



Maximum Permissible Exposure Evaluation

FCC ID: 2ALYRHG-D04

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) Radiation as specified in §1.1307(b).

EUT Specification

Product Name:	Intelligent Flight Equipment
Trade Mark:	NA
Model/Type Reference:	HG-D04
Listed Model(s):	NA
Model Differences:	NA
Frequency Band (Operating)	BLE: 2402MHz ~ 2480MHz
	2.4G XB: BLE: 2402 - 2480 MHz (for 1 Mbps operating mode) 2404 - 2478 MHz (for 2 Mbps operating mode)
	Zigbee: 2405MHz ~ 2480MHz
	900M XB: 902.5MHz ~ 927.5MHz
	U-NII-3: 5745MHz ~ 5825MHz
Device Category	<input type="checkbox"/> Portable (<5mm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Fixed (>20cm separation) <input type="checkbox"/> Others _____
Exposure Classification	<input type="checkbox"/> Occupational/Controlled exposure (S=5mW/cm ²) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm ²)
Antenna Diversity	<input type="checkbox"/> Single antenna <input checked="" type="checkbox"/> Multiple antennas <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input type="checkbox"/> Tx/Rx diversity
Antenna Gain (Max)	BLE: 0.5dBi 2.4G XB: 4dBi 900M XB: 15.1dBi RLAN: ANT1: 1.96dBi; ANT2: 4.86dBi
Evaluation Applied	<input checked="" type="checkbox"/> MPE Evaluation <input type="checkbox"/> SAR Evaluation

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**Limits for Maximum Permissible Exposure (MPE)**

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
(A) Limits for Occupational/Controlled Exposure				
300-1500	--	--	F/300	<6
1500-100000	--	--	5	<6
(B) Limits for General Population/Uncontrolled Exposure				
300-1500	--	--	F/1500	<30
1500-100000	--	--	1	<30

Calculation Method

Friis transmission formula: $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2)$

Where:

P_d = Power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

P_d limit of MPE is 1mW/cm². If we know the maximum gain of the antenna and total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

Measurement Result

Mode	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Tune Up Tolerance (dB)	Max. Tune Up Power (dBm)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)
BLE	2402	0.5	2.11	±1	3.11	0.00036	1
RLAN U-NII-3 802.11a ant1	5785	1.96	16.95	±1	17.95	0.01548	1

2.4G XB

Mode	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)
BLE	2402	4	19.6	0.0456	1
Zigbee	2405	4	19.44	0.0439	1

900M XB

$$r = \sqrt{\frac{P \cdot G}{4 \cdot \pi \cdot S}} = \sqrt{\frac{EIRP}{4 \cdot \pi \cdot S}}$$

$$S = f/1500 = 902.5/1500 = 0.6 \text{ mW/cm}^2$$

$$EIRP = 36.0 \text{ dBm} = 10^{36/10} \text{ mW} = 3981 \text{ mW (Worst Case)}$$

$$(\text{Minimum Safe Distance, } r) = \sqrt{\frac{EIRP}{4 \cdot \pi \cdot S}} = \sqrt{\frac{3981}{4 \cdot \pi \cdot (0.6)}} \approx 23 \text{ cm}$$

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RLAN	BLE	2.4G XB	900M XB	Total Power density at 20cm (mW/cm ²)	Power density Limit (mW/cm ²)
0.01548	0.00036	0.0456	0.6	0.66144	1

Note:

1. Calculate in the worst-case mode.
2. Max. Tune Up Power is declared by manufacturer, and used to calculate.
3. For a more detailed features description, please refer to the RF Test Report.

*****THE END*****