RF EXPOSURE EVALUATION

1. PRODUCT INFORMATION

FCC ID	2BBX7APLUS
Product Description	Rc Quadcopter
Model Name	X7 Ranger PLUS
Frequency Band (Operating)	☐WLAN: 2.412GHz ~ 2.462GHz ☒WLAN: 5.18GHz ~ 5.24GHz ☐WLAN: 5.745GHz ~ 5825GHz ☐Bluetooth: 2.402GHz ~ 2.480GHz ☐Others
Device Category	☐Portable (<20cm separation) ☒Mobile (≥20cm separation)
Antenna Diversity	☐Single antenna ☒Multiple antennas
Max. Output Power	ANT1:IEEE 802.11a(HT20): 8.25dBm; ANT2:IEEE 802.11a(HT20): 7.83dBm;
Antenna Gain	5GHz WIFI: Antenna 1: 3.74dBi, Antenna 2: 3.74dBi
Minimum Assessment Distance	20cm
Evaluation Applied	☒MPE Evaluation ☐SAR Evaluation
Evaluation Result	Pass

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2. PORTABLE DEVICE EVALUATION METHOD AND LIMIT

Following FCC KDB 447498 D01 “General SAR test exclusion guidance” The corresponding SAR Exclusion Threshold condition, listed below:

1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤50 mm are determined by:
   [(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] [if(GHz)] s 3.0 for 1-g SAR and ñ 7.5 for 10-g extremity SAR, where
   - f(GHz) is the RF channel transmit frequency in GHz.
   - Power and distance are rounded to the nearest mW and mm before calculation.
   - The result is rounded to one decimal place for comparison The test exclusions are applicable only when the minimum test separation distance is ≤50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

2) At 100 MHz to 6 GHz and for test separation distances > 50 mm, the SAR test exclusion threshold is determined according to the following:
   a) [Threshold at 50 mm in step 1) + (test separation distance - 50mm) (f(MHz)/150)] mW, at 100MHz to 1500 MHz;
   b) [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)-10] mW at > 1500 MHz and ≤6 GHz;

3) At frequencies below 100 MHz, the following may be considered for SAR test exclusion.
   a) The threshold at the corresponding test separation distance at 100 MHz in step 2) is multiplied by [1 + log(100/f(MHz))] for test separation distances > 50 mm and < 200 mm.
   b) The threshold determined by the equation in a) for 50 mm and 100 MHz is multiplied by 1/2 for test separation distances ñ 50 mm.
   c) SAR measurement procedures are not established below 100 MHz. When SAR test exclusion cannot be applied, a KDB inquiry is required to determine SAR evaluation requirements for any test results to be acceptable.

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3. MOBILE DEVICE EVALUATION METHOD AND LIMIT

Human exposure to RF emissions from mobile devices (47 CFR §2.1091) may be evaluated based on the MPE limits adopted by the FCC for electric and magnetic field strength and/or power density, as appropriate, since exposures are assumed to occur at distances of 20 cm or more from persons.

LIMITS FOR GENERAL POPULATION / UNCONTROLLED EXPOSURE

Frequency Range (MHz)	E-field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (Minutes)
0.3 -- 1.34	614	1.63	(100)*	30
1.34 -- 30	824/f	2.19/f	($180/f^2$)*	30
30 -- 300	27.5	0.073	0.2	30
300 -- 1500	--	--	f/1500	30
1500 -- 100,000	--	--	1.0	30

*Note:

1. f= Frequency in MHz * Plane-wave Equivalent Power Density
2. The averaging time for General Population/Uncontrolled exposure to fixed transmitters is not applicable for mobile and portable transmitters. See 47 CFR §§2.1091 and 2.1093 on source-based time-averaging requirement for mobile and portable transmitters.

$S=PG/4\pi R^2$

Where:

S=power density

P=power input to antenna

G=power gain of the antenna in the direction of interest relative to an isotropic radiator R=distance to the center of radiation of the antenna

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4. MEASUREMENT RESULT

A minimum test separation distance ≥ 20 cm is required between the antenna and radiating structures of the device and nearby persons to apply mobile device exposure limits. The distance must be at least 20 cm and fully supported by the operating and installation configurations of the transmitter and its antenna(s), according to the source-based time-averaged maximum power requirements of § 2.1091(d)(2). In cases where cable losses or other attenuations are applied to determine compliance, the most conservative operating configurations and exposure conditions must be evaluated.

5G WLAN antenna 1: Antenna Gain=3.74dBi (Numeric 2.37), π=3.14

5G WLAN antenna 2: Antenna Gain=3.74dBi (Numeric 2.37), π=3.14

Test Mode	Test Frequency (MHz)	Max.Output Power (dBm)	Max.Output Power (mW)	Power Density (mW/cm^2)	Measurement Limit (mW/cm^2)
5GWIFI Ant 1	5180	8.25	6.68	0.003147389	1
5GWIFI Ant 2	5240	7.83	6.07	0.002857264	1
5GWIFI MIMO	5240	11.04	12.71	0.005983432	1

Note：

1. Calculate the SAR test to eliminate thresholds from chapter 2 conditions "3" formula.
2. Max Power (mW) = $10^{(\text{Max power (dBm)}/10)}$
3. This device does not support multi -launch mode when the wireless function is evaluated.

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