

03/03/2022

**Federal Communications Commission**  
**Office of Engineering and Technology**  
**Laboratory Division**

**U-NII-4 BAND GENERAL ADMINISTRATIVE REQUIREMENTS**

**INTRODUCTION**

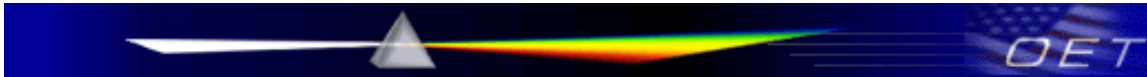
The First Report and Order FCC 20-164 (docket no. 19-138) repurposed 45 MHz of the 5.850-5.925 GHz band (the 5.9 GHz band) to expand unlicensed mid-band spectrum operations in the existing 5.725-5.85 GHz U-NII band to 5.895 GHz. Prior to this Report and Order, the spectrum from 5.850-5.925 GHz was designated for Intelligent Transportation System (ITS) operations under Part 90 and Part 95.<sup>1</sup> Relocation, transition requirements, and future rulemakings for ITS in the spectrum of 5.895-5.925 GHz are not the subject of this publication.

**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 <sup>2</sup>	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.			

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

<sup>2</sup> Outdoor usage is pending final decisions in the rulemaking. Thus, such use cannot be permitted without a waiver until the rules become effective.



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#### 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 channels<sup>3</sup> 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 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.

- b) **Subordinate devices** 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 in 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 device 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 associate with a specific access point. Once a subordinate is associated under control of an access point it can behave as a master and allow other clients to associate with it. Subordinate devices can connect with other subordinates and access points.

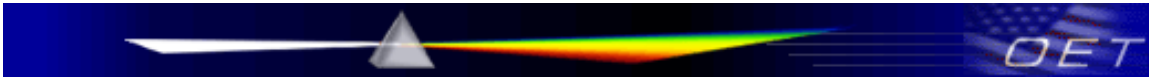
Subordinate devices cannot have a direct connection to the internet to source the internet to other devices from a wired or direct connection.

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

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

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<sup>3</sup> 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.



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Clients shall passively scan to associate with an access point or a subordinate. Clients are permitted to initiate a brief probe message requesting to join and associate 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.

## **LABELS AND INFORMATION TO USER**

### **a) Labels on the device**

#### **1) Indoor Access Point, Subordinate devices & Client devices**

- 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 ID
- Indoor Use only
- E-labelling is permitted on devices qualifying for e-labelling..

### **b) Manual**

#### **1) Indoor Access point, Subordinate devices & Client devices**

- Section 15.19 Statement (if not on the device)

#### **2) Indoor Access point & Subordinate devices**

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

#### **3) Subordinate devices**

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

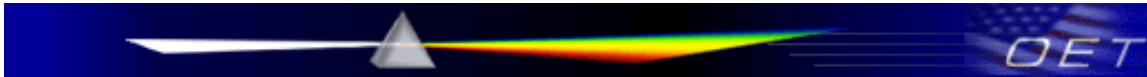
## **U-NII-4 BAND EMISSION REQUIREMENTS**

### **a) For an indoor Access point and Subordinate t**

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

### **b) For Client devices**

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



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c) **For All devices below 5.725 GHz**

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

**CHANNELS THAT SPAN U-NII -3 & -4 <sup>4</sup>**

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

**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 ID<sup>5</sup> represents the identical<sup>6</sup> embodiment of the physical form factor (PFF), electrical, and operational functions as granted in accordance with all the applicable rules. A single product may be capable of operating under other rule sections<sup>7</sup> in addition to operating in the U-NII-4 band. A product can also operate as an Indoor Access point, Subordinate or Client in the U-NII-4 band. However, each operation must be fully compliant to the technical, physical, and operational requirements specified for each type. This means the restrictions by type may dictate the physical factors (such as indoor, powered by wire, etc.) for an entire product. An applicant must demonstrate in the filing how the restrictions are maintained when devices operate in the different modes. For example, when configured as a subordinate any feature permitting operation to directly connect to wired internet connection cannot be enabled. Having both an integrated antenna and detachable would require an explanation how the detachable is not enabled in the restricted modes for AP and subordinate. Explanations should be provided as operational descriptions.

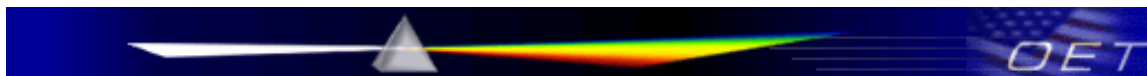
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<sup>4</sup> *Id.*, note 1

<sup>5</sup> §2.925

<sup>6</sup> 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.

<sup>7</sup> This also applies across other rules and bands: for example, for an Access point that operates under Section 15.247 in the 2400-2483.5 MHz band and U-NII -1 through -8 bands, the physical form restrictions will dominate the form factor resulting in the product having the most restrictive form factors (a -f) in the table below.



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Device capable of multiple modes				
Restrictions		AP Mode	Subordinate Mode	Client Mode
a	Integrated Antenna	Required	Required	*
b	Indoor (no weather proofing)	Required	Required	*
c	Power (not battery)	Required	Required	*
d	Indoor Only label	Required	Required	*
e	Internet wired direct connection	Enabled in this mode	Not permitted in this mode	*
f	Not used between Buildings	Required	Required	*
* filling to require an explanation in the filling if client device has other modes that do not conform to restrictions.				

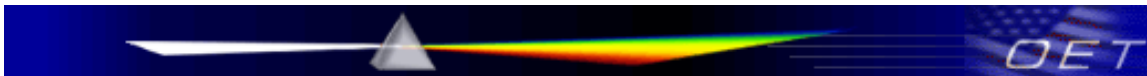
## MAXIMUM FUNDAMENTAL POWER IN SIMULTANEOUS MULTI-GROUP TRANSMISSION

The maximum conducted output power for simultaneous transmitters is limited to the aggregate of the maximum power permitted for each band per its specific rule section – Each band and associated rules section is identified in the table below<sup>8</sup> as separate rule part bands A through E. The table below is provided as a reference to determine the rule section the defines the output power for other than U-NII-4 channels and U-NII -3 & -4 span channels.

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) <sup>9</sup>	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			

<sup>8</sup> 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 guidance related to simultaneous channels that span other U-NII bands see KDB Publication 789033.

<sup>9</sup> A (1) (ii) for point-to-point not applicable due to Product form factor.



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## 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).<sup>10</sup> Integration instructions shall be provided 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, full compliance as a stand-alone module independent of any host. The host manufacturer or any third party are restricted from modifying or controlling these parameters under the U-NII device security restrictions. The manufacturer may demonstrate an alternative method specific to a host, host agreement, or contract and qualify as a limited module.

## 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 NII<sup>11</sup>. If a new equipment class is required and can be justified as a software change (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,<sup>12</sup> except for an SDR device.<sup>13</sup> Adding a new equipment class to an existing FCC ID requires that the FCC ID must be a composite device.<sup>14</sup>

Field upgrades, for indoor access points and subordinates (C2PC Push),<sup>15</sup> are only permitted if the initial filing 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 any software uploads as required for a C2PC Push in KDB Publication

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<sup>10</sup> Not clearly defining these restrictions to the host manufacture can result in the Grantee being responsible for violations of host products.

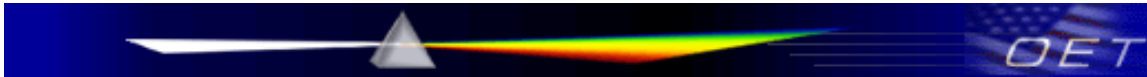
<sup>11</sup> Since most devices that add U-NII-4 and U-NII -3 & -4 span channels will already have an NII equipment class, it is not expected that there will be a need to add a new equipment class to an existing FCC ID (if a new equipment class is needed, see note 13).

<sup>12</sup> Adding an equipment class. If the approved device is already a Form 731 composite, then the TCB can directly submit the application as an original 731 application or Change in ID to add the equipment class. If the device is not a composite, the TCB must submit an inquiry under Supersede/Audit Mode TCB Procedures KDB: TCB Audit Request inquiry and request for the FCC to put the application in Audit mode. Then, for most cases, the TCB can change the grant to a composite and notify the FCC to close the audit. 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 directly submit the application for the new equipment class.

<sup>13</sup> Software Defined Radio (SDR), the new equipment class is submitted as a Class III permissive changes.

<sup>14</sup> *Id.*, note 13

<sup>15</sup> KDB 594280 D01 Software Configuration Control VI. PERMISSIVE CHANGES AND FIELD PROGRAMMING



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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 FCC 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 FCC ID application depending on existing grant conditions, See Section titled, “Change in FCC ID” below.

#### **CHANGE IN FCC ID:**

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

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

For the situation, when an existing device from 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 a cover sheet explaining that the test reports are the originals previously submitted by grantee [A] for the FCC ID. In addition, a letter from the original grantee [A] giving permission to grantee [B] is required to use the filed data. and a separate statement that grantee [B] is taking full responsibility for the test data filed is also required.
- b) For the situation when the equipment class is a new equipment class,<sup>16</sup> then a second change in FCC ID must be filed. In this case the change in FCC 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 FCC ID. Note that no test reports are required for a second change in FCC ID. This second procedure may also be used in place of procedure a) above.

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<sup>16</sup> *Id.*, note 13