



Persistent Inquiry Approval (PIA) - Geolocation General Description

Version: 2.0

Release Date: 08 January 2025

Document Revision History

Revision	Date	Description
1.0	23 October 2024	<ul style="list-style-type: none">Initial version
2.0	06 January 2025	<ul style="list-style-type: none">Sync content with Geolocation Justification Report

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1. Purpose and Declaration

The purpose of this document is to respond to the Persistent Inquiry Approval procedure for Standard Power Access Points (6SD), FCC ID: MXF-W1701K. The content of this paper aligns with the PIA procedure 10.2 Exhibits for 731 filing, with a primary focus on the Geolocation General Description.

The content of this document, along with the additional test report/data, is authorized for use on Gemtek devices but is not limited to a specific FCC ID.

2. Geolocation General Description

In response to section 10.2.1 of the FCC’s Geolocation Approval Procedure for Standard Power Access Points (6SD) and Fixed Clients (6FX), this chapter provides an overview of the geolocation system embedded in the Access Point Device (Product Name: W1701K, also referred to as the “W1701K Wi-Fi Controller” or the “Device”). Additionally, it includes an attestation confirming the location uncertainty with a 95% confidence level, along with proof of daily AFC confirmation.

2.1. Overview of the Geolocation System

2.1.1. The Device

The W1701K Wi-Fi Controller Device consists of the following essential components:

- Airoha AN7581GT SoC functions to support a variety of networks.
- MTK WIFI SoC group that operates concurrently in the 2.4GHz, 5GHz, and 6GHz bands.

The W1701K is an Access Point Wi-Fi Controller Device that does not feature a built-in GNSS system. Instead, it relies on the geolocation data shared by a nearby Access Point W1700K (FCC ID: MXF-W1700K, Geolocation PIA Acceptance 299892) (*Note). The major axis, minor axis, and vertical position accuracy (Vacc) for the W1701K are calculated based on its distance from the W1700K and are then used to determine its geolocation relative to the W1700K’s location.

(* Note: For more information on Access Point W1700K, please refer to the FCC ID: MXF-W1700K, Geolocation PIA Acceptance 299892.

The following figure is a Function Block Diagram of the Device depicted from the hardware perspective. (Figure 1)

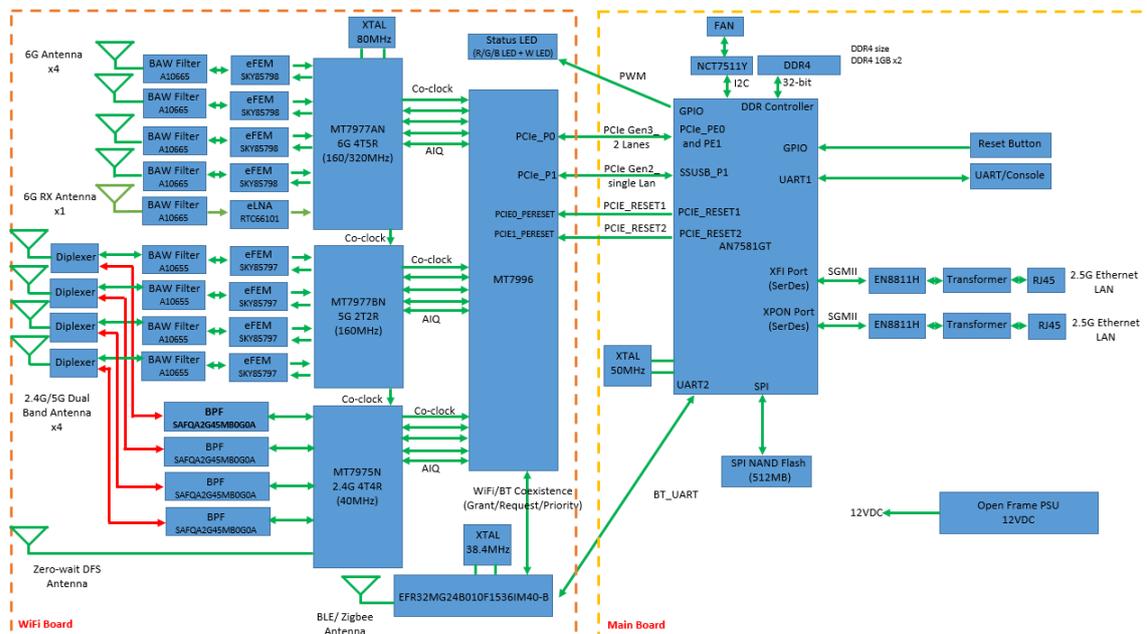


Figure 1. Function Block Diagram of the W1701K Wi-Fi Controller

2.1.2. How W1701K Obtains Geolocation Information

The W1701K Device is a product bundled with the W1700K (FCC ID: MXF-W1700K, Geolocation PIA Acceptance 299892). The W1701K functions as a Wi-Fi Controller Device and retrieves geolocation information from Access Point W1700K (*Note) via the AO Cloud. When operating independently, the W1701K will only support 6ID and will not proceed to query for AFC approval for 6SD if it is not within the Wi-Fi coverage/range of the W1700K.

(*) Note: The W1700K has a GNSS receiver that supports the GPS satellite system, and serves as the primary component responsible for determining the W1700K Device’s geographic coordinates (longitude, latitude, and height), velocity, and timing information. **(Figure 2)**

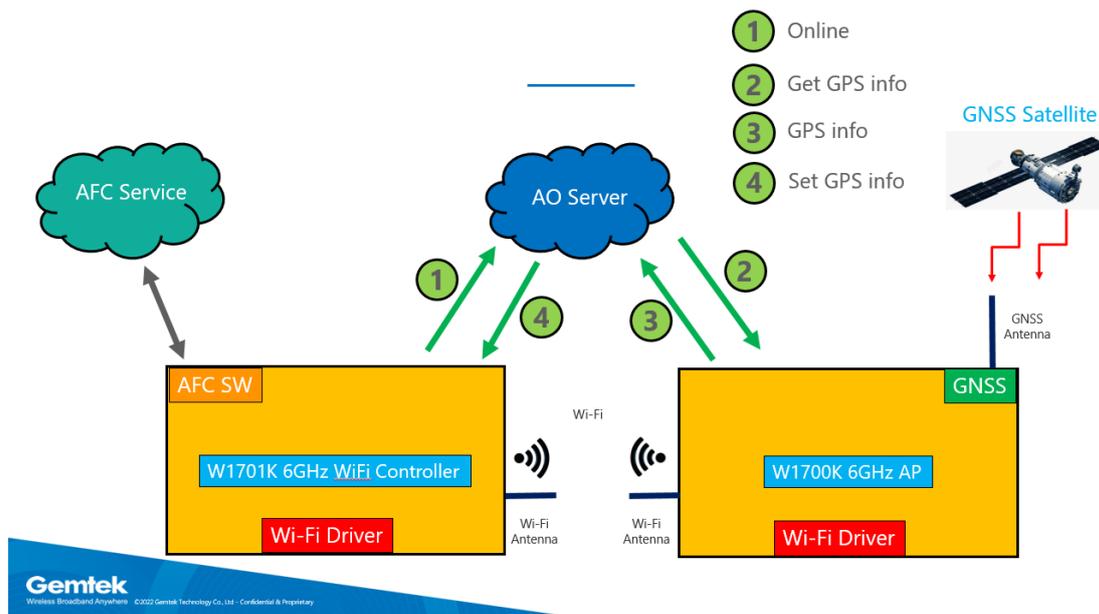


Figure 2 Diagram of How W1701K Obtains Geolocation Data

- ① The W1701K powers on and transmits a signal to the AO server.
- ② Upon receiving the signal, the AO server identifies the device and sends a request to the W1700K to retrieve GPS data.
- ③ The W1700K responds by providing the requested GPS data.
- ④ The AO server then forwards the GPS data to the co-located W1701K.

The geolocation of the W1701K is determined by the W1700K’s relative location (GPS Reference Point) and the distance of the Wi-Fi signal coverage between the two devices (W1700K and W1701K). By applying the distance at which the W1701K can effectively reach the W1700K, we can recalculate the major axis, minor axis, and vertical position accuracy for the W1701K’s location.

The W1700K serves as the geolocation source for determining the W1701K's AFC location. Once the W1700K and W1701K are both linked to the internet, they automatically register with the AO Cloud, which is powered by AXON Orchestrator™—a proprietary software platform designed for seamless subscriber management and network visibility. The AO Cloud then verifies whether the W1701K is part of the same household as the W1700K using a unique, pre-configured ID that cannot be altered by the end user.

For example, when the W1700K boots up, it reports its status and GPS information to the AO Cloud. The W1700K then updates its GPS data on the AO Cloud. Once the W1701K links to the network, the AO Cloud verifies that it is co-located with the specified W1700K. The W1700K’s GPS location is subsequently shared with the W1701K, serving as its GPS reference point.

Whenever the W1700K or W1701K is power-cycled or remains powered on for 24 hours, the GPS location is obtained from the W1700K and shared with the W1701K to maintain consistency in GPS ephemeris data.

The image below illustrates how more than one devices (W1701K) acquire relevant ephemeris data from the W1700K and AO Cloud. **(Figure 3)**

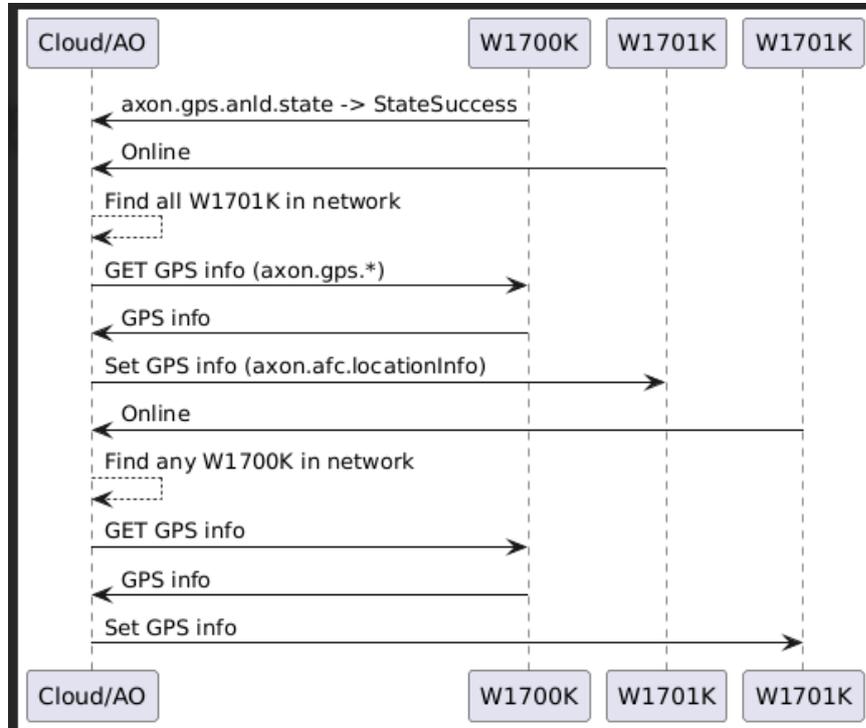


Figure 3 Diagram of How Multiple W1701K Devices Obtain Geolocation Data