



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

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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 example, 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 OOB 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

Fundamental signal: 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:

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

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 including the Tool Report that is provided from the AFC DUT test harness and the applicable DUT spectrum inquiry request/response logs as appendices.

14. Operating Modes

List all modes of operation, such as:

1. Is channel puncturing supported?
2. If indoor AP is a composite of LPI and St. power, does it support dividing a single channel between LPI client and Standard client? And if so, is power boosting supported?
3. Partial RU configurations supported?

Change Note:

08/07/2023: 987594 D04 UN6GHZ Pre-Approval Guidance Checklist v02 replaces 987594 D04 UN6GHZ Pre-Approval Guidance Checklist v01. Phase 2 questions 12-14 added.