



Maximum Permissible Exposure Evaluation

FCC ID: PADWF156

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:	Bike Computer
Trade Mark:	WAHOO FITNESS
Model/Type Reference:	WF156
Listed Model(s):	/
Model Differences:	/
Frequency Band (Operating)	BT: 2402MHz ~ 2480MHz WLAN: 2412MHz ~ 2462MHz U-NII-1: 5180MHz ~ 5240MHz U-NII-2A: 5260MHz ~ 5320MHz U-NII-2C: 5500MHz ~ 5700MHz U-NII-3: 5745MHz ~ 5825MHz ANT+: 2457MHz
Device Category	<input type="checkbox"/> Portable (<5mm separation) <input type="checkbox"/> Mobile (>20cm separation) <input checked="" 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)	ANT+: 2.84dBi BT: 2.86dBi 2.4G WIFI: 0.5dBi 5G WIFI: 0.2dBi
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: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

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.

$$e_{irp} = p_t \times g_t = (E \times d)^2 / 30$$

where:

p_t = transmitter output power in watts,

g_t = numeric gain of the transmitting antenna (unitless),

E = electric field strength in V/m, --- $10^{((dBuV/m)/20)/10^6}$

d = measurement distance in meters (m), --- 3m

$$\text{So } p_t = (E \times d)^2 / (30 \times g_t)$$

ANT+ 2457MHz Field strength = 87.41 dBuV/m @3m

Ant gain = 2.84dBi, Ant numeric gain = 1.92

$$\text{So } p_t = \{ [10^{(87.41/20)/10^6} \times 3]^2 / (30 \times 1.92) \} \times 1000 \text{ mW} = 0.0859 \text{ mW} = -10.66 \text{ dBm}$$



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	2480	2.86	-1.279	± 1	-0.5	0.0003	1
WLAN 802.11g	2412	0.5	18.37	± 1	19.0	0.0177	1
RLAN U-NII-3 802.11a	5785	0.2	17.88	± 1	19.0	0.0165	1

The BT and WIFI can transmit simultaneously.

BT Power density at 20cm (mW/cm ²)	WLAN Power density at 20cm (mW/cm ²)	Total Power density at 20cm (mW/cm ²)	Power density Limit (mW/cm ²)
0.0003	0.0177	0.0180	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*****