



Federal Communications Commission
Office of Engineering and Technology
Laboratory Division

October 10 2024

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. Allowed device types are as follows:

- i. **Standard Power Access Point**—These devices can be installed indoors or outdoors, and an AFC database is utilized to determine available channels and power levels for their operation. The access point must limit its EIRP to 21 dBm above 30-degree antenna elevation angles if installed outside.
- ii. **The client is 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**—An Indoor or outdoor client device that connects to a Standard Power Access point and is installed in a fixed location. These devices shall have the exact certification requirements as Standard Power Access Points (AFC required, power levels, etc.).
- iv. **Low-Power indoor Access Point**—This type is limited to indoor use. It must not have a weatherized enclosure, be powered from a wired connection, run on batteries, or have an integrated antenna. A contention-based protocol is required to protect incumbent users.
- v. **Clients connected to low-power indoor Access Points—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. It must use a contention-based protocol. Power limits are the same as those of a low-power indoor access point.
- vii. **Dual Client:** These client devices can connect to Standard Power APs and low-power indoor APs.
- viii. **Very Low Power**—Indoor/Outdoor devices that do not need to be controlled by an access point or an AFC.

Q2. Can these devices be certified for vehicular use?

A2. Except for VLP, these devices cannot be used on cars, trains, boats, or aircraft. Low-power indoor 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. 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 Automatic Power Control (APC) required for client devices?

A5. APC is required for all client devices connected to Standard Power Access Points, excluding Fixed Client devices. The APC mechanism shall limit client power to 6 dB below its associated Standard Power APs authorized transmit power level. APC is not required for client devices connected to Low-Power indoor Access Points and Subordinate devices. Note that APC is not the same as TPC.

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

A6. Yes. A Dual Client device may work with a Standard and low-power indoor AP. In this case, the client shall meet all the requirements for an Outdoor Client and 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. Direct Client-to-client communication is prohibited except for VLP devices.

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 yet to be made, a new original equipment application can be filed under the same FCC ID. Suppose the granted application is not already a composite. In that case, the TCB shall send an inquiry to the FCC to request that the FCC place the application in audit mode, thereby allowing the 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. An 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 bandwidths in each channel shall be measured.

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

A10. No. Compliance with OOB limits only applies outside 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 Form 731 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 to the highest frequency. 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 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 the frequency range for each contiguous frequency span of operation in U-NII sub-band five and U-NII sub-band seven separately. In no case are channels permitted to span 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. 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. 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 > the nominal bandwidth.

Q14. Is the 6 dB reduction required on the PSD and the conducted power for a client device connected to a standard power access point?

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. The EUT cannot transmit anything, including intermittent control signals, on the 10 MHz band occupied by the AWGN signal.

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 at which the device starts transmitting again. What is the lowest AWGN signal level the EUT detects and determines the medium is busy?

Q17. Can the Standard power equipment class be added to the existing LPI AP?

A17. A 6ID device may add 6SD by submitting a new application with the same FCC ID. However, this device cannot be used outdoors because of the form factor restrictions. A new ID is required when the device is installed outdoors with a new weatherized enclosure.

Q18. Can 99% bandwidth be used to show compliance with the 320 MHz maximum bandwidth requirement?

A18. Yes. The test report must show the 99% and 26 dB bandwidths for all bandwidths used by the device.

Q19. Can a VLP device connect to a Standard Power or LPI AP?

A19. Yes (see Figure 1 in DO1)

Q20. Can an LPI Client (6XD & 6CD) connect to an LPI/SP AP composite?

A20. Yes, only if the AP composite has an indoor form factor.

Change notice :

08/07/2023 : 987594 D03 U-NII 6 GHz QA v02 replaces 987594 D03 U-NII 6 GHz QA v01. Phase 2 restriction removed.

10/10/2024: 987594 D03 U-NII 6 GHz QA v03 replaces 987594 D03 U-NII 6 GHz QA v02. v03 updates 987594 to add new unlicensed rules under FCC 23-86, effective 03/08/2024, by permitting very low-power (VLP) devices under equipment class 6VL in the U-NII-5 (5.925–6.425 MHz) and U-NII-7 (6.525–6.875 MHz) portions of the 6 GHz band.