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Cassia Router Quick Start Guide

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Contents

Version: EN-20200821-YJ

1. Version Notice

This document describes the steps of installing a Cassia router with firmware v1.3 or above. If the customer is using firmware 1.2, please follow https://www.cassianetworks.com/download/docs/Cassia_Quick_Start_Guide-v1.2.pdf

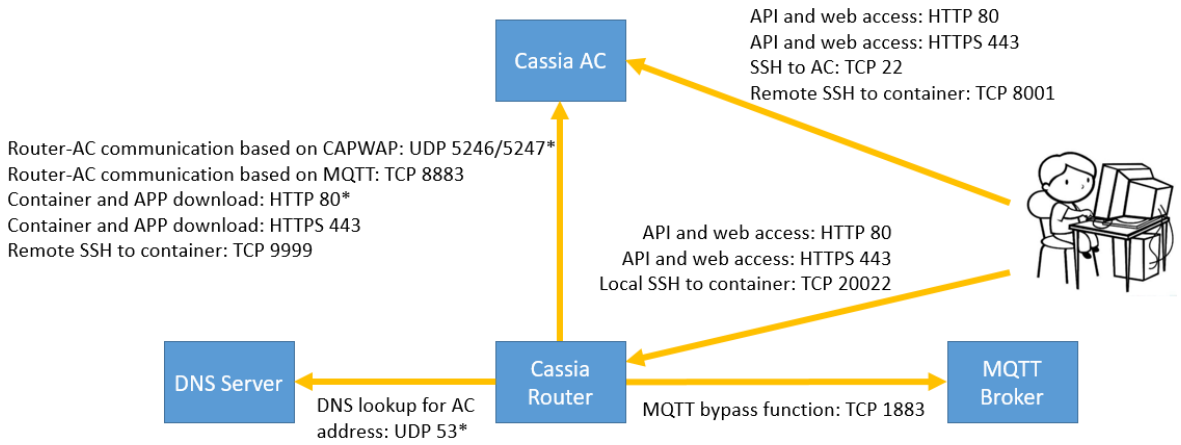
In this guideline, the Cassia router is running in AC Managed mode. If the router is running in standalone mode (no AC), please skip chapter 6 and 11.

2. Network Environment Requirement

Please make sure the following ports are opened outbound on customer router side firewall. Customer can check if a TCP port is opened by using Netcat in chapter 5.5.

Type	Port	M/O	Description
UDP	5246, 5247*	Mandatory	Router-AC communication based on CAPWAP. *Port 5246 and 5246 can be disabled after migrating router-AC communication to MQTT (see below steps)
TCP	8883		Router-AC communication based on MQTT (recommended from firmware v2.0.2)
HTTP	80*	Mandatory	Container and APP download from AC based on HTTP. *HTTP port 80 can be disabled if HTTPS is enabled
HTTPS	443		Container and APP download from AC based on HTTPS
UDP	53	Mandatory*	DNS lookup for AC address. *Optional if internal DNS is specified in router network configuration
TCP	9999	Mandatory	Remote SSH to container (laptop->8001->AC<-9999<-container)
TCP	1883	Optional	For MQTT bypass function only (see chapter 5.6)

Below image shows the ports which may be used in the system.



3. Find Router's MAC Address

Please find Cassia router's MAC address on the bottom of the router.

Figure 1: Cassia router's MAC address

NOTE: If you are filtering MAC addresses in your security policy, please make sure to input the active MAC addresses. For example, if you are using WIFI for uplink connection, the active MAC will be label MAC + 1. Please see below table for the details.

Model	Label MAC	Ethernet MAC	WIFI MAC
C1000/X1000	MAC	MAC	MAC+1
E1000	MAC	MAC	MAC+1
S2000	MAC	MAC	MAC+1
S1000/S1100	MAC	MAC	MAC-1

4. Setup using WiFi Hotspot

From firmware 1.2, Cassia Bluetooth router provides a WIFI hotspot (2.4GHz only) for initial setup. Its SSID is cassia-**xxxxxx** (the **xxxxxx** corresponds to the last 6 digits of the router's MAC address). The default password of the WIFI hotspot is the same as the SSID.

For example, if the router's MAC address is "CC:1B:E0:**E0:96:DC**", the WIFI hotspot SSID and its default password will be "cassia-**E096DC**".

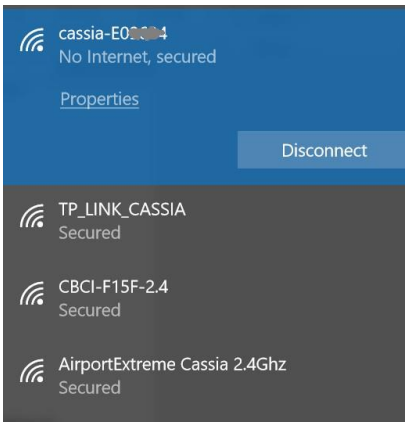


Figure 2: Router's WIFI hotspot (2.4GHz only)

Then, power up your Cassia router, search its WIFI hotspot from your laptop and connect your laptop to the WIFI hotspot.

If you can’t find the WIFI hotspot, and you are sure that your firmware is 1.2 or above, please press and hold the reset button at the bottom of Cassia router for 10 to 15 seconds while the router is powered on.

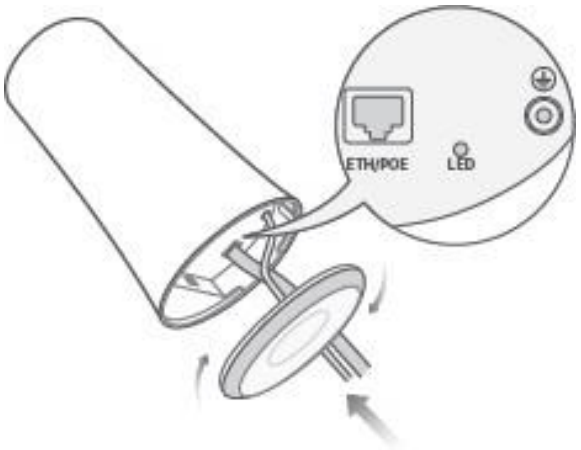


Figure 3: Cassia Router Reset Button

Please open Google Chrome in your laptop and enter the router’s default IP address 192.168.40.1. The default web username and password is admin/admin.

At the first time you log in, the system will ask you to change the default password. The password should include number, characters and special characters. The password length should be between 8-20. Please note down your new password for future use.

If you forget the username and password, please reset the Cassia Bluetooth router. Once reset, the username and password will be restored to admin/admin. What is more, the router configurations in below table will be set to the default profile settings. The country code, container and customer APP will not be impacted. You need to configure the Cassia router again.

Parameter	Manufacturing Default Value
Router Console Username	admin
Router Console Password	(set new password)
AC Server Address	Empty
Local RESTful API	OFF
Remote Assistance	OFF
Connection Priority	Wired
WIFI / Operating Mode	Hotspot
WIFI / SSID	cassia-xxxxxx
WIFI / Password	cassia-xxxxxx

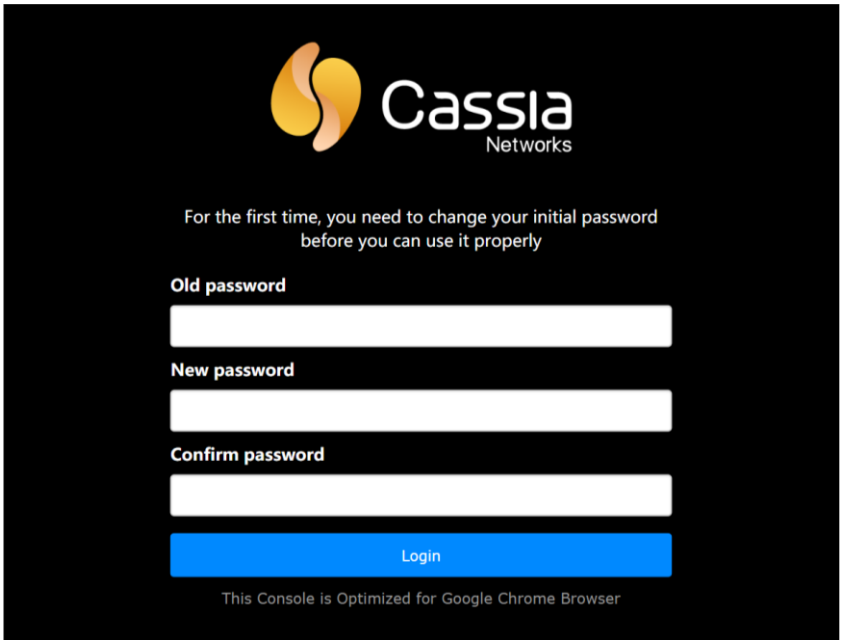


Figure 4: Cassia router's web login page

Now, please log in to the router's web page with the new password.

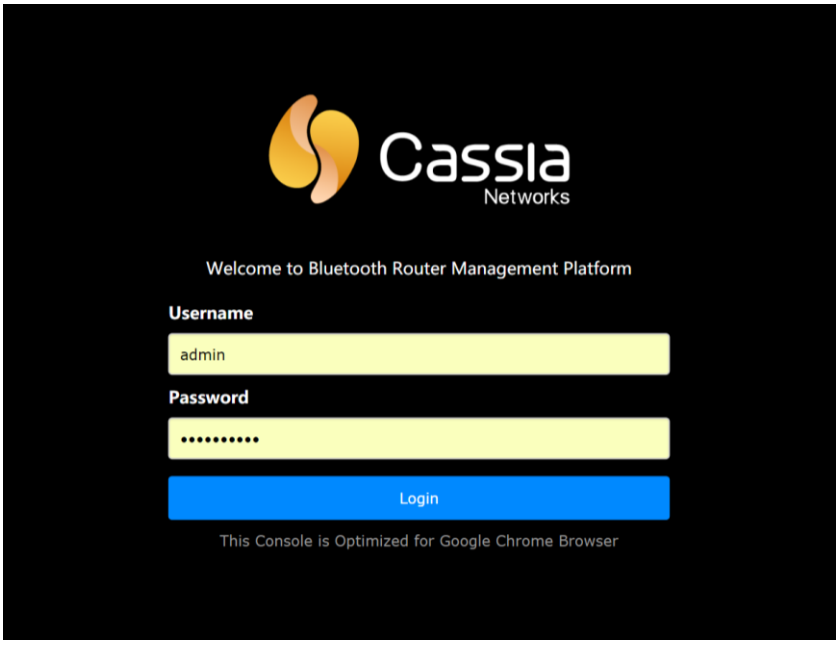


Figure 5: Cassia router's web login page

5. Setup using Ethernet Connection

If you don't have a laptop which supports WiFi, please connect the Cassia Bluetooth router to a managed Ethernet switch and access the DHCP table or scan using a port scanning tool to locate the IP address assigned to the router's MAC ID.

After that, please open Google Chrome on a computer that is connected to the same network and enter the IP address discovered above.

6. Configure AC Address

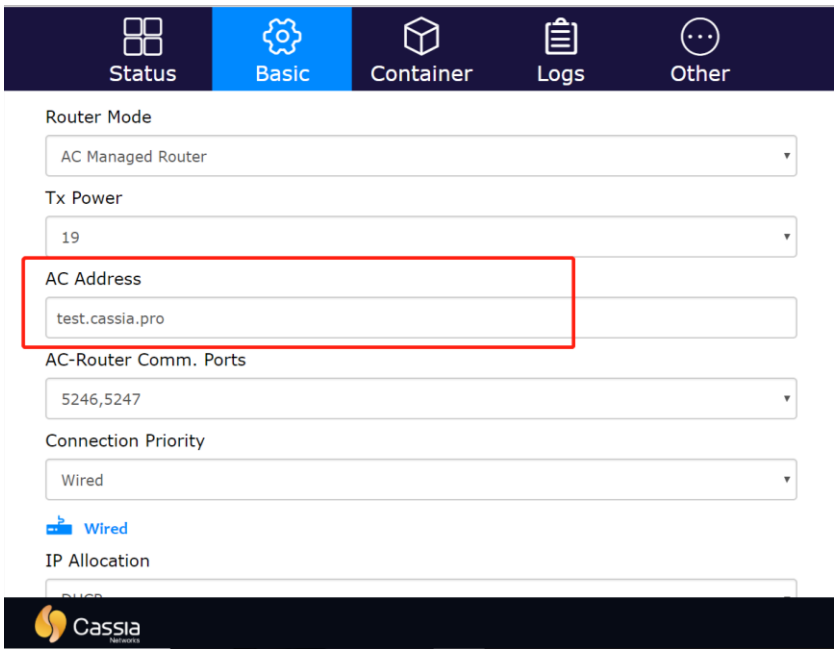


Figure 6: Configure AC address in Cassia router's web

The customer can skip this step in below scenarios.

- If the router and the AC are in the same network and DHCP is configured in the network, AC can discover the routers automatically (see chapter 8.2).
- If the customer needs to configure more Cassia routers at the same time, it is better to use DHCP server option 43 to help the routers to find the AC. IP gateway will serve as DHCP relay.
- If the router is configured as standalone mode, there will be no AC.

7. Configure Uplink Network

The Cassia Bluetooth Router supports Ethernet (Wired), WIFI and Cellular dongles as networking uplink.

Please check chapter 5.2 in Cassia Bluetooth Router User Manual for more information. In this guideline, we use Ethernet as an example.

Below is the configuration with wired and DHCP.

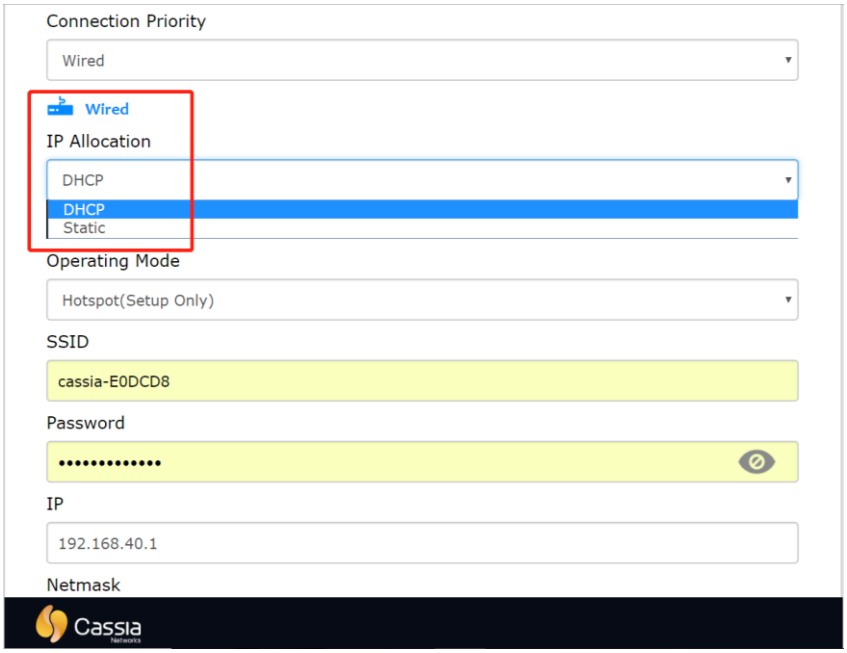


Figure 7: Setup network configuration for your router

Below is the configuration with wired and static IP.

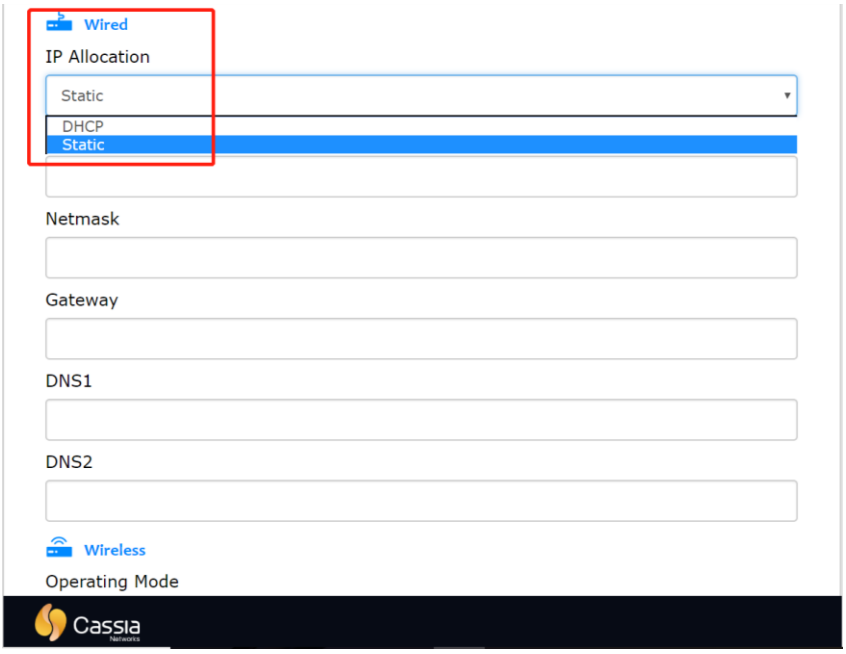


Figure 8: Setup network configuration for your router

8. CAPWAP and MQTT Setting

Before firmware 2.0.2, Cassia Bluetooth router communicates with AC using CAPWAP protocol. CAPWAP is based on UDP port 5246 and 5247, and uses DTLS 1.2 to ensure the security.

From firmware 2.0.2, customer can select MQTT for the communication between routers and

AC. MQTT uses TCP port 8883 and TLS 1.2. MQTT improves the robustness of router and AC communication. It brings higher upgrade success rate and less BLE data drop rate. What is more, sometimes the customer's firewall doesn't allow UDP packets to pass. In this case, MQTT will help the packets between router and AC pass through the customer's firewall.

One Cassia AC can use MQTT to communicate with some routers and use CAPWAP to communicate with the other routers at the same time. By default, a new 2.0.3 AC only has MQTT port enabled. An 2.0.3 AC upgraded from lower versions will have both CAPWAP and MQTT ports enabled for backward compatible. Customer can enable/disable CAPWAP and MQTT ports on AC by setting "CAPWAP port" and "MQTT port" in AC setting page. Customer can disable CAPWAP ports, if don't want the routers to connect this AC by CAPWAP.

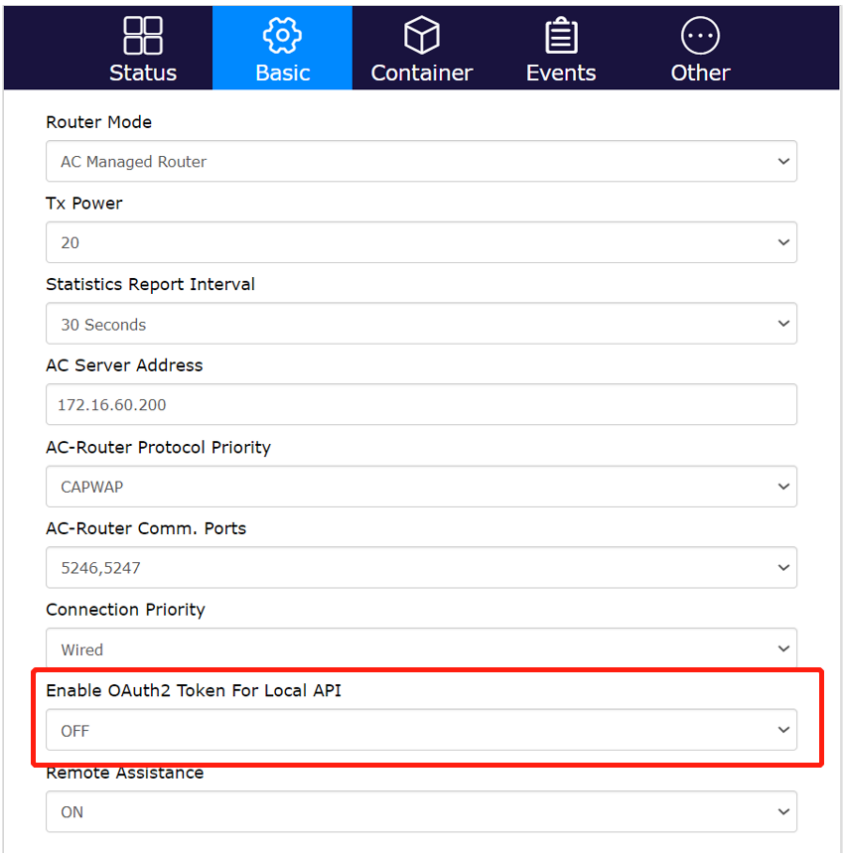
Customer can set the preferred router-AC protocol by setting parameter "AC-Router Protocol Priority" on Cassia Bluetooth router. First, the router will try to use the preferred protocol to connect AC. If it failed, e.g. port is blocked by firewall, the router will try the other protocol automatically. After router is online, customer can find the actually used protocol by checking "AC-Router Protocol" parameter. From firmware 2.0.3, the default "AC-Router Protocol Priority" is MQTT. If the router was upgrade from lower versions, the default value will be CAPWAP.

Please check chapter 4.4 of Cassia user manual for more information.

9. Enable Local RESTful API and OAuth2 Token

This step is only valid for the customers who wants to use RESTful APIs on the local routers (not through AC or in container).

From firmware 2.0.3, customer can enable OAuth2 token for Cassia local RESTful API to improve the security. The default value is off.



From firmware 1.3, if the router is configured as standalone mode, local RESTful API will be automatically turned on. If the router is configured as AC managed mode, the local RESTful API will be automatically turned off.

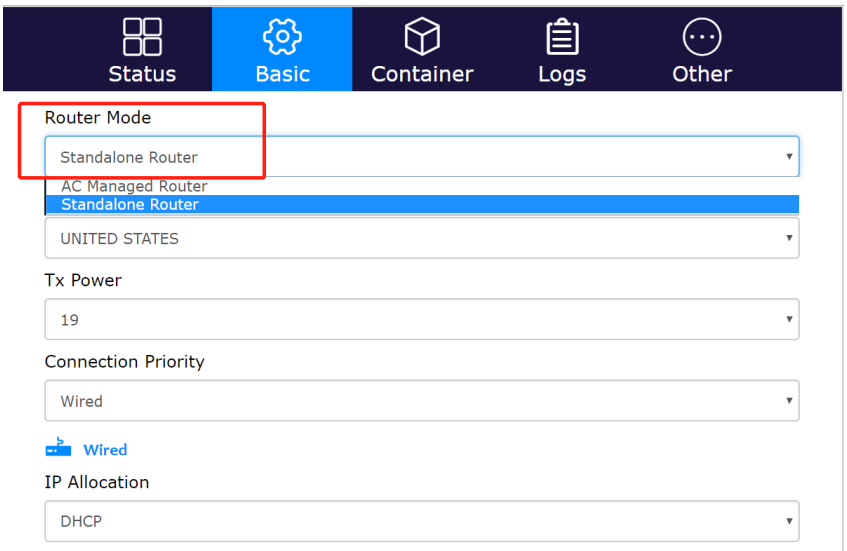


Figure 9: (v1.3) Configuration of Router Mode on Router Console

For firmware 1.2, customer needs to turn on Local RESTful API in AC console or router console manually. Please see below figures.

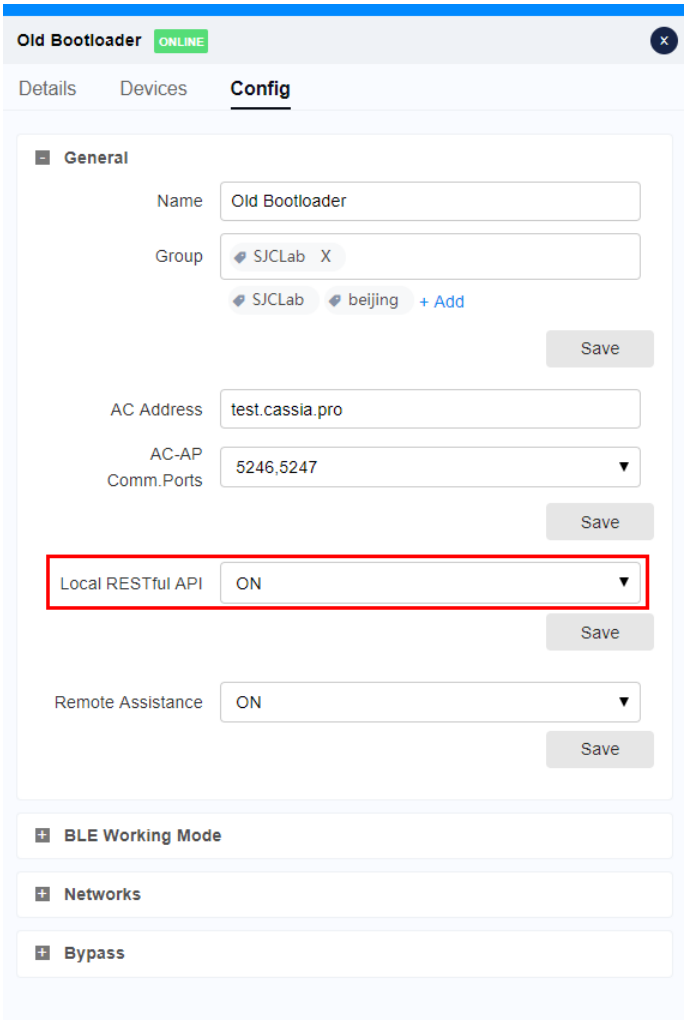


Figure 10: (v1.2) Turn on Local RESTful API in AC Console

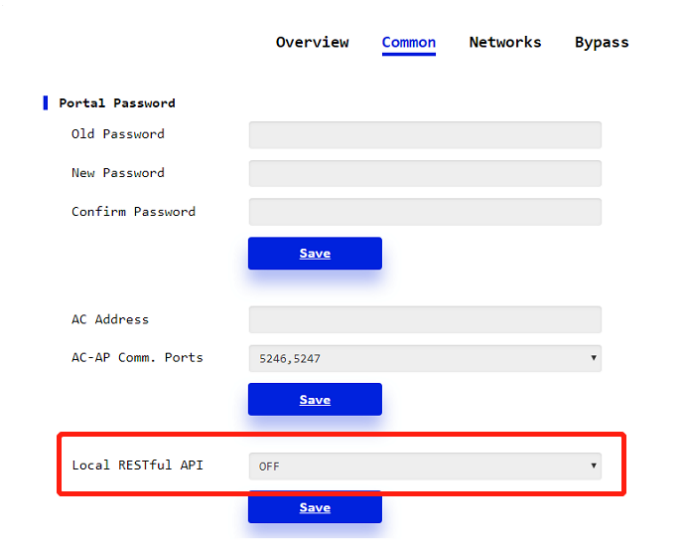


Figure 11: (v1.2) Turn on Local RESTful API in Router Console

10. Finish Router Configurations and Sign out

Please follow Cassia User Manual to finish other router configurations, if necessary. After the configuration, please click Sign Out button in Other page to sign out.

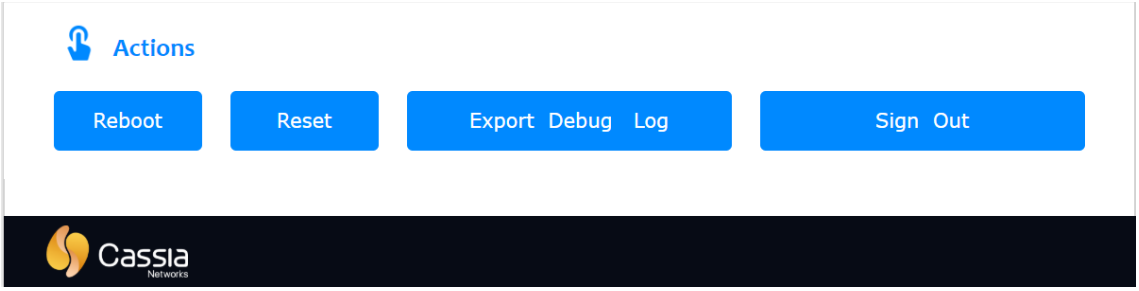


Figure 13: Cassia router configuration page – other continued

11. Add Router to AC

11.1. Login AC

Please switch your laptop to the WIFI SSID which will provide you with Internet access. Please open Google Chrome and enter the IP address or domain name of the AC, and log in.

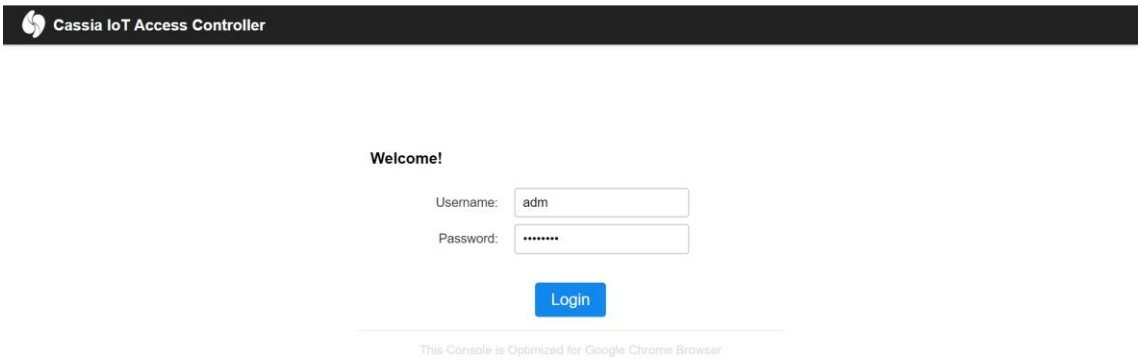


Figure 14: Cassia AC login page

11.2. Discover the Routers

Navigate to the Routers page.

Figure 15: Discover Bluetooth routers

After clicking Discover button, Cassia AC will identify the routers that are either in the same local network as the AC or have been configured to talk to this AC (see chapter 5) but haven't been added to the AC yet.

11.3. Add the Routers

Please find the routers you want to add, then click “Add selected routers” button. You can select multiple routers and add all of them in one batch.

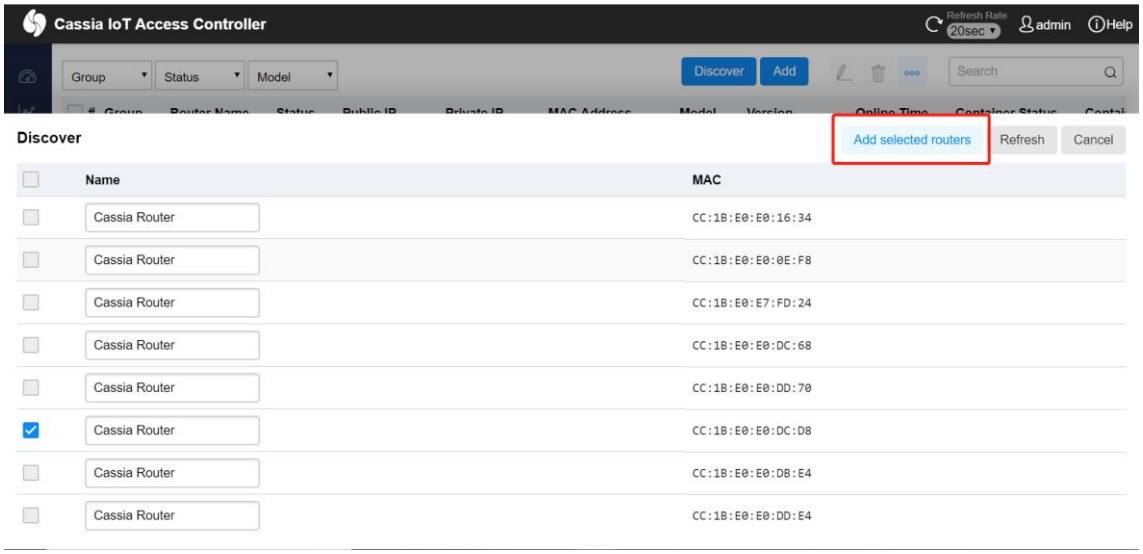


Figure 16: Add the routers into the AC

12. Upgrade the Router

If your router is not running the latest firmware, you can upgrade the firmware.

If you don’t have the latest firmware on the AC yet, please get it from Cassia, and then upload it to the AC maintenance page. The latest firmware download is available here: https://www.cassianetworks.com/knowledge-base/router-gateway-firmware/. Please note, this download site is password protected for Cassia’s authorized partners

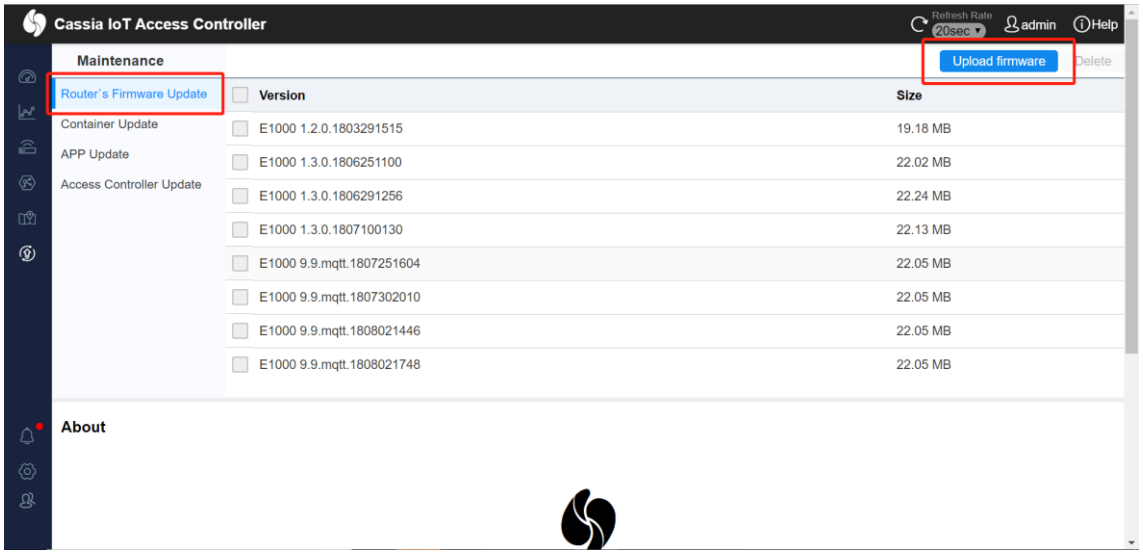


Figure 17: Upload firmware to the AC

Please navigate to Routers page, select the router(s) that you want to upgrade, and click the

Upgrade button.

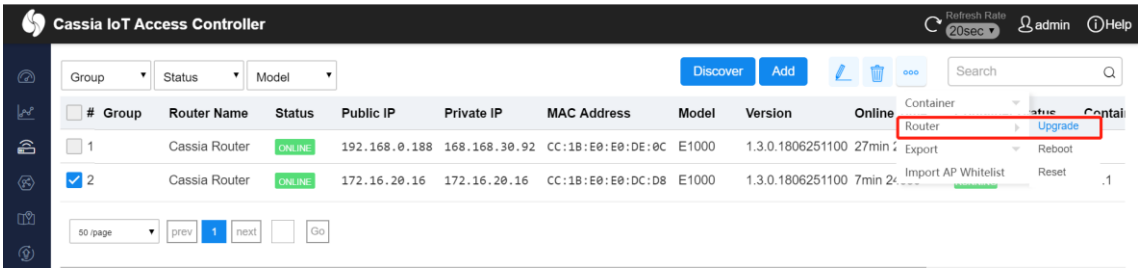


Figure 18: Upgrade a router

Please choose a firmware you want to upgrade to, and then click OK. If E1000 and X1000 firmware upgrade fails during firmware download, it will resume from last broken download.

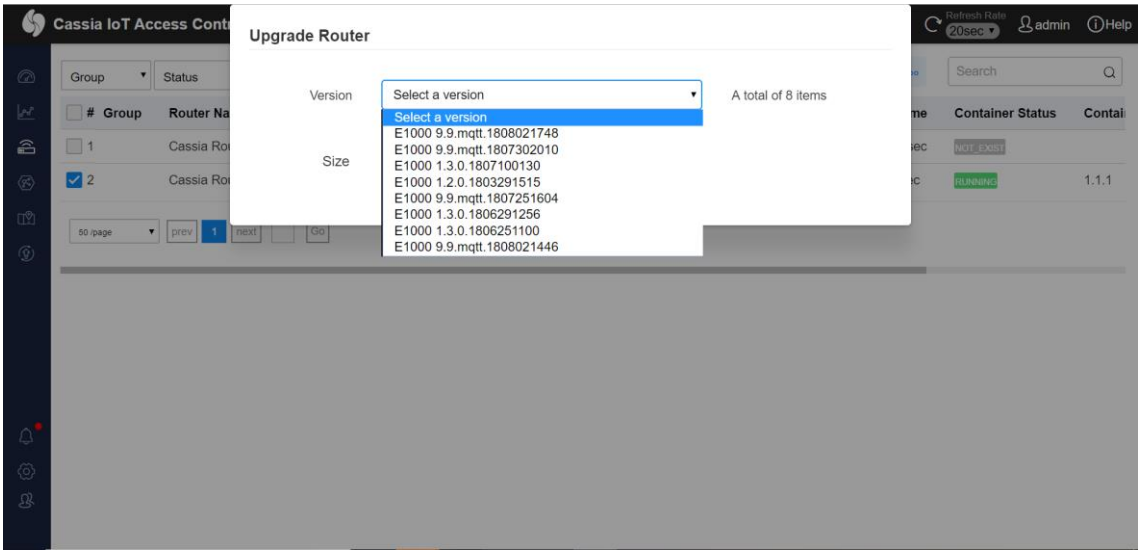


Figure 19: Select a firmware and upgrade the router

From firmware 1.3, the customer can update the router's firmware locally from router console by clicking the Select File and Upgrade button. If the firmware image is encrypted with *.GPG, please switch on "Verify GPG File Encryption?". Please turn it off if the firmware image is *.gz file format.

From firmware 1.4.2, the user can update the router's firmware from an Android smart phone locally. Please download the router firmware on to your smart phone in advance and log into the router's local console from WiFi hotspot (2.4GHz only) or router's private IP.

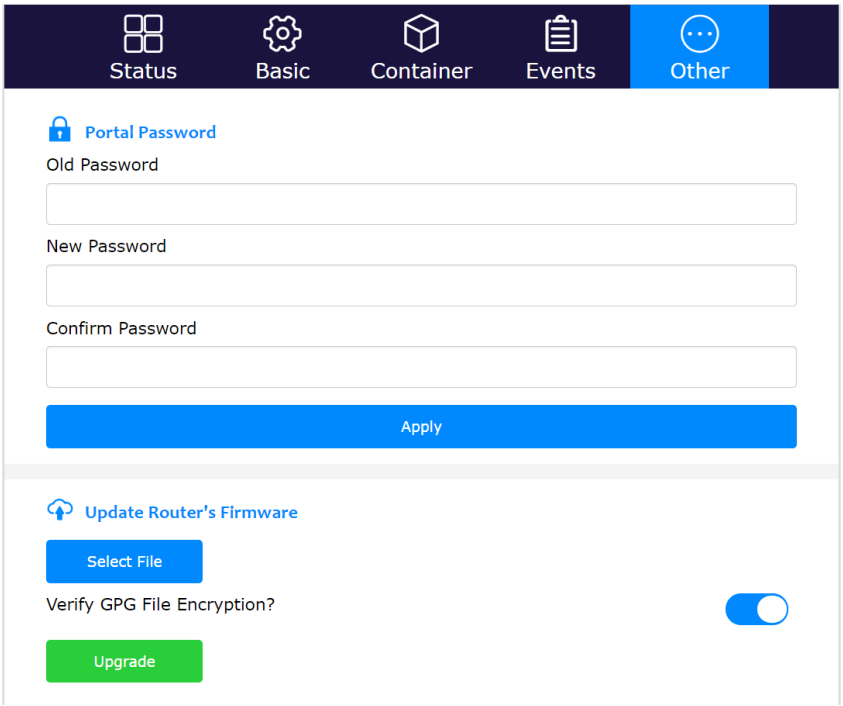


Figure 20: Update router's firmware locally from router web

13. Trouble Shooting Tips

Router does not generate the WIFI hotspot (2.4GHz only) for setup:

- Cassia router's WiFi hotspot is 2.4GHz only
- If the router is configured to use a WIFI network for uplink, the router will not generate a WIFI hotspot.
- Check the power supply and make sure the power and Wi-Fi LED is ON.
- Try to reset the Cassia Bluetooth router according to chapter 4.
  NOTE: once reset, all router configurations will be reset to the default profile settings, except for country code, container and customer APP. What is more, the router debug log and route event log will be cleaned. If you would like Cassia to trouble shooting this issue, please don't reset router!

Forget the login credentials or make a mistake while configuring the WIFI network SSID or password:

- From firmware 2.0.3, the user can enable "Verify before saving" before switching to Client mode. If the router can't connect to Wi-Fi AP within 30 seconds, it will switch back to Hotspot mode automatically. This function will avoid un-necessary router reset if the user set wrong Wi-Fi configuration.
- Please follow chapter 4 to reset the Cassia Bluetooth router.
  NOTE: once reset, all router configurations will be reset to the default profile settings, except for country code, container and customer APP.

Wi-Fi or cellular uplink connection is not stable

- If you are using router firmware v2.0 or higher versions, please check the Wi-Fi and cellular network signal strength on AC->Router->Details->Uplink or router console Status tab. If the signal strength is POOR, please try other WiFi SSID, try 5G WiFi, try

SIM card from other cellular operators or try other uplink solutions. **NOTE:** Only some cellular modems support signal strength measurement. Please check Cassia user manual for the list.

- If you are using router firmware lower than v2.0, please check the Wi-Fi and cellular signal strength on your mobile phone.

Router does not connect to AC server (Status page doesn't show Online Time):

- Double check the Bluetooth router configuration and Internet connection
- Check Ethernet and Wi-Fi LED on Cassia Bluetooth router. Check the LED on USB cellular modem.
- In case a USB cellular modem is used, check the model is supported (check Cassia User Manual) and that the modem has established a connection to a mobile network.
- Check that the used network does not use VPN.
- Check the used network firewall settings. Please check chapter 2 for more information.
- Check the connection to AC with Debug Tools in Other tab. Please check Cassia User Manual chapter 5.5 for more information.
- Check CAPWAP and MQTT configuration. Please check chapter 4.4 of Cassia User Manual for more information.
- Reboot the Bluetooth router (power off/on)

Check if the Bluetooth device can be scan or connect

- Check the Bluetooth device is power on and working well.
- Check the BLE LED is ON.
- The router location or orientation needs to be changed if the Bluetooth devices are not reachable or if the RSSI of is lower than -70, e.g. -80. If you are using AC software v1.4 or higher versions, you can try to scan and connect the Bluetooth device with AC Bluetooth Debug Tool (please check Cassia User Manual). Please use http://www.bluetooth.tech/debugger/, if you are using lower AC versions.
    - RSSI value between 0 and -70 is OK
    - RSSI value between -70 and -80 is weak. The Bluetooth device might be scan and connect from time to time
    - RSSI value -80 or less is poor. Most probably the Bluetooth device cannot be reached.

E1000/S2000 LED (Green)

LED	Function	Status	Description
PWR	Power status	Off	Power off
		Solid on	Power on
SYS	System status	Off	System didn't start or cannot operate normally
		Solid on	System cannot operate normally
		Fast blinking	System is starting or going to reset
		Slow blinking	System is operating normally
ETH	Ethernet status	Off	No Ethernet link
		On	Ethernet link present

		Blinking	Sending or receiving data
WIFI	Wi-Fi status	Off	Wi-Fi didn't start or is in disable mode
		On	Wi-Fi is operating normally in hotspot or client mode
		Blinking	Sending or receiving data
BT1/2	Bluetooth status	Off	Bluetooth chip didn't start
		Solid on	Bluetooth chip is operating normally
		Fast blinking	Bluetooth connection has been setup
		Slow blinking	Bluetooth scan has been enabled

X1000 LED (Blue)

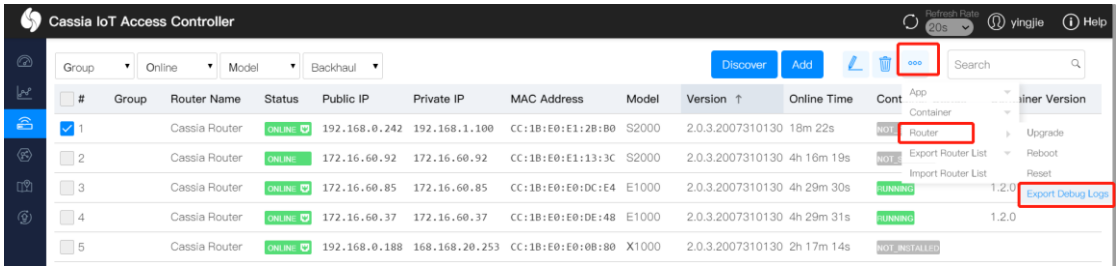
LED	Function	Status	Description
PWR	Power status	Off	Power off
		Solid on	Power on

14. Contact Cassia Support

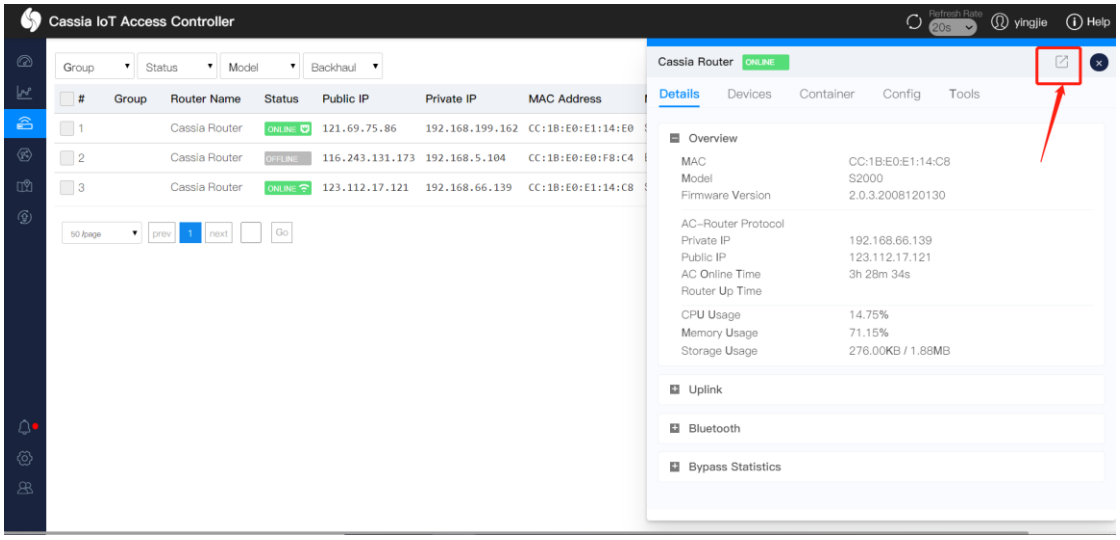
If you can't fix the issue following the tips in chapter 14, please contact Cassia support **support@cassianetworks.com**. Please export router debug log and router event log, and email to us for further analysis.

NOTE: the router debug log and route event log will be cleaned after router reset. If you would like Cassia to trouble shooting, please don't reset router!

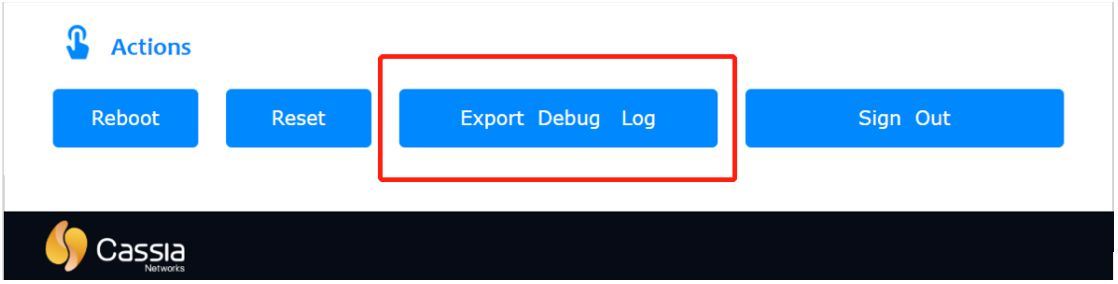
From firmware 2.0.3, the user can download router debug log from AC too (see below screenshot). Only one router's debug log can be downloaded from AC at the same time. It may take 2-5 minutes (time out in 10 min) to download one router's debug log. Please don't touch AC console and wait until the download finished, otherwise the download may be interrupted. This log is not readable to end users.



On AC console, customer can export router event log by clicking below button.



On router console, customer can export router debug log by clicking Export Debug Log button on Other tab. This log is not readable to end users.



On router console, customer can export Router event log by clicking the Export button on Events tab.