

## **Comments on Draft KDB Publication 987594 U-NII 6 GHz devices 5.925-7.125 GHz DR02-45002**

Submitted by Cisco Systems, Inc.

April 17, 2023

Cisco submits the following comments regarding Draft KDB publication 987594 DR02-45002, which updates existing 6 GHz KDB guidance for AFC Phase 2 devices.<sup>1</sup> Now that the OET Laboratory Division (“Lab”) has gained experience with client device certifications, Cisco recommends that the Lab update its administrative equipment classes used when applying for certification to specify a single category of non-fixed client devices. Specifically, the Lab should consolidate the 6XD, 6CD, and 6FX 6 GHz administrative classes.

Maintaining separate administrative categories for these non-fixed clients will undermine consumer expectations and needlessly force operators to deploy inefficient networks. Organizations, including educational institutions and libraries, whose networks must accommodate a diverse set of users might have no choice but to deploy redundant indoor and standard power access points in the same area solely to ensure that they can serve each of the different non-fixed administrative client classes. In contrast, combining these device classes will best reflect the 6 GHz rules, which do not separately define non-fixed clients. If the Lab does not formally consolidate the non-fixed client administrative classes, it should at minimum make clear that non-fixed client devices operating pursuant to technical standards that contemplate associations to both standard and low-power access points—such as IEEE 802.11—should apply for certification using the 6CD “dual client” class.

The Lab should also update the draft guidance to (a) recognize that both subordinate devices and access points may operate as mesh nodes; (b) specify the required behavior for standard power access points upon power up; (c) clarify the role of low power access point enabling signals; and (d) clarify that a soft reboot of a radio does not constitute a “power cycle” for geolocation accuracy purposes.

### **1. The 6 GHz U-NII rules do not specify “Indoor” or Standard Power” non-fixed clients.**

Most of the draft KDB’s administrative equipment classes directly correspond to a distinct device definition in 47 C.F.R. § 15.403. However, this is not the case for administrative classes 6XD, 6CD, and 6CD, as illustrated in Table 1.

---

<sup>1</sup> See *6 GHz UNII 5-8 Bands*, Draft Laboratory Division Publications Report, Publication No. 987594 DR02-45002 (rel. Mar. 17, 2023) (“Draft KDB”).

*Table 1: Proposed Administrative Equipment Classes vs U-NII Rule Device Definitions<sup>2</sup>*

KDB Admin. Class	KDB Description	Section 15.403 Device
6SD	Standard power access point	Standard Power Access Point
6FC	Fixed client	Fixed client device
6ID	Low-power indoor access point	Indoor Access Point
6PP	Subordinate indoor device	Subordinate Device
6XD	Low power indoor client	Client Device
6FX	Standard client	
6CD	Dual client	

Rather, the 6XD, 6FX, and 6CD administrative classes are each a “client device” under the U-NII rules.

Section 15.403 as updated by the *6 GHz Report and Order* defines a client device as “[a] U-NII device whose transmissions are generally under the control of an access point and is not capable of initiating a network.”<sup>3</sup> Although the operating parameters a client device will adhere to when it joins a specific network are based on whether the device is “operating under the control of an indoor access point” or “operating under the control of a standard power access point,”<sup>4</sup> there are no other distinctions between non-fixed clients. Indeed, the draft KDB itself underscores that this is the case: there are no differences among any of the non-fixed administrative client classes for attributes such as Product Form Factor (PFF), antenna restrictions, weatherization, installation requirements, prohibitions on network initiation, use of modules, or device labeling.<sup>5</sup>

## **2. Separate administrative classes for non-fixed clients will undermine consumer expectations and force operators to deploy inefficient networks.**

Two of the three 6 GHz non-fixed client administrative classes, 6XD and 6FX, can “only associate” with indoor APs and standard power APs, respectively—even though client devices certified under these classes could otherwise appear identical.<sup>6</sup> As the FCC prepares to begin issuing authorizations for standard power access points, these administrative class distinctions, if continued, will undermine consumer expectations. End users who purchase non-fixed 6 GHz U-NII clients would reasonably assume that their devices can connect to all 6 GHz access points that use the same standard (e.g., IEEE 802.11 Wi-Fi) as the client. But that would not be the

<sup>2</sup> Compare Draft KDB § 2.1 at 6 with 47 C.F.R. § 15.403.

<sup>3</sup> 47 C.F.R. § 15.403 (defining “Client Device”).

<sup>4</sup> See, e.g., 47 C.F.R. §§ 15.407(a)(6)-(8) (setting forth power limits for client devices).

<sup>5</sup> See Draft KDB at 12-18.

<sup>6</sup> See *Id.* at 12.

case if the Lab maintains these distinctions and the consumer purchases a device certified under the 6XD or 6FX class.

Under the 6 GHz rules, network operators deploying 6 GHz local area networks indoors can use standard power APs to leverage higher power levels, indoor APs to leverage access to additional sub-bands, or a mix of these APs to best address network coverage and capacity. But if non-fixed client devices can operate only with standard power *or* indoor APs, these operators must choose between two unfavorable outcomes: they must either deploy 6 GHz networks that are incapable of serving a subset of non-fixed clients, or deploy redundant indoor and standard power APs to ensure that they can serve each of the different administrative classes.

Organizations, including educational institutions and libraries, whose networks must accommodate a diverse set of users might have no choice but to deploy redundant APs under the latter scenario. These deployments would be inefficient on several levels. First, the networks would be spectrally inefficient, as operators would need to use separate unique channels to accommodate the different administrative classes. Deploying redundant APs would also significantly increase network deployment costs. Finally, these networks would be far less energy efficient than if a single type of AP could serve all clients.<sup>7</sup>

### **3. The 6 GHz rules allow both subordinate devices and access points to operate as mesh nodes.**

The draft KDB only discusses mesh networking in the context of subordinate devices, noting that “[a] Subordinate device includes equipment such as Wi-Fi extenders and mesh networks.”<sup>8</sup> This statement is true as far as it goes. However, the draft KDB does not discuss mesh networking in any other context, potentially raising questions about how mesh devices can be certified for outdoor use.

The 6 GHz rules clearly state that “[a]ccess points and subordinate devices may connect to other access points or subordinate devices,”<sup>9</sup> thus, a mesh node may be certified as *either* a subordinate device or as an access point. The KDB does not necessarily contradict these rules, but its silence on the possibility of certifying a mesh device as a standard power access point could be misinterpreted and generate confusion about whether outdoor mesh devices are

---

<sup>7</sup> If the Lab retains the existing categories of non-fixed client devices, we note some typographical errors in the first sentence in footnote 9. That sentence should read “[i]ndoor client (6XD) devices are limited to indoor locations by ~~15.407(b)(3)~~ 47 C.F.R. §15.407(d)(3), stating that a client under control of an indoor access point or ~~subordinate~~ subordinate device 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. See 47 C.F.R. 15.407(a)(8).” Similarly, we note that page 12’s list of requirements for Standard Client Devices (6FX) fails to include the requirement that such devices can operate at 30 dBm max and no more than 6 dB below what is authorized by the AFC for the standard-power AP. Compare Draft KDB Table 3.

<sup>8</sup> Draft KDB at 8.

<sup>9</sup> 47 C.F.R. § 15.407(d)(5).

permitted. Thus, the KDB should specifically recognize the possibility of certifying a mesh device as either a subordinate device or as an access point.<sup>10</sup>

#### **4. The Lab should specify the required behavior for standard power access points upon power up.**

Standard power access points are required to obtain channel availability information from the AFC and use that information to select a permissible channel of operation before beginning transmissions.<sup>11</sup> However, the draft KDB does not specify that standard power access points must maintain their radios in a powered-off state—including when the device is initially powered on—until the access point obtains the necessary channel availability information from the AFC. For clarity, we recommend adding this requirement to the requirements for standard power access points outlined in section 4.1 of the draft KDB.

However, it is equally important to ensure that this guidance does not prevent the operation of composite devices—i.e., devices certified under both equipment classes 6SD (standard power access points) and 6ID (low-power indoor access points). Thus, the Lab should take care to impose this requirement only on devices certified *only* as standard power access points. For composite devices, the KDB should only restrict operations to power levels authorized for low-power indoor access points in the absence of AFC channel availability information, and not require that the radio is powered down altogether.

#### **5. The Lab should clarify the role of low-power access point enabling signals.**

Section 3.1 of the draft KDB discusses the requirement for a low power indoor access point to “provide an indoor identification or method to enable clients or subordinates to operate indoors at a power level and power spectral density in accordance with the rules for indoor access points (6ID) and no greater than as granted.”<sup>12</sup> Cisco agrees that a low power indoor access point should send a suitable enabling signal to client devices, with sufficient information to allow them to comply with section 15.407(a)(3)(iii), which limits the PSD and EIRP for client devices associated with low power indoor access points. Specifically, the AP should send an enabling signal that specifies the authorized power level of the access point, allowing the client device to select a power level 6 dB lower.<sup>13</sup>

---

<sup>10</sup> Certification of mesh devices such as standard power access points will require appropriate geolocation solutions to ensure that each access point in the mesh network is properly geolocated and assigned a permissible channel by the AFC. The Lab can address these issues, however, in its approval of specific geolocation solutions, including through the Persistent Inquiry Approval (“PIA”) process.

<sup>11</sup> 47 C.F.R. § 15.407(k)(1).

<sup>12</sup> Draft KDB at 7 (internal citation omitted).

<sup>13</sup> This would ensure compliance with both section 15.407(a)(8), which sets a maximum EIRP for client devices that is six dB lower than the EIRP limit for Low Power Indoor Access Points (specifically –1 dBm/MHz and 24 dBm total in the device’s band of operation), as well as section 15.407(a)(7), depending on the type of access point with which the client device is associated.

If this is what section 3.1 of the draft KDB requires, then Cisco agrees that these requirements are appropriate. However, the draft KDB's requirement for a low-power indoor access point to provide an enabling signal that allows a client device to operate at a power level "no greater than as granted"<sup>14</sup> could be read to go further, and impose requirements not contemplated by the rules. It is unclear what grant this clause refers to. However, because this section discusses low-power indoor access points, it cannot refer to channel-availability information provided by the AFC. It could, potentially, be read to refer to the power limits specified in a client device's own equipment authorization. However, there is no requirement in the 6 GHz rules that a low-power indoor access point somehow enforce client devices' compliance with their own authorized power limits, and there is no practical way for them to do so without greatly increasing the cost and complexity of these access points. Accordingly, Cisco recommends that the Lab strike the clause "and no greater than as granted" from the end of the first paragraph of section 3.1, and make clear that a low power indoor access point is only required to transmit its own operating EIRP, and is not required to take any further steps to set or verify the client device's EIRP.

Cisco has no objection to the Lab's clarifying that a client device must always comply with its own authorized power limits where those are lower than would otherwise be allowed under the rules. But, consistent with the 6 GHz rules, there should be no requirement for a low power indoor access point to take an active role in enforcing this limit.

#### **6. The Lab should clarify that a soft reboot does not constitute a power cycle.**

Cisco suggests revising Section 10.2.3 (Geolocation Accuracy After a Power Cycle) to clarify the meaning of a "Power Cycle." Footnote 25 defines a power cycle as "when the power source cycles from on to off to on."<sup>15</sup> We recommend that the Lab clarify that a soft reboot of a 6 GHz radio does not constitute a power cycle.

\* \* \* \*

In sum, the FCC's rules define a single category of non-fixed client device that must adhere to operating parameters based on the type of AP that controls it. But these rules do not contemplate a category of non-fixed clients that are *per se* prohibited from connecting to certain types of APs. The Lab should remove administrative classes for non-fixed clients that impose this restriction. The Lab should also make the other targeted changes to the draft guidance described above to ensure that devices can be certified and operated consistent with the *6 GHz Report and Order* and the U-NII rules.

---

<sup>14</sup> Draft KDB at 7.

<sup>15</sup> *Id.* at 20 n.25.