

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

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Draft Laboratory Division Publications Report

Title: U-NII 5.9 GHz devices operating in the 5.850-5.895 GHz band

Short Title: U-NII-4 - 5.9 GHz

Reason: Guidance for Certification 15, Subpart E

Keyword/Subject: U-NII 5.9 GHz, U-NII-4, 5.850-5.895 GHz band, 15E

First Category: Unlicensed Service Rules and Procedures

Second Category: U-NII devices – 15.401

Note This draft may be used for submitting applications for equipment authorization under the Pre-Approval Guidance (PAG) Procedure (See Publication 388624).

Question: What are the requirements for obtaining a Certification for U-NII-4 band 5.9 GHz devices operating in the 5.850-5.895 GHz band under Part 15, Subpart E?

Answer: The following attachments provide guidance for obtaining Certification for devices operating in the 5.850-5.895 GHz band under Part 15, Subpart E:

291074 D01 General Requirements. Form 731 and supporting information requirements for all types of devices.

291074 D02 EMC Measurement. Test report exhibits and RF Measurement Procedures for demonstrating: EIRP, Bandwidth, and Out of Band Emissions, as applicable to 5.9 GHz devices.

291074 D03 Q&A General Questions and Answers.

Attachment List:

[291074 D01 General Requirements.v01](#)

[291074 D02 EMC Measurement v01](#)

[291074 D03 Q&A General Questions and Answers v01](#)

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-NII-4 BAND GENERAL ADMINISTRATIVE REQUIREMENTS

1. INTRODUCTION

The First Report and Order FCC 20-164 (docket no. 19-138) repurposed 45 MHz of the 5.850-5.925 GHz band (the 5.9 GHz band) to expand unlicensed mid-band spectrum operations in the U-NII band 5.725-5.85 GHz band to 5.895 GHz. Prior to this Report and Order, the spectrum from 5.850-5.925 GHz was allocated for Intelligent Transportation System (ITS) operations under Part 90 and Part 95.¹ Relocation, transition requirements, and future rulemakings for ITS in the spectrum of 5.895-5.925 GHz are not the subject of this publication.

2. U-NII BANDS (OVERVIEW)

Band	Band GHz	Notes	KDB Pub
U-NII-1	5.15-5.25	Indoor use /Outdoor restrictions apply	789033, 926956 (*), 594280 (security)
U-NII-2A	5.25-5.35	Indoor/outdoor/DFS	789033, 905462 (DFS), 926956 (*), 594280 (security)
U-NII-2B	5.35-5.47	Not available	
U-NII-2C	5.47-5.725	Indoor/outdoor/DFS	789033, 905462 (DFS), * 926956 (*), 594280 (security)
U-NII-3	5.725-5.85	Indoor/outdoor **indoor only U-NII -3 & -4 span channel	789033 * 926956, 594280 (security), ** 291074 (U-NII -3 & -4)
U-NII-4	5.85-5.895	Indoor only	291074 (U-NII -4), 594280 (security)
DSRC	5.895-5.925	Part 90 & Part 95 Subpart L	
U-NII-5	5.925-6.425	Indoor	987594 (6GHz), 594280 (security)
U-NII-6	6.425-6.525	Indoor	
U-NII-7	6.525-6.875	Indoor	
U-NII-8	6.875-7.125	Indoor	
* 926956 (*) Transition period ended March 2, 2020 for marketing DTS, and required Class II permissive change § Section 2.1043 (C2PC) under 15/407 (b) (4) (ii) Not applicable.			
** Example: 5 GHz (802.11a/h/j/n/ac/ax), Channels 163: 5735–5895; 167: 5815–5855; 171: 5825–5885 GHz can operate in the expanded 5.725-5.895 GHz band.			

¹ See 47 CFR Part 90—Private Land Mobile Radio Services and 47 CFR Part 95—Personal Radio Services.

3. U-NII-4 TYPES OF DEVICES: UNDER EQUIPMENT CLASS NII

Devices operating in the U-NII-4 Band (5.850-5.895 GHz) and channels that span U-NII-3 and U-NII-4 Bands are restricted to three category types: Indoor Access point, Subordinate and Client devices.

- a) **An Indoor Access point** in the U-NII-4 band (5.850-5.895 GHz) and U-NII -3 & -4 span channels² must use an integrated antenna, are restricted to indoor operation, cannot use a weatherized enclosure, and may not be battery powered. It must be powered from a wired permanent indoor local power connection. Automatic battery back operation is permitted during power loss. Upon restoration of the power, the unit must return to operating on an indoor local power connection.

As an access point, the device can operate as a master as defined in Section 15.202, allowing it to transmit without receiving an enabling signal. This mode can select a channel and initiate a network by sending enabling signals to client devices and subordinate devices.

A multiband or composite indoor access point product capable of operating in other bands with U-NII-4 and U-NII -3 & -4 span channels the entire product under that FCC ID is restricted to U-NII-4 indoor conditions.

Indoor access point devices must bear a statement in a conspicuous location on the device and the user's manual: **“FCC regulations restrict the operation of this device to indoor use only.”**

- b) **Subordinates** like indoor access points, are limited to the same indoor operation and the same form factor as access points: integrated antenna, cannot use a weatherized enclosure, must be powered from a wired permanent indoor local power connection, may not be battery powered. However, an automatic battery back-up operation is permitted. They must also bear a statement in a conspicuous location on the device and the user's manual: “FCC regulations restrict the operation of this device to indoor use only.” The user’s manual must also warn users that this device cannot operate as a subordinate between separate buildings or structures.

Subordinate devices have additional operational restrictions over Indoor access points: Subordinates cannot act as a standalone master device as defined Section 15.202 and must act as a contingent device under Section 15.202 subservient to an indoor access point within the same building or structure. A subordinate passively scans or listens in the U-NII-4 or U-NII -3 & -4 span channels for an indoor access point available channel. The subordinate is permitted to initiate a brief probe message requesting to join and associated with a specific access point. Once a subordinate is associated under control of an access point it can behave

² Example: 5 GHz (802.11a/h/j/n/ac/ax), Channels 163: 5735–5895; 167: 5815–5855; 171: 5825–5885 can operate in the expanded 5.725-5.895 GHz band.

as a master and allow other clients to associate with it. Subordinates can connect with other subordinates and access points.

Subordinate devices cannot have a direct connection to the internet to source the internet to other devices from a wired or direct connection.

A multiband or composite subordinate that operates on U-NII-4 channels or U-NII -3 & -4 span channels the entire product under that FCC ID is restricted to U-NII-4 indoor conditions.

- c) **Client devices** *are* not capable of initiating a network but act as a contingent device under Section 15.202. Client devices must be under control of an U-NII-4, Indoor access point or subordinate device.

Clients shall passively scan to associate with access point or subordinate. Clients are permitted to initiate a brief probe message requesting to join and associated with a specific access point or Subordinate. Clients cannot have a direct connection to the internet to source the internet to other clients, access points, subordinates or clients from a wired or direct connection.

4. LABELS AND INFORMATION TO USER

a) Labels on the device

1) Indoor Access point, Subordinates & client Device

- Section 2.948 FCC ID OR Section 15.212 (Contains FCC ID) as appropriate for modules
- Section 15.19 Statement: if not practical, it can be placed in the manual see KDB Publication 784748 D01 Section A2.

2) Indoor Access point and Subordinates

- FCC regulations restrict the operation of this device to indoor use only.

b) Manual

1) Indoor Access point, Subordinates & client Device

- Section 15.19 Statement (if not on the device)

2) Indoor Access point, Subordinates

- FCC regulations restrict the operation of this device to indoor use only.

3) Subordinates

- The user's manual must warn users that this device cannot be used to provide connections between separate buildings or structures.

5. U-NII-4 BAND EMISSION REQUIREMENTS

a) For an indoor Access point and Subordinate t

- 1) $PSD \leq EIRP$ 20 dBm/MHz.
- 2) Maximum EIRP \leq 36 dBm.
- 3) Above 5.895 GHz- $PSD \leq EIRP$ of 15 dBm/MHz to decrease linearly to an EIRP of -7 dBm/MHz at \geq 5.925 GHz.

b) For Client devices

- 1) $PSD \leq EIRP$ 14 dBm /MHz.
- 2) Maximum EIRP \leq 30 dBm.
- 3) Above 5.895 GHz $PSD \leq EIRP$ of -5 dBm/MHz to decrease linearly to an EIRP of -27 dBm/MHz at \geq 5.925 GHz.

c) For All devices below 5.725 GHz

- Shall not exceed an EIRP of -27 dBm/MHz at 5.65 GHz increasing linearly to 10 dBm/MHz at 5.7 GHz, and from 5.7 GHz increasing linearly to a level of 15.6 dBm/MHz at 5.72 GHz, and from 5.72 GHz increasing linearly to a level of 27 dBm/MHz at 5.725 GHz.

6. CHANNELS THAT SPAN U-NII -3 & -4 ³

- **Emission requirements:** Same emissions requirements as above in Section 5.
- **Product Form factor** restricted for each type as stated in Section 3 above.

7. A U-NII-4 – AND U-NII -3 & -4 SPAN CHANNELS WITH OTHER BANDS UNDER THE SAME FCC ID

FCC rules permit products to be certificated under multiple rule sections, equipment classes and/or different administrative and operational requirements.

An FCC ID⁴ represents the identical⁵ embodiment of the physical form factor (PFF), electrical, and operational functions as granted in accordance with all the applicable rules that have been demonstrated in the Equipment authorization database. For U-NII-4 devices, a single product may be capable of operating under different types of rule parts as defined in Section 3 under the same FCC ID. This means a product can operate as an Indoor Access point, Subordinate or Client. However, when operating as each, each operation must be fully compliant to the technical, physical, and operational requirements specified for each type. This means the

³ *Id.*, note 1

⁴ §2.925

⁵ Identical ascribes that all units subsequently marketed by the grantee are identical (see §2.908) to the sample tested and changes authorized by the Commission pursuant to §2.1043.

restrictions by type will dictate the physical factors (such as indoor, powered by wire, etc.) for an entire product.

Thus, a product under one FCC ID with user selectable configurations: Indoor Access point, Subordinate or Client will have restrictions on the Physical Form Factor (PFF: indoor operation, integrated antenna, labelling, enclosure, power) even when configured as a client. When configured as a subordinate any feature permitting operation to directly connect to wired internet connection cannot be enabled.⁶

This also applies across other rules and bands: for example, an Access point that operates under Section 15.247 in the 2400-2483.5 MHz band and U-NII -1 through -8, the physical form restrictions will dominate the form factor resulting in the product having the most restrictive form factors (a -f⁷).

Restrictions		AP Mode	Subordinate Mode	Client mode ⁸
a	Integrated Antenna	Required	Required	PFF Required
b	Indoor (no weather proofing)	Required	Required	PFF Required
c	Power (not battery)	Required	Required	PFF Required
d	Indoor Only label	Required	Required	PFF required
e	Internet wired direct connection	Enabled in this mode	Not permitted in this mode	Not Practical by common Protocol
f	Not used between Buildings	Required	Required	PFF Required

8. MAXIMUM FUNDAMENTAL POWER IN SIMULTANEOUS MULTI-GROUP TRANSMISSION

The maximum conducted output power for simultaneous transmitters is limited to the aggregate of the maximum power permitted for each rule part band – Each rule part band is identified in the table below⁹ as separate bands A through E. The table below is provided as a reference for other bands to determine the rule part the defines the output power for other than U-NII-4 and U-NII -3 & -4 span channels.

⁶ This does not preclude a wired ethernet connections provided by the subordinate to source the internet from an associated Access Point through the air interface.

⁷ It is noted that restrictions a-f as product form factors apply to both U-NII -4 through -8 devices.

⁸ This does not to apply for example to a product that are only a client device product

⁹ This table only provides guidance relative to the subject of this publication (targeted for U-NII-4 and U-NII -3 &-4 span channels). For other guidance related to simultaneous channels that Span bands see KDB Publication 789033.

U-NII	Band MHz	Rule Part Bands	Rule	Rule Band MHz
15.247	2400-2483.5	A	15.247	2400-2483.5
U-NII-1	5150–5250	B	§15.407(a) (1) (ii) & (iv) ¹⁰	5150–5250
U-NII-2A	5250-5350	C	§15.407(a) (2)	5250-5350 &
U-NII-2B	5350-5470	Not in U-NII Rule		
U-NII-2C	5470-5725	C	§15.407(a) (2)	5470-5725
U-NII-3	5725-5850	D	§15.407(a) (3)	5725-5895
U-NII-4	5850-5895			
DSRC	5895-5925	Not in U-NII Rule		
U-NII-5	5925–6425	E	§15.407(a) (5)(6)(7)(8)	5.925-7.125
U-NII-6	6425–6525			
U-NII-7	6525–6875			
U-NII-8	6875–7125			

9. MODULES

Except for subordinate devices, modules are permitted for Indoor access and client devices under Section 15.212. Furthermore, a module can be a composite under one FCC ID for both Indoor access points and clients.

For host, labeling, indoor use, power, restrictions, etc., a module grantee must extend these restrictions to the host manufacturer through the integration instructions (see KDB Publication 996369 D03).¹¹ Integration instructions shall be in enough detail so that the host manufacturer is obligated to adhere to these requirements and restrictions as a condition for using the module’s certification.

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 specific to a host, host agreement, or contract and qualify as a limited module.

¹⁰ A (1) (ii) for point-to-point not applicable due to Product form factor.

¹¹ Not clearly defining these restrictions to the host manufacture can result in the Grantee being responsible of violations of Host products.

10. PERMISSIVE CHANGES

Because U-NII-4 and U-NII -3 & -4 span channels have been adopted as a new rule ordered by FCC 20-164, software changes to add the new band is permitted as a Class II Permissive Change under §2.1043 (C2PC). In most cases the devices will already have an equipment class of NII¹². If a new equipment class is required and can be justified as software changes (i.e., adding U-NII-4 to a 6 GHz device) it cannot be done under a C2PC. It must be done by filing an original Form 731 application,¹³ except for SDR.¹⁴ Adding a new equipment class to an existing FCC ID requires that the FCC ID must be a composite device.¹⁵

Field upgrades, for indoor access points and subordinates (C2PC Push),¹⁶ are only permitted if the initial filing had demonstrated that the devices were labeled “FCC regulations restrict the operation of this device to indoor use only”. The C2PC must provide evidence of the initial labeling as well as details of grantee’s procedures to maintain control of the software uploads as required for a C2PC Push in KDB Publication 594280 D01 Software Configuration Control. This C2PC Push is subject to KDB Publication 388624 D02 Pre-Approval Guidance, item SWC2PC, for TCB processing.

As an alternative to a field upgrade, a grantee can file a C2PC and indicate in the C2PC request that all new shipped units under this FCC ID will be labeled “FCC regulations restrict the operation of this device to indoor use only”.

If a grantee [A] files a C2PC application to an existing approved device to add U-NII-4 and U-NII -3 & -4 Span channels, and grantee [A] also previously permitted another grantee [B] to file a change in ID prior to adding the U-NII-4 and U-NII -3 & -4 Span channels, the C2PC application filed by grantee [A] does not apply to Grantee [B]. Grantee [B] must file either a C2PC application or a second change in ID application depending on existing grant conditions, See Section 11 Change in ID below.

¹² Since most devices that add U-NII-4 and U-NII -3 & -4 span channels will already have an NII equipment class, it is not expected that there will be a need to add a new equipment class to an existing FCC ID, if needed see note 12.

¹³ Adding an equipment class If the approved device is already a Form 731 composite, then the TCB can then directly submit the application as original 731 application or Change in ID to add the equipment class. If the device is not a composite, then the TCB must submit an inquiry under Supersede/Audit Mode TCB Procedures KDB: TCB Audit Request inquiry and request FCC to put the applications in Audit mode. Then, for most cases, the TCB can change the grant to a composite and notify the FCC to close the audit. Then the TCB can then directly submit the new application for the equipment class. In some cases, (new TCB or pending applications) the FCC will need to make the change to a composite and then the TCB can then directly submit the application for the new equipment class.

¹⁴Software Defined Radio (SDR), the new equipment classes is submitted as a Class III permissive changes.

¹⁵ *Id*, note 12

¹⁶ KDB 594280 D01 Software Configuration Control VI. PERMISSIVE CHANGES AND FIELD PROGRAMMING

11. CHANGE IN ID:

For a change in ID under §2.933 see KDB Publication 249634 for procedural guidance.

A change in ID is permitted for module grants, however subordinate modules are not permitted.

For the situation, when an existing device form grantee [B] was previously granted as a change-in-ID, and subsequently the original grantee [A] that permitted this original change-in-id for grantee [B] added U-NII-4 and U-NII -3 & -4 span channels as a C2PC, two procedures apply for grantee [B] to also add the new band.

- a) If there is no new equipment class needed to be added, grantee [B] may file a C2PC plus all the required exhibits to demonstrate compliance for the new U-NII-4 band and U-NII -3 & -4 Span channels. If the original test reports from grantee [A] are to be used, then cover sheet explaining that the test reports are the originals by FCC ID for grantee [A]. In addition, a letter from the original grantee [A] is required giving permission to grantee [B] to use the filed data. and separate a statement that grantee [B] is taking full responsibility for the test data filed.
- b) For the situation when the equipment class is a new equipment class,¹⁷ then a second change in ID must be filed. In this case the change in ID would follow the procedures in publication KDB Publication 249634 requiring all the exhibits for a change- in-id, including a second approval letter from the original grantee and an explanation for the reason for the second change in ID. Note as a change in ID no test reports are required. This second procedure may also be used in place of a) procedure above.

¹⁷ *Id.*, note 13

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

1. INTRODUCTION

This document provides guidance for determining 5.9 GHz U-NII devices emissions compliance under Part 15, Subpart E of the FCC rules.

This document includes acceptable procedures for measuring emission bandwidth, maximum output power, power spectral density, and unwanted emissions both in and out of the restricted bands. 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. When technical requirements are expressed in terms of radiated power (EIRP) or radiated power spectral density (EIRP/given bandwidth), general requirements applicable to radiated test setup and measurement, stated in Clause 5 of ANSI C63.10-2013, must be followed.

All EUT operating modes and configurations must satisfy all requirements. The operating mode and configuration that is the worst case for one test may not be the worst case for another test.

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.

2. MEASUREMENT PROCEDURES

2.1 General Guidance

Refer to KDB Publication 789033.

2.2 Frequency Stability

Refer to KDB 789033.

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

Refer to KDB Publication 789033 or

2.4 Emission Bandwidth (EBW)

Refer to Section II C of KDB Publication 789033.

2.5 99% Occupied Bandwidth

Refer to Section II D of KDB Publication 789033.

2.6 Maximum Output Power

Refer to KDB Publication 789033. Any of the methods in Section II E of KDB Publication 789033 for maximum output power or power spectral density can be used. Refer to KDB Publication 662911 D01 and D02 if conducted power measurements are combined with directional gain of the antenna system to demonstrate compliance with radiated limit.

Note that total transmit power of a device operating on a channel that spans the 5.725-5.850 GHz and 5.850-5.895 GHz bands is subject to the limit specified in § 15.407(a). However, if the device is capable of multiple simultaneous transmissions, maximum power of each individual transmission within a band is subject to the limit specified in § 15.407(a). Refer to Section III of KDB Publication 789033 for further guidance on channel aggregation.

2.8 Maximum Power Spectral Density (PSD)

Refer to Section F of KDB Publication 789033.

2.9 Unwanted Emission Measurement

Use guidance in KDB Publication 789033 for all measurements. Unwanted emissions outside of restricted bands are measured with an 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. Refer to KDB 662911 D01 and D02 if conducted power measurements are combined with directional gain of the antenna system to demonstrate compliance with radiated limit.

Unwanted band-edge emissions may be measured using the integration method as described in KDB Publication 789033 3. d) (ii). Emissions below 5725 MHz should be measured using peak-detection while emission above 5895 MHz should be measured using average.

2.10 Out of Band Emissions

2.10.1 General

Indoor access points, subordinate devices and client devices operating in the 5.850-5.895 GHz band are required to meet the following OOB Emissions.

- a) For an indoor access point or subordinate, all emissions at or above 5.895 GHz shall not exceed an EIRP of 15 dBm/MHz and shall decrease linearly to an EIRP of -7 dBm/MHz at or above 5.925 GHz.

- b) For a client device or an outdoor access point, all emissions at or above 5.895 GHz shall not exceed an EIRP of -5 dBm/MHz and shall decrease linearly to an EIRP of -27 dBm/MHz at or above 5.925 GHz.
- c) For a client device or indoor access point or subordinate, all emissions below 5.725 GHz shall not exceed an EIRP of -27 dBm/MHz at 5.65 GHz increasing linearly to 10 dBm/MHz at 5.7 GHz, and from 5.7 GHz increasing linearly to a level of 15.6 dBm/MHz at 5.72 GHz, and from 5.72 GHz increasing linearly to a level of 27 dBm/MHz at 5.725 GHz.

2.10.2 Test Procedure

a) Measurement Procedures

The measurements shall be performed using Section G of KDB Publication 789033 as guidance.

b) Out of Band Emissions Mask

Indoor access points, subordinates, client devices, and outdoor access points shall meet the Out of Band Emissions as illustrated in Figure 1 below.

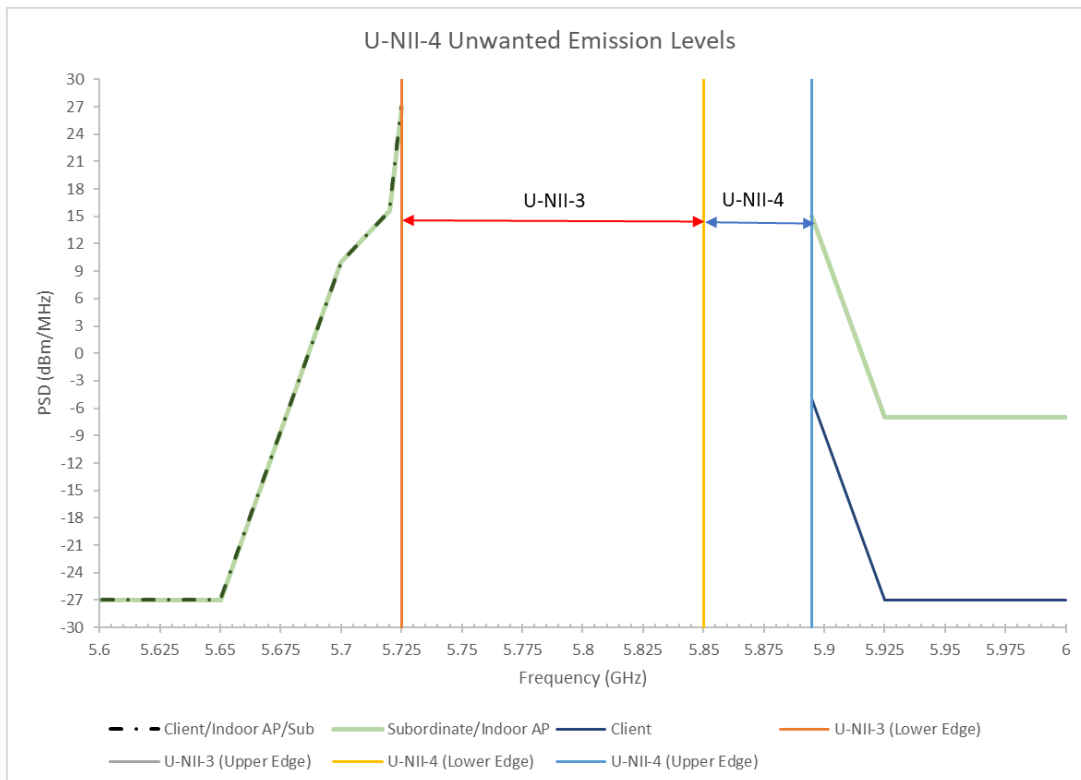


Figure 1. Out of Band Emission Mask of U-NII Devices Operating in the 5.850-5.895 GHz Band

2.11 Minimum Emission Bandwidth for the band 5.850-5.895 GHz

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 kHz for the 5.850–5.895 GHz band. The following procedure shall be used for measuring this bandwidth:

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described in this section. For devices that use channel aggregation refer to III.A and III.C of KDB Publication 789033 for determining emission bandwidth.

3. Declarations Required in applications for certification

A filing for certification shall include a declaration statement that is signed and dated by grantee. The below requirements shall be declared (wordings are suggestions only). Keep in mind that these declarations by themselves do not override additional requirements that maybe required in the rules.

Indoor devices:

- a) Clients
 - 1) Client device (EUT) will not directly connect to another client device.
 - 2) Client device (EUT) will only associate and connect with an indoor Access Point (AP) or indoor Subordinate.
 - 3) Client device (EUT) will always be under the control of an indoor AP. However, there may exist situations where the client may transmit brief messages, prior to being under the control of an AP, to join an AP network. But these brief messages will only occur if the client has detected a signal confirming that an AP is operating on a particular channel. These brief messages will have a time-out mechanism if it does not receive a response from an AP.
- b) Subordinates
 - 1) No direct connection to internet
 - 2) Prohibited for control of or communications with unmanned aircraft systems including drones.

- 3) Directly connected to AC power and has no batteries.
 - 4) Indoor installation only.
- c) Access Points
- 1) Directly connected to AC power and has no batteries.
 - 2) Indoor installation only.

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**Part 15 Subpart E U-NII 5.9 GHz
Questions and Answers**

Q1. What are the different types of devices that can be certified for 5.9 GHz U-NII use?

A1. Device types are as follows.

Indoor Access Point – an access point that operates in the 5.850-5.895 GHz or the 5.925-7.125 GHz band, is supplied power from a wired connection, has an integrated antenna, is not battery powered, and does not have a weatherized enclosure.

Client Device –

Subordinate – a device that operates in the 5.850-5.895 GHz band or the 5.925-7.125 GHz band under the control of an Indoor Access Point, is supplied power from a wired connection, has an integrated antenna, is not battery powered, does not have a weatherized enclosure, and does not have a direct connection to the internet.

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 aircraft above 10,000 feet.

Q3. Is modular approval allowed for these devices?

A3. Yes, except for Subordinate devices.

Q4. Can a Client device directly connect to another Client device?

A4. No. Direct Client to Client communications is prohibited.

Q5. Can new 5.9 GHz band be added to an existing NII grant under the same FCC ID?

A5. Yes. If hardware or enclosure changes have not been made, and meets new requirements, A Class II Permissive Change (C2PC) maybe performed. The device will be restricted to indoor use only even if other bands allow outdoor use. In addition, the device would already have to have an integrated antenna.

Q6. How does one determine if an enclosure is not weatherized?

A6. 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 there is a good chance that the device can be used outdoors. However, test labs and TCBs shall review the user's manual and other documentation to verify that the device cannot be used outdoors and that the intent of the requirement is met.

Q7. If a 160 MHz channel spans both U-NII-3 and U-NII-4 is the power limited to 36 dBm EIRP?

A7. Yes. This contrasts with two separate channels operating in U-NII-3 and U-NII-4 where each individual channel is limited to 36 dBm EIRP. This guidance also applies to PSD limits as well.

Q8. When a device is operating in U-NII-4 how are OOBE and spurious emissions measured?

A8. When operating in U-NII-4 OOBE and spurious emissions are to be measured outside of the 5725-5895 MHz band. Below 5725 MHz the -27 dBm EIRP is measured with a Peak detector and above 5895 MHz it is measured with an RMS detector. If the -27 dBm EIRP limit is met with a Peak detector retesting with an RMS detector is not required.

Q9. What detector is used for measuring fundamental emissions?

A9. For measuring fundamental emissions such as power and power spectral density an RMS detector shall be used.

Q10. Is there a limit on the conducted power for a device transmitting in U-NII-4?

A10. The limit on the power is 36 dBm EIRP. There is no limit on the conducted power as long as the EIRP is limited to less than 36 dBm EIRP.

Q11. How is the U-NII-4 device power listed on the grant?

A11. The power for U-NII-4 device shall be listed as EIRP. It is understood that for a device operating across multiple U-NII bands power will be listed in terms of conducted and EIRP power. For instance, a device operating in U-NII-1 through U-NII-3 will be listed as conducted power and U-NII-4 will be listed as EIRP. The grant notes should state as such.

Q12. How is a 160 MHz channel that spans both U-NII-3 and U-NII-4 listed on the grant?

A12. The 160 MHz channel should be a separate line item on form 731 and grant.

Q13: 15.407(a)(12) What reference bandwidth should be used when making PSD measurements in the U-NII-4 band?

A13: For the portions of the carrier which fall within the U-NII-3 band (5.725 – 5.850 GHz), measurements should be based upon a reference bandwidth of 500 kHz. For portions within the U-NII-4 band (5.850 – 5.895 GHz), measurements should be based upon reference bandwidth of 1 MHz. Narrower resolution bandwidth maybe used, provided that the measured power is integrated over the full reference bandwidth.

Q14: 1 (b) (5) (ii) (ii) For a client device, all emissions at or above 5.895 GHz shall not exceed an EIRP of -5 dBm/MHz and shall decrease linearly to an EIRP of -27 dBm/MHz at or above 5.925 GHz. Due to steep band mask requirement in the immediate 1 MHz outside the band edge, is using a 100 kHz measurement bandwidth (instead of 1 MHz measurement bandwidth) allowed.

A14: Unwanted band-edge emissions may be measured using the integration method as described in KDB Publication 789033 3. d) (ii). Emissions below 5725 MHz should be measured using peak-detection while emission above 5895 MHz should be measured using average.