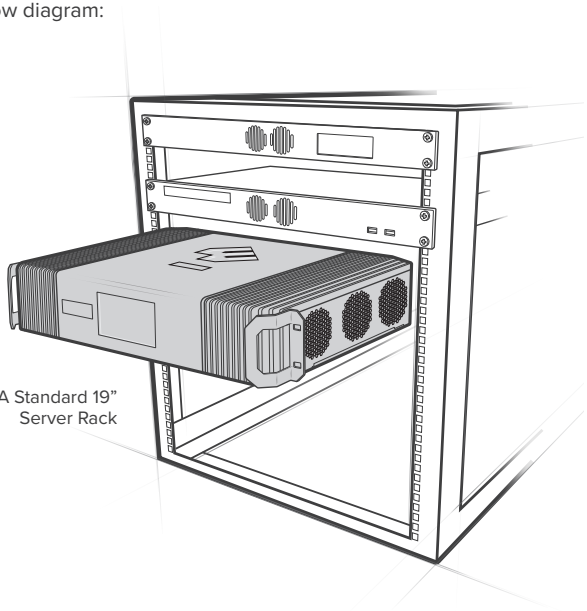
Rack Mounting Installation

Mount to EIA Standard 19” Server Rack (compliant with EIA-310-D) with 4 standard #10 or #12 cage Screws and Nuts.

Please reference the below diagram:



Standard #10 or #12
Cage Screws & Nuts

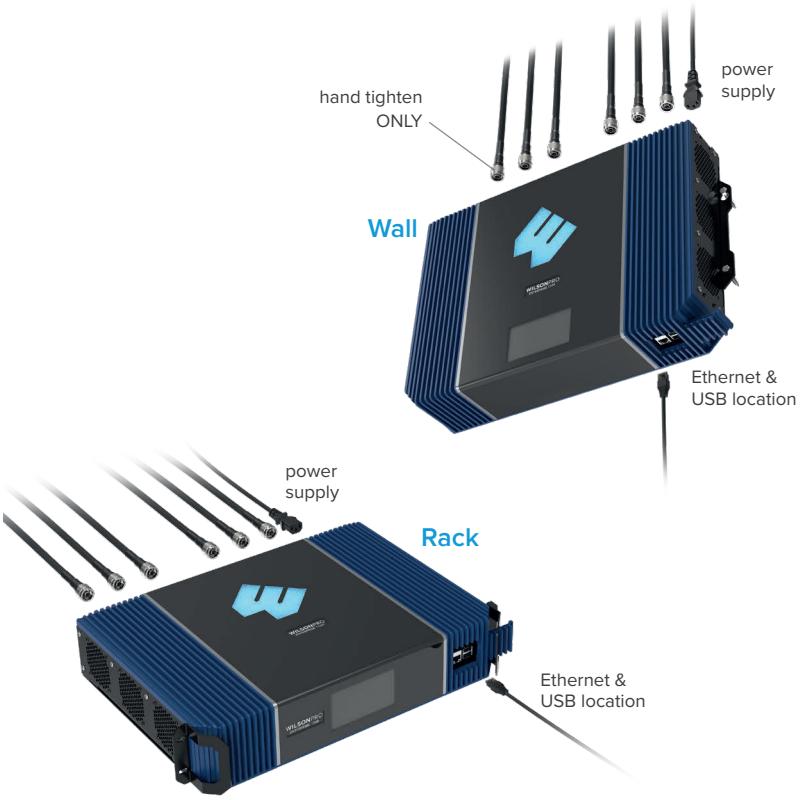


WARNING: Proper installation environment to reduce risks related to the environment, the unit must be installed indoors only. It is the consumer’s responsibility to ensure that structural engineering requirements for potential seismic activity are met per your local requirements. This may require wall reinforcement. Do not install near sources of high heat or steam or where condensation is likely to occur, such as near air conditioners. Do not install on a structure that is prone to vibration or movement. The power supply must be plugged into an earthed outlet ONLY.

Post-Install Setup

The Enterprise 1398 system is designed with advanced internal programming, which allows it to automatically adjust for a variety of conditions, including the added functionality, alerts, and troubleshooting of an enhanced cloud management and monitoring solution.

Once the AC power cable and antenna cables are connected, scan the QR code on the Quick Registration Card to add the amplifier to your WilsonPro Cloud account. For detailed instructions see the WilsonPro Cloud section.

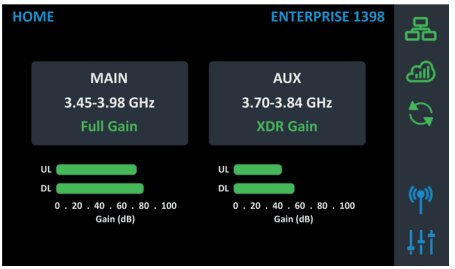


Menu System

The Enterprise 1398 takes about 3 minutes to boot up. Once boot up is complete, the home screen will appear, showing the amplification and status of each band.

Start Up Screen

Home Screen



Band Menu Color Description

Green indicates that a band is operating correctly with maximum allowable gain.

Yellow indicates band gain reduction because of an oscillation condition. Reposition antennas (increase separation between indoor and outdoor antennas, and point in opposite directions) and then reboot (turn the unit off & on) the Enterprise 1398 system to reactivate the band and maximize performance. When adequate separation is achieved, the yellow lights will return to green upon reboot.

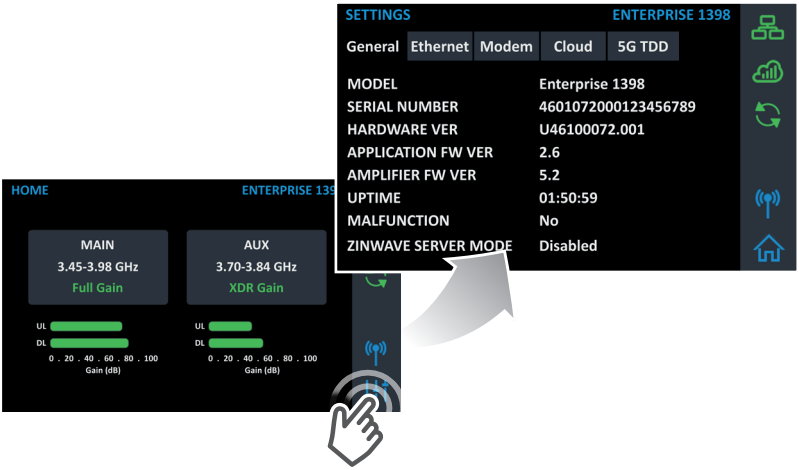
Note: when the light is yellow, the band is operational; however, performance is reduced.

Red indicates a band has been shut down because of a severe oscillation condition or repeated oscillation. Reposition antennas (increase separation between indoor and outdoor antennas, and point in opposite directions) and then reboot (turn the unit off & on) the Enterprise 1398 system to reactivate the band and maximize performance. When adequate separation is achieved, the red light(s) will return to green upon reboot.

Gray indicates band has been disabled.

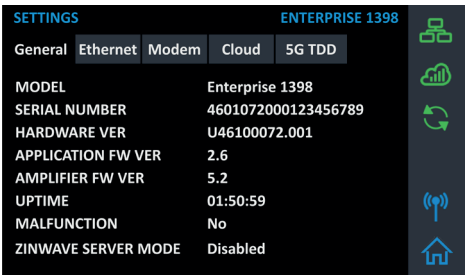
Settings Screen

Tap **‘Settings Icon’** in the lower right corner to view the Settings Screen.



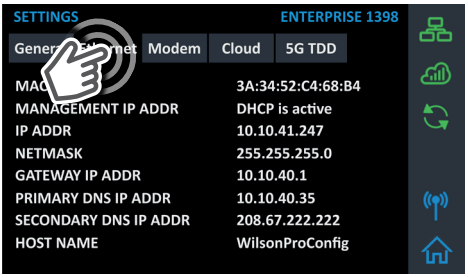
There are 5 Settings Screens represented by “tabs”. Tap the tab heading to view each Settings Screen. General settings below.

NOTE: Bands and Ports are disabled or enabled from the Cloud or Local Amplifier Configuration Utility only.



(MENU SYSTEM cont.)

Ethernet Settings Tab

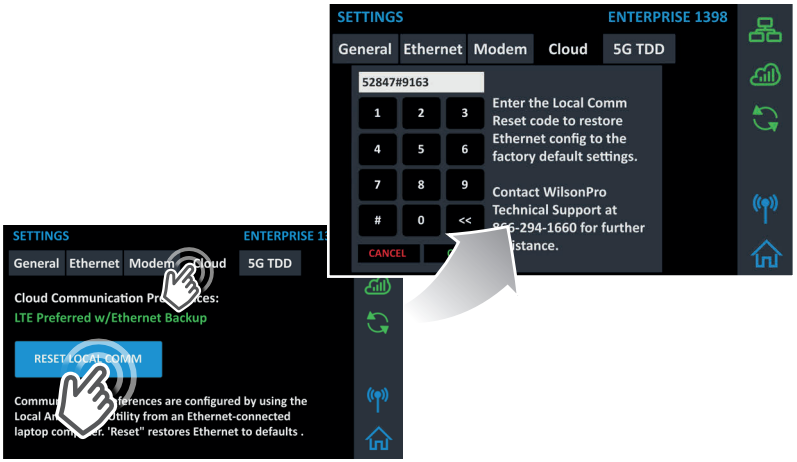


Modem Settings Tab

(MENU SYSTEM cont.)

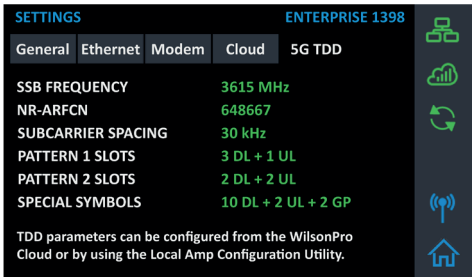
Cloud Communication Settings Tab

NOTE: The Reset Local Comm button is used in case the user has configured the amplifier such that the Local Amplifier Configuration Utility (LACU) is not accessible, e.g., if the communication preferences are set to “LTE Only” or the LACU password needs to be reset. The “reset” function will re-enable Ethernet access and also reset the login credentials for LACU to factory defaults.



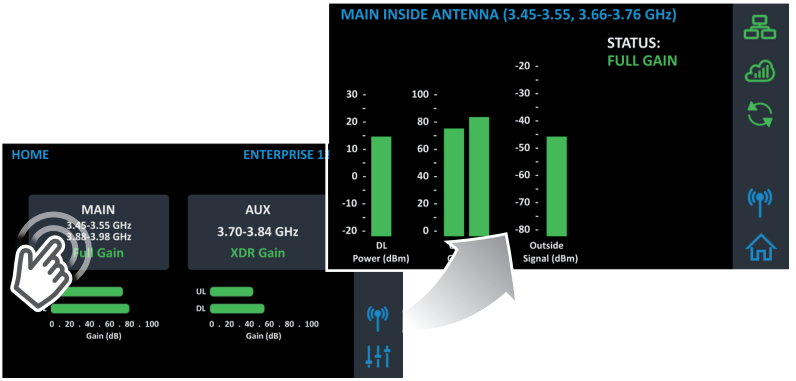
5G TDD Settings Tab

The TDD Modem must be configured to synchronize with the carrier network. Knowledge of the carrier’s configuration is required before the parameters can be provisioned using the Local Amplifier Configuration Utility (LACU) or via the WilsonPro Cloud.

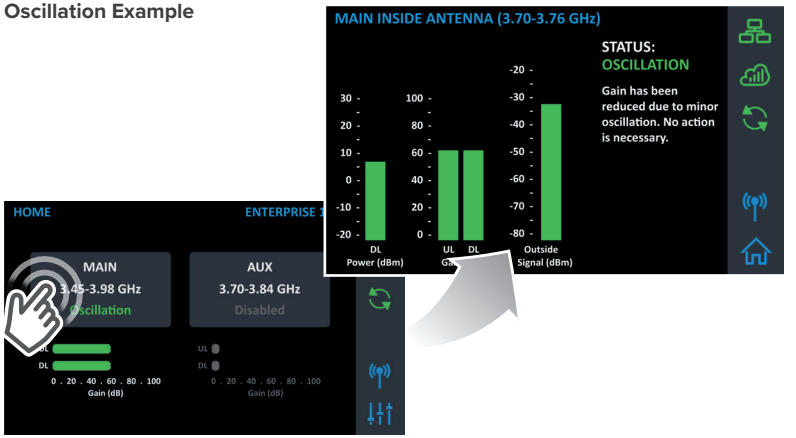


Band-Status Screens

To view specific band information (such as the strength of the received uplink & down-link signal, outside signal strength, and amplifier gain status) tap the desired band on the home screen.

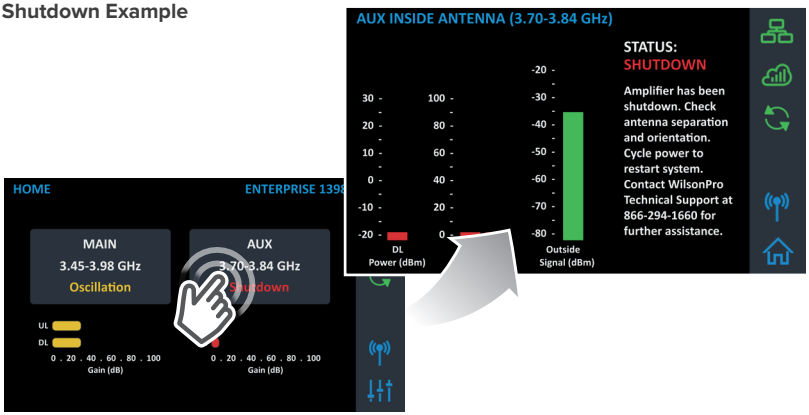


Oscillation Example



NOTE: If the reduced gain due to oscillation is greater or equal to 60dB, the condition will be displayed as Green and no action is necessary.

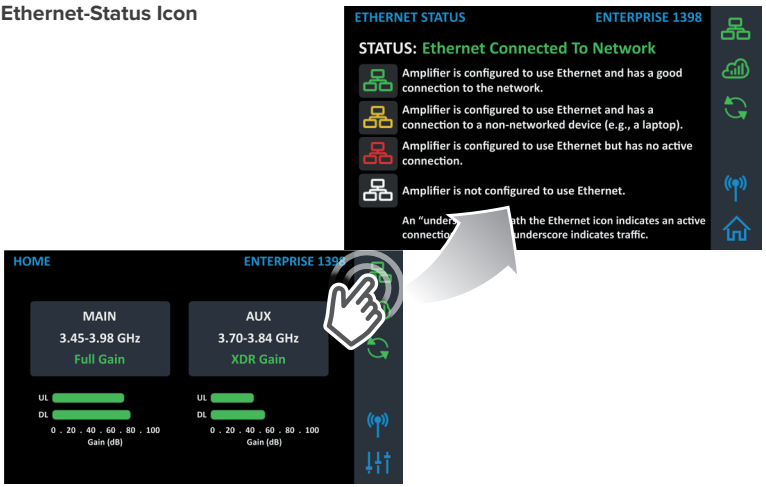
Shutdown Example



Connectivity Status Screens

The three icons in the upper right provide status related to the Ethernet connection, Cloud connection, and USB device (if inserted).

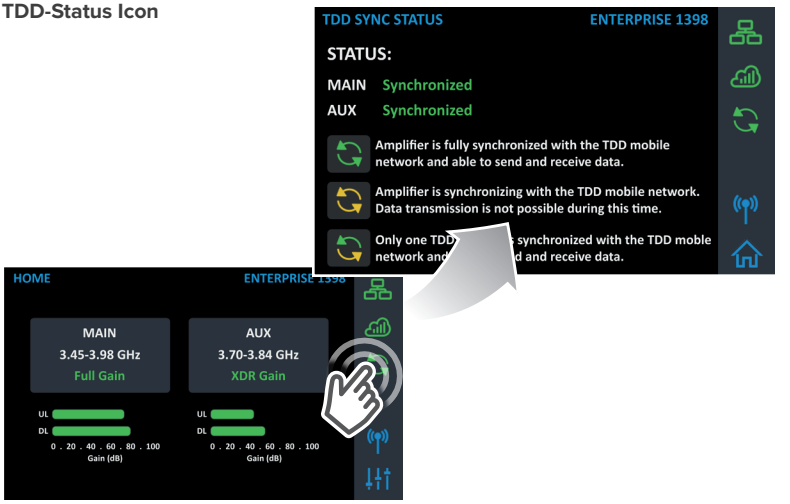
Ethernet-Status Icon



(MENU SYSTEM cont.)

Cloud-Status Icon

TDD-Status Icon

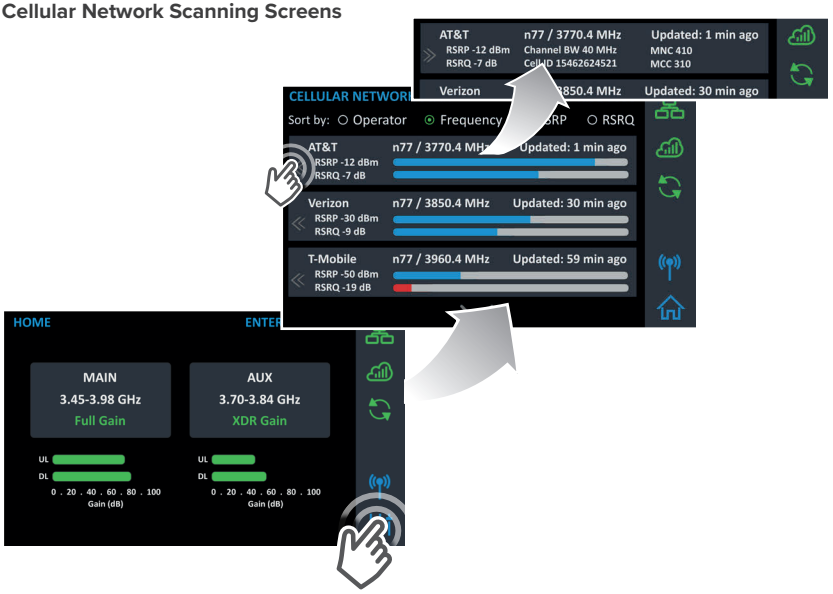


Cellular Network Scan

The **Cellular Network Scan** screen provides RSRP (Reference Signal Received Power) and RSRQ (Reference Signal Received Quality) for the major cellular carriers in U.S. and Canada that support C-Band, measured at the indoor antenna ports (after the signal has been amplified). Band (n77), SSB frequency, bandwidth, cell I.D., MCC, and MNC are also shown for all cell tower channels found during scanning. **Scanning begins as soon as the unit is power on, and is automatic, and continuous.** A full scan cycle takes about three minutes to scan all bands and frequencies. Carrier names represented as **Unknown** require an active WilsonPro Cloud Subscription for name resolution.

NOTE: The Cellular Network Scanning results are dependent on the C-Band filter configuration.

Cellular Network Scanning Screens



WilsonPro Cloud

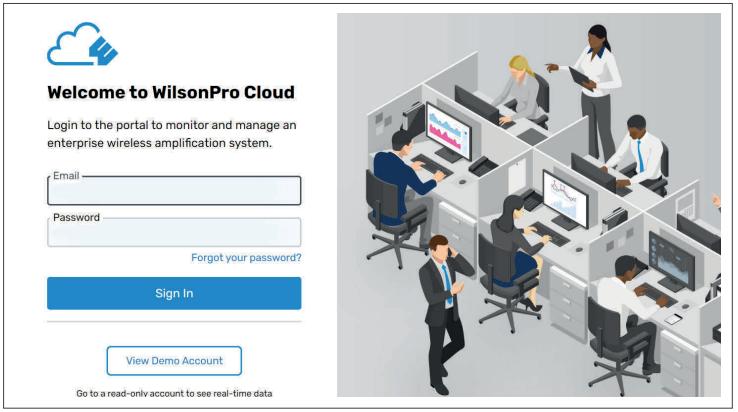
The cloud-based platform for remote monitoring & control of cellular signal amplifiers

Enterprise 1398 connects to WilsonPro Cloud via the internet, through a standard RJ-45 “hardwired” Ethernet connection or via LTE connection through the outside antenna. The default setting is “Ethernet Preferred” (gives priority to Ethernet, but will switch to LTE if Ethernet is not connected). NOTE: The LTE modem and SIM card are installed and activated at the WilsonPro factory.

Logging into the WilsonPro Cloud via Ethernet

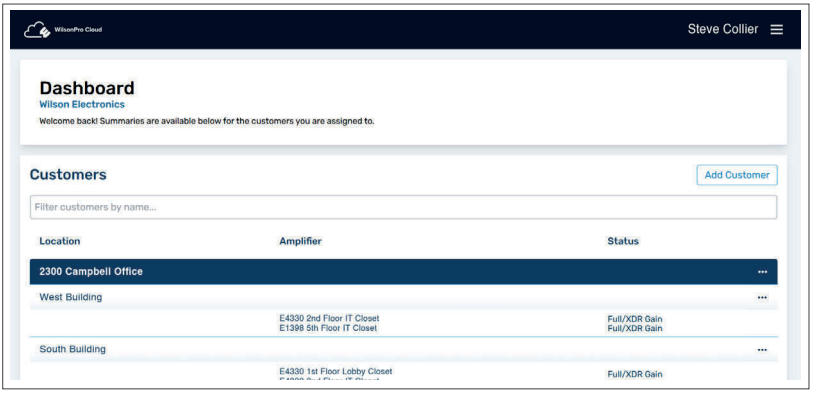
If you don’t already have a WilsonPro Cloud™ account at cloud.wilsonpro.com, call 1-888-923-4448, Monday-Friday 8am-5pm MT so that your account can be created. Once your account is set up, you can then add multiple customers, locations, and amplifiers.

Your supported amplifiers can be added and managed via our WilsonPro Cloud website located at **https://cloud.wilsonpro.com**. Simply log in using your email address and password.



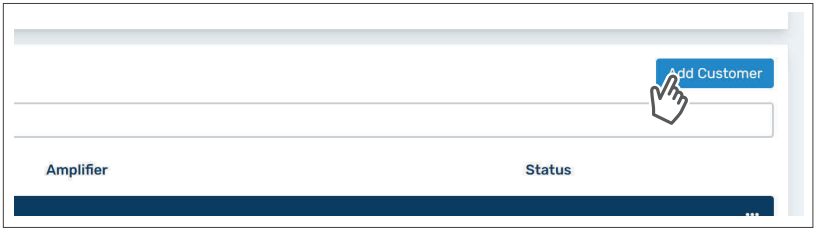
Customer Dashboard

You can quickly check the status of all of your amplifiers from the **Dashboard** summary screen.



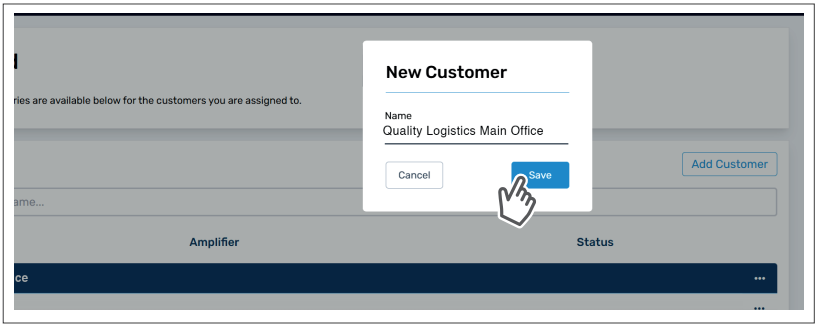
Adding a Customer

To create a new customer from the Dashboard screen, click on **Add Customer.**



NOTE: If you don't already have a WilsonPro Cloud account at cloud.wilsonpro.com, call **1-888-923-4448**, Monday-Friday 8am-5pm MT.

Enter information for **Customer** (business/organization). After clicking on **Save** the new customer will appear on the dashboard page.

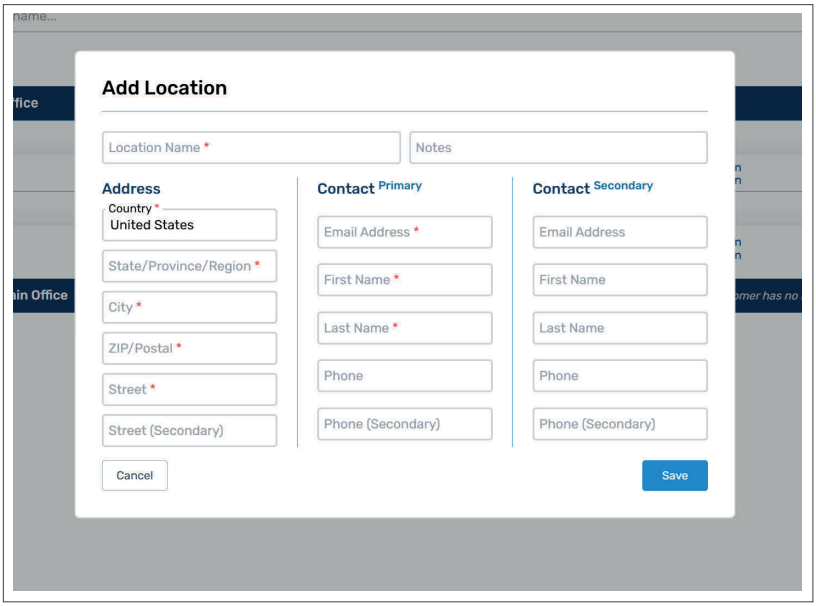


Adding Customer Location

To Add Location, click on the ••• button and click **Add Location**.

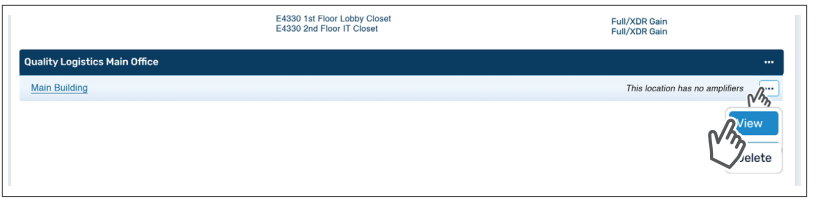
(WILSONPRO CLOUD cont.)

Enter **Location Name** and **Primary Contact** (notification recipient) information and click save. NOTE: Fields with red asterisks are required.

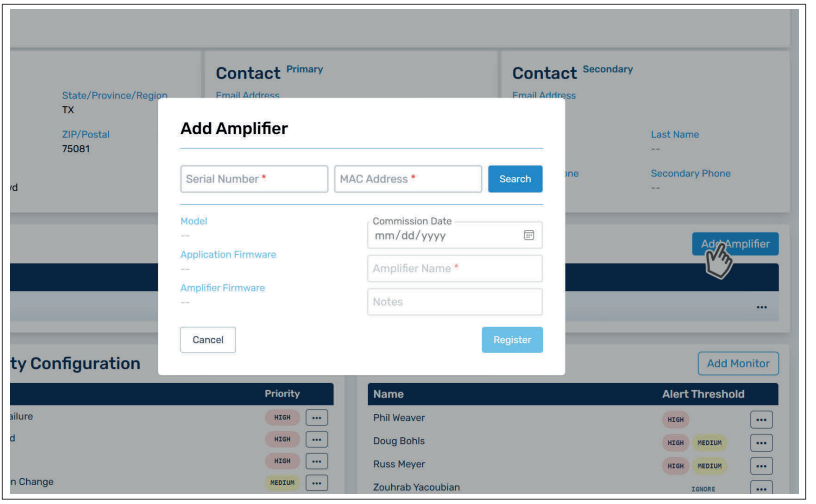


Adding an Amplifier

To add a amplifier, click on the ••• button on desired location and click **View** to open location summary page.

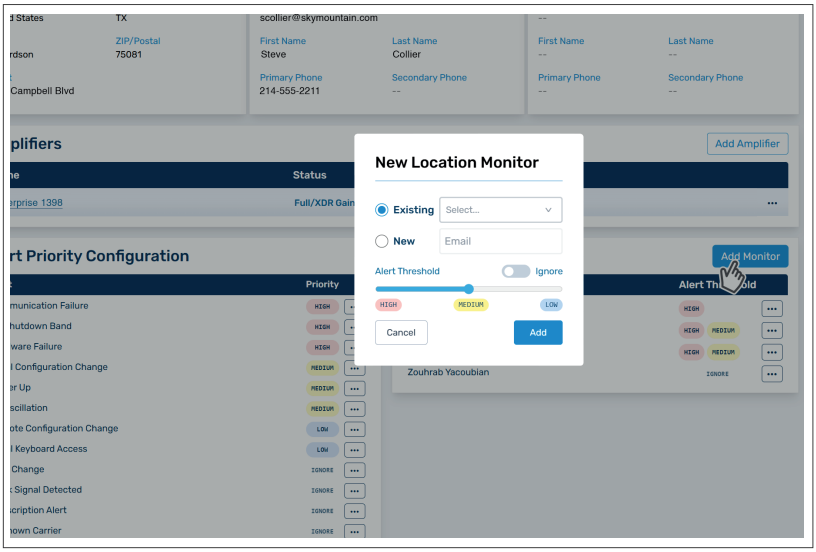


Click on **Add Amplifier** and enter the amplifier serial number, MAC address and amplifier name. An example: 1st Floor Lobby.



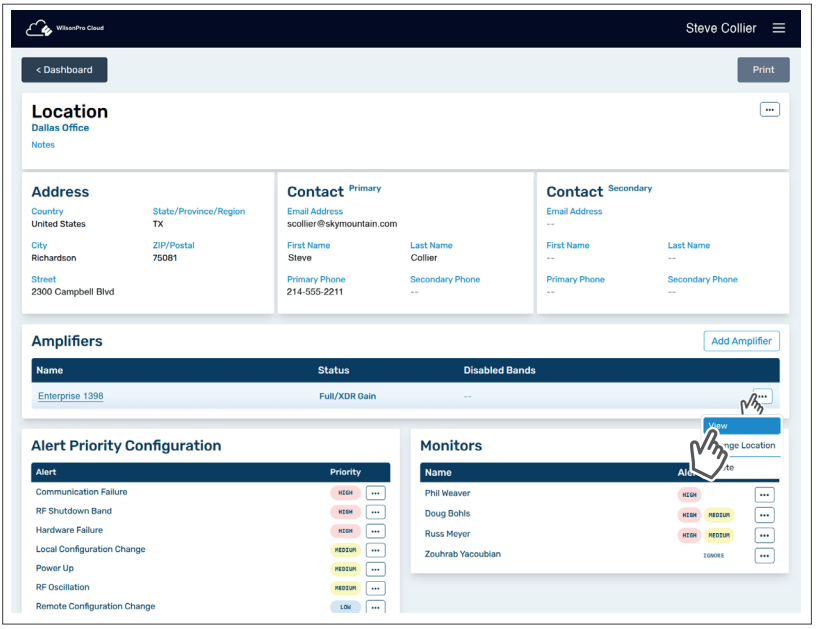
Adding a Monitor

If a Monitor has not been created, click on **Add Monitor**. Installer/Integrator can assign monitors to track the performance of the amplifier(s). Alert priorities can be set to low, medium or high.



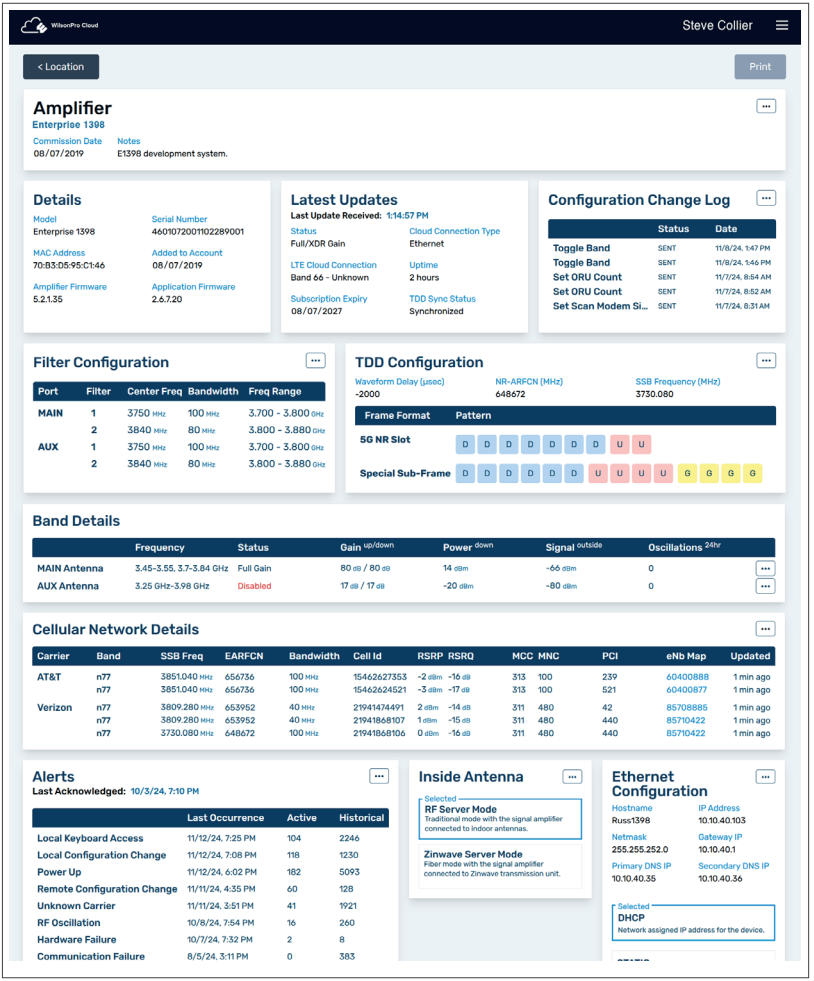
Amplifier Metrics

Now that the amplifier(s) have been added to the location, click ••• button and click **VIEW** to view details about the amplifier.



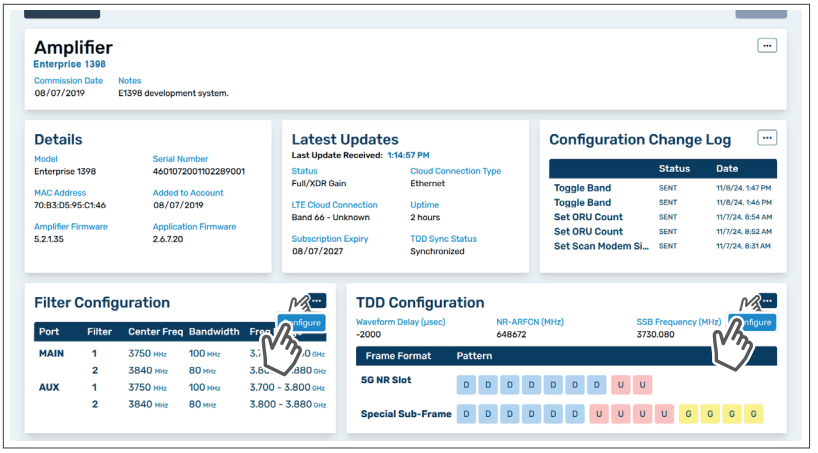
(WILSONPRO CLOUD cont.)

On the Amplifier Details page, Filter, TDD, Band, Inside Antenna, and Ethernet settings can be viewed and configured. External Cellular Network C-band information can be viewed, as well as Alerts.

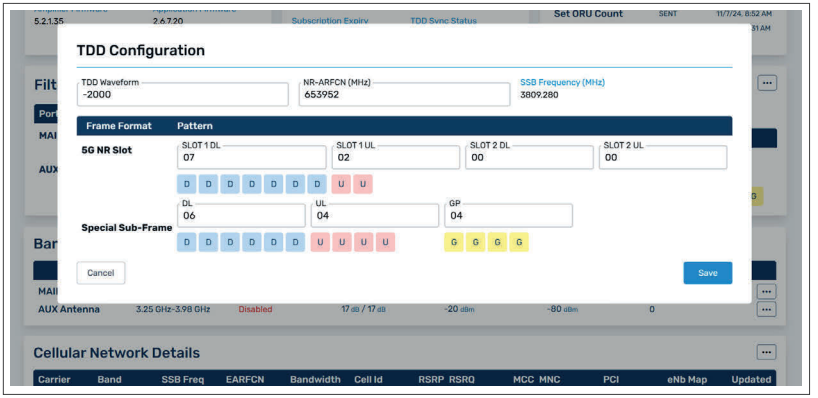


(WILSONPRO CLOUD cont.)

The amplifier's **Filters**, including setting MIMO vs SISO mode, is done by editing the Filter Configuration. Both the "MAIN" and "AUX" paths can be independently configured via 2 X 100MHz filters per path, for up to 400MHz of total bandwidth (or 200MHz of 2X2 MIMO). NOTE: CBRS frequencies are currently prohibited from amplification. Filters must be set to exclude the CBRS band.

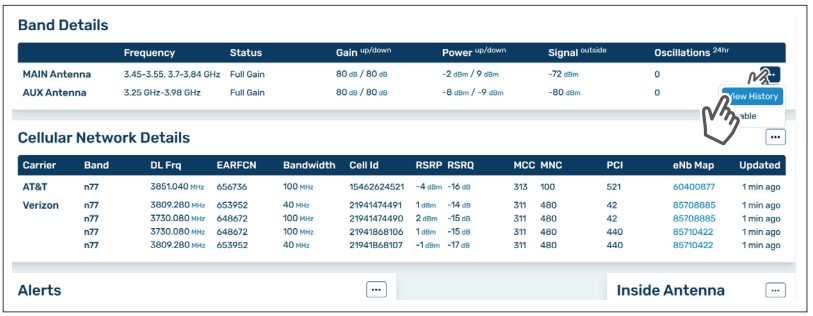


The amplifier's embedded **TDD** Modem setting can be viewed and reconfigured if necessary. NOTE: Do not change these values unless you are sure of the values they are being changed to.

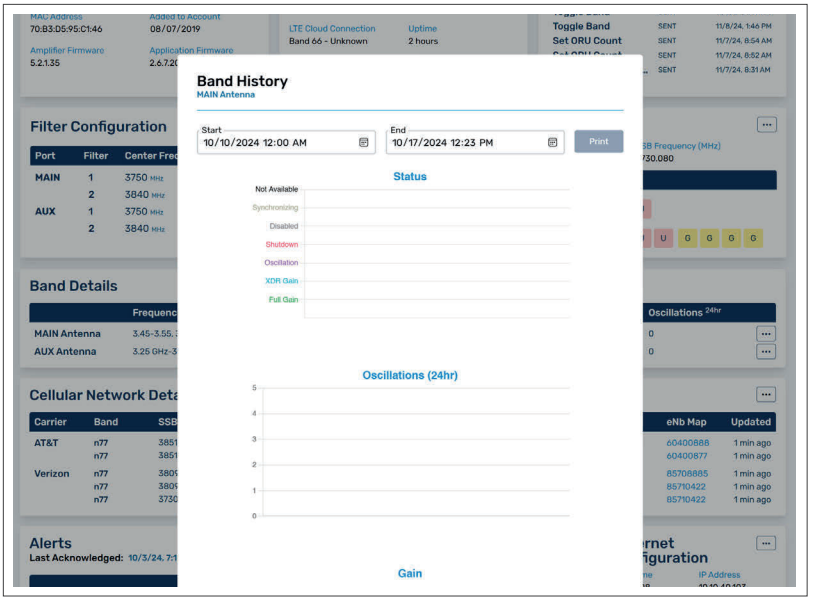


(WILSONPRO CLOUD – AMPLIFIER METRICS cont.)

In the Band Details section, C-Band history for each Antenna can be viewed by clicking ••• button, by each band, and then click **View History.**

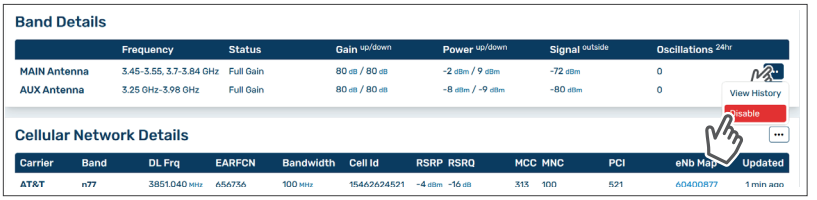


The Band History screen provides performance and signal level histories.

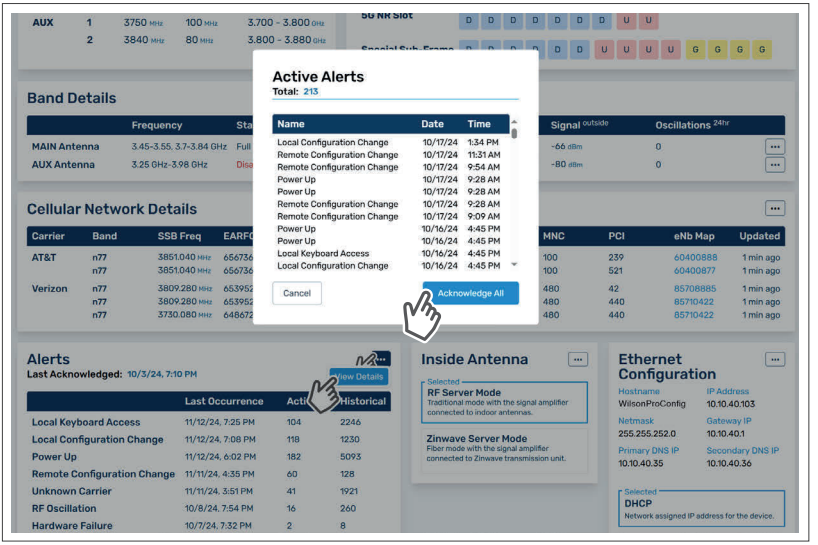


(WILSONPRO CLOUD – AMPLIFIER METRICS cont.)

Also in the Band Details section, the **MAIN Antenna** and **AUX Antenna** can be Enabled or Disabled from the Band Details by clicking the ••• button and click **Disable.**



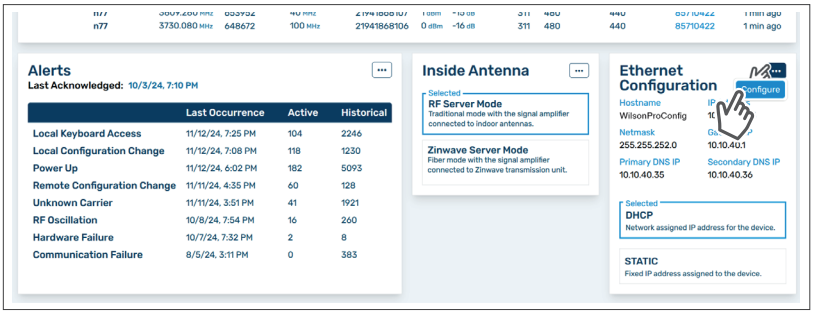
Active and acknowledged alerts can be viewed in the Alert section. To view alert history click ••• and then click **View History.** To acknowledge and remove the alert from the lists, choose the alert and click **Acknowledge All**.



(WILSONPRO CLOUD – AMPLIFIER METRICS cont.)

The Enterprise 1398 defaults to traditional RF Server Mode for its indoor antennas. If connecting the amplifier with a Zinwave DAS for fiber connectivity, the Inside Antenna can be configured for Zinwave Server Mode.

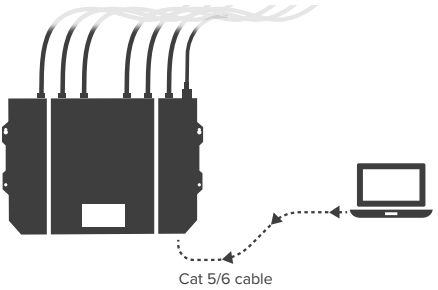
The Enterprise 1398 Ethernet settings can be configured from this section. The default configuration is DHCP.



Local Amplifier Configuration Utility

If you want to view or modify the amplifier configuration settings directly on the amplifier, this utility was created to help you. With this utility, you can change Communication Preferences and Ethernet settings, as well as Enable/Disable bands and ports. It can also be used to view live band details and static information such as firmware version. Additionally, the Local Amplifier Configuration Utility contains an Antenna Tuner tool to assist with system setup.

NOTE: The only time it is necessary to use this utility is if you wish to CHANGE the communication preference setting. The default setting of “Ethernet preferred, LTE backup” is almost always the best setting to use.



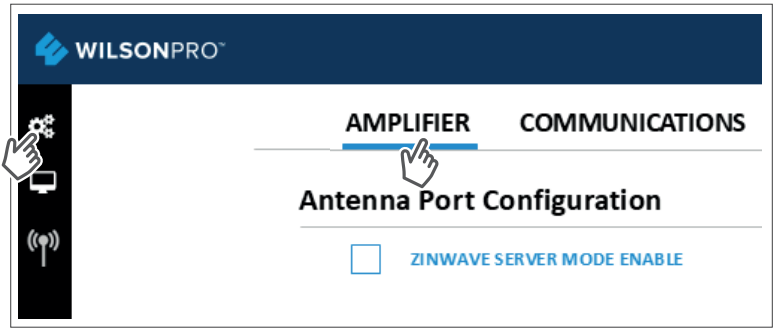
To use the Local Amplifier Configuration Utility, a laptop computer must be connected to the 1398 via a Cat 5/6 cable to the Ethernet port on the amplifier.

When configured with default communication settings, the network icon on the amplifier will change color from red to yellow or green after connecting to the network or a laptop. It could take up to two minutes.

(LOCAL AMPLIFIER CONFIGURATION UTILITY cont.)

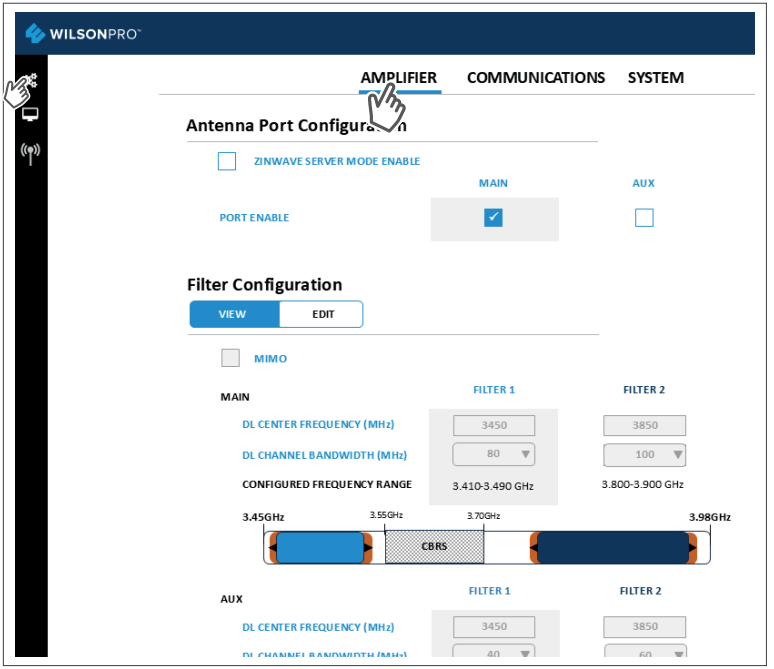
Type **wilsonproconfig** into the web browser. A login will be displayed, type the following: Username: **admin** – Password: **admin**

You can navigate through the site by clicking on the **Settings** , **Status** , **Network Scanner** icons located on the left then selecting **AMPLIFIER, COMMUNICATIONS** or **SYSTEM**.

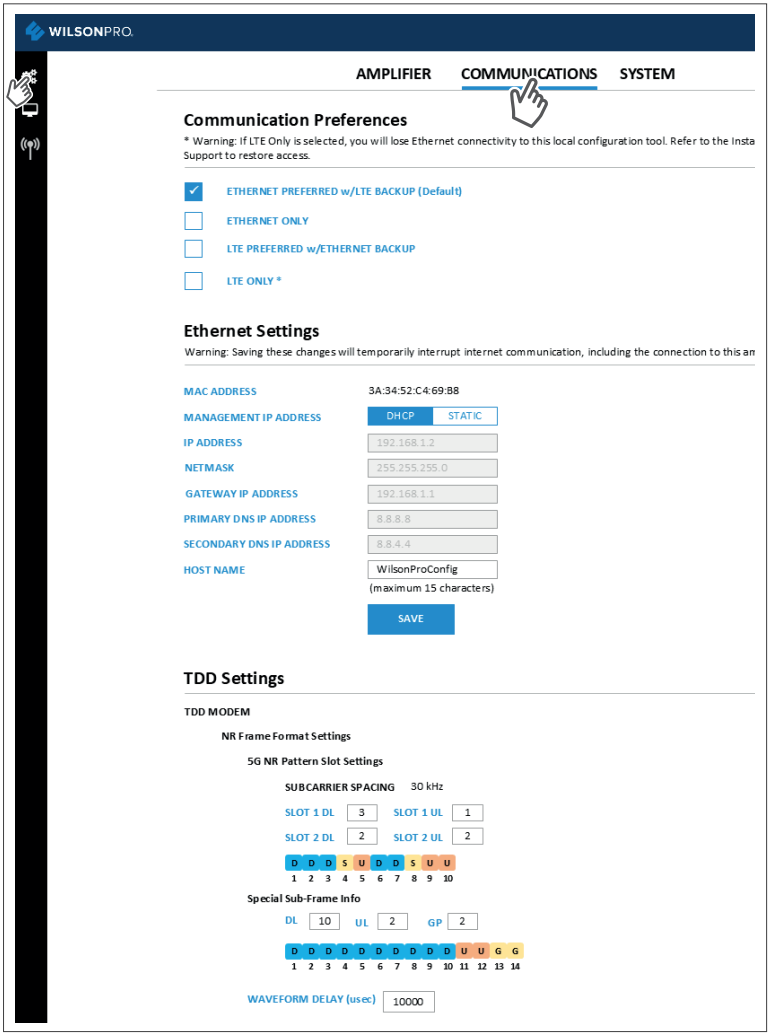


Click on then **AMPLIFIER**. MAIN and AUX antenna ports, C-Band filters, and Cellular Network signal source can be configured. Both the MAIN and AUX paths can be independently configured via 2X 100MHz filters per path, for up to 400MHz of total bandwidth (or 200MHz of 2x2 MIMO).

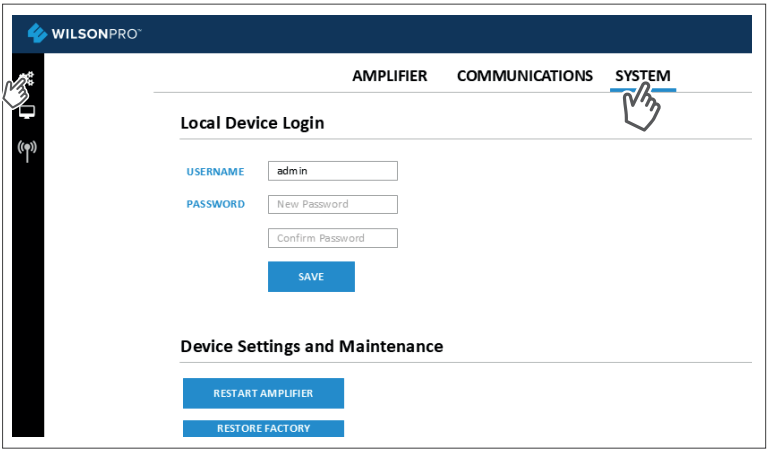
NOTE: CBRS frequencies are currently prohibited from amplification. Filters must be set to exclude the CBRS band.



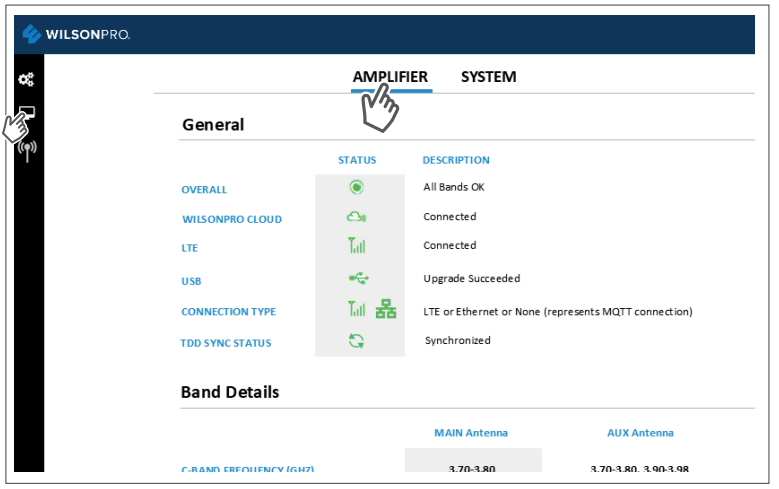
Click on then **COMMUNICATIONS**, Communication Preferences, Ethernet Settings, and TDD Settings can be made here.



Click on then **SYSTEM**, set password for local amplifier (this password is unrelated to WilsonPro Cloud Service), reboot amplifier and restore system to factory default.

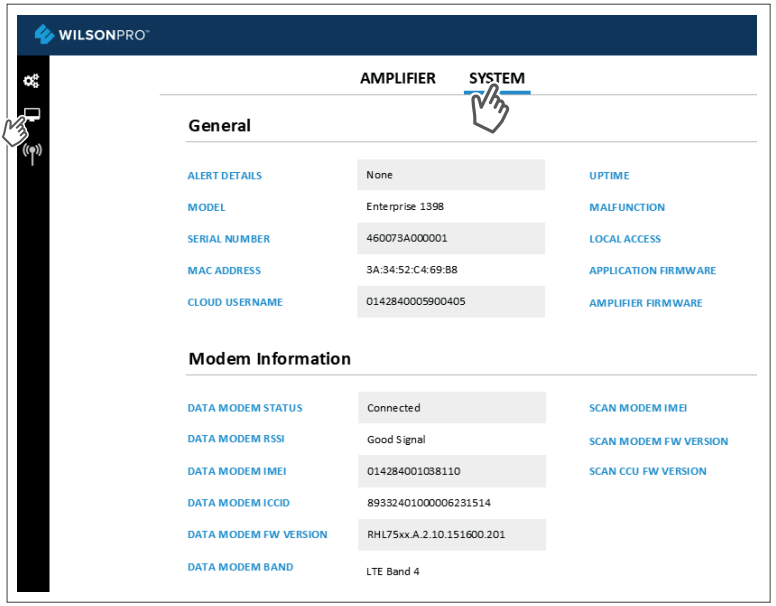


Click on then **AMPLIFIER**, view overall status of amplifier, WilsonPro Cloud, LTE connection, Ethernet connection, USB connection and power levels for each port.



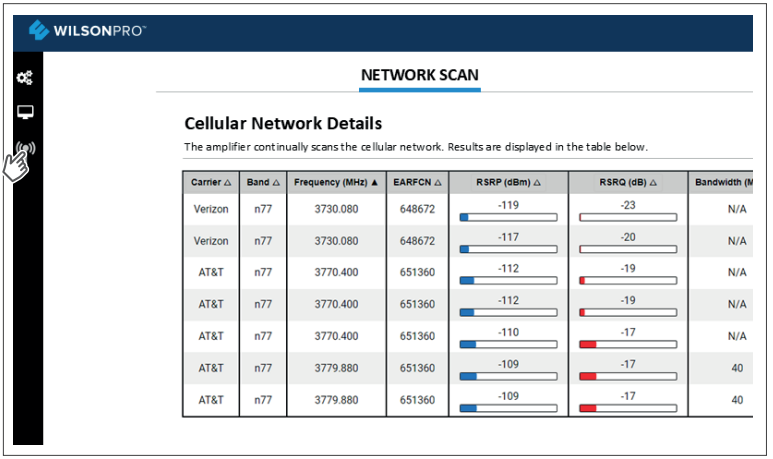
(LOCAL AMPLIFIER CONFIGURATION UTILITY cont.)

Click on then **SYSTEM**, view overall system details.



Click on to use the **Cellular Network Scan** feature which provides RSRP (Reference Signal Received Power) and RSRQ (Reference Signal Received Quality) for the major cellular carriers in U.S. and Canada that support C-Band, measured at the indoor antenna ports (after the signal has been amplified). Band (n77), SSB frequency, bandwidth, cell I.D., MCC, and MNC are also shown for all cell tower channels found during scanning. **Scanning begins as soon as the unit is power on, and is automatic, and continuous.** A full scan cycle takes about three minutes to scan all bands and frequencies. Carrier names represented as **Unknown** require an active WilsonPro Cloud Subscription for name resolution.

NOTE: The Cellular Network Scanning results are dependent on the C-Band filter configuration.



Troubleshooting Local Amplifier Configuration Utility

Using the LCD screen on the amplifier to find the IP Address

You can use the LCD screen on the amplifier to find the IP Address of the Ethernet connection after the laptop is connected. This IP Address can be used instead of “wilsonproconfig”. Note that Ethernet icon must be Yellow.

The LCD screen is 0.0.0.0

If the IP Address shown on the LCD screen is 0.0.0.0, the Ethernet connection has not been established.

Using Apple Mac computers

Apple Mac computers are known to have a problem using the “wilsonproconfig” alias. Always use the IP Address when connecting via an Apple Mac computer.

Can’t open the utility in your default browser

If the Ethernet connection appears to be established (Yellow Ethernet Network icon) and you still can’t open the utility in your default browser, try opening the URL in a different browser.

Can’t open the utility in your default browser on your laptop

If the Ethernet connection appears to be established (Yellow Ethernet Network icon) and you still can’t open the utility in your default browser, try putting the laptop in “Airplane Mode” (all wireless communication turned off).

Safety Guidelines

Warnings

To uphold compliance with network protection standards, all active cellular devices must maintain at least 6 feet of separation distance from Panel and Dome antennas.

Use only the power supply provided in this package. Use of a non-Wilson Electronics product may damage your equipment.

The Signal Amplifier unit is designed for use in an indoor, temperature-controlled environment (operating temperature ranges from 0°C to 35°C (32°F to 95°F). It is not intended for use in attics or similar locations subject to temperatures in excess of that range.

RF Safety Warning: Any antenna used with this device must be located at least 8 inches from all persons.

AWS Warning: The Outside Antenna must be installed no higher than 10 meters (31'9") above ground.

CAUTION: Double pole, neutral fusing. Disconnect mains before servicing.

Replacement Fuse: 5x20mm, 0.8A Type T (Time-Lag), 250VAC.

This equipment is not suitable for use in locations where children are likely to be present.

WARNING. This is **NOT** a **CONSUMER** device. Is is designed for installation by **FCC LICENSEES** and **QUALIFIED INSTALLERS**. You **MUST** have an **FCC LICENSE** or express consent of an FCC Licensee to operate this device. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of $100,000 for each continuing violation.

WARNING. This is **NOT** a **CONSUMER** device. It is designed for installation by an installer approved by an **ISED** licensee. You **MUST** have an **ISED LICENCE** or the express consent of an **ISED** licensee to operate this device.

AVERTISSEMENT: Ce n'est **PAS** un appareil **CONSOMMATEUR.** Il est conçu pour être installé par un installateur agréé par un licencié **ISED.** Vous **DEVEZ** détenir une **LICENCE ISED** ou le consentement exprès d'un titulaire de licence **ISDE** pour utiliser cet appareil.

FOR MORE INFORMATION ON REQUIREMENTS SET OUT IN ISED CPC-2-1-05, SEE BELOW:

http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf08942.html

Specifications

MODEL NUMBER	460072 / 461072
FCC ID	PWO072
IC ID	4726A-072
CONNECTORS	N-Connectors
ANTENNA IMPEDANCE	50 Ohms
FREQUENCY	3450-3980 MHz
POWER OUTPUT FOR SINGLE CELL PHONE (Uplink) dBm	28.5
POWER OUTPUT FOR SINGLE CELL PHONE (Downlink) dBm	28.3
NOISE FIGURE	5 dB Nominal
ISOLATION	>90 dB
POWER REQUIREMENTS	120...240V / 50...60 Hz / 0.8...0.4A

The term "IC" before the radio certification number only signifies that Industry Canada technical specifications were met.

Each Signal Amplifier is individually tested and factory set to ensure FCC compliance. The Amplifier cannot be adjusted without factory reprogramming or disabling the hardware. The Signal Amplifier will amplify, but not alter incoming and outgoing signals in order to increase coverage of authorized frequency bands only. If the Signal Amplifier is not in use for five minutes, it will reduce gain until a signal is detected. If a detected signal is too high in a frequency band, or if the Signal Amplifier detects an oscillation, the Signal Amplifier will automatically turn the power off on that band. For a detected oscillation the Signal Amplifier will automatically resume normal operation after a minimum of 1 minute. After 5 (five) such automatic restarts, any problematic bands are permanently shut off until the Signal Amplifier has been manually restarted by momentarily removing power from the Signal Amplifier. Noise power, gain, and linearity are maintained by the Signal Amplifier's microprocessor.

This device complies with Part 15 of FCC rules. Operation is subject to two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Changes or modifications not expressly approved by Wilson Electronics LLC could void the authority to operate this equipment.

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions: (1) This device may not cause interference, and (2) This device must accept any interference, including interference that may cause undesired operation of the device.
Changes or modifications not expressly approved by Wilson Electronics LLC could void the authority to operate this equipment.

This product conforms to UL/CSA/IEC STD 62368-1 for US and Canada.

Warranty

30 DAY MONEY-BACK GUARANTEE

All WilsonPro products are protected by WilsonPro 30-day money-back guarantee. If for any reason the performance of any product is not acceptable, simply return the product directly to the reseller with a dated proof of purchase.

3 YEAR WARRANTY

WilsonPro Amplifiers are warranted for three (3) years against defects in workmanship and/or materials. Warranty cases may be resolved by returning the product directly to the reseller with a dated proof of purchase.

Signal Amplifiers may also be returned directly to the manufacturer at the consumer's expense, with a dated proof of purchase and a Returned Material Authorization (RMA) number supplied by WilsonPro. WilsonPro shall, at its option, either repair or replace the product.

This warranty does not apply to any Signal Amplifiers determined by WilsonPro to have been subjected to misuse, abuse, neglect, or mishandling that alters or damages physical or electronic properties.

Replacement products may include refurbished WilsonPro products that have been recertified to conform with product specifications.

RMA numbers may be obtained by contacting Customer Support.

DISCLAIMER: The information provided by WilsonPro is believed to be complete and accurate. However, no responsibility is assumed by WilsonPro for any business or personal losses arising from its use, or for any infringements of patents or other rights of third parties that may result from its use.

MARKETING APPROVAL: Installer and end customer hereby grants to Wilson Electronics the express right to use installers or end customers company logo in marketing, sales, financial, and public relations materials and other communications solely to identify Customer as a Wilson Electronics customer.

WILSONPRO™
A Wilson Electronics Brand

3301 East Deseret Drive, St. George, UT
www.**wilsonpro**.com | support.**wilsonpro**.com

THIS PRODUCT CONFORMS TO UL/CSA STD 62368-1 FOR US AND CANADA

GDE000625_Rev03_12.09.24