

## RF EXPOSURE EVALUATION

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)

FCC ID: 2AQI5-GS1200

### EUT Specification

<b>EUT</b>	<b>PowerRoam Portable Power Station</b>
<b>Frequency band (Operating)</b>	<input checked="" type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz <input type="checkbox"/> WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz <input type="checkbox"/> WLAN: 5.745GHz ~ 5825GHz <input checked="" type="checkbox"/> Others: BLE: 2402-2480MHz
<b>Device category</b>	<input type="checkbox"/> Portable (<20cm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others ____
<b>Exposure classification</b>	<input type="checkbox"/> Occupational/Controlled exposure <input checked="" type="checkbox"/> General Population/Uncontrolled exposure
<b>Antenna diversity</b>	<input checked="" type="checkbox"/> Single antenna <input type="checkbox"/> Multiple antennas <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input type="checkbox"/> Tx/Rx diversity
<b>Max. output power</b>	WiFi 2.4G: 20.62dBm (0.1153W) BLE: 5.85dBm (0.0038W)
<b>Antenna gain (Max)</b>	3.96 dBi
<b>Evaluation applied</b>	<input checked="" type="checkbox"/> MPE Evaluation <input type="checkbox"/> SAR Evaluation

Limits for Maximum Permissible Exposure(MPE)

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density(mW/cm <sup>2</sup> )	Average Time
<b>(A) Limits for Occupational/Control Exposures</b>				
300-1500	--	--	<b>F/300</b>	<b>6</b>
1500-100000	--	--	<b>5</b>	<b>6</b>
<b>(B) Limits for General Population/Uncontrol Exposures</b>				
300-1500	--	--	<b>F/1500</b>	<b>30</b>
1500-100000	--	--	<b>1</b>	<b>30</b>

## Friis transmission formula: $P_d = \frac{P_{out} * G}{4 * \pi * R^2}$

Where

$P_d$  = Power density in  $mW/cm^2$

$P_{out}$  = output power to antenna in Mw

$G$  = gain of antenna in linear scale

$\pi = 3.1416$

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

$P_d$  the limit of MPE. 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

Operating Mode	Channel Frequency (MHz)	Maximum output power (dBm)	Tune up tolerance (dBm)	Max. Tune up Power (dBm)	Antenna Gain (dBi)	Power density at 20cm ( $mW/cm^2$ )	Power density Limits ( $mW/cm^2$ )
802.11b	2412	18.91	18.91 $\pm$ 1	19.91	3.96	0.0485	1
	2437	19.96	19.96 $\pm$ 1	20.96	3.96	0.0618	1
	2462	20.62	20.62 $\pm$ 1	21.62	3.96	0.0719	1
802.11g	2412	18.87	18.87 $\pm$ 1	19.87	3.96	0.0481	1
	2437	19.93	19.93 $\pm$ 1	20.93	3.96	0.0614	1
	2462	20.56	20.56 $\pm$ 1	21.56	3.96	0.0709	1
802.11n (HT20)	2412	18.34	18.34 $\pm$ 1	19.34	3.96	0.0426	1
	2437	18.98	18.98 $\pm$ 1	19.98	3.96	0.0493	1
	2462	19.56	19.56 $\pm$ 1	20.56	3.96	0.0564	1
802.11n (HT40)	2422	15.51	15.51 $\pm$ 1	16.51	3.96	0.0222	1
	2437	16.38	16.38 $\pm$ 1	17.38	3.96	0.0271	1
	2452	16.42	16.42 $\pm$ 1	17.42	3.96	0.0273	1
GFSK	2402	4.40	4.40 $\pm$ 1	5.40	3.96	0.0017	1
	2440	5.76	5.76 $\pm$ 1	6.76	3.96	0.0023	1
	2480	5.85	5.85 $\pm$ 1	6.85	3.96	0.0024	1

Note: BLE&WiFi cannot support simultaneous transmission.

Result: No Standalone SAR test is required.