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UN6GHZ PRE-APPROVAL GUIDANCE CHECKLIST

Date: 2024-05-06

To:
Federal Communications Commission
Authorization and Evaluation Division
7435 Oakland Mills Road
Columbia, MD

FCC ID: 2A49R-MS-01

Subjects: 987594 D04 UN6GHZ Pre-Approval Guidance Checklist v01

Requirements		Explanation
1, Antennas	1.1 Information for all the antennas, i.e., type, gain and relative positions within host, must be included in the filing	Detail in documents "Antenna specification", "EUT Internal Photos"and "Working principle Description".
	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.	Please refer to test report “RF231116004-03-005 FCC part 15E(WIFI 6e)“ page 20. Unequal antenna gains, with equal transmit powers. For antenna gains given by G_1, G_2, …, G_NdBi If transmit signals are correlated, then Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/N_{ANT}]$ dBi [Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently. G1, G2... GN is not the maximum gain value, but the actual gain value for each phase. Only max Directional gain was recorded]
	1.3 For conducted test in MIMO cases, show that the testing was done for that path that has the lowest antenna gain.	For conducted test in MIMO cases, the testing was done for that path that has the lowest antenna gain.

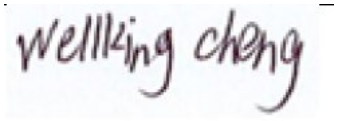
<table>
<tr><td rowspan="8">2. Contention Based Protocol (CBP)</td><td>2.1 CBP testing shall be performed on one channel in each sub-band of operation for both narrowest and widest bandwidths</td><td>Yes, Please refer to the module (FCC ID: RAS-MT7922A22M) test report “RFBARR-WTW-P21030485A-6 “ at page 240-251.</td></tr>
<tr><td>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</td><td>Yes, Please refer to the module (FCC ID: RAS-MT7922A22M) test report “RFBARR-WTW-P21030485A-6 “.</td></tr>
<tr><td>2.3 Report lowest AWGN signal detectable by EUT</td><td>Yes, Please refer to the module (FCC ID: RAS-MT7922A22M) test report “RFBARR-WTW-P21030485A-6 “.</td></tr>
<tr><td>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 instance a table like the following (or similar) shall be reported:
<table>
<tr><td>UNII Band</td><td>…</td><td>…</td><td>…</td></tr>
<tr><td>Channel Number</td><td>…</td><td>…</td><td>…</td></tr>
<tr><td>Bandwidth (MHz)</td><td>…</td><td>…</td><td>…</td></tr>
<tr><td>EUT Frequency (MHz)</td><td>…</td><td>…</td><td>…</td></tr>
<tr><td>AWGN Frequency (MHz)</td><td>…</td><td>…</td><td>…</td></tr>
<tr><td>AWGN Power (dBm)</td><td>-65.5</td><td>-70.4</td><td>-80.0</td></tr>
<tr><td>Antenna Gain (dBi)</td><td>3</td><td>3</td><td>3</td></tr>
<tr><td>Path Loss (dB)</td><td>0.2</td><td>0.2</td><td>0.2</td></tr>
<tr><td>Adjusted Power (dBm)</td><td>-68.3</td><td>-73.2</td><td>-82.8</td></tr>
<tr><td>Detection Limit (dBm)</td><td>-62</td><td>-62</td><td>-62</td></tr>
<tr><td>EUT Tx Status[1]</td><td>OFF</td><td>Minimal</td><td>ON</td></tr>
<tr><td colspan="4">[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</td></tr>
</table></td><td>Yes, Please refer to the module (FCC ID: RAS-MT7922A22M) test report “RFBARR-WTW-P21030485A-6 “.</td></tr>
<tr><td>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)</td><td>Yes, Please refer to the module (FCC ID: RAS-MT7922A22M) test report “RFBARR-WTW-P21030485A-6 “.</td></tr>
<tr><td>2.6 Include plots showing EUT has stopped transmitting after detection of AWGN signal.</td><td>Yes, Please refer to the module (FCC ID: RAS-MT7922A22M) test report “RFBARR-WTW-P21030485A-6 “.</td></tr>
<tr><td>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.</td><td>Yes, Please refer to the module (FCC ID: RAS-MT7922A22M) test report “RFBARR-WTW-P21030485A-6 “.</td></tr>
<tr><td>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.</td><td>N/A, conducted measurements are used</td></tr>
<tr><td rowspan="2">3. Client Device Limitations</td><td>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</td><td>Yes, Please refer to " User manual“</td></tr>
<tr><td>3.2 Requires attestation (as a Form 731 exhibit) stating that the device can only operate under the</td><td>Yes, Please refer to " User manual“</td></tr>
</table>

	control of a low-power indoor access point and subordinate.	
	3.3 No vehicular use, except large aircrafts above 10000 ft.	Yes, Please refer to " User manual“
	3.4 Transmit Power Control (TPC) required for client devices connected to Standard Power Access Points, excluding Fixed Client devices	Yes, this is Fixed Client devices
	3.5 Show/justify enclosure is not weatherized for Subordinate and APs.	Yes
4. Emission Mask	4.1 Power spectral density suppression complies with 47 CFR § 15.407(b)(6).	Yes
	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.	The EUT supports OFDMA, For 802.11 ax, Please refer to test report RF231116004-03-005 FCC part 15E(WIFI 6e)-CG“ page 13-17 for detail of the test modes.
	4.3 OOBE 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.	Yes, All in-band emissions meet the channel mask. Please refer to the module (FCC ID: RAS-MT7922A22M) test report “RFBARR-WTW-P21030485A-6 “.
5. Filing	99% of the occupied bandwidth must be contained within all the U-NII sub bands authorized for that equipment class	YES, See 99% of the occupied bandwidth test results. Please refer to the module (FCC ID: RAS-MT7922A22M) test report “RFBARR-WTW-P21030485A-6 “.
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.	N/A as VoLTE is not supported
	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.	“indoor use only“ on the label and manual.
	7.2 E-labelling may be acceptable if proper justification is provided	N/A
8. Modular Certifications	8.1 Modular approval letter to be uploaded with the application	N/A
	8.2 No subordinate devices can be modules	

(when applicable)	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	Mobile use
	9.2 Address f > 6 GHz RF exposure via most recent applicable KDB or TCB Workshop procedures	Yes
	9.3 Address all applicable simultaneous transmission conditions using the compliance condition TER≤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.	Yes
10. Security	Provide specific exhibit with device security description is required (complying with 47 CFR § 15.407(i))	Please See file " SOFTWARE SECURITY INFORMATION"
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	Yes, The test was carried out at standard heights on three axes.

If you have any questions, please feel free to contact us at the address shown below

Sincerely



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