Federal Communications Commission
Office of Engineering and Technology
Laboratory Division Public Draft Review

March 17, 2023

Draft Laboratory Division Publications Report

Title: 6 GHz UNII 5-8 Bands

Short Title: 6 GHz UNII

Reason: Update Publication for AFC Phase 2 Devices

Publication: 987594

Keyword/Subject: UNII-6GHZ, UNII 5-8, 6 GHz, UNII

First Category: Unlicensed Service Rules and Procedure

Second Category UNII devices- 15.401:

Question: What are the requirements for obtaining a Certification for U-NII 6 GHz devices operating in the 5.925-7.125 GHz band under Part 15, Subpart E?

Answer:

The following attachments are guides for obtaining certification for devices operating in the 5.925-7.125GHz band under Part 15, Subpart E:

- 987594 D01 U-NII 6GHz General Requirements v02 provides general requirements for filling form 731 and supporting information requirements for all types of 6 GHz devices.
- 987594 D02 U-NII 6 GHz EMC Measurement v02 test report, exhibits, and RF Measurement Procedures for demonstrating: EIRP, Bandwidth, Channel Mask, Out of Band Emissions, Contention Based Protocol (Listen Before Talk), Automatic Power Control (APC) as applicable to 6 GHz devices.
- 987594 D03 U-NII 6 GHz QA v01 Questions and Answers for 6 GHz devices. This attachment provides a guide for submitting a Pre-Approval Guidance (PAG) for item UN6GHZ.
- 987594 D04 UN6GHZ Pre-Approval Guidance Checklist v01 provides a guide to submitting a Pre-Approval Guidance (PAG) for item UN6GHZ
- 987594 D05 AFC DUT Test Harness Testing v01 provides guidance for Device managed by the AFC

Note: 6SD Standard power access point.; 6FX: Standard client; and 6FC fixed client cannot be granted until further notice.

Attachment List:

987594 D01 U-NII 6GHz General Requirements v02
987594 D02 U-NII 6 GHz EMC Measurement v02
987594 D03 U-NII 6 GHz QA v01
987594 D04 UN6GHZ Pre-Approval Guidance Checklist v01
987594 D05 AFC DUT Test Harness Testing v01

Attachment 987594 D01 U-NII 6GHz General Requirements.docx

Federal Communications Commission
Office of Engineering and Technology
Laboratory Division Publication

Part 15 Subpart E U-NII 6 GHz

General Guidance Bands 5, 6, 7, 8

Month XX, 2023

Table of Contents:

1 Introduction
2 U-NII Bands Overview
  2.1 Equipment classes for UNII bands 5, 6, 7, 8 Overview
3 Indoor Devices (6ID, 6PP, 6XD) operating in the 5.925-7.125 GHz band Devices
  3.1 Low-power indoor Access Points (6ID) operating in the 5.925-7.125 GHz band
  3.2 Subordinate (6PP) operating in the 5.925-7.125 GHz band
  3.3 Indoor Client (6XD) operating in the 5.925-7.125 GHz band.
  3.4 Dual Client (6CD)
  3.5 Summary of Requirements for indoor and dual client exhibits
4 Standard Power Access Points and Associated Clients (6SD, 6FX, 6FC)
  4.1 Standard Power Access Point (6SD)
  4.2 Standard Client Device (6FX))
  4.3 Fixed Client (6FC)
  4.4 Summary of 6 GHz Application Requirements for (6SD, 6FC, 6FX)
5 Multiple Rule Parts (Composite devices)
6 Application Restrictions
7 Modules
8 Overall Summary
9 RF Exposure
10 Geolocation approval procedure for Standard Power Access Points (6SD) and Fixed Clients (6FX)
  10.1 Automated Frequency Coordination (AFC) Database
  10.2 Exhibits for filling
    10.2.1 Geolocation General Description.
    10.2.2 Geolocation Justification Report
    10.2.3 Geolocation Accuracy After a Power Cycle
  10.3 Persistent Inquiry Approval (PIA) Procedure

Figure and Tables:

Figure 1 - Part 15 Subpart E Equipment Classes
Table 1 - Overviews of U-NII Rules
Table 2 - Summary of Application Requirements for Indoor and Dual Client Exhibits.
Table 3 - Summary of Application Requirements for (6SD, 6FC, 6FX)
Table 4 - Composites
Table 5 - Modules
Table 6 - Overall Summary
Table 7 - Exhibits Reference Guide
Table 8 - Note Code References

Appendix:

A – Exhibits Reference Guide
B - Attestation Examples

Related Attachments under Publication 987594

987594 D01 U-NII 6 GHz General Requirements
987594 D02 U-NII 6GHz EMC Measurement Procedures
987594 D03 U-NII 6GHz Q&A
987594 D04 UN6GHZ Pre-Approval Guidance Checklist
987594 D05 AFC DUT Test Harness Testing

1. Introduction

This Knowledge Data Base (KDB) Publication, 987594, provides guidance for obtaining an equipment authorization under the certification procedures for products and modules that operate under CFR Title 47, Part 15 Subpart E—UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE DEVICES[1] U-NII Bands 5-8. This publication requires that the reader be familiar with Equipment Authorization[2] (EA) procedures and FCC regulations. This KDB publication consist of 5 attachments:

1. **987594 D01 U-NII 6GHz General Requirements** . Provides a general overview for filling a certification.
2. **987594 D02 U-NII 6GHz EMC Measurement Procedures**. Test Lab guidance for EMC testing required for certification.
3. **987594 D03 U-NII 6GHz Q&A** . A set of additional guidance based on questions and answers.
4. **987594 D04 UN6GHZ Pre-Approval Guidance Checklist**. Guidance for TCBs submitting a PAG when required for 6 GHz.
5. **987594 D05 AFC DUT Test Harness Testing**. Guidance for testing devices required to be authorized operation through the Automated Frequency Coordination (AFC) data base System.

2. U-NII Bands Overview

Band	Band GHz	Rules	Notes	KDB Pub
U-NII 1	5.15-5.25	15.407(a)(1)	Indoor Use/Outdoor Restrictions	789033 (U-NII)
U-NII 2A	5.25-5.35	15.407(a)(2)	Indoor/Outdoor/DFS	789033 (U-NII) 905462 (DFS)
U-NII 2B	5.35-5.47	Not Available		
U-NII 2C	5.47-5.725	15.407(a)(2)	Indoor/Outdoor/DFS	789033 (U-NII) 905462 (DFS)
U-NII 3	5.725-5.85	15.407(a)(3)(i)	Indoor/Outdoor	789033 (U-NII) 926956 (&)
U-NII-4	5.850-5.895	15.407(a)(3)(ii) –(v)	Indoor	789033 291074
U-NII-4	5.895-5.925	95 Subpart L and 90 Subpart M	On-Board Units (OBU) must transmit signals to other OBUs and Roadside Units (RSU).	FCC 20-164[3]

[1] The 6 GHz rules were effective as of July 27, 2020. See Electronic Code of Federal Regulations (e-CFR) at: https://www.ecfr.gov/current/title-47#block-menu-block-4#block-menu-block-4 Part 15Radio Frequency Devices, . Subpart E - Unlicensed National Information Infrastructure Devices.

[2] Equipment Authorizations under the certification procedures require FCC-recognized Telecommunication Certification Body (TCB) approval. Parties unfamiliar with FCC Equipment Authorization procedures and FCC Rules should consult with Telecommunications Certification Bodies listed in the Equipment Authorization General guidance page htttp://www.fcc.gov/oet/ea to ensure a complete understanding of the process and steps necessary to obtain FCC equipment approval.

[3] At the time of this publication, the rules adopting FCC 20-164 FIRST REPORT AND ORDER November 2020, splitting the U-NII-4 band into Unlicensed operations in the 5.850-5.895 GHz and Intelligent Transportation Systems (ITS) operation in the 5.895-5.925 GHz.

Band	Band GHz	Rules	Notes	KDB Pub
U-NII 5	5.925-6.425	15.407(a)(4) – (8)	Low-power Indoor AP, Subordinates, Indoor Clients Standard Power AP, Fixed & Standard Clients	789033 (U-NII) 987594 (6 GHz Band)[4]
U-NII 6	6.425-6.525	15.407(a)(5), (6), (8)	Low-power Indoor AP, Subordinates, Indoor Clients	
U-NII 7	6.525-6.875	15.407(a)(4) – (8)	Low-power Indoor AP, Subordinates, Indoor Clients Standard Power AP, Fixed & Standard Clients	
U-NII 8	6.875 - 7.125	15.407(a)(5), (6), (8)	Low-power Indoor AP, Subordinates, Indoor Clients	
& Transition period ended March 2, 2020 for marketing DTS in the 5 GHz Band, as stated in 15.407(b)(4)(ii)				

Table 1- Overviews of U-NII Rules

2.1. Equipment classes for U-NII bands 5 - 8 Overview.

There are seven equipment classes that are required when applying for certification und Part 15 Subpart E for U-NII bands 5 - 8 as illustrated in Figure 1[5].

2.1.1. 6ID: 15E 6 GHz Low-power indoor access point. Operating in U-NII bands 5-8.

2.1.2. 6PP: 15E 6 GHz Subordinate indoor device. These devices are under control of a Low-power indoor access point (P1). Operating in U-NII bands 5-8.

2.1.3. 6XD: 15E 6 GHz Low-power Indoor client. These devices are under control of a low-power indoor access point (P1). Operating in U-NII bands 5-8.

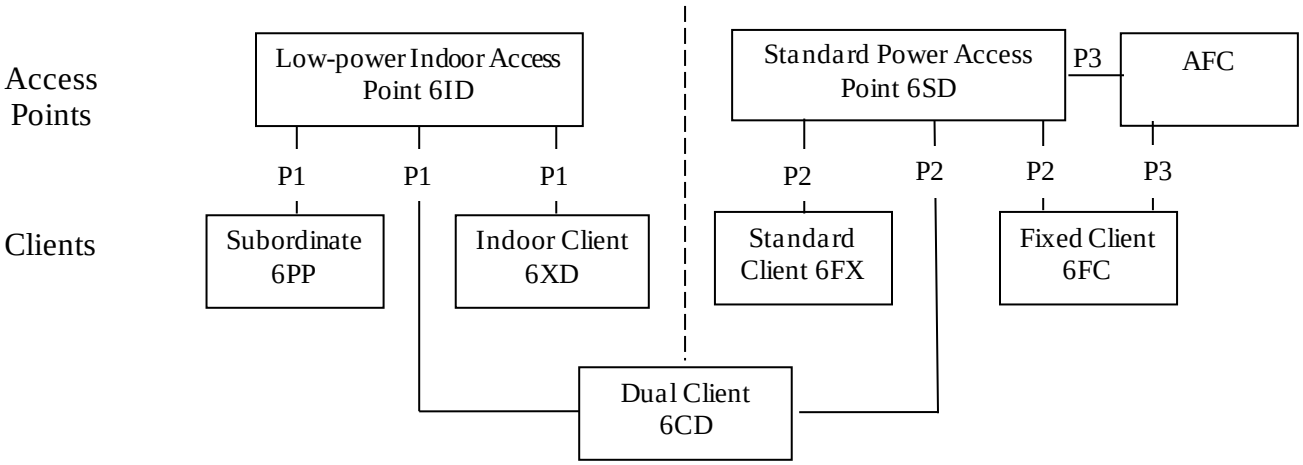
2.1.4. 6CD: 15E 6 GHz Dual client. These devices are under control of either a low-power indoor access point or standard power access(P1 &P2). Operating in U-NII bands 5-8.

2.1.5. 6SD: 15E 6 GHz Standard power access point. These devices are managed by the Automatic Frequency Coordination (AFC) system (P3). Operating in U-NII bands 5 & 7.

2.1.6. 6FX: 15E 6 GHz Standard client. These devices are under control of a Standard power access point managed by the AFC system (P2). Operating in U-NII bands 5& 7.

2.1.7. 6FC: 15E 6 GHz Fixed client. These devices are associated with a standard power access point (P3). Operating in U-NII bands 5&7.

[4] This KDB publication 987594 D01-D05 provides guidance for U-NII 5-8 bands.
[5] P1, P2 notes the type of Access Point that the client and subordinate must be associated with. P3 notes that standard Access Points and Fixed Client devices are managed by the AFC



P1 Client and subordinate devices under control of low-power indoor access point.
P2 Client devices under control of standard access point.
P3 Standard Power Access Point and Fixed Client devices managed by the AFC.

Figure 1 – Part 15 Subpart E Equipment Classes

3. Indoor Devices (6ID, 6PP, 6XD) operating in the 5.925-7.125 GHz band

These devices must use a contention-based protocol (CBP) such as "listen before talk" that provides interference protection for incumbent services. The contention-based protocol can allow multiple users to share the same spectrum among low-power indoor access points, subordinates, and clients. The contention-based protocol "listen before talk" must be demonstrated in the test report based on the requirements of attachment D02 of this publication.

Operation of transmitters in the 5.925-7.125 GHz band is prohibited for control of or communications with unmanned aircraft systems.

A Security description is required (15.407(i), Device Security) for all U-NII devices to demonstrate protection of unauthorized software modification by third parties[6] (see KDB Pub. 789033).

3.1. Low-power indoor access points (6ID) operating in the 5.925-7.125 GHz band

A low-power indoor access point (6ID) is a device that operates in a master mode as defined in Section 15.202, which can transmit without receiving an enabling signal. This mode can select a channel and initiate a network by sending enabling signals to client devices. A low-power indoor- access point shall provide an indoor identification or method to enable clients or subordinates to operate indoors[7] at a power level and power spectral density in accordance with the rules for indoor access points (6ID) and no greater than as granted.

These devices may operate as a: bridge, peer-to-peer connection, connector between the wired and wireless segments of the network, or a relay between wireless network segments.

These devices are limited to indoor locations, have an integrated antenna, and cannot use a weatherized enclosure.

[6] Third parties include end-users, professional installers, and authorized distributors. Non-third parties are only the Grantee or Contactors working on behalf of the Grantee. The Grantee remains the responsible party.
[7] 15.407 (d)(3) Transmitters operating under the provisions of paragraphs 15.407 (a)(5) indoor access point, (a)(6) subordinate device and (a)(8) client devices operating under the control of an indoor access point of this section are limited to indoor locations.

Low-power indoor access points devices are prohibited on oil platforms, cars, trains, boats, and aircraft, except large aircraft while flying above 10,000 feet in the 5.925-6.425 GHz band.

Low-power indoor access points must be powered by a wired connection and not by battery power. Low-power indoor access points may use battery backup only during power outages.

FCC ID: E-labelling is permitted on devices qualifying for e-labelling.

Label information required in the exhibit types ID Label/Location Info:

- FCC ID
- Indoor Use only

The device user manual must contain the following information. The user manual must be filed as an exhibit in the application filing .

- FCC regulations restrict the operation of this device to indoor use only.
- The operation of this device is prohibited on oil platforms, cars, trains, boats, and aircraft, except that operation of this device is permitted in large aircraft while flying above 10,000 feet in the 5.925-6.425 GHz band.
- Operation of transmitters in the 5.925-7.125 GHz band is prohibited for control of or communications with unmanned aircraft systems.

3.2. Subordinate device (6PP) operating in the 5.925-7.125 GHz band

A Subordinate device includes equipment such as Wi-Fi extenders and mesh networks with the additional requirement that it must be under the control of a low-power indoor access point (6ID) to share the same propagation channel path.

Being under the control of a low-power indoor access point is an association process where the subordinate passively scans or listens in the 6 GHz band for a low-power indoor access point (6ID) available channel. The subordinate may initiate a brief probe message requesting to join a low-power indoor access point network and request to be associated with a specific access point.

Subordinate device may wirelessly connect to other access points, subordinate devices, and client devices when associated with a low-power indoor access point (6ID).

These devices are limited to indoor locations, must have an integrated antenna, and cannot have or use a weatherized enclosure. These devices are prohibited on oil platforms, cars, trains, boats, and aircraft, except large aircraft while flying above 10,000 feet.

FCC ID: E-labelling is permitted on devices qualifying for e-labelling.

Label information required in the exhibit types ID Label/Location Info:

- FCC ID
- Indoor Use only

The device user manual must contain the following information. The user manual must be filed as an exhibit in the application filing.

- FCC regulations restrict the operation of this device to indoor use only.
- The operation of this device is prohibited on oil platforms, cars, trains, boats, and aircraft, except that operation of this device is permitted in large aircraft while flying above 10,000 feet.

- Operation of transmitters in the 5.925-7.125 GHz band is prohibited for control of or communications with unmanned aircraft systems.

Applications for a subordinate device must demonstrate via an attestation (see Appendix B for example) that the device can only operate under control of a low-power indoor access point.

Subordinate devices must be powered by a wired connection and not by battery power, may use battery backup only during power outages., cannot have a direct connection to the internet[8].

3.3 Indoor Clients (6XD) operating in the 5.925-7.125 GHz band

An indoor client device, where a client device is defined in Sec. 15.202, is limited to indoor locations[9] and is under control of a low-power indoor access point (6ID) or subordinate(6PP).

A client may initiate brief messages to associate with a low-power indoor access point or subordinate and establish a connection only after receiving a confirmation signal confirming that an AP is present and operating on a particular channel. After being associated, the indoor client can only initiate transmission with that access point. Indoor client devices (6XD) are prohibited from making a direct air interface connection to other clients.

An indoor client device must demonstrate via an attestation (see Appendix B, for example) that the device can only operate under the control of a low-power indoor access point or subordinate.

An indoor client device cannot have a direct connection to the internet[9].

FCC ID: E-labelling is permitted on devices qualifying for e-labelling.

Label information required in the exhibit types ID Label/Location Info:

- FCC ID

The device user manual must contain the following information. The user manual must be filed as an exhibit in the application filing .

- The operation of this device is prohibited on oil platforms, cars, trains, boats, and aircraft, except that operation of this device is permitted in large aircraft while flying above 10,000 feet.
- Operation of transmitters in the 5.925-7.125 GHz band is prohibited for control of or communications with unmanned aircraft systems.

3.4 Dual Client 6CD

6CD is an equipment class for a client device under the control of either a low power indoor access point or a standard power access point. Dual client devices must demonstrate operation under the respective requirements for low-power indoor and standard power access points.

A dual client device must demonstrate:

[8] A client/subordinate device cannot provide a direct connection to source the internet from a wired or direct connection to other devices over a 6 GHz air interface.

[9] Indoor client (6XD) devices are limited to indoor locations by 15.407(b)(3), stating that a client under control of an indoor access point or subcordate must be indoors and is limited to a maximum EIRP of 24 dBm power spectral density and must not exceed −1 dBm EIRP. in any 1-megahertz band-15.407(a)(8). A device that is an indoor (6XD) client that is also an AP just for configuring Wi-Fi network credentials is also an indoor access points (6ID) and filed with separate 731applications as a composite.

- When under control of a low power indoor access point or subordinate the device is restricted to the 5.925-7.125 GHz band and is limited to a maximum power of +24 dBm EIRP and a power spectral density limit of −1 dBm EIRP in any 1-megahertz band.
- When under control of a standard power access point the device is restricted to the 5.925-6.425 GHz and 6.525-6.875 GHz bands and its transmit power is limited to 6 dB below the standard power access point's transmit power authorized by the AFC not to exceed a limit of 30 dBm EIRP and a power spectral density limit of 17 dBm EIRP in any 1-megahertz band.

These devices must use a contention-based protocol (CBP) such as "listen before talk" that provides interference protection for incumbent services. The contention-based protocol can also allow multiple users to share the same spectrum among low-power indoor access points, subordinates, and clients. The contention-based protocol "listen before talk" must be demonstrated in the test report exhibits to the requirements of attachment D02 of this publication[10].

Applications for a dual client device must demonstrate via an attestation (see Appendix B for example) that the device operate under control of a low-power indoor access point, subordinate and standard access point. A dual client device cannot have a direct connection to the internet.

FCC ID: E-labelling is permitted on devices qualifying for e-labelling.

Label information required in the exhibit types ID Label/Location Info:

- FCC ID

The device user manual must contain the following information. The user manual must be filed as an exhibit in the application filing .

- The operation of this device is prohibited on oil platforms, cars, trains, boats, and aircraft, except that operation of this device is permitted in large aircraft while flying above 10,000 feet.
- Operation of transmitters in the 5.925-7.125 GHz band is prohibited for control of or communications with unmanned aircraft systems.

[10] The contention-based protocol applies to a dual client independent if it is associated with an indoor or standard access point. 15.407 (d)(6). Indoor access points, subordinate devices, and client devices operating in the 5.925-7.125 GHz band must also employ a contention-based protocol.

3.5 Summary of Application Requirements for indoor and dual client exhibits.

[N] .. [1],[2]…[15] identifies a note code in Table 8 for requirements for Form-731 Application, exhibits and information.		6ID	6PP	6XD	6CD	
					Indoor AP	Standard AP
Labelling and Manual						
[11]	Labelling: Indoor Only	X	X			
[12]	Manual: FCC regulations restrict the operation of this device to indoor use only. Operation prohibited on oil platforms, cars, trains, boats, and aircraft, except that operation of this device is permitted in large aircraft while flying above 10,000 feet	X	X			
[14]	Manual: Prohibited for control of or communications with unmanned aircraft systems	X	X	X	X	X
	Restrictions, Operation & Attestation					
[1]	Attestation: Indoor Access Point 6ID (Appendix B)	X				
[2]	Attestation: Indoor Client 6XD (Appendix B)			X		
[3]	Attestation: Indoor Subordinate 6PP (Appendix B)		X			
[4]	Attestation: Dual Client 6CD (Appendix B)				X	X
[15]	UNII Security	X	X	X	X	X
Demonstrate in Test report See D02						
[5]	Contention-Based Protocol.	X	X	X	X	X
[6]	Fundamental Maximum EIRP (dBm)	30	30	24	24	30 max & 6dB below Std. AP
[7]	Fundamental power spectral density in any 1-megahertz band. (dBm/MHz)	5	5	-1	-1	17 max & 6dB below AP
[8]	Fundamental bandwidth	<= 320 MHz				
[9]	Emissions outside of 6 GHz Band within any 1-megahertz band (EIRP).	-27 dBm				
[10]	Channel Mask	Compliance to DO2 Channel Mask				

Table 2 - Summary of Application Requirements for Indoor and Dual Client Exhibits

4. Standard Power Access Points and Associated Clients (6SD, 6FX, 6FC)

The operation of these devices (i.e., standard power APs and Fixed clients) are prohibited on oil platforms, cars, trains, boats, and aircraft.

Operation of transmitters in the 5.925-7.125 GHz band is prohibited for control of or communications with unmanned aircraft systems.

A Security description is required (15.407(i), Device Security) for all U-NII devices to protect against software modification by unauthorized parties (see KDB 789033).

Label information required in the exhibit types ID Label/Location Info FCC ID E-labelling is permitted on devices qualifying for e-labelling.

4.1 Standard Power Access Point (6SD)

Operates in the 5.925-6.425 GHz and 6.525-6.875 GHz bands.

Is managed by an Automated Frequency Coordination System.

A standard power access point must provide relevant information to an associated client so that the client can adjust its EIRP to no more than 6 dB lower that what is authorized by the AFC for the standard-power access point.

FCC ID: E-labelling is permitted on devices qualifying for e-labelling.

Label information required in the exhibit types ID Label/Location Info:

- FCC ID

The device user manual must contain the following information. The user manual must be filed as an exhibit in the application filing .

- The operation of this device is prohibited on oil platforms, cars, trains, boats, and aircraft.
- Operation of transmitters in the 5.925-7.125 GHz band is prohibited for control of or communications with unmanned aircraft systems.

Geolocation exhibits required see section 10 below.

EMC test reports guidance provided in 987594 D02 U-NII 6 GHz EMC Measurement

AFC DUT test harness guidance, provided in 987594 D05 Standard AP and Fixed Client Testing.

4.2 Standard Client Device (6FX)[11]

A device that only associates with a standard power access point.

FCC ID: E-labelling is permitted on devices qualifying for e-labelling.

Label information required in the exhibit types ID Label/Location Info:

[11] A standard client device (6FX) and a dual client device (6CD) differ from an indoor client device (6XD). The standard client device (6FX) and dual client device (6CD) devices need to demonstrate in the filing that they can auto-adapt their power under the control of a standard power access point (6SD). The indoor client device (6XD) device can only associate with an indoor access point (6ID) or subordinate (6PP). A dual client device (6CD) can associate with either an indoor access point (6ID), subordinate (6PP), or standard power access point (6SD), and when associated with a standard power access point (6SD), must adapt its power. See 15.407(a)(7). Any client device that is also an AP just for configuring Wi-Fi network credentials is also an indoor access points (6ID) and filed with separate 731 applications as a composite.

- FCC ID

The device user manual must contain the following information. The user manual must be filed as an exhibit in the application filing .

- The operation of this device is prohibited on oil platforms, cars, trains, boats, and aircraft.
- Operation of transmitters in the 5.925-7.125 GHz band is prohibited for control of or communications with unmanned aircraft systems.

A Standard Client Device client device cannot have a direct connection to the internet[9].

4.3.Fixed Client (6FC)

A device intended as customer premise equipment that is permanently attached to a structure, operates only on channels provided by an AFC, has a geolocation capability, complies with antenna pointing angle requirements, and can only connect with a standard power access point.

Operates in the 5.925-6.425 GHz and 6.525-6.875 GHz bands.

Is managed by an AFC and can connect with standard access points

A Fixed Client (6FC) client device cannot have a direct connection to the internet.

FCC ID: E-labelling is permitted on devices qualifying for e-labelling.

Label information required in the exhibit types ID Label/Location Info:

- FCC ID

The device user manual must contain the following information. The user manual must be filed as an exhibit in the application filing .

- The operation of this device is prohibited on oil platforms, cars, trains, boats, and aircraft.
- Operation of transmitters in the 5.925-7.125 GHz band is prohibited for control of or communications with unmanned aircraft systems.

Geolocation exhibits required see section 10 below.

EMC test reports guidance provided in 987594 D02 U-NII 6 GHz EMC Measurement

AFC DUT test harness guidance provided in 987594 D05 Standard AP and Fixed Client Testing

4.4 Summary of 6 GHz Application Requirements for (6SD, 6FC, 6FX)

[N] .. [6],[7]…[29] identifies a note code in Table 8 sections E for requirements for Form-731 Application, exhibits and information		6SD Standard Power Access Point	6FC Fixed Client	6FX Standard Client
	Labelling and Manual			
[13]	Manual: FCC regulations restrict the operation of this device on oil platforms, cars, trains, boats, and aircraft	X	X	X
[14]	Manual: Prohibited for control of or communications with unmanned aircraft systems	X	X	X
	Operation Descriptions and Attestations			
[15]	UNII Security – 15.407(i)	X	X	X
[25]	AFC Security – 15.407(k)(8)(v)	X	X	
[17]	Geolocation General Description	X	X	
[18]	Geolocation Justification Report	X	X	
[19]	Geolocation Accuracy After a power cycle (If applicable)	X	X	
[21]	Power cycle Re-authorization	X	X	
[23]	Daily contact with AFC & Grace Period	X	X	
[24]	Security of Connection to External Geolocation Source	X	X	
[22]	Network Element/ Proxy Ops Description if required (see D05)	X		
[27]	Attestation: Standard Power Access Point (Appendix B)	X		
[28]	Attestation: Fixed Client (Appendix B)		X	
[29]	Attestation: Standard Client (Appendix B)			X
	Demonstrate in Test report See D02 & D05			
[16]	AFC DUT test Harness Report D05	X	X	
[26]	Operates 6B below Standard Power AP D02			X
[6]	Fundamental Maximum EIRP (dBm)	36 dBm	36 dBm	30 max & 6dB below Std. AP
[7]	Fundamental power spectral density in any 1-megahertz band. (dBm/MHz) D02	23 dBm EIRP in any 1-megahertz band.		17 max & 6dB below AP
[20]	Maximum EIRP above 30 degrees D02	125 mW (21 dBm).		
[8]	Fundamental bandwidth	<= 320 MHz		
[9]	Emissions outside of 6 GHz Band within any 1-megahertz band (EIRP). D02	-27 dBm		
[10]	Channel Mask D02	Compliance to Channel Mask		

Table 3 - Summary of Application Requirements for (6SD, 6FC, 6FX)

5. Multiple Rule Parts (Composite devices)

6 GHz devices can be authorized under multiple rule parts. Either as an initial application or after an initial application. 6 GHz equipment classes can only be added after an initial application under the same FCC ID[12] using only software changes. This is not done as a C2PC[13].,but as an initial application under the same FCC ID.

If the original application was approved as a Software Defined Radio (SDR) the new equipment classes should be submitted as Class III permissive changes.

6. Application Restrictions.

Products that are certified in the 6 GHz U-NII bands as Low-power indoor access points (6ID) and subordinate (6PP) devices have restrictions that apply to the entire Product's Form Factor (PFF), i.e., cannot have an outdoor weatherized enclosure, must have an integrated antenna, cannot operate on battery power, include a product label "indoor use only" and instruct the users the product cannot be used outdoors and restricted operation. For example, a product that contains certifications for equipment classes 6ID and/or 6PP and DTS and NII in 2.4 bands and U-NII bands 1, 2A, 2C, 3, and 4 is restricted to an indoor PFF.

The grantee shall clearly describe how each restriction is ensured and indexed by the rule part in the operational description and user manual.

The table below is an example of various options for a composite device under one FCC ID.

Composite	Low-power indoor AP	Subordinate device	Client Indoor Only	Dual Client	Standard AP	Standard Client	Fixed Client	DTS,NII Other
Equipment Class	6ID	6PP	6XD	6CD	6SD*	6FX	6FC*	DTS/NII
Product 1	X	X			X			X
	PFF	PFF			PFF			PFF
Product 2				X	X	X	X	X

- * AFC Managed
- PFF : cannot have a weatherized enclosure, have an integrated antenna, no ability to operate on battery power, and must include a product label "indoor only"

Table 4 - Composites

Product 1 is restricted to a form factor that cannot have a weatherized enclosure, must have an integrated antenna, not operate on battery power, and must include a product label "indoor only". However product 2 is not limited in form factor.

[12] Many 6 GHz devices will be composite devices. Composite devices have two meanings: (1) A Form 731 composite refers to a filing for multiple equipment classes certified under one FCC ID. (2) The second meaning, under §2.947(f) Measurement procedure, refers to the compliance responsibilities under multiple rules, including transmitters and unintentional radiators under part 15B under SDoC and Certification.

[13] A TCB may do this without FCC intervention if the approved device is already a Form 731 composite device. If the approved device is not a Form 731 composite device and the initial grant is more than 30 days old the TCB must submit a KDB inquiry for staff to determine the appropriate procedure.

7. Modules

Except for subordinate devices, all equipment classes are permitted to be a module under Sec. 15.212. Furthermore, different modules can be a composite under one FCC ID as indicated above.

Composite device	Low-power indoor AP	Subordinate device	Client Indoor Only	Dual Client	Standard power AP	Standard Client	Fixed Client
	6ID	6PP	6XD	6CD	6SD	6FX	6FC
Module permitted	Yes	No[14]	Yes	Yes	Yes	Yes	Yes

Table 5 – Modules

No host controls, configuration settings (selections, scripts interface protocol) can be used in setting, configuring, or adjusting the air interface RF emission parameters to meet the grant conditions. The module must demonstrate in the filing that the full compliance as a stand-alone module independent of any host. The restrictions for modifying or controlling these parameters include the host manufacturer or any third party under the U-NII security restrictions.

The manufacturer may demonstrate an alternative method[15] specific to a host, host agreement, or contract and qualify as a limited module.

For requirements such as labeling, indoor use, power, restrictions, etc., a module grantee must extend these requirements to the host manufacturer through the integration instructions (see Publication KBB 996369 D03). Integration instructions shall be in sufficient detail so that the host manufacturer is obligated to adhere to these requirements and restrictions as a condition for using the module's certification.

[14] A subordinate device may not be certified as a module (15.403).

[15] Depending on the proposed method, when a module cannot demonstrate compliance in a standalone mode independent of a host, this will require shared host responsibility between the host responsible party and the module Grantee, with a C2PC for each host or host type.

8.0 Overall Summary

Type	Eq Class		U-NII Bands				Contention Based Protocol	Under control of	Antenna Restriction	Max EIRP (dBm)	APC 6 dB Below AP	Module	Re-strictions Notes
			5	6	7	8							
Low-power indoor access point	6ID	Indoor	X	X	X	X	X	NA	Integral	30	NA	X	a c d i
Subordinate	6PP	Indoor	X	X	X	X	X	Indoor AP 6ID By Attestation	Integral	30	NA	Not Permitted	a c d e g i k
Indoor Client	6XD	Indoor	X	X	X	X	X	Indoor AP 6ID By Attestation	15.203	24	NA	X	a e g i j
Dual Client	6CD	Indoor	X	X	X	X	X	Indoor AP 6ID By Attestation	15.203	24	NA	X	a e g i j
		Indoor/Outdoor	X		X		NA	Standard AP 6SD By Attestation		30	Yes		a e h i j
Standard Power Access Point	6SD	Indoor/Outdoor	X		X		NA	AFC	15.203	36	NA	X	a b i
Standard Client	6FX	Indoor/Outdoor	X		X		NA	Standard AP 6SD	15.203	30	Yes	X	a e h j
Fixed Client	6FC	Indoor/Outdoor	X		X		NA	Standard AP 6SD/AFC	15.203	36	NA	X	a b e f h j i

Restriction Notes: a. Prohibited for control of or communications with unmanned aircraft systems. b. Prohibited on oil platforms, cars, trains, boats, and aircraft, c. Prohibited on oil platforms, cars, trains, boats, and small aircraft, and large aircraft under 10,000 feet. d. Indoor only, powered by wired connection, has an integrated antenna, is not battery powered, and does not have a weatherized enclosure e. No direct internet connection permitted. f. Limited for installation on fixed infrastructures. g. limited to indoor use by low-power indoor access point association. h. limited to operation through association with standard power access point. i. Attestation Required j. Under the control of an access point and is not capable of initiating a network k. Modules not permitted

Table 6 - Overall Summary

9. RF Exposure

Per Sec. 15.407(f), application filings for all U-NII devices must address RF exposure compliance in accordance with KDB Pub. 447498 and other KDB publications referenced therein. For U-NII 6-7 GHz band portable devices (subject to MPE power density limits, not SAR limits), until specific additional exposure evaluation guidance is published by FCC, applicants and test labs must submit a KDB inquiry for review of the RF exposure evaluation plan before completing testing and submitting to a TCB, consistent with KDB Pub. 388624 PAG requirements.

10. Geolocation approval procedure for Standard power access points (6SD) and fixed client (6FX)

10.1 Automated Frequency Coordination (AFC) Database.

Standard power access point (6SD) and fixed client (6FX ***)*** devices need to connect to an FCC-approved[16] Automated Frequency Coordination (AFC) Database for authorization[17] to transmit on any frequency in the 5.925-6.425 GHz and 6.525-6.875 GHz bands and at a power level based on geolocation coordinates and area provided to the AFC by that device. The authorization is required whenever the device is initially activated, relocated, and, at a minimum, at least once a day. The authentication protocol [18] includes the devices credentials, granted FCC ID, geographic coordinates and location uncertainty (in meters), with a confidence level of 95%[19]. The AFC responds back with available frequencies and permitted power for the requested operation for that geolocation area requested. In addition 6SD and 6FX devices shall seek re-authorization with the AFC to re-obtain operating parameters after a power on-off-on cycle with an exception for devices that use Geolocation Accuracy after Power Cycle (see section 10.2.3) that shall be approved through a Persistent Inquiry Approval (PIA) Procedure (see section 10.3).

[16] AFC Approval is not an equipment authorization certification procedure under Part 2 Subpart J of CFR Title 47 of the rules and is not the subject of this publication. Wi-Fi Alliance defines specifications. See DA/FCC #: DA-22-1146, Docket/RM: 21-352. Available at https://www.fcc.gov/edocs.

[17] AFC Authorization protocol Specifications are available from https://www.wi-fi.org/ Wi-Fi Alliance searching for AFC. Available packages for 6 GHz are: AFC Test Harness Software License Agreement, AFC Test Harness Package, AFC Specification and Test Plans, Global Regulatory and AFC Update - June 2021

[18] Protocol between the AFC and a device is specified in "AFC System to AFC Device Interface Specification," available from Wi-Fi Alliance.

[19] Uncertainty of the requested coverage area with a 95% confidence (or 95.4%) for location and Point objects required to be provided by 6SD and 6FX devices in the device to AFC spectrum inquiry request message is specified in Wi-Fi Alliance AFC Device Interface Specification.

Standard power access point (6SD) and fixed client (6FX) must confirm their operating frequency and power with the AFC at least one time per day. In case of failure to contact the AFC or no response from the AFC[20], the standard power access point (6SD) and fixed client (6FX) devices shall cease operation[21] by 11:59 p.m. the following day. The devices may resume transmissions only after reestablishing contact with the AFC system and receiving information for permitted frequencies and power levels.

10.2 Exhibits for 731 filing

6SD and 6FX devices require the following 731 exhibits: a Geolocation General Description, a Geolocation Justification Report, and, if applicable, a Geolocation Accuracy after Power Cycle description. See sections 10.2.1, 10.2.2, and 10.2.3 below. These 731 exhibits can be pre-approved by the commission using a one-time procedure described in section 10.3 below and referred to as a Persistent Inquiry Approval (PIA) procedure.

10.2.1 Geolocation General Description

A general description shall provide an overview of the geolocation system. This document shall be written for a general public knowledge level without referring to the technical details of GPS communications and the details that justified the 95% confidence level claim. The document shall provide:

- A general overview of the method used by the 6SD and 6FX for either an internal geolocation capability or a secured connection to an external geolocation device or service, to automatically[22] determine the standard power access point's geographic coordinates and location uncertainty with a confidence level of 95%.
- Attestation confirming the location uncertainty with a 95% confidence level.
- State that daily AFC confirmation will be performed, and after a power cycle operation (either AFC re-authorization or if applicable the approved “Geolocation Accuracy after a Power Cycle” operation).

This description shall be filed as a 731 exhibit in the attestation folder. Short-term or long-term confidentiality is not permitted.

10.2.2 Geolocation Justification Report

A justification report is required to support that devices meet the location uncertainty with a confidence level of 95% . This document is filed in the operational description folder and when the Grantee manages this information as confidential the Geolocation Justification Report may be held as a long-term confidential 731 exhibit, as permitted by CFR 47 §§ 0.457(d) and 0.459 of the FCC Rules (see KDB 726920).

This document must demonstrate the testing method and calculations used to justify the location uncertainty with 95% confidence level claim, e.g., via testing and statistical data. This report is expected to contain the following:

- An overview of the geolocation system identifying all significant sections and components with block diagrams. The information shall identify any independent GPS not part of the device certification (such as handsets, tablets, etc.). Details are required about GPS chip manufacturers and antenna information (including gain) for GPS reception.
- A description is required to explain how the 95% confidence level claim is justified. Since each manufacturer may have different methods, this description has no hard and fast set of

[20] Failure to contact the AFC or no response does not include a power cycle event. After a power cycle see 10.2.3 Geolocation Accuracy After a Power Cycle.
[21] 47 CFR 15.407(k)(8)(iv)
[22] 47 CFR 15.407(k)(9)(i) geolocation capability must be automatic. Manual keying geolocation as an entry is not permitted.

requirements. We expect the narrative to include sample sizes, different installation environments, locations, variations when different or independent subsystems are used, test setup, accuracy of survey markers or bench systems, and other relevant factors that effect the accuracy.

- A list or graph of the data utilized to determine the confidence interval.
- Explain how the confidence interval area is established for any particular device.
- For independent GPS devices[23], describe how many different manufacturers, models, and types of devices were used and what factors were used to determine the geolocation being reported to the AFC.
- A description of the security features (i.e., how end users are prevented from bypassing the AFC protocol).
- Describe how height is determined and entered[24].

10.2.3 Geolocation Accuracy After a Power Cycle

A power cycle[25] occurs when a device is moved, or a temporary power failure. Some devices can automatically determine their location and re-authenticate with the AFC to reestablish operations These devices do require a Power cycle re-authorization test[26] in the test report when geolocation is automatically acquired after power failure [21][27].

There may be other devices that do not automatically obtain geolocation information and rely upon operator intervention. If these devices have built-in mechanisms that can detect that it has not moved during a temporary power failure, then a Geolocation Accuracy After a Power Cycle description exhibit shall be submitted as a PIA[19][28]. The Geolocation Accuracy after a Power Cycle exhibit shall describe the method used to determine that the device has not been moved.

If approved, then that device could continue to operate based on the AFC authorization provided before the temporary power failure. The device is limited to a temporary power failure event by the once-a-day confirmation schedule established with the AFC before the power failure. The device shall maintains its daily schedule and accuracy through any temporary power failure . The Geolocation Accuracy After a Power Cycle description shall state that the method does not affect the 95% confidence requirement.

[23] Independent systems are devices such as handsets and tablets with separate GPS instruments that are not part of the certified equipment but are required for the 6SD and 6FX devices to automatically determine their geolocation and area.
[24] Elevation/height objects provided by 6SD and 6FX devices, in the spectrum inquiry request message as specified in Wi-Fi Alliance AFC Device Interface Specification.
[25] Power cycle is when the power source cycles from on to off to on.
[26] Power cycle re-authorization test [21] is different from Geolocation Accuracy after a Power Cycle[19].
[27] [21] refers to required attestation for operation during power cycle in the 731, see Table 8 – Note Code References
[28] [19] refers to the Geolocation Accuracy after a Power Cycle exhibit in the 731, see Table 8 – Note Code References

10.3 Persistent Inquiry Approval (PIA) Procedure

Persistent Inquiry Approval (PIA)[29] is an equipment authorization inquiry procedure. It is used to allow the commission to review the Geolocation General Description, a Geolocation Justification Report, and, if applicable, a Geolocation Accuracy after Power Cycle description. This inquiry will require the first category to be " Equipment Authorization" and the second category "Geolocation".

Once reviewed under this procedure, 731 applications for (6SD) and (6FX) devices can be permitted to submit the same PIA descriptions[30] as 731 exhibits[31] for Certification to demonstrate compliance which will be considered reviewed and permitted under the original PIA procedure.

- The inquiry is used for reviewing a manufacturer's claim for geolocation. It is recommended to be submitted by the Grantee[32] seeking approval.
- Although not recommended, if a Grantee choses to have a test laboratory or TCB submit a PIA, it shall also include a signed letter from the Grantee giving that laboratory or TCB authority to seek approval on their behalf.
- The PIA is not a Commission approval of the accuracy of the data presented. It is a technical testament by the Grantee to meet the geographic coordinates and location uncertainty (in meters), with a confidence level of 95%, or the geolocation accuracy after a power cycle.
- The PIA itself (copy of actual KDB inquiry), shall be included in the Geolocation Justification Report to allow the TCB/Commission to confirm the original PIA approval.
- The PIA is not public, and the 731 exhibits Geolocation Justification Report and Geolocation Accuracy after Power Cycle description may be submitted as long term confidential exhibits.
- The TCB submitting the 731 application shall ensure that the exhibits are supplied and that the Geolocation Justification Report contains the PIA inquiry tracking number.
- If the TCB chooses or suspects that the tracking number is not correct or legitimate, they should submit a separate inquiry to confirm the PIA tracking number.
- Changes to the geolocation or power cycle methods require a new PIA exhibits. These can be submitted as Class II or III permissive changes for any device initially approved under an initial PIA filling. The new PIA when approved shall provide a descriptions to clearly explain how the different PIA approaches are managed for the same FCC ID.
- A new and separate and complete PIA is required for different Grantees, including a change in ID.
- Filing the required documents with each application for certification for a standard power access point (6SD) or a fixed client (6FX) provides the affirmation that the device complies with the geolocation confidence required by 47 CFR 15.407(k)(9)(i).

---

[29] PIA is not a Pre-Approval Guidance (PAG Publication Number: 388624). A PIA does not mean a PAG is or is not still required. It is an inquiry and is recommended that the Grantee submits the PIA. It is recommended since the Grantee is responsible for its geolocation accuracy and power cycle operation. Any misunderstandings between a third party and the commission will not alleviate the Grantee's responsibility for its accuracy.

[30] The term" PIA descriptions " refers to the Geolocation General Description, a Geolocation Justification Report, and, if applicable, a Geolocation Accuracy after Power Cycle description submitted in the inquiry for the initial Inquiry and reviewed by the Commission.

[31] "731 exhibits" when referenced in this Section, refers to the 731 exhibits submitted to the Equipment Authorization System for Certification. The "731 exhibits" shall be the same information as the "PIA descriptions."

[32] Submit a KDB inquiry at htttp://www.fcc.gov/labhelp

Appendix A
Exhibits Reference Guide

The table "Exhibits Reference Guide" below provides a Reference Guide for uploading exhibits for U-NII 6 GHz applications. The "Y" Indicates exhibits that are required, and the notes number[33] [N] provides additional guidance related to a U-NII 6 GHz applications.

The test laboratory and TCB Scope are A4- U-NII Devices & low-power transmitters using spread spectrum techniques for all equipment classes.

The frequency range for Form 731 and listed on the grant shall be the contiguous frequency span of operation as authorized for that equipment class from the channel center frequency of the lowest-frequency channel to the channel center frequency highest-frequency channel. 99% of the occupied bandwidth must be contained within all the U-NII sub-bands authorized for that equipment class.

Exhibit Type	Application Type	LPI AP	Subordinate device	LPI Client	Dual Client	Std pwr AP	Std pwr Client	Fixed Client
		6ID	6PP	6XD	6CD	6SD	6FX	6FC
ID Label/Location	Original Equipment	Y[11]	Y[11]	Y	Y	Y	Y	Y
	Change in ID	Y[11]	Y[11]	Y	Y	Y	Y	Y
	Class II PC							
	Class III PC							

Exhibit Type	Application Type	LPI AP	Subordinate	Client indoor	Dual Client	Std AP	Client	Fixed Client
		6ID	6PP	6XD	6CD	6SD	6FX	6FC
Attestation	Original Equipment	Y [1]	Y[3]	Y [2]	Y [4]	Y [17] [21] [23] [24] [27]	Y[29]	Y [17][21][23] [24][28]
	Change in ID							
	Class II PC							
	Class III PC							

[33] The "Y[N]" denotes information associated with this guidance. "Y" without a number indicates exhibits required but are not the subject of this publication. A blank space means an exhibit may or may not be necessary for other reasons, not the topic for this publication. For example, portable devices requiring RF exposure evaluation and or testing of handsets requiring Hearing Aid Compatibility are not the subject of this publication, but exhibits are required.

Exhibit Type	Application Type	LPI AP	Subordinate	Client indoor	Dual Client	Std AP	Client	Fixed Client
		6ID	6PP	6XD	6CD	6SD	6FX	6FC
External Photos	Original Equipment	Y	Y	Y	Y	Y	Y	Y
	Change in ID	Y	Y	Y	Y	Y	Y	Y
	Class II PC							
	Class III PC							

Exhibit Type	Application Type	LPI AP	Subordinate	Client indoor	Dual Client	Std AP	Client	Fixed Client
		6ID	6PP	6XD	6CD	6SD	6FX	6FC
Block Diagram	Original Equipment	Y	Y	Y	Y	Y	Y	Y
	Change in ID							
	Class II PC							
	Class III PC							

Exhibit Type	Application Type	LPI AP	Subordinate	Client indoor	Dual Client	Std AP	Client	Fixed Client
		6ID	6PP	6XD	6CD	6SD	6FX	6FC
Schematics	Original Equipment	Y	Y	Y	Y	Y	Y	Y
	Change in ID							
	Class II PC							
	Class III PC							

Exhibit Type	Application Type	LPI AP	Subordinate	Client indoor	Dual Client	Std AP	Client	Fixed Client
		6ID	6PP	6XD	6CD	6SD	6FX	6FC
Test Reports	Original Equipment	Y[5] to [10]	Y[5] to [10]	Y[5] to [10]	Y[5] to [10]	Y[6] to [10] [16] [20]	Y[6] to [10] [26]	Y[6] to [10] [16] [20]
	Change in ID							
	Class II PC							
	Class III PC	Y	Y	Y	Y	Y	Y	Y

Exhibit Type	Application Type	LPI AP	Subordinate	Client indoor	Dual Client	Std AP	Client	Fixed Client
		6ID	6PP	6XD	6CD	6SD	6FX	6FC
Test Set UP Photos	Original Equipment	Y	Y	Y	Y	Y	Y	Y
	Change in ID							
	Class II PC							
	Class III PC							

Exhibit Type	Application Type	LPI AP	Subordinate	Client indoor	Dual Client	Std AP	Client	Fixed Client
		6ID	6PP	6XD	6CD	6SD	6FX	6FC
Internal Photos	Original Equipment	Y	Y	Y	Y	Y	Y	Y
	Change in ID							
	Class II PC							
	Class III PC							

Exhibit Type	Application Type	LPI AP	Subordinate	Client indoor	Dual Client	Std AP	Client	Fixed Client
		6ID	6PP	6XD	6CD	6SD	6FX	6FC
Parts List/Tune Up Info	Original Equipment							
	Change in ID							
	Class II PC							
	Class III PC							

Exhibit Type	Application Type	LPI AP	Subordinate	Client indoor	Dual Client	Std AP	Client	Fixed Client
		6ID	6PP	6XD	6CD	6SD	6FX	6FC
User Manual	Original Equipment	Y[12] [14]	Y[12] [14]	Y[12] [14]	Y [13] [14]	Y[13] [14]	Y[13] [14]	Y[13][14]
	Change in ID	Y[12] [14]	Y[12] [14]	Y[12] [14]	Y[13] [14]	Y[13] [14]	Y[14]	Y[13][14]
	Class II PC							
	Class III PC							

Exhibit Type	Application Type	LPI AP	Subordinate	Client indoor	Dual Client	Std AP	Std Client	Fixed Client
		6ID	6PP	6XD	6CD	6SD	6FX	6FC
RF Exposure	Original Equipment							
	Change in ID							
	Class II PC							
	Class III PC							
Exhibit Type	Application Type	LPI AP	Subordinate	Client indoor	Dual Client	Std AP	Std Client	Fixed Client
		6ID	6PP	6XD	6CD	6SD	6FX	6FC
Operational Description	Original Equipment	Y	Y	Y	Y	Y[18] [19] [22]	Y	Y [18] 19]
	Change in ID							
	Class II PC							
	Class III PC	Y	Y	Y	Y			

Exhibit Type	Application Type	LPI AP	Subordinate	Client indoor	Dual Client	Std AP	Std Client	Fixed Client
		6ID	6PP	6XD	6CD	6SD	6FX	6FC
Cover Letter	Original Equipment							
	Change in ID	Y	Y	Y	Y	Y	Y	Y
	Class II PC	Y	Y	Y	Y	Y	Y	Y
	Class III PC	Y	Y	Y	Y	Y	Y	Y

Exhibit Type	Application Type	LPI AP	Subordinate	Client indoor	Dual Client	Std AP	Std Client	Fixed Client
		6ID	6PP	6XD	6CD	6SD	6FX	6FC
SDR Software/ Security Info	Original Equipment	Y[15]	Y[15]	Y[15]	Y[15]	Y[15]	Y[15]	Y[15]
	Change in ID	Y[15]	Y[15]	Y[15]	Y[15]	Y[15] [25]	Y[15]	Y[15][25]
	Class II PC							
	Class III PC	Y	Y	Y	Y			

Table 7 - Exhibits Reference Guide

Notes		LPI AP	Subordinate	Client indoor	Dual Client	Std AP	Std Client	Fixed Client
		6ID	6PP	6XD	6CD	6SD	6FX	6FC
[1]	Attestations: Indoor Access Point 6ID Appendix B	X						
[2]	Attestations: Indoor Client 6XD (Appendix B)			X				
[3]	Attestations: Indoor Subordinate 6PP (Appendix B)		X					
[4]	Attestations: Dual Client 6CD (Appendix B)				X			
[5]	Contention-based protocol.	X	X	X	X			
[6]	Fundamental Maximum EIRP (dBm).	X	X	X	X	X	X	X
[7]	Fundamental power spectral density in any 1-megahertz band. (dBm/MHz).	X	X	X	X	X	X	X
[8]	Fundamental bandwidth	X	X	X	X	X	X	X
[9]	Emissions outside of 6 GHz Band any 1-megahertz band (EIRP).	X	X	X	X	X	X	X
[10]	Channel Mask.	X	X	X	X	X	X	X
[11]	Labelling: Indoor Only	X	X					
[12]	Manual: FCC regulations restrict the operation of this device to indoor use only. Operation prohibited on oil platforms, cars, trains, boats, and aircraft, except that operation of this device is permitted in large aircraft while flying above 10,000 feet.	X	X					
[13]	Manual: FCC regulations restrict the operation of this device on oil platforms, cars, trains, boats and aircraft.					X		X
[14]	Manual: Prohibited for control of or communications with unmanned aircraft systems	X	X	X	X	X	X	X
[15]	UNII Security	X	X	X	X	X	X	X
[16]	DUT Test harness Report					X		X

Notes		LPI AP	Subordinate	Client indoor	Dual Client	Std AP	Std Client	Fixed Client
		6ID	6PP	6XD	6CD	6SD	6FX	6FC
[17]	Geolocation General Description					X		X
[18]	Geolocation Justification Report					X		X
[19]	Geolocation Accuracy After a power cycle: If applicable					X		X
[20]	Measurement of emission at elevation angles higher than 30° from horizon					X		X
[21]	Power cycle re-authorization test when geolocation is automatically acquired after power failure					X		X
[22]	Network Element/ Proxy Ops Description if required see D05.					X		
[23]	Daily contact with AFC & Grace Period					X		X
[24]	Security of Connection to External Geolocation Source					X		X
[25]	AFC Security					X		X
[26]	Operates 6dB below Standard Power AP				X		X	
[27]	Attestations: Standard Power AP 6SD (Appendix B)							
[28]	Attestations: Fixed Client 6FC (Appendix B)							
[29]	Attestation: Standard Client 6FX (Appendix B)							

Table 8 – Note Code References

Appendix B
Attestation Example

We, Grantees Name, attest that this device under FCC ID XXX complies with device protocol requirements and operational restrictions: for (all that apply - indoor client 6XD, subordinate 6PP, Dual Client 6CD).

Note for Modules:

- Device protocol attestation and contention-based protocol apply to functions permanently embedded in the module and cannot be host-dependent. Otherwise, the module must be restricted and filed as a Software Defined Radio or with joint responsibility agreements.
- Device Restriction statements: We, the grantee, will document the physical restrictions associated with the equipment classes for host products (wired power, integral antenna, non-weatherized enclosure) as conditions-of-use through the host manufacture's integration instructions.

Indoor Access Point 6ID:

1. Device Protocol Attestation Statement:
    a. Statement for modules only: Contention-Based Protocol, as demonstrated in the test report, is permanently embedded in the module and is not host-dependent.
    b. Statement describing the method the indoor access point uses to control the associated client/subordinate power control.
2. Statement acknowledging device restrictions:
    a. Low-power indoor Access Point. Access Point operating in the 5.925-7.125 GHz band shall be supplied power from a wired connection, has an integrated antenna, is not battery-powered, and does not have a weatherized enclosure.
    b. This device's operation will not be allowed on oil platforms, cars, trains, boats, and aircraft, except that operation of this device is permitted in large aircraft while flying above 10,000 feet only in the 5.925-6.425 GHz band.
    c. Indoor access points are prohibited for control of or communications with unmanned aircraft systems, including drones.

Indoor Client 6XD:

1. Device Protocol Attestation Statement:
    a. Statement for modules only: Contention-Based Protocol, as demonstrated in the test report, is permanently embedded in the module and is not host-dependent.
    b. Statement that the device will only associate and connect with a low-power indoor access point or subordinate device and never directly connect to other client devices.
    c. Statement that this device will always initiate transmission under the control of a low-power indoor AP or subordinate except for brief transmissions before joining a network. These short messages will only occur if the client has detected an indoor AP or subordinate operating on a channel. These brief messages will have a time-out mechanism such that if it does not receive a response from an AP it will not continually repeat the request.
    d. Statement that transmissions will be lower or equal to the power advertised by the indoor low-power access point or subordinate and never above the maximum output power allowed by the FCC grant for equipment class 6XD.
    e. Statement for modules only: Contention-based protocol as demonstrated in the test report is permanently embedded in the module and is not host-dependent.

2. Understanding of Statement acknowledging device restrictions:
    a. Prohibited for control of or communications with unmanned aircraft systems, including drones.

Indoor Subordinate 6PP:

1. Device Protocol Attestation Statement:
    a. Statement for modules only: Contention-Based Protocol, as demonstrated in the test report, is permanently embedded in the module and is not host-dependent.
    b. Statement that this device will always be under the control of a low-power indoor AP and will only initiate brief messages to be under the control of an indoor low-power AP. These brief messages will only occur if the subordinate has detected a low-power indoor AP operating on a channel. These brief messages will have a time-out mechanism such that if it does not receive a response from an AP it will not continually repeat the request.
    c. Statement that once under control of an indoor access point, a subordinate will initiate connections with clients, other access points, or other subordinate devices at a lower power or equal to the power advertised by the access point controlling the subordinate and never above the maximum output power allowed by the FCC grant for equipment class 6PP.
    d. Statement describing the method the subordinate uses to inform the associated client/subordinate of its permitted maximum power.
    e. Statement for modules only: Contention-based protocol demonstrated in the test report is permanently embedded in the module and is not a host-dependent.
2. Statement acknowledging device restrictions:
    a. Indoor Access Point. This Access Point operates in the 5.925-7.125 GHz band. It is supplied power from a wired connection, has an integrated antenna, is not battery-powered, and does not have a weatherized enclosure.
    b. The operation of this device will not be allowed on oil platforms, cars, trains, boats, and aircraft, except that this device's operation is permitted in large aircraft while flying above 10,000 feet.
    c. Prohibited for control of or communications with unmanned aircraft systems, including drones.
    d. Has no direct connection to the internet.

Dual Client 6CD:

1. Device Protocol Attestation Statement:
    a. That this device will only associate and connect with a low-power indoor Access Point, subordinate device, or standard access point and never directly link to any other client devices.
    b. Statement that this device will always initiate transmission under the control of a low-power indoor AP, subordinate or standard client except for brief communications before joining a network. These quick messages will only occur if the client has detected an indoor AP, subordinate, or standard access point operating on a channel. These brief messages will have a time-out mechanism such that if it does not receive a response from an AP it will not continually repeat the request.
    c. Statement that this device, when associated and connected with a low-power indoor access point, subordinate or standard access point device, will operate at a power lower as advertised by the indoor access point, subordinate, or standard access point:
        i. lower or equal to the power advertised by the low-power indoor access point or subordinate and never above the maximum output power allowed by the FCC grant for clients associated with indoor clients or subordinates.
        ii. lower than or 6 dB below the power advertised by the standard access point.

d. Statement for modules only: Contention-based protocol as demonstrated in the test report is permanently embedded in the module and is not host-dependent based protocol demonstrated in the test report.

2. Statement acknowledging device restrictions:
   a. Prohibited for control of or communications with unmanned aircraft systems, including drones.

Standard Power Access Point 6SD:

1. Device Protocol Attestation Statement:
   a. Statement this device will contact an AFC system at least once per day to obtain the latest list of available frequencies and the maximum permissible power the standard power device may operate with on each frequency at the standard power device's location. If the device fails to successfully contact the AFC system during any given day, the standard device may continue to operate until 11:59 p.m. of the following day at which time it will cease operations until it re-establishes contact with the AFC system and re-verifies its list of available frequencies and associated power levels - 15.407(k)(8)(iv)
   b. Statement this device will automatically acquire geolocation and re-register with AFC to obtain frequency and power values after a power cycle
   c. Statement this device if using an external geolocation source will be connected to the standard power device using a secure connection that ensures that only an external geolocation source approved for use with a standard power device provides geographic coordinates to that standard power device. Alternatively, an extender cable may be used to connect a remote receive antenna to a geolocation receiver within a standard power device.
2. Statement Acknowledging device restrictions:
   a. Prohibited for control of or communications with unmanned aircraft systems, including drones.

Fixed Client 6FC:

1. Device Protocol Attestation Statement:
   a. Statement this device will contact an AFC system at least once per day to obtain the latest list of available frequencies and the maximum permissible power the standard power device may operate with on each frequency at the standard power device's location. If the device fails to successfully contact the AFC system during any given day, the standard device may continue to operate until 11:59 p.m. of the following day at which time it will cease operations until it re-establishes contact with the AFC system and re-verifies its list of available frequencies and associated power levels - 15.407(k)(8)(iv)
   b. Statement this device will automatically acquire geolocation and re-register with AFC to obtain frequency and power values after a power cycle
   c. Statement this device if using an external geolocation source will be connected to the standard power device using a secure connection that ensures that only an external geolocation source approved for use with a standard power device provides geographic coordinates to that standard power device. Alternatively, an extender cable may be used to connect a remote receive antenna to a geolocation receiver within a standard power device.
2. Statement acknowledging device restrictions:
   b. Prohibited for control of or communications with unmanned aircraft systems, including drones.

Standard Client 6FX:

1. Device Protocol Attestation Statement:
    a. Statement that this device will only associate and connect with a Standard Power Access Point and never directly link to any other client devices.
    b. Statement that this device will always initiate transmission under the control of a Standard Power Access Point except for brief communications before joining a network. These quick messages will only occur if the client has detected a Standard Power Access Point operating on a channel. These brief messages will have a time-out mechanism such that if it does not receive a response from an AP it will not continually repeat the request.
    c. Statement that this device, when associated and connected with a Standard Power Access Point, will operate at a power level as described:
        i. lower or equal to the maximum output power allowed by the FCC
        ii. At least 6 dB below the power of the Standard Power Access Point.
2. Statement acknowledging device restrictions:
    a. Prohibited for control of or communications with unmanned aircraft systems, including drones.

Change Notice:

12/16/2020: 987594 D01 U-NII 6GHz General Requirements v01r01 replaces 987594 D01 U-NII 6GHz General Requirements v01 to correct Table 6. The previous version v01 erroneously indicated that indoor and dual clients required an integral Antenna. It was updated to display, along with other devices, that 15.203 applies.

2/04/2021: 987594 D01 U-NII 6GHz General Requirements v01r02 replaces 987594 D01 U-NII 6GHz General Requirements v01r01 to update Appendix A Exhibits Reference Guide.

05/20/2021: 987594 D01 U-NII 6GHz General Requirements v01r03 replaces 987594 D01 U-NII 6GHz General Requirements v01r02 to update Appendix A Exhibits Reference Guide. Note 13 for Dual Client 6CD was removed because it was noted in error.

05/24/2021: 987594 D01 U-NII 6GHz General Requirements v01r04 replaces 987594 D01 U-NII 6GHz General Requirements v01r03. Table 1 typo correction, 14.407 (a) (3) was corrected to 15.407(a)(3) for U-NII 3 band 5.725-5.85.

XX/dd/2023: 987594 D01 U-NII 6GHz General Requirements v02 replaces 987594 D01 U-NII 6GHz General Requirements v01r03. Phase 2 restriction removed ….Table 5 removed and Table 6 is now table 5

Attachment 987594 D02 U-NII 6 GHz EMC Measurement v02

Month XX, 2023

Federal Communications Commission
Office of Engineering and Technology
Laboratory Division

GUIDELINES FOR COMPLIANCE TESTING OF UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE 6 GHz (U-NII) DEVICES PART 15, SUBPART E

I. INTRODUCTION

This document provides guidance for determining 6 GHz U-NII device emissions compliance under Part 15, Subpart E of the FCC rules.

This document includes acceptable procedures for measuring emission bandwidth, maximum conducted output power, power spectral density, and unwanted emissions both in and out of the restricted bands, in-band emissions and contention-based protocol. For equipment under test (EUT) that can transmit on multiple outputs simultaneously (e.g., MIMO or beamforming devices), see KDB Publication 662911 for additional guidance.

All EUT operating modes and data rates must satisfy all requirements. The operating mode and data rate that is the worst case for one test may not be the worst case for another test. Data rate settings may have a significant effect on test results.

Note that average emission measurements in the restricted bands are based on continuous transmission by the U-NII device during the measurement interval. Downward adjustment of test data based on actual operational duty cycle of the device is not permitted.

II. MEASUREMENT PROCEDURES

A. General Guidance

Refer to KDB 789033

1. Frequency Stability

Refer to KDB 789033

B. Duty Cycle (x), Transmission Duration (T), and Maximum Power Control Level

Refer to KDB 789033 or as specified in this section where applicable.

C. Emission Bandwidth (EBW)

Refer to KDB 789033

D. 99% Occupied Bandwidth

Refer to KDB 789033

E. Maximum Conducted Output Power

Refer to KDB 789033. Any of the methods in this section of 789033 for conducted power can be used.

F. Maximum Power Spectral Density (PSD)

Refer to KDB 789033

G. Unwanted Emission Measurement

Use guidance in KDB 789033 for measurements below 1000 MHz and above 1000 MHz. Unwanted emissions outside of restricted bands are measured with a RMS detector. In addition, 15.35(b) applies where the peak emissions must be limited to no more than 20 dB above the average limit

H. Measurement of emission at elevation angles higher than 30° from horizon

For an outdoor standard power access point and fixed client device operating in the 5.925-6.425 GHz and 6.525-6.875 GHz bands, the maximum EIRP at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm). This restriction leads to a general requirement for the antenna pattern: if the EIRP within the 3 dB elevation beamwidth of any radiation lobe is higher than 125 mW, this lobe must be controlled, either mechanically or electrically, so that the 3 dB elevation beamwidth of this lobe is below the 30° elevation angle relative to the horizon.

For compliance purposes, information for all the antenna types must be included in the filing. For antennas to be considered of similar type, the antenna patterns as well as other characteristics of the antenna must also be similar.

Note: Elevation angle is defined as 0° is horizontal and 90° is straight-up.

1. For fixed infrastructure, not electrically or mechanically steerable beam antenna

a) If elevation plane radiation pattern is available:

i) Determine the device intended mounting elevation angle and define 0° reference angle on the elevation plane radiation pattern.

ii) Indicate any radiation pattern between 30° and 90° which has the highest gain.

iii) Calculate the EIRP based on this highest gain and conducted output power.

iv) Compare to the 125 mW limit to establish compliance.

v) Include the elevation pattern data in the application filing with the test report to show how the calculations are made.

Note: For MIMO devices, take the maximum gain of each antenna and apply the guidance in KDB Publication 662911 for calculating the overall gain including directional gain for the maximum EIRP calculation.

b) If the elevation plane radiation pattern is not available, but the antenna type (such as dipole omnidirectional, Yagi, parabolic, or sector antenna) has a symmetrical elevation plane pattern referenced at the main beam and all lobes on the main beam elevation plane have highest gains, then the following measurement method is acceptable to determine compliance:

(i) Determine the device's intended mounting elevation angle referenced to the horizon.

(ii) Rotate the EUT antenna by 90° around the main beam axis in a horizontal position to transform the measurement in elevation angle into an azimuth angle and define a 0° reference angle based on the device's intended mounting elevation angle.

(iii) Move the test antenna along the horizontal arc, or rotate the turntable with the EUT antenna placed at the center, between 30° and 90° relative to the 0° reference angle, and then continuing down from 90° to 30° on the other side of the pattern, while maintaining the test antenna pointing with constant distance to the EUT antenna. Search for the spot which has the highest measured emission. Both horizontal and vertical polarization shall be investigated to determine the maximum radiated emission level.

Note: Moving the test antenna along the horizontal arc, or rotating the turntable, shall be performed in an angular step size as small as possible, but not larger than 3°.

(iv) Calculate the EIRP based on the highest measured emission. Compare to the limit of 125 mW to determine compliance.

(v) The antenna pattern measurements must be included in the filing.

2. For All Other Antenna Types

For all other antenna types (such as patch antennas, array antennas, antennas with irregular radiator shapes, etc.) which have any combination of following characteristics:

- Asymmetrical, complex radiation patterns
- 2-D or 3-D steerable beam
- Portable/mobile, not fixed infrastructure device

Provide the following information in the report:

a) Describe what type of antenna is used.

b) Determine by calculation, measurement or simulation, all radiation lobes/beams, which have EIRP higher than 125 mW within a 3-dB elevation beamwidth.

c) Provide an explanation of how these antenna beams are controlled to be kept below the 30° elevation angle. The explanation should include device installation instructions, mechanical control, electro-mechanical control or software algorithms, if the beams are electrically controlled by software.

I. Contention Based Protocol

Indoor access points, subordinate devices and client devices operating in the 5.925-7.125 GHz band (herein referred to as unlicensed devices) are required to use technologies that include a contention-based protocol to avoid co-channel interference with incumbent devices sharing the band. To ensure incumbent co-channel operations are detected in a technology-agnostic manner, unlicensed devices are required to detect co-channel radio frequency energy (energy detect) and avoid simultaneous transmission.

Unlicensed low-power indoor devices must detect co-channel radio frequency power that is at least -62 dBm or lower. Upon detection of energy in the band, unlicensed low power indoor devices must vacate the channel (in which incumbent signal is transmitted) and stay off the incumbent channel as long as detected radio frequency power is equal to or greater than the threshold (-62 dBm)[34]. The -62 dBm (or lower) threshold is referenced to a 0 dBi antenna gain.

To ensure incumbent operations are reliably detected in the band, low power indoor devices must detect RF energy throughout their intended operating channel. For example, an 802.11 device that plans to transmit a 40 MHz- wide signal (on a primary 20 MHz channel and a secondary 20 MHz channel) must detect energy throughout the entire 40 MHz channel. Additionally, low-power indoor devices must detect co-channel energy with 90% or greater certainty.

Test Procedure

a) Simulating Incumbent Signal

The incumbent signal is assumed to be noise-like. One example of such transmission could be Digital Video Broadcasting (DVB) systems that use Orthogonal Frequency Division Multiplexing (OFDM). Incumbent systems may also use different bandwidths for their transmissions. A 10 MHz-wide additive white Gaussian noise (AWGN) signal is selected to simulate and represent incumbent transmission.

b) Required number of tests

Incumbent and EUT (access point, subordinate or client) signals may occupy different portions of the channel. Depending on the EUT transmission bandwidth and incumbent signal center frequency (simulated by a 10 MHz-wide AWGN signal), the center frequency of the EUT signal f_{c1} may fall within the incumbent's occupied bandwidth (Figure 1.a), or outside of it (Figure 1.b).

[34] Unlicensed low-power indoor devices must use its contention-based protocol to ensure a channel is available each time it intends to transmit, including on the same channel(s) previously used after any continuous transmission ends.

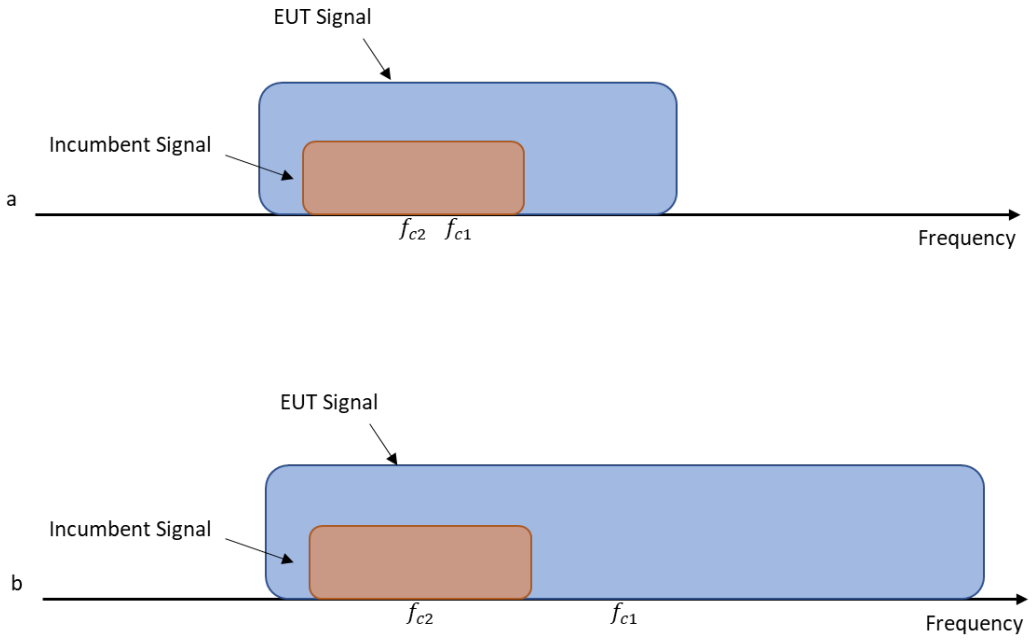


Figure 1. Two possible scenarios where a) center frequency of EUT transmission falls within incumbent's bandwidth, or b) outside of it

To ensure EUT reliably detects an incumbent signal in both scenarios shown in Figure 1, the detection threshold test may be repeated more than once with the incumbent signal (having center frequency f_{c2}) tuned to different center frequencies within the UT transmission bandwidth. The criteria specified in Table 1 determines how many times the detection threshold test must be performed;

Table 1. Criteria to determine number of times detection threshold test may be performed

If	Number of Tests	Placement of Incumbent Transmission
$BW_{EUT} \leq BW_{Inc}$	Once	Tune incumbent and EUT transmissions ($f_{c1} = f_{c2}$)
$BW_{Inc} < BW_{EUT} \leq 2BW_{Inc}$	Once	Incumbent transmission is contained within BW_{EUT}
$2BW_{Inc} < BW_{EUT} \leq 4BW_{Inc}$	Twice. Incumbent transmission is contained within BW_{EUT}	Incumbent transmission is located as closely as possible to the lower edge and upper edge, respectively, of the EUT channel
$BW_{EUT} > 4BW_{Inc}$	Three times	Incumbent transmission is located as closely as possible to the lower edge of the EUT channel, in the middle of EUT channel, and as closely as possible to the upper edge of the EUT channel

where:

BW_{EUT}: Transmission bandwidth of EUT signal
BW_{Inc}: Transmission bandwidth of the simulated incumbent signal (10 MHz wide AWGN signal)
f_{c1}: Center frequency of EUT transmission
f_{c2}: Center frequency of simulated incumbent signal

c) Test Setup

To ensure the EUT is capable of detecting co-channel energy, the first step is to configure the EUT to transmit with a constant duty cycle.[35] To simulate an incumbent signal, a signal generator (or similar source) that is capable of generating band-limited additive white Gaussian noise (AWGN) is required. Depending on the EUT antenna configuration, the AWGN signal can be provided to the EUT receiver via a conducted method (Figure 2) or a radiated method (Figure 3). Figure 2 shows the conducted test setup where a band-limited AWGN signal is generated at a very low power level and injected into the EUT's antenna port. The AWGN signal power level is then incrementally increased while the EUT transmission is monitored on a signal analyzer 2 to verify if the EUT can sense the AWGN signal and can subsequently cease its transmission. A triggered measurement, as shown in Figure 2, is optional, and assists with determining the time it takes the EUT to cease transmission (or vacate the channel) upon detecting RF energy. If the EUT has only one antenna port, then an AWGN signal source can be connected to the same antenna port.

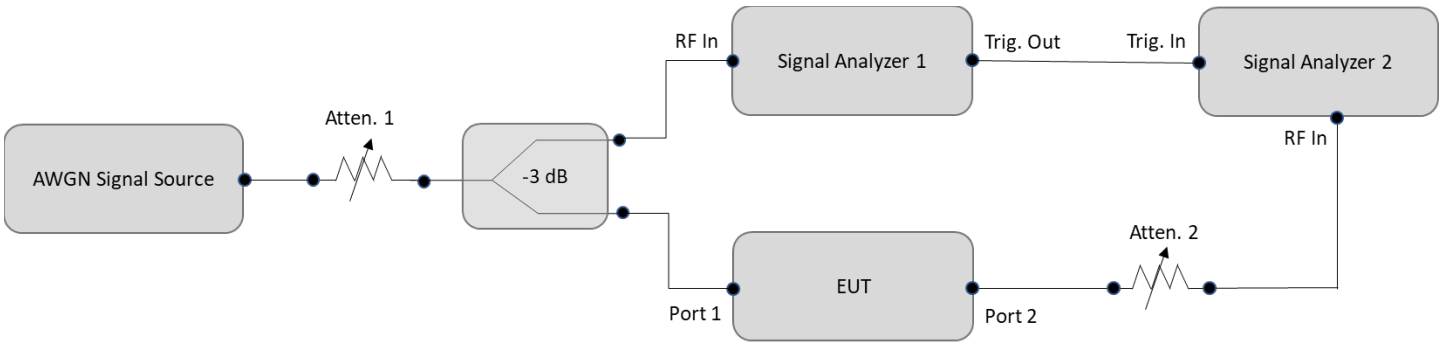


Figure 2. Contention-based protocol test setup, conducted method Step-by-Step Procedure, Conducted Setup

1. Configure the EUT to transmit with a constant duty cycle.
2. Set the operating parameters of the EUT including power level, operating frequency, modulation and bandwidth.
3. Set the signal analyzer center frequency to the nominal EEUT channel center frequency. The span range of the signal analyzer shall be between two times and five times the OBW of the EUT. Connect the output port of the EUT to the signal analyzer 2, as shown in Figure 2. Ensure that the attenuator 2 provides enough attenuation to not overload the signal analyzer 2 receiver.

[35] The EUT does not have to be configured to transmit with constant duty cycle if the sole purpose of the test is to verify whether the EUT can detect the incumbent signal and cease transmission upon detection. However, if it is desired to also determine the time it takes the EUT to cease transmission, then having a constant duty cycle will help with an accurate measurement of the time it takes the EUT to detect an incumbent signal and cease transmission.

4. Monitoring the signal analyzer 2, verify the EUT is operating and transmitting with the parameters set at step two.
5. Using an AWGN signal source, generate (but do not transmit, i.e., RF OFF) a 10 MHz-wide AWGN signal. Use Table 1 to determine the center frequency of the 10 MHz AWGN signal relative to the EUT's channel bandwidth and center frequency.
6. Set the AWGN signal power to an extremely low level (more than 20 dB below the -62 dBm threshold). Connect the AWGN signal source, via a 3-dB splitter, to the signal analyzer 1 and the EUT as shown in Figure 2.
7. Transmit the AWGN signal (RF ON) and verify its characteristics on the signal analyzer 1.
8. Monitor the signal analyzer 2 to verify if the AWGN signal has been detected and the EUT has ceased transmission. If the EUT continues to transmit, then incrementally increase the AWGN signal power level until the EUT stops transmitting.
9. (Including all losses in the RF paths) Determine and record the AWGN signal power level (at the EUT's antenna port) at which the EUT ceased transmission. Repeat the procedure at least 10 times to verify the EUT can detect an AWGN signal with 90% (or better) level of certainty.
10. Refer to Table 1 to determine number of times the detection threshold testing needs to be repeated. If testing is required more than once, then go back to step 5, choose a different center frequency for the AWGN signal and repeat the process.

d) Step-by-Step Procedure, Radiated Setup

To perform the same test in a radiated fashion, it is imperative to ensure that the AWGN signal can be radiated in a controlled environment, the AWGN radiated signal can illuminate the EUT antenna entirely, and the AWGN signal power level can be accurately measured at the EUT antenna's exact location. Figure 3 shows the radiated test setup where the AWGN signal is generated and transmitted via antenna 1. It should be noted that antenna 1 must be selected such that its 3 dB beamwidth can illuminate the EUT entirely. To ensure the AWGN signal level can be accurately measured at the EUT location, the EUT is initially replaced by antenna 2 which has a known gain, as shown in Figure 3. The radiated signal level is then measured using antenna 2. Antennas 1 and 2 are aligned and placed at a distance R which is greater than the far field distances of both antenna 1 and antenna 2. The AWGN signal power level is measured by the signal analyzer 1. The measured power P_{meas} is then corrected by the gain of antenna 2, G_2, and by all cable losses and attenuations L, to determine the AWGN signal power level at antenna 2, P_2, according to

$$P_2 = P_{meas} + L - G_2 \quad (1)$$

The EUT is then placed exactly where antenna 2 was, as shown in Figure 4.

Figure 3. Contention-based protocol test setup, radiated method, power measurement

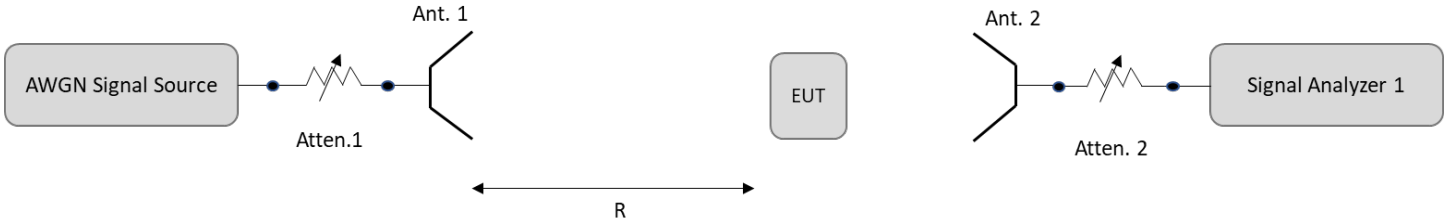


Figure 4. Contention-based protocol test setup, radiated method, detection threshold measurement

The following is a step-by-step procedure for testing the contention-based protocol using the radiated setup described above:

1. Using the AWGN signal source, generate (but do not transmit, i.e., RF OFF) a 10 MHz-wide AWGN signal. Use Table 1 to determine the center frequency of the 10 MHz AWGN signal relative to the EUT's channel bandwidth and center frequency.
2. Connect the AWGN signal source to antenna 1, as shown in Figure 3, and transmit the signal (RF ON).
3. Using signal analyzer 1 and antenna 2, measure the AWGN signal power level. Align antenna 2 and antenna 1 to maximize emission.
4. Using equation 1, correct the measured power P_{meas} by the gain of antenna 2, G_2 and all cable losses and attenuations L to obtain the AWGN signal power level at antenna 2, P_2.
5. Set the corrected power P_2 to an extremely low level (more than 20 dB below the -62 dBm threshold).
6. Place the EUT exactly where antenna 2 was. Configure the EUT to transmit a constant duty cycle.
7. Set the operating parameters of the EUT including power level, operating frequency, modulation and bandwidth.
8. Set the signal analyzer 1 center frequency to the nominal EUT channel center frequency. The span range of the signal analyzer shall be between two times and five times the OBW of EUT.
9. Monitor the signal analyzer 1 to verify if AWGN signal has been detected and EUT has ceased transmission. If the EUT continues to transmit, then incrementally increase the AWGN signal power level until the EUT stops transmitting.
10. Determine and record the AWGN signal power level at which the EUT ceased transmission. Repeat the procedure at least 10 times to verify the EUT can detect the AWGN signal with 90% (or better) level of certainty.
11. Refer to Table 1 to determine number of times the detection threshold testing needs to be repeated. If testing is required more than once, then go back to step 1, choose a different center frequency for the AWGN signal and repeat the process.

J. In-Band Emissions (Mask Figure 5)

1. Connect output of the antenna port to a spectrum analyzer or EMI receiver, with appropriate attenuation, as to not damage the instrumentation.
2. Set the reference level of the measuring equipment in accordance with procedure 4.1.5.2 of ANSI C63.10-2013.
3. Measure the 26 dB EBW using the test procedure 12.4.1 of ANSI C63.10-2013. (This will be used to determine the channel edge.)
4. Measure the power spectral density (which will be used for emissions mask reference) using the following procedure:
   a) Set the span to encompass the entire 26 dB EBW of the signal.
   b) Set RBW = same RBW used for 26 dB EBW measurement.
   c) Set VBW ≥ 3 X RBW
   d) Number of points in sweep ≥ [2 X span / RBW].
   e) Sweep time = auto.
   f) Detector = RMS (i.e., power averaging)
   g) Trace average at least 100 traces in power averaging (rms) mode.
   h) Use the peak search function on the instrument to find the peak of the spectrum.
5. For the purposes of developing the emission mask, the channel bandwidth is defined as the 26 dB EBW.
6. Using the measuring equipment limit line function, develop the emissions mask based on the following requirements. The emissions power spectral density must be reduced below the peak power spectral density (in dB) as follows:
   a. Suppressed by 20 dB at 1 MHz outside of the channel edge. (The channel edge is defined as the 26-dB point on either side of the carrier center frequency.)
   b. Suppressed by 28 dB at one channel bandwidth from the channel center.
   c. Suppressed by 40 dB at one- and one-half times the channel bandwidth from the channel center.
7. Adjust the span to encompass the entire mask as necessary.
8. Clear trace.
9. Trace average at least 100 traces in power averaging (rms) mode.
10. Adjust the reference level as necessary so that the crest of the channel touches the top of the emission mask.

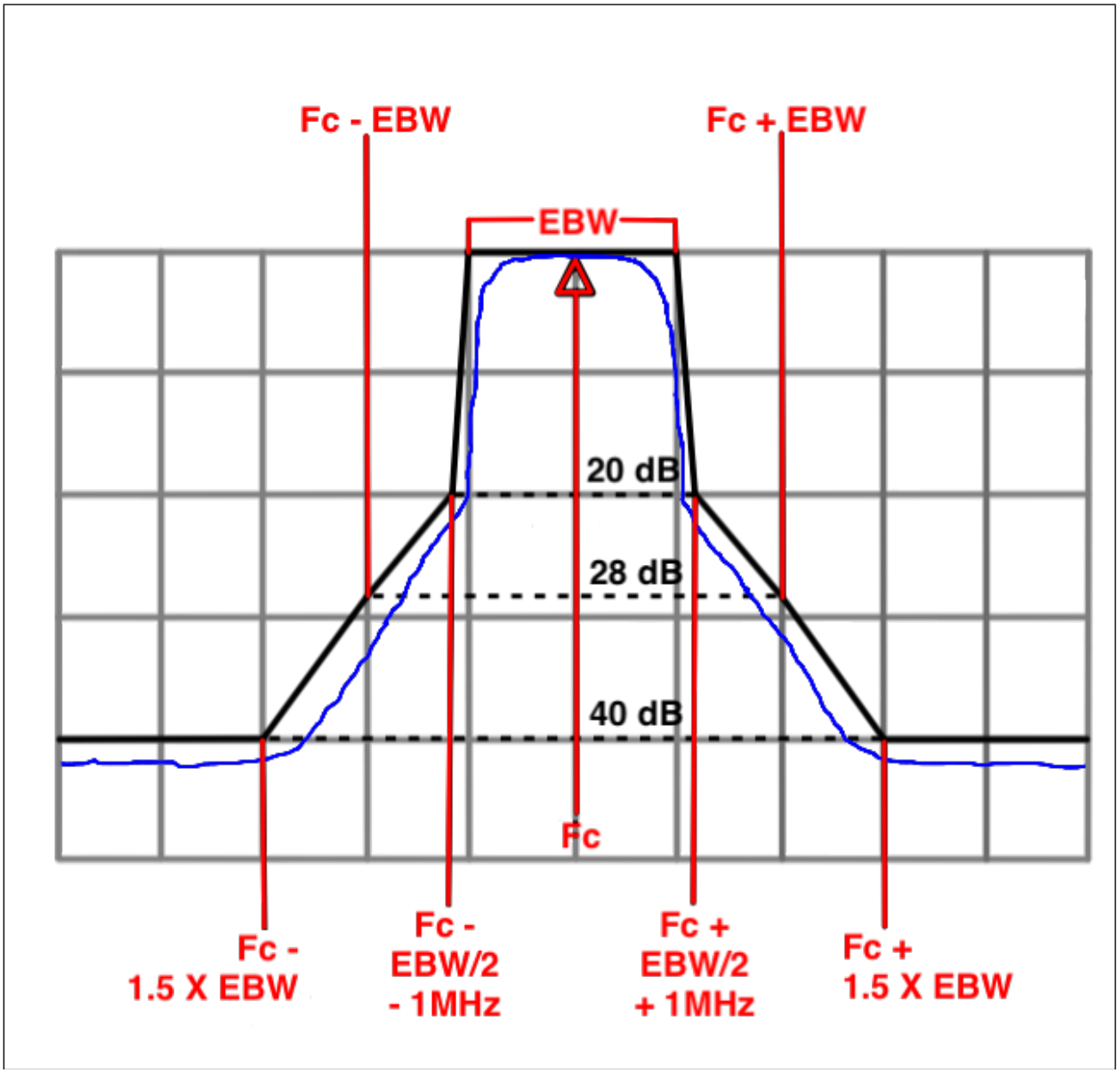


Figure 5. Generic Emission Mask

K. Dual Client Test, Demonstration of Proper Power Adjustment based on Associated AP

A client device may connect to a Standard Power AP with a maximum power level of 30 dBm EIRP. A client may also connect to a Low Power indoor AP, but the power level is limited to a maximum of 24 dBm EIRP. If a client has the flexibility to connect to both APs, verification is needed to show that it can distinguish between the two configurations, and then control the power levels accordingly.

TEST PROCEDURE:

1. Connect equipment as shown in Figure 6 below.
2. Adjust Atten 2 to Std Power AP so as to facilitate error free communication with the Client (Atten 1 should be set to High on the RF path to the Low Power AP).
3. Configure the Client and APs so that they associate and start sending data (stream data). It is important that the client is configured to transmit at its highest power level. Initially, because the attenuation on Atten 1 is set high, the Client will only associate with the Std Power AP.
4. Verify transmission between Client and Std Power AP. Additional attenuators may be required to protect measurement equipment. Measure the Client RF power using any of the methods in C63.10 for NII devices. Note – if the client RF power has been certified to never operate above 24 dBm EIRP then this test is not necessary.
5. Gradually increase Atten 2 while at the same time decreasing Atten 1. This simulates the Client moving from outdoors to indoors. At some level of attenuation the Client should associate with the Low Power indor AP. Verify transmission between Client and Low Power AP.
6. Measure the RF power of the Client device using the same method as in step 4. Verify the power is no more than 24 dBm EIRP.
   Note – measuring Client RF power reliably from a directional coupler measurement port may be tricky. Due to coupling, some energy from the AP will show up on the measurement port. Signal isolation techniques on the measurement analyzer will need to be used.

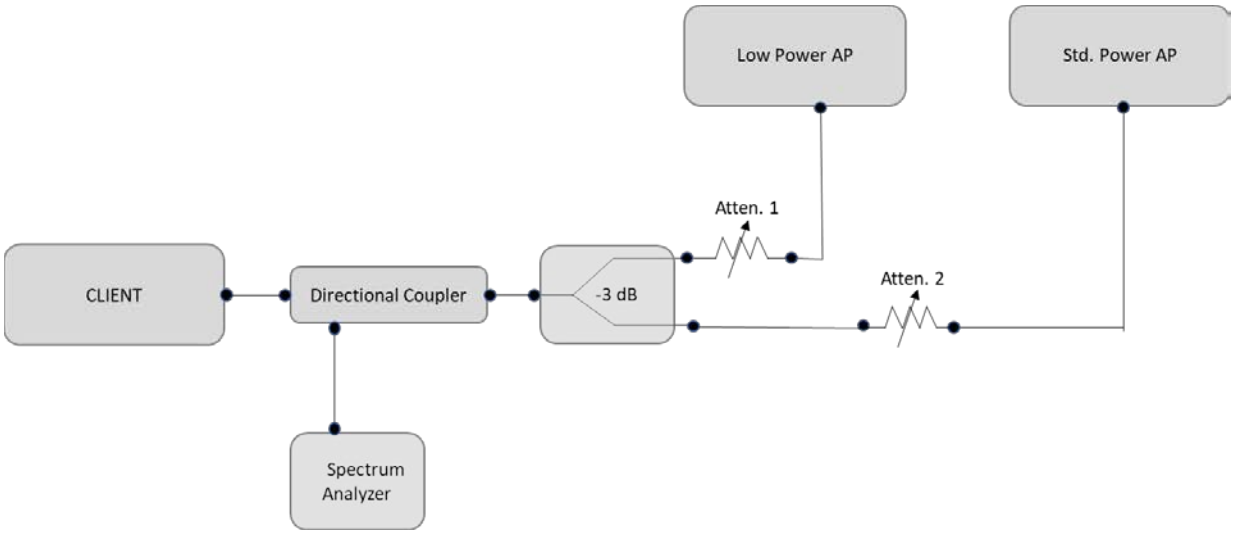


Figure 6. Test setup for conducted testing

L. Proper Power Adjustment, Client Devices Connected to a Standard Power Access Point

A client device which connects to a Standard Power AP must limit its power to no more than 6 dB below its associated Standard Power access point's authorized transmit power.
Verification is needed to show that the client device can lower its power accordingly.

TEST PROCEDURE:

1. Connect equipment as shown in Figure 7 below.
2. Adjust Atten 1 to Std Power AP so as to facilitate error free communication with the Client but protect the Client receiver from overload or damage.
3. Configure the Client and AP so that they associate and start sending data (stream data). The AP should be configured such that its registered power is 36 dBm EIRP.
4. Verify transmission between Client and Std Power AP. Additional attenuators may be required to protect measurement equipment. Measure the Client RF power using any of the methods in C63.10 for NII devices. Use this power, along with its antenna gain, to calculate the Client EIRP.
5. The Client EIRP should be minimally 6 dB lower than that of the AP.
6. Repeat Steps 2 through 5 but with the AP advertising an EIRP 3 dB less than Step 2.
7. Repeat Steps 2 through 6 until the rated minimum power level of the client has been reached.

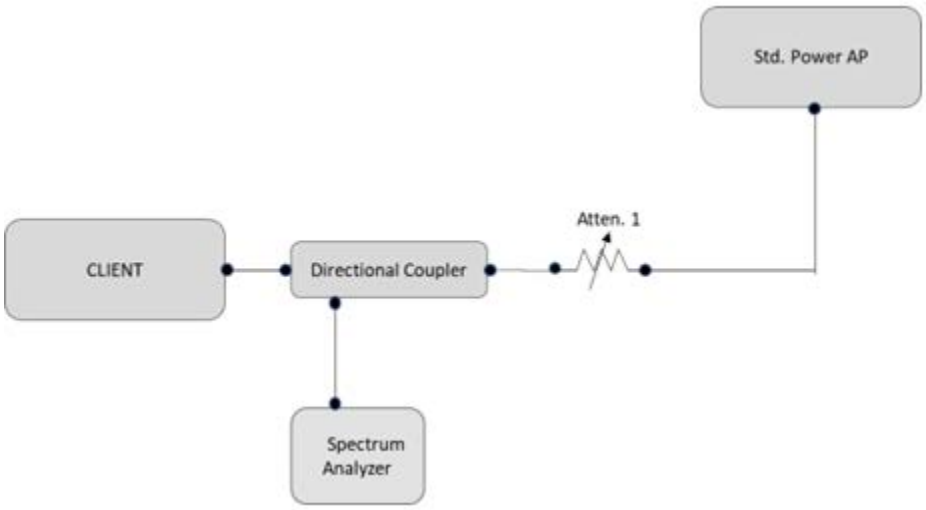


Figure 7. Test setup for conducted testing

Change Notice:
02/04/2021: 987594 D02 U-NII 6GHz EMC Measurement v01r01 replaces 987594 D02 U-NII 6GHz EMC Measurement v01. Changes to the document include the following:

- Added additional qualifiers to the statement “unlicensed low power indoor devices must vacate the channel (in which incumbent signal is transmitted) and stay off the incumbent channel as long as detected radio frequency power is equal to or greater than the threshold (-62 dBm).” to clarify the unlicensed low power indoor devices must vacate only the channel that is occupied by the incumbent signal.
- Added footnote 1 on page 4 to emphasize unlicensed low power indoor devices must always use contention-based protocol and on every channel, it intends to transmit, including on the same channel(s) previously used after any continuous transmission ends.

XX/dd/2023: 987594 D02 U-NII 6 GHz EMC Measurement v02 replaces 987594 D02 U-NII 6 GHz EMC Measurement v01r01. Phase 2 restriction removed ….Table 5 removed and Table 6 is now table 5

Attachment 987594 D03 U-NII 6 GHz QA

Month XX, 2023

Federal Communications Commission
Office of Engineering and Technology
Laboratory Division

Part 15 Subpart E U-NII 6 GHz
Questions and Answers

Q1. What are the different types of devices that can be certified for 6 GHz U-NII use?
A1

i. **Standard Power Access Point** – Devices that can be installed indoors or outdoors and utilize an AFC database to determine available channels and power levels. If installed outside, the access point must limit its EIRP to 21 dBm above 30-degree antenna elevation angles.
ii. **Client connected to Standard Power Access Point** – these devices can be used indoors or outdoors. They must maintain an EIRP level at least 6 dB below that of the associated AP.
iii. **Fixed Client Device** – Indoor/Outdoor client device that connects to a Standard Power Access point and is installed in a fixed location. These devices shall have the same certification requirements as a Standard Power Access Points (AFC required, power levels, etc.).
iv. **Low-Power indoor Access Point** – Limited to indoor use. Must not have weatherized enclosure, power supplied from a wired connection, must not run on batteries, and must have an integrated antenna. A contention-based protocol is required to protect incumbent users.
v. **Client connected to low-power indoor Access Point** – clients that connect to low-power indoor Access Points and use a contention-based protocol.
vi. **Subordinate Device** – a device such as an indoor extender that is under the control of a low-power indoor Access Point, is supplied power from a wired connection, has an integral antenna, does not have a weatherized enclosure and is not used to connect devices between separate buildings and structures. Must use a contention-based protocol. Power limits are set the same as a Low Power indoor Access Point.
vii. **Dual Client** – these client devices can connect to Standard Power APs as well as Low Power indoor APs.

Q2. Can these devices be certified for vehicular use?

A2. No. At this time these devices cannot be used on cars, trains, boats and aircraft, with the exception that low power indoor devices and associated client devices can operate on large aircrafts above 10,000 feet.

Q3. Is modular approval allowed for these devices?

A3. Yes, except for Subordinate devices.

Q4. How is linear interpolation interpreted when constructing the mask?
A4. The rules specify PSD suppression values in dB (logarithmic scale). When linearly interpolating, the dB values must first be converted to a linear scale. After interpolating in linear terms, the PSD values should be converted back into db.

Q5. Is Transmit Power Control (TPC) required for client devices?

A5. TPC is required for all client devices connected to Standard Power Access Points excluding Fixed Client devices. The TPC mechanism shall limit client power to no more than 6 dB below its associated Standard Power APs authorized transmit power level. TPC is not required for client devices connected to Low-Power indoor Access Points and Subordinate devices.

Q6. Can a Client device be certified for outdoor and indoor use?

A6. Yes. A Dual Client device may work with a Standard Power AP and a low power indoor AP. In this case the client shall meet all the requirements for an Outdoor Client as well as an Indoor Client. Additionally, testing must show that the client properly adjusts its power when transitioning from Outdoor to Indoor.

Q7. Can a Client device directly connect to another Client device?

A7. No. Direct Client to Client communication is prohibited.

Q8. Can new 6 GHz bands be added to an existing U-NII grant under the same FCC ID?

A8. Yes. If hardware or enclosure changes have not been made, a new original equipment application can be filed under the same FCC ID. If the granted application is not already a composite, the TCB shall send an inquiry to the FCC to request that the FCC place the application in audit mode thereby allowing TCB to modify the existing grant to identify the device as a composite.

Q9. If a device operates in U-NII bands 5, 6, 7 and 8, does the test lab need to test at least three channels (L, M & H) in each sub-band of operation?

A9. Yes. LMH in band 5, LMH in band 6, and so forth. Exception exists for the contention-based protocol test where only one channel in each supported sub-band needs to be tested. The narrowest and widest bandwidth in each channel shall be measured.

Q10. If a device only operates in one sub-band (example, U-NII-6), does OOBE need to be shown in other sub-bands (example, U-NII-5&7)?

A10. No. Compliance with OOBE limits only apply outside of the 5.925 – 7.125 GHz band. All in-band emissions need to meet the channel mask.

Q11. How are operating channels listed on an equipment authorization grant?

A11. The frequency range for the Form 731 and listed on the grant shall be the contiguous frequency span of operation as authorized for that equipment class from the channel center frequency of the lowest frequency channel to the channel center frequency of the highest frequency channel. 99% of the occupied bandwidth must be contained within all the U-NII sub bands authorized for that equipment class.

For example:
A device such as a low-power indoor access point operating in all 6 GHz U-NII bands (5-8) would list the frequency range for all channels of operation as one-line entry across all 6 GHz U-NII bands (5-8). Channels spanning within U-NII sub bands (i.e. 5 & 6, 6 & 7, 7 & 8) are not required to be separately listed on the Form 731. 99% of the occupied bandwidth of any channel must be contained within U-NII bands (5-8).

A device such as a standard power access point operating in U-NII bands (5 & 7) would list separately the frequency range for each contiguous frequency span of operation in U-NII sub band 5 and U-NII sub band 7. In no case are channels permitted spanning across U-NII bands that they are not authorized in (i.e. across 5 & 6, 6 & 7 and 7 & 8). 99% of the occupied bandwidth of any channel must be contained within each of its respective U-NII sub bands (e.g., 5) separately.

Q12. How does one determine if an enclosure is not weatherized?

A12. There are many factors in determining if an indoor device meets the requirement of not having a weatherized enclosure. Clearly if the enclosure has openings to vent heat it is not weatherized. The IP rating of a device could potentially be used. For example, if a device has been certified for IP 65 (Ingress Protection Code, IEC standard 60529) there is a good chance that the device can be used outdoors. However, test labs and TCBs shall review the user manual and other documentation to verify that the device cannot be used outdoors and that the intent of the requirement is met.

Q13. Can the smallest 26 dB bandwidth be used for all channels with the same nominal bandwidth when performing the mask measurement?

A13. Yes. As an example, for a 20 MHz nominal bandwidth the smallest measured 26 dB bandwidth may be used for all 20 MHz channels. As a practical matter, the nominal bandwidth may also be used provided it can be shown that the 26 dB bandwidth is always > nominal bandwidth.

Q14. For a client device connected to a standard power access point, is the 6 dB reduction required on both the PSD as well as the conducted power?

A14. Yes.

Q15. During contention-based protocol testing, once the EUT has detected an AWGN signal and ceased transmission is it allowed to send intermittent control signals?

A15. No. Signals of any kind are not allowed to be sent.

Q16. What data is required to be submitted for contention-based protocol testing?

A16. In addition to showing that the device stops transmitting at the required threshold we would also like to see the AWGN signal levels that the device starts transmitting again. That is, what is the lowest AWGN signal level that the EUT detects and determines the medium is busy.

Q17. Can Standard power mode be added to existing LPI AP?

A17. Yes, a 6ID device may add 6SD by submitting a new application with same FCC ID. However, considerations should be made in circumstances where the device is now to be installed outdoors with a new weatherized enclosure. This may require a new ID.

Change notice:
XX/dd/2023: 987594 D03 U-NII 6 GHz QA v02 replaces 987594 D03 U-NII 6 GHz QA v01. Phase 2 restriction removed ….

Attachment 987594 D04 UN6GHZ Pre-Approval Guidance Checklist

Federal Communications Commission
Office of Engineering and Technology
Laboratory Division

Month XX, 2023

UN6GHZ PRE-APPROVAL GUIDANCE CHECKLIST

UN6GHZ

This publication attachment provides a guide to submitting a Pre-Approval Guidance (PAG) for item UN6GHZ when required by publication 388624 D02 Pre-Approval Guidance List.

U-NII devices authorized in U-NII Bands 5.925-7.125 GHz under guidance of KDB Publication 987594, except when related to a C2PC in U-NII bands 5.925-7.125 GHz for an already certified module addressing RF exposure conditions for a specific host(s).

Checklist for PAG Review

1. Antennas

1.1 Information for all the antennas, i.e., type, gain and relative positions within host, must be included in the filing

1.2 Show how the (aggregate, if applicable) antenna gain was computed/measured (as in TCB Workshop Presentation Aggregate Antenna Gain Review, April 2021). Provide equation(s) used to calculate Directional Gain and provide example calculation showing how the DG was calculated with the antenna gain of individual antennas. Provide details (references or attached documents) on how the individual antenna gains were derived, i.e., declared by the host manufacturer, based on data sheet, or measured. Since the CBP needs to detect a small signal, the worst case scenario to consider is when the receiver has the lowest antenna gain.

1.3 For conducted test in MIMO cases, show that the testing was done for that path that has the lowest antenna gain.

2. Contention Based Protocol (CBP)

2.1 CBP testing shall be performed on one channel in each sub-band of operation for both narrowest and widest bandwidths

2.2 Use three separate 10 MHz AWGN signals when testing a 160 MHz channel. The simulated incumbent signal must be a 10 MHz wide AWGN signal

2.3 Report lowest AWGN signal detectable by EUT

2.4 Verify that the testing was performed with the AWGN signal set to lowest level (for example, -100 dBm) and increased until the EUT detects and stops transmitting.
For instance a table like the following (or similar) shall be reported:

UNII Band	…	…	…
Channel Number	…	…	…
Bandwidth (MHz)	…	…	…
EUT Frequency (MHz)	…	…	…
AWGN Frequency (MHz)	…	…	…
AWGN Power (dBm)	-65.5	-70.4	-80.0
Antenna Gain (dBi)	3	3	3
Path Loss (dB)	0.2	0.2	0.2
Adjusted Power (dBm)	-68.3	-73.2	-82.8
Detection Limit (dBm)	-62	-62	-62
EUT Tx Status[1]	OFF	Minimal	ON

[1] The AWGN level is reported for the following conditions:
- OFF = AWGN level at which no transmission is detected, consistently for a minimum period of 10 seconds
- Minimal: AWGN level at which the system begins to trigger the transmission switch-off, albeit not being kept off consistently
- ON = AWGN level at which no impact on the transmission is detected, consistently for a minimum period of 10 seconds

2.5 If conducted measurements are used, the detection threshold needs to be corrected to refer to a 0 dBi gain antenna and include all the applicable losses (cables, etc.). For instance, the report should show (at least):

Detection Level = Injected AWGN Power (dBm) – Antenna Gain (dBi) + Path Loss (dB)

2.6 Include plots showing EUT has stopped transmitting after detection of AWGN signal.

2.7 Describe whether channel puncturing and/or bandwidth reduction mechanisms supported. The report needs to include a plot as an example for at least one of the AWGN signals used.

2.8 If radiated testing is used, show that spot-checks were done to identify which side of the EUT has the lowest sensitivity to the incumbent signal detection, and that side was indeed chosen for the test.

3. Client Device Limitations

3.1 Client device (per definition in 47 CFR § 15.202) is limited to indoor locations, does not connect directly to the internet nor to other clients

3.2 Requires attestation (as a Form 731 exhibit) stating that the device can only operate under the control of a low-power indoor access point and subordinate.

3.3 No vehicular use, except large aircrafts above 10000 ft.

3.4 Transmit Power Control (TPC) required for client devices connected to Standard Power Access Points, excluding Fixed Client devices

3.5 Show/justify enclosure is not weatherized for Subordinate and APs.

4. Emission Mask

4.1 Power spectral density suppression complies with 47 CFR § 15.407(b)(6).

4.2 If EUT supports OFDMA discuss testing of partial Resource Unit (RU) configurations. In any case the shape of the mask shall be based on full RU.

4.3 OOBE limits only apply outside of the 5.925-7.125 GHz band. All in-band emissions need to meet the channel mask. In case a higher RBW for the in-Band Emissions Mask is used (i.e., a more conservative case) that should be noted.

5. Filing

99% of the occupied bandwidth must be contained within all the U-NII sub bands authorized for that equipment class

6. Hearing Aid Compatibility (HAC)

6.1 Confirm that VoLTE cannot be transported over 5G NR sub 6 GHz. If so, must state that in the OTT declaration of pre-install of OTT voice service and test report.

6.2 Manufacture must provide an attestation (cover letter) confirming that the results using ABM1 values obtained from VoLTE connections over LTE bands and ABM2 values for 5G NR sub 6 GHz connections over the same bands provide a reasonable representation of the HAC rating over the 5G NR sub 6 GHz connections.

7. Labelling

7.1 Label showing indoor only for Subordinate and APs.

7.2 E-labelling may be acceptable if proper justification is provided

8. Modular Certifications (when applicable)

8.1 Modular approval letter to be uploaded with the application

8.2 No subordinate devices can be modules

8.3 Show notification for the host manufacturer about referencing KDB Publication 996369 D04 Module Integration Guide

9. RF Exposure

9.1 Demonstrate applicable classification (portable/mobile/fixed) in reference to worst-case scenario use cases

9.2 Address $f > 6$ GHz RF exposure via most recent applicable KDB or TCB Workshop procedures

9.3 Address all applicable simultaneous transmission conditions using the compliance condition $TER \leq 1$, where TER (total exposure ratio) in this context is defined as:

$$TER = \sum_{k=1}^{N_S} \left(\frac{SAR_k}{SAR_{\text{lim}}} \right) + \sum_{k=1}^{N_f} \left(\frac{MPE_{field,\,k}}{MPE_{field,\,\text{lim}}} \right)^2 + \sum_{k=1}^{N_{PD}} \left(\frac{MPE_{PD,\,k}}{MPE_{PD,\,\text{lim}}} \right)$$

with N_S, N_f, and N_{PD} referring to sources requiring SAR, field-MPE, or PD-MPE, respectively, k referring to measured or estimated values for the source k, and "lim" to the corresponding applicable compliance limit

Simultaneous transmit evaluations and test exemption analyses may use SPLSR per KDB Publication 447498.

10. Security

Provide specific exhibit with device security description is required (complying with 47 CFR § 15.407(i))

11. Spurious Emissions

Show that measurements are made at the prescribed antenna heights, per KDB Publication 987594 D01, including measurements along all three axes, as per ANSI C63.10

12. Standard Power Access Points and Fixed Client

Provide Geolocation General Description document and Geolocation Justification Report. Additionally, if applicable provide Geolocation Accuracy After a Power Cycle description.

13. AFC DUT Test Harness Report

A separate test report showing EUT meets the AFC testing requirements.

Change Note:
mm/dd/yyyy: 987594 D04 UN6GHZ Pre-Approval Guidance Checklist v02 replaces 987594 D04 UN6GHZ Pre-Approval Guidance Checklist v01. Phase 2…..

Attachment **987594 D05 AFC DUT Test Harness Testing v01**

Month XX, 2023

Federal Communications Commission
Office of Engineering and Technology
Laboratory Division

AFC DUT TEST HARNESS TESTING

Technical Requirements

1) The following Tables 1 and 2 outline key protocol requirements for a Standard Power Access Point or Fixed Client device (from here on referred to as standard AP/fixed client device). Table 1 outlines protocol requirements between a standard AP/fixed client and an AFC that can be demonstrated via a Test Harness (AFC simulator)[36]. This is referred to as the "DUT Test Harness Report" throughout KDB 987594. Table 2 lists the key protocol requirements between a standard AP/fixed client and an AFC that may not be possible to test via a test harness.

47 CFR Section	Requirement
15.407(k)(1)	Transmit only as instructed by AFC System
15.407(k)(8)(i)	Register with AFC System prior to initial transmission Register with AFC System after change of location
15.407(k)(8)(ii)	Provide required registration parameters Update AFC System upon change of registration parameters
15.407(k)(8)(iii)	Registration either directly or via Network Element/Proxy
15.407(k)(9)(i)	Report location and uncertainty from power-off condition

Table 1 – Standard AP or Fixed Client protocol Testing available via a Test Harness

47 CFR Section	Requirement

[36] Devices may use the test harness developed by WiFi Alliance to demonstrate compliance with the associated requirements. The test harness is available at https://github.com/Wi-FiTestSuite/AFC-DUT and can be tested using the WiFi Alliance AFC Device (DUT) Compliance Test Plan. The test plan and interface specifications can be found at https://www.wi-fi.org/file/afc-specification-and-test-plans. Devices that do not use the WiFi Alliance protocol/test harness must identify a specific AFC and demonstrate compliance using that AFC.

15.407(k)(8)(iv)	Daily contact with AFC system and grace period - attestation
15.407(k)(8)(v)	Security of connection to AFC
15.407(k)(9)(i)	Automatic determination of geolocation System–identified in geolocation general description and justification report
15.407(k)(9)(iii)	Security of connection to external geolocation source - attestation
15.407(k)(9)(iv)	Geolocation accuracy and uncertainty determination System–identified in geolocation general description and justification report

Table 2- Standard AP or Fixed Client protocol Testing that may not be available via a Test Harness*

*when testing through a test harness is not available separate attestations and test reports are required.

2) Network Element/Proxy

A standard power access point that requires, or has the option to be managed with a network element representing multiple standard power access points must demonstrate compliance with the AFC DUT test Harness communicating through the network element.

A detailed description of the network element communication network and protocol used between a standard access point, network element, and AFC shall be provided as an operational description exhibit. This description shall also include a security statement by the grantee that no third party can control, authorize or allow a standard access point to radiate emissions in the 6 MHz band any other way than permitted by an AFC-registered session. Third parties are end-users, professional installers, and authorized distributors. Non-third parties are only the grantee or contactors working on behalf of the grantee. The grantee remains the responsible party.