IIOT TECHNOLOGIES

X1000 Gateway

Installation Manual

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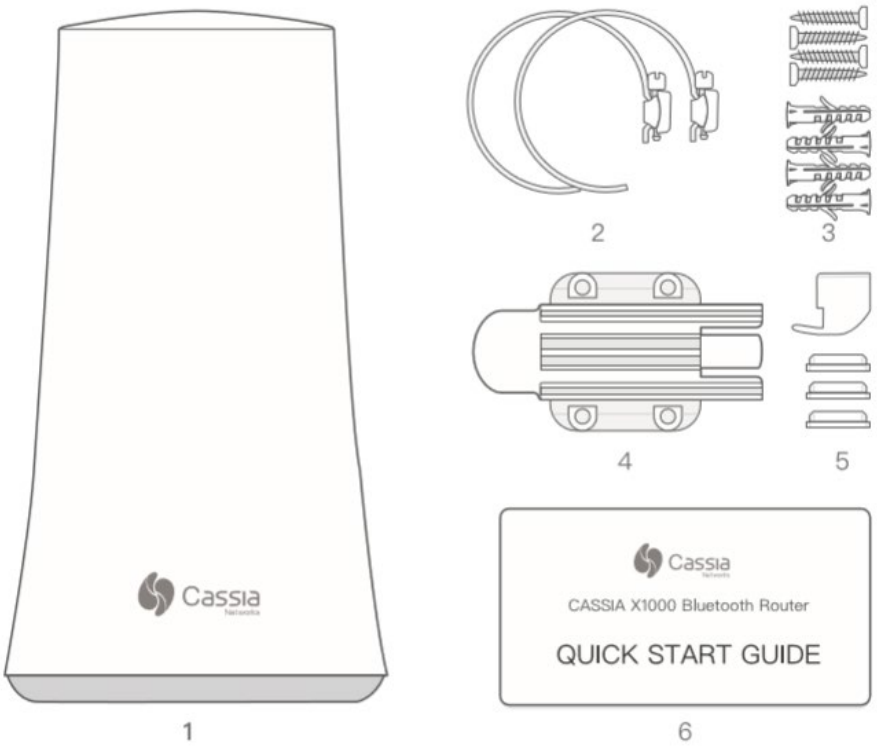
1 General

The X1000 Gateway is used to upload Dodge® sensor data automatically to the OPTIFY™ platform. For the gateway to start reading the sensors, it needs to be configured for internet access. The following internet connections are supported:

- LAN/ethernet network together with a Power over Ethernet (PoE) injector
- 2.4GHz Wi-Fi network
- 3G/4G mobile network with specific a USB dongle

The package includes:



1. X1000 Router	(1)	3. Anchors with Screws	(2*4)	5. Silicon Plugs	(4)
2. Pole Mounting Straps	(2)	4. Mounting Bracket	(1)	6. Quick Start Guide	(1)

Figure 1: package contents

For general information about this gateway, please refer to Cassia's user manual:
https://www.cassianetworks.com/download/docs/Cassia-User_Manual.pdf

2 Installation

2.1 Prerequisites for installation

Internet connection:

- The gateway does not operate in networks with a VPN (Virtual Private Network)
- If a firewall is used, the following ports need to be opened:

URL	Port Type	Port Number	Gateway Communication Partner	Service Details
gw.dodgeoptify.com	TCP	8883	Access Controller (AC)	MQTT for Cassia Access Controller
gw.dodgeoptify.com	TCP	9999	Access Controller (AC)	SSH port to provide troubleshooting services for gateways
gw.dodgeoptify.com	TCP/HTTP	80	Access Controller (AC)	HTTP service for gateway software and firmware updates
gw.dodgeoptify.com	TCP/HTTPS	443	Access Controller (AC)	HTTPS service for gateway software and firmware updates
global.azure-devices-provisioning.net	TCP	8883	Azure IoT Device Provisioning Service	MQTT for gateway provisioning application
dodge.azure-devices.net	TCP	8883	Azure IoT Hub	MQTT communication between AC and router
api.dodgeoptify.com	TCP/HTTPS	443	OPTIFY Platform	HTTPS for OPTIFY API
dodge-provisioning.azure-devices-provisioning.net	TCP	8883	Azure IoT Device Provisioning Service	MQTT for gateway provisioning application
Customer DNS URL	TCP/UDP	53	DNS Server	DNS lookup for AC address (optional if specified in gateway network configuration)

Note: the above table is from the gateway's perspective. All communication is out of the gateway to the communication partner.

Note: OPTIFY is hosted in the United States (East Coast) via Microsoft Azure Cloud Service.

Access controller

- Global: gw.dodgeoptify.com

OPTIFY platform

- Global: gw.dodgeoptify.com
- The mobile network needs to have adequate signal strength. In demanding locations, a USB extension cable or external antenna might be needed for the USB modem/dongle.

OPTIFY Azure IoT Services

- Global: dodge.azure-devices.net

  global.azure-devices-provisioning.net

  dodge-provisioning.azure-devices-provisioning.net

Power supply

- In case the PoE network is not available, a PoE injector is needed for the power supply
- PoE is 802.3af/at compliant

Ethernet cable

- 1 x ethernet cable is needed when a PoE, Wi-Fi, or mobile network is used
- 2 x ethernet cables when a LAN/ethernet network is used

Computer

- Computer with a Wi-Fi adapter is needed to configure the gateway. A tablet or mobile phone can also be used.
- Google Chrome is the recommended web browser to use

USB cellular modem/dongle

- The gateway has built-in drivers for several USB dongles. For the list of supported dongles, please check section 2.7 USB Mobile Dongle Connection.
- A SIM card with an internet data plan
- The gateway also supports the use of any USB-powered Wi-Fi modem

Mounting

- A flat-head screwdriver can be used for pole mounting
- A Phillips-head screwdriver and a drill (optional if needed) can be used for wall mounting
- Mounting the gateway is not mandatory but is recommended so the unit is secured in its intended location

Grounding

- For outdoor installations, a ground cable is needed to ensure the gateway will not be damaged by electrical surges. Install the cable as shown below

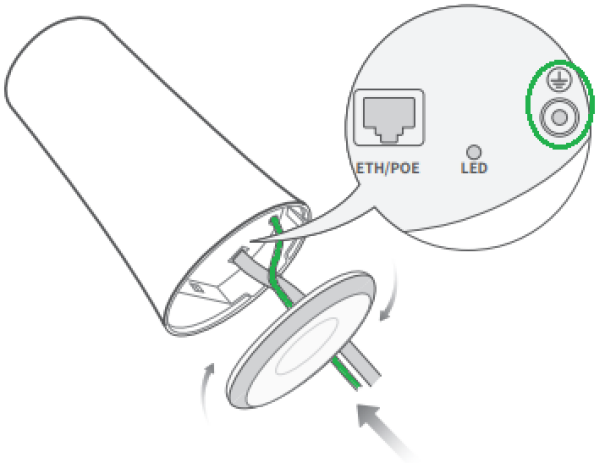


Figure 2: Ground cable installation

2.2 Recommended location

Height

- The recommended height for the gateway is 3-30 meters above ground level. A lower level is acceptable, but the gateway's Bluetooth range might be shorter due to obstacles.

Orientation

- The gateway has the best reception in the direction where the Cassia logo is located on the side of its case. If the gateway has trouble connecting to a specific sensor, it is recommended to rotate the gateway to point in that direction.

2.3 Gateway configuration

When the gateway is powered on, a blue LED on the bottom of the gateway will turn on. After booting up, the gateway will turn on its configuration Wi-Fi hotspot. The bootup process may take 30-60 seconds to complete.

The configuration Wi-Fi hotspot has an SSID named "cassia-XXXXXX" where the series of 6 "X"s match the last 6 digits of the gateway's MAC address. The MAC address can be found at the bottom of the gateway. The password for the Wi-Fi hotspot is the same as the SSID.

Connect to the Wi-Fi hotspot with the device used for configuration (computer, tablet, or mobile phone). Open your web browser, then type 192.168.40.1 into the web address field. Press "enter" to search, then the Cassia configuration web page will open.

When logging in the first time, the default password will be required to change. The new password is required to be between 8-20 characters using a combination of letters, numbers, and special characters. The default credentials are listed below:

- Login: admin
- Password: admin

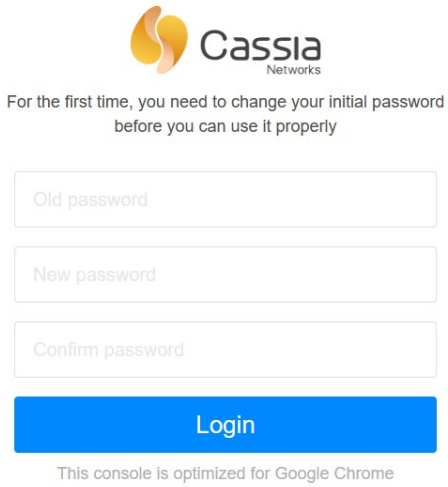


Figure 3: Cassia login page

Once logged in, the Status page is shown to display the current operation mode and connection status of the gateway. The AC Online Time shows how long the gateway has been connected to the AC server. If no time is shown, it means the gateway does not have a connection to the AC server. Connection to the AC server is required for the transfer of sensor data.

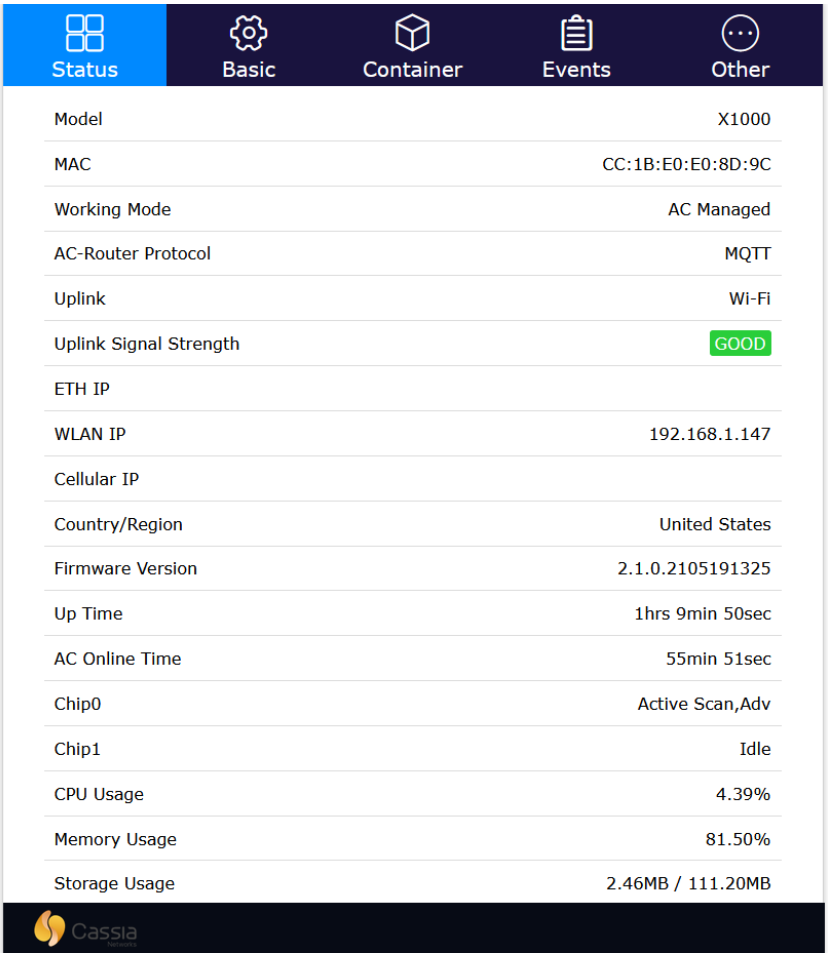


Figure 4: Cassia status page

The Basic page is where the configuration is managed. The following values are common for all network configurations (PoE, LAN, Wi-Fi, and Mobile):

- **AC server address: gw.dodgeoptify.com**
- **Remote assistance: on**
- **Router mode: AC managed router**

Connection Priority is where a prioritized connection method is selected in case there are several in use. Select the priority according to the connection in use:

- **Wired for PoE and LAN connections**
- **Wireless for a Wi-Fi connection**
- **3G/4G for a mobile USB dongle connection**

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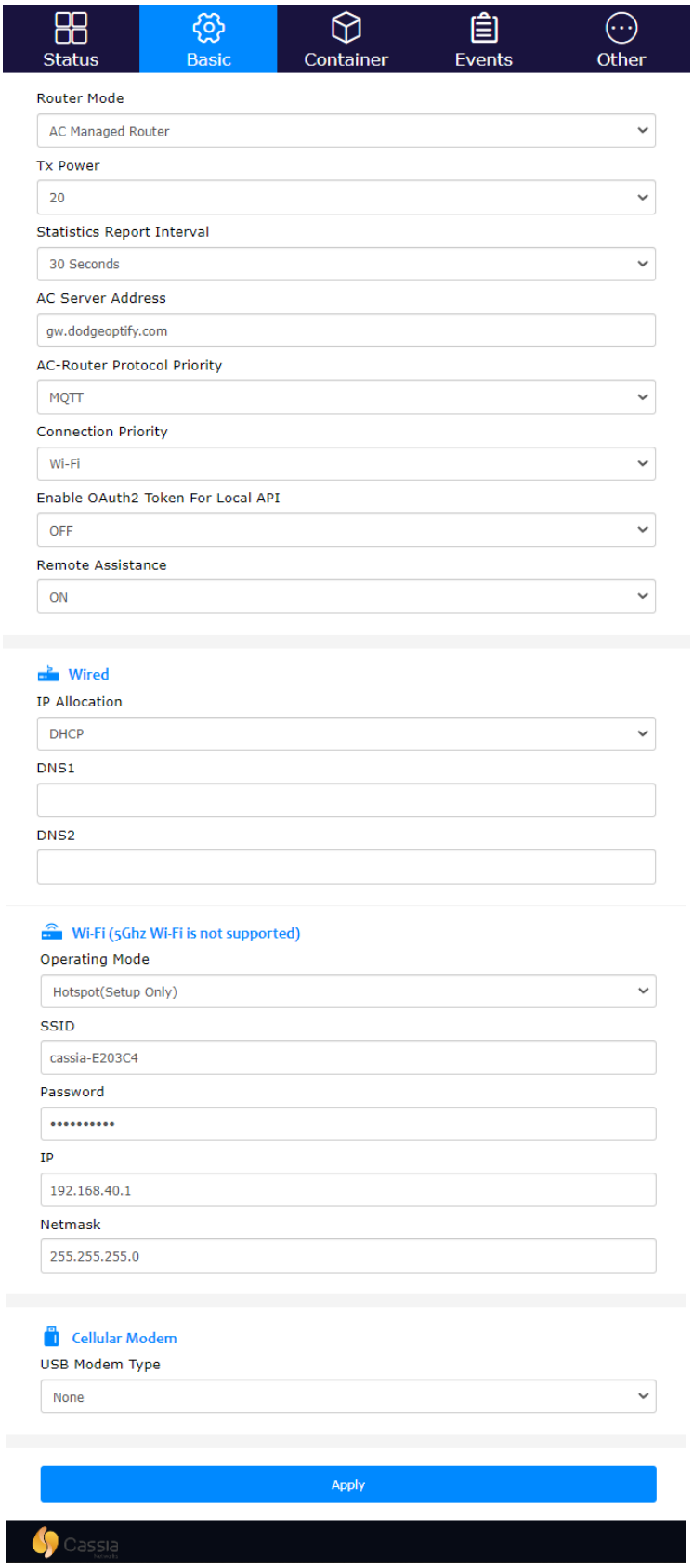

Figure 5: Cassia basic page

2.4 PoE connection

If a PoE network is available, the gateway can be configured for use without any additional power supply.

Figure 6: PoE network configuration

From the Basic page, select:

- Connection priority: wired
- IP allocation: DHCP or static (in case the IP allocation is given)

! For security reasons, we recommend that you change the Wi-Fi hotspot password of the gateway. This can be done under the Wi-Fi section. Please make note of the new password.

You can also change the SSID (name of the Wi-Fi hotspot of the gateway) if desired.

Figure 7: changing the Wi-Fi hotspot password

Press "apply" at the bottom of the screen.

2.5 LAN/ethernet cable connection

If a LAN/ethernet network is available, the gateway can be configured for use with a PoE injector as the power supply.

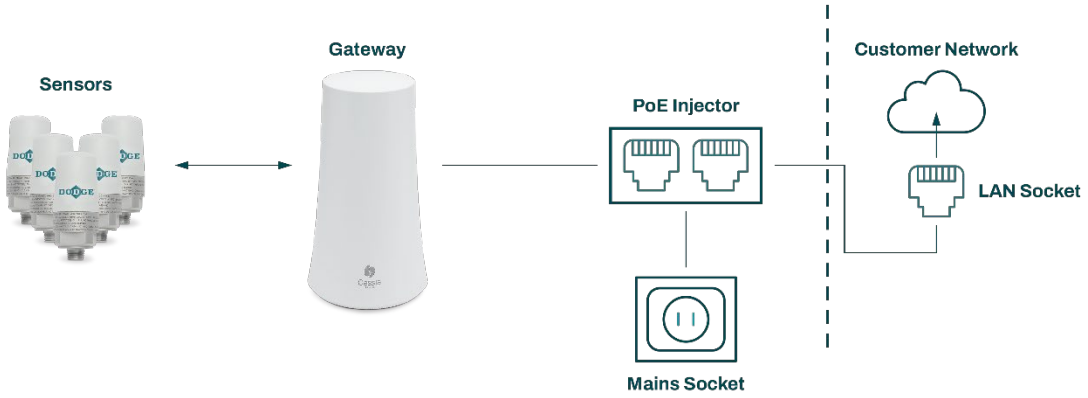

Figure 8: LAN network configuration

From the Basic page, select:

- Connection priority: wired
- IP allocation: DHCP or static (in case the IP allocation is given)

! For security reasons, we recommend that you change the Wi-Fi hotspot password of the gateway. This can be done under the Wi-Fi section. Please make note of the new password.

You can also change the SSID (name of the Wi-Fi hotspot of the gateway) if desired.

Figure 9: changing the Wi-Fi hotspot password

Press "apply" at the bottom of the screen.

2.6 Wi-Fi connection

The gateway can be configured to use an existing Wi-Fi network with a PoE injector as the power supply.

Note: Only 2.4GHz Wi-Fi is supported.

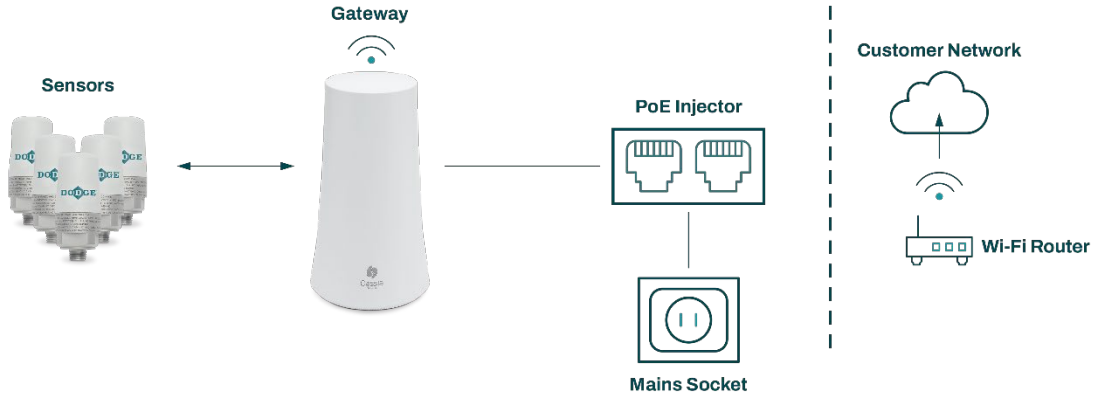

Figure 10: Wi-Fi network configuration

From the Basic page, select:

- Connection priority: wireless
- Enter the Wi-Fi network SSID (name)
- Enter the Wi-Fi network password
- Change the wireless operation mode from "hotspot" to "client"
- IP allocation: DHCP or static (in case the IP allocation is given)

Press "apply" at the bottom of the screen.

Note: Once the "apply" button is pressed, the gateway's Wi-Fi adapter stops sharing the Wi-Fi hotspot and changes the connection to the configured Wi-Fi network. In case the DHCP is used, the gateway now has a new IP address. The new IP address is needed to reconnect to the gateway (e.g., to check the Status page or scan the devices within the gateway's range). Your local IT department can find the gateway's IP address by accessing the Wi-Fi router device list or by performing a network scan for IP addresses. In the case of a static IP being used, the address is known.

Connect your computer, tablet, or mobile phone to the same Wi-Fi network the gateway is connected to. Open your web browser and type the new IP address to the address field, then press enter. Access to the gateway configuration pages is established again.

Note: If there was an error in the SSID, password, or IP address configurations, you cannot access the gateway anymore. In this case, the gateway isn't shown in the Wi-Fi router device list or a network scan. To resolve, press and hold the reset button on the bottom of the gateway for 10 seconds to reset the gateway back to factory default values.

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2.7 USB mobile dongle connection

A mobile network can be used with a specific USB dongle. In addition, a PoE injector (power supply), a supported USB dongle, and a SIM card are needed.

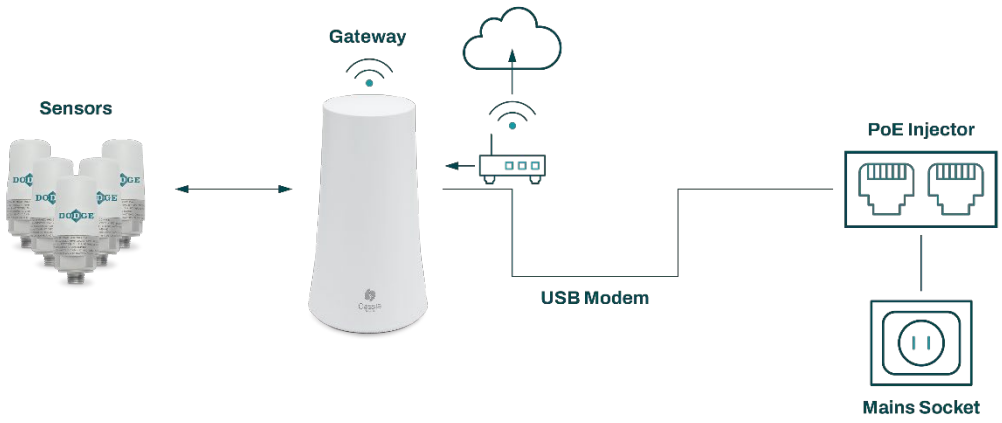

Figure 11: mobile network configuration

Insert the USB dongle with the SIM card into the USB port at the bottom of the gateway. The PIN query needs to be disabled from the SIM card.

From the Basic page, select:

- Connection priority: 3G/4G
- USB dongle type: select the correct dongle type being used
- Type the access point name (APN) the SIM card's carrier is using
- Type the username and password for the APN if needed

! For security reasons, we recommend that you change the Wi-Fi hotspot password of the gateway. This can be done under the Wi-Fi section. Please make note of the new password.

You can also change the SSID (name of the Wi-Fi hotspot of the gateway) if desired.

Figure 12: changing the Wi-Fi hotspot password

Press "apply" at the bottom of the screen, then reboot the gateway by removing the power supply for a few seconds and reconnecting it.

Note: With a USB dongle, the gateway needs to be in a location with good network coverage. In the signal strength is weak, a USB extension cable or additional external antenna for the USB dongle might be needed.

If a Wi-Fi modem is used, connect the modem to the USB port at the bottom of the gateway, then follow the instructions under section 2.6 Wi-Fi connection.

For supported USB dongle modems, please consult Cassia's user manual. Please note that some countries might have regulations that forbid the use of certain types of hardware providers (i.e., check if Huawei can be used in the United States).

2.8 Firewall configuration

If there is a firewall in the network the gateway is using, specific ports need to be opened.

Figure 13: firewall configuration

The firewall should allow communication between the gateway and the access controller as well as the gateway and the OPTIFY platform respectively. If needed, refer to the required ports in section 2.1 Prerequisites for installation.

2.9 Verifying the configuration

Once the configuration is done, it can be verified from the Status page. When the connection is established to the access controller, the AC Online Time will show.

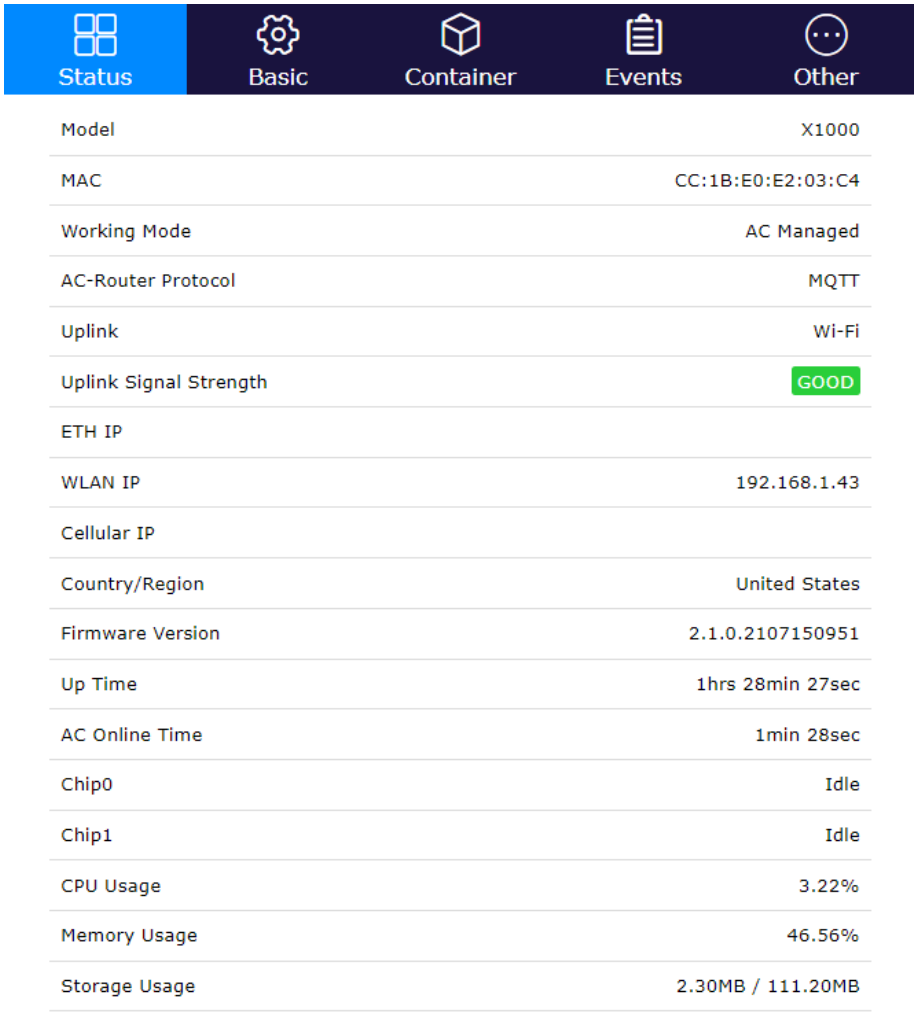

Figure 14: gateway connected to gw.dodgeoptify.com

If the AC Online Time is not shown within a few minutes:

- Check the configuration and internet connection
- Reboot the gateway by powering it off, then on

Connection to access controller can also be verified with debug tools on the Other page:

- Under debug tools, select "ping"
- For the address type "gw.dodgeoptify.com" select "5s", then press "run"
- A success message will appear if the gateway is connected to the access controller

Note: Remember to change the router mode to AC Managed Router. If this mode is not changed, the gateway will not establish the connection to the AC server and the sensor data is not being read.

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3 Troubleshooting

If you forget your login credentials or make a mistake while configuring the Wi-Fi network's SSID or password:

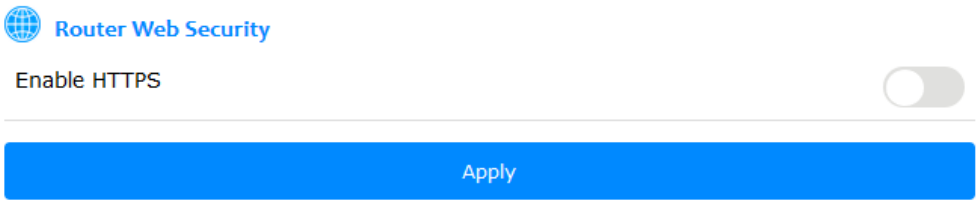
- Press and hold the reset button on the bottom of the gateway for 10 seconds to reset the gateway back to factory default values

If the gateway does not generate the Wi-Fi hotspot for setup:

- Check the power supply and verify the blue LED on the bottom of the gateway is on
- If the gateway is configured to use a Wi-Fi network, it does not generate a Wi-Fi hotspot
- Press and hold the reset button on the bottom of the gateway for 10 seconds to reset the gateway back to factory default values

If the gateway does not connect to the AC server:

- Check access to the internet
- If a USB dongle is used, check if the model is supported by the gateway and that the dongle has established a connection to a mobile network
- Check the network being used does not use a VPN
- Check the firewall settings for the network being used to ensure the necessary ports for outbound communication are open (see section 2.1 Prerequisites for installation)
- Check the router web security on the Other page is turned off (see below)



If the gateway is not reading the sensor data:

- Check the sensor is within the gateway's range
- If the gateway is reading the sensor data in a timely manner, it can take a couple of hours to see the first measurements in OPTIFY
- Check if the Online Time on the Status page is being shown, and if it is not, check the internet connection

Scanning for Bluetooth devices:

The correct gateway placement can be checked by scanning for Bluetooth devices within the gateway's range. The gateway's location or orientation might need to be changed if all desired sensors are not visible for the gateway or if the sensors are showing weak signal levels.

To enable scanning, the router's mode on the Basic page needs to be changed from "AC managed router" to "standalone router". Once changed, the gateway will automatically reboot and will be operational again in 30-60 seconds.

Open the following web page on your computer, tablet, or mobile phone through your internet browser: http://www.bluetooth.tech/debugger/

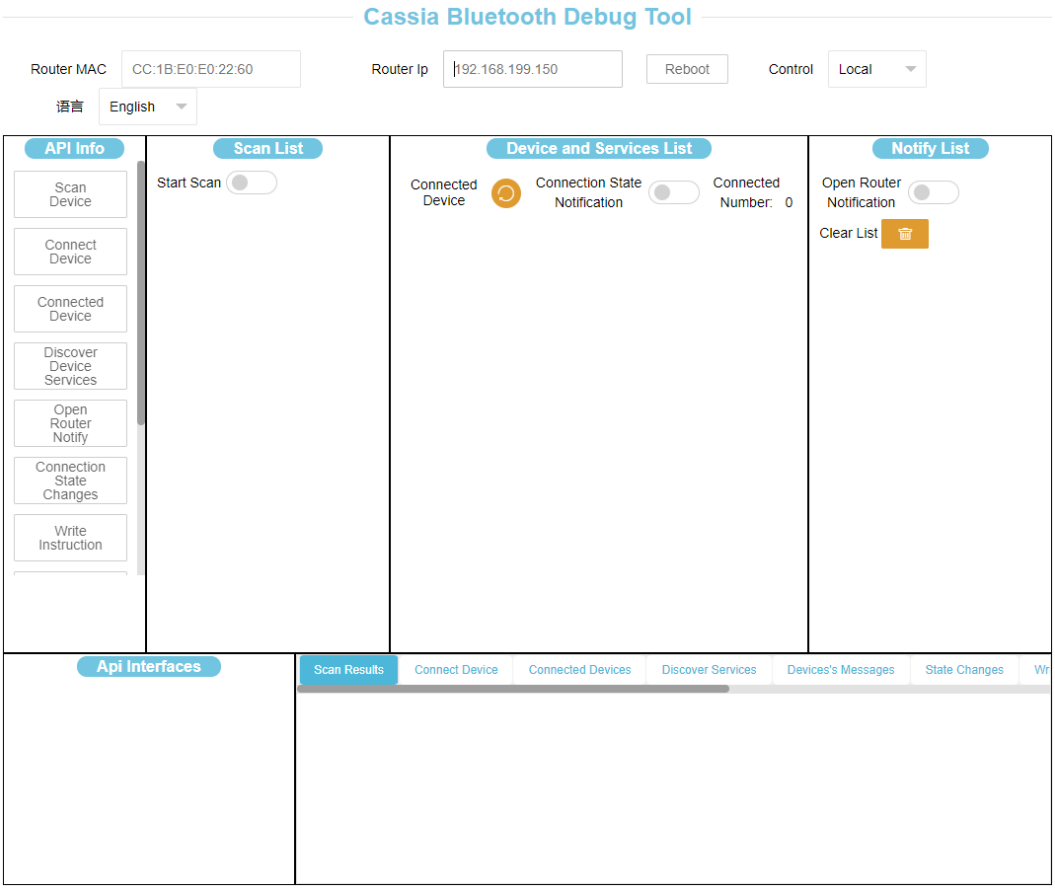


Figure 15: Cassia Bluetooth debug tool

Once the debug tool is loaded, connect the device used for configuration (computer, tablet, or mobile phone) to the Wi-Fi network generated by the gateway. If the gateway is connected to Wi-Fi, connect the configuration device to the same Wi-Fi network the gateway is connected to.

Type in the gateway's MAC address into the Router MAC field and the IP address into the Router IP field.

Press "start scan".

The debug tool will start to list all Bluetooth devices within range. For all scanned devices, the tool shows the MAC address and the RSSI value. Sometimes the name is not available, but it is listed if known.

RRSI values can be generally categorized into the following groups:

- RSSI value between 0 and -70: good
- RSSI value between -70 and -80: weak (the sensor data might be read periodically)
- RSSI value -80 or less: poor (most of the time the sensor cannot be read)

If the desired sensors are showing RSSI values of -70 or less, adjusting the gateway's location or orientation is recommended.

Support:

For additional support, please contact the Dodge IIoT Technologies team:

Email: engineering@support.dodgeindustrial.com

Phone: 864-284-5700 ext.6

Availability: Monday-Friday, 8:00am-5:00pm EST