

6 GHz Frequently Asked Questions

FAQ: Understanding Automated Frequency Coordination (AFC) and 6 GHz Standard Power and Client Modes

Definition of different modes:

Standard Power AP: This is when the device operates as an access point or backhaul master and requires the device to send geo-location information. In this mode, the device is allowed to operate at a maximum of 36dBm EIRP.

Standard Client: This is when a device is operating as a SM or backhaul client and does not require geo-location information to be shared with the AFC. In this mode, the device is allowed to operate at 6dB < than the AP. The AP will continue to operate in standard power mode and receive its channel allocation from the AFC.

Fixed Client: The device is operating as a SM or backhaul client and communicating to the AFC using geo-location information derived from a GPS source. The device is allowed to operate at the same EIRP level as the AP it communicates with. Maximum EIRP allowed is 36dBm.

Q1: Does Cambium Networks require a separate price or subscription for operation with the AFC?

A1: No. The AFC functionality is included in the price of the ePMP radio. There is a fee that Cambium Networks pays, but it is not passed on to the user at this time.

Q2: How often does the radio have to query the AFC?

A2: The radio queries the AFC once every 24 hours but also can query more frequently when there are configuration changes related to frequency, channel bandwidth, Tx power. The 24-hour cycle starts when the AP queries the AFC database for the first time which happens soon after power up assuming connectivity is available.

Q3: What happens to my network operation if the radio cannot reach the AFC?

A3: When the AP is powered on for the first time, it will not transmit until AFC server sends responses to the queries from the AP. This process entails authentication, geo-location information sharing among other supporting parameters. AP will continuously send the request until the AFC server sends the AFC response message. The Subscriber Module (SM) will revert to standard client mode when it first powers up. In the SM UI, both standard client and fixed client modes available as choices to configure but by default all SMs boot up in standard client mode. Once the SM connects to the AP

and has a path to the internet, and fixed client mode is configured then it will start querying the AFC system similar to the AP. If the AFC server connection fails for the AP, it will never transmit. However on the SM side if the connection fails once fixed client is configured it will default to standard client mode. If it succeeds on the first attempt but days later it fails, there is a 24 hour grace period for the SM where it continues to use the allocated fixed client frequency and EIRP before falling back to standard client.

Q4: Do I need a GPS receiver to provide geo-location information to the AFC server?

A4: In standard power AP mode, which all three SKUs (4600, Force600 & 4625) support require GPS to send geo-location information. For the 4600 & Force600C this is built in while the 4625 has an optional USB based GPS puck. Only during fixed client operation is the GPS puck required for the SM. If operating in standard client mode, the GPS puck is not necessary.

Q5: Are GPS modules and antennas included for ePMP 4600 APs? Will SMs need GPS? If so, what is required?

A5: The GPS module is onboard for the ePMP4600 4x4 and ePMP4600L APs and the Force 4600C. In majority of the cases, it is recommended that an external source is used. Please refer to the user guide for more information regarding the different ways geo-location can be derived. Note that in some case, the source only provide time syncing abilities and not geo-location. (i.e. Cambium sync). For Subscriber Module Force 4625 an external GPS USB puck is required for Fixed Client operation.

Q6: Does the AFC tell the AP how much Tx power is allowed or only which channels are available?

A6: Yes, the AFC provides the list of frequency and the associated EIRP. Standard Power is limited to 36 dBm (EIRP). Please refer to the product UI to see what is available from the AFC system.

Should we always try to configure and use fixed client vs standard client?

No, there are scenarios where the AFC system may grant channels with EIRP less than 30dBm which is the max for standard client mode. This is often due to how the AFC system makes assumptions regarding the antennas on fixed wireless systems. Directionality is not taken into account by the AFC system. Therefore, in some scenarios operators may benefit from using the standard client mode. In 5.7 release, there is logic

that the SM utilizes to fall back to standard client mode @ 30dBm EIRP when the channels given by the AFC in fixed client mode is less than what standard client mode offers. However, in the UI it may continue to show fixed client mode operation. This is done to prevent unnecessary disconnections.

Q7: What are the requirements to connect to the AFC system?

A7: In order to use the Automated Frequency Coordination (AFC) system, the Access Points and Subscriber Modules operating in Standard Power and Fixed Client Mode must:

1. Be able to make HTTPS requests out to the Internet.
2. Be running firmware version 5.7-RC63 or greater.
3. Have DNS server configured.
4. Get GPS data from GPS receiver

The units are pre-provisioned with AFC keys in order to authenticate. Release 5.7 supports connectivity to the AFC and user interface information showcasing channel availability.

Q8: Where can I check the AFC server connection status?

A8: The AFC Server connection Status available on radio's web interface and is displayed on the AFC section on Configuration -> Radio page along with the operational channel information. Please continue to monitor our community knowledgebase for further details on troubleshooting connectivity.

Q9: What is AFC server FQDN that needs to be allowed on the firewall for query exchange?

A9: <https://api.qcs.qualcomm.com/>