

1. RF Exposure Requirements

1.1 General Information

Client Information

Applicant:	AcoustMax International Corporation
Address of applicant:	Room 501,Lingyun Building ,HongLang North 2 Road, Baoan District, ShenZhen, China
Manufacturer:	AcoustMax International Corporation
Address of manufacturer:	Room 501,Lingyun Building ,HongLang North 2 Road, Baoan District, ShenZhen, China

General Description of EUT:

Product Name:	PBS2W
Trade Name	Pioneer
Model No.:	PBS2W
	PBS2W-EB, PBS2W-BK, PBS2W-BL, PBS2W-CR, PBS2W-DB, PBS2W-FG, PBS2W-GD, PBS2W-GR, PBS2W-GY, PBS2W-HW, PBS2W-IV, PBS2W-LW, PBS2W-NW, PBS2W-NV, PBS2W-OK, PBS2W-RD, PBS2W-SL, PBS2W-SG, PBS2W-WL, PBS2W-WH, PBS2W-EL, PBS2W-EX, PBS2W-LE, PBS2W-LX, PBS2W-PLM, PBS2W-PR, PBS2W-SIG, PBS2W-V, PBS3L-BK, PBS3L-BL, PBS3L-BZ, PBS3L-BN, PBS3L-CG, PBS3L-CM, PBS3L-CR, PBS3L-DB, PBS3L-GD, PBS3L-GR, PBS3L-GY, PBS3L-NV, PBS3L-OV, PBS3L-IV, PBS3L-OR, PBS3L-PK, PBS3L-PU, PBS3L-RD, PBS3L-SL, PBS3L-TN, PBS3L-SG, PBS3L-TG, PBS3L-WH, PBS3L-YL, PBS3L-EL, PBS3L-EX, PBS3L-LE, PBS3L-LX, PBS3L-PLM, PBS3L-PR, PBS3L-SIG, PBS3L-V, PBS3L
Adding Model(s):	
Rated Voltage:	USB-C Input : 5V/3A, 9 V/2.22A, 12 V/1.67A Battery: DC 7.4V
Battery Capacity:	2500mAh
Adapter Model:	/
FCC ID:	2BAA5-PBS2W
Equipment Type:	Portable device

Technical Characteristics of EUT:

Bluetooth (LE mode)

Bluetooth Version:	V5.4 (LE mode)
Frequency Range:	2402-2480MHz
RF Output Power:	1Mbps:-0.51dBm (Conducted) 2Mbps: -0.11dBm (Conducted)
Data Rate:	1Mbps, 2Mbps
Modulation:	GFSK

Quantity of Channels:	40
Channel Separation:	2MHz
Type of Antenna:	Chip Antenna
Antenna Gain:	1.86dBi
Bluetooth (BR/EDR mode)	
Bluetooth Version:	V5.4 (BR/EDR mode)
Frequency Range:	2402-2480MHz
RF Output Power:	0.50dBm (Conducted)
Data Rate:	1Mbps, 2Mbps, 3Mbps
Modulation:	GFSK, $\pi/4$ DQPSK, 8DPSK
Quantity of Channels:	79
Channel Separation:	1MHz
Type of Antenna:	Chip Antenna
Antenna Gain:	1.86dBi

1.2 RF Exposure Exemption

According to §1.1307(b)(3) and KDB 447498 D04 Interim General RF Exposure Guidance v01, system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

Option A: FCC Rule Part 1.1307 (b)(3)(i)(A): The available maximum time-averaged power is no more than 1mW, regardless of separation distance.

Option B: FCC Rule Part 1.1307 (b)(3)(i)(B): The available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula. P_{th} is given by:

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

d = the separation distance (cm);

Option C: FCC Rule Part 1.1307 (b)(3)(i)(C): The minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. R must be at least $\lambda/2\pi$, where λ is the free-space operating wavelength in meters.

Single RF Sources Subject to Routine Environmental Evaluation	
RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	$1,920 R^2$
1.34-30	$3,450 R^2/f^2$
30-300	$3.83 R^2$
300-1,500	$0.0128 R^2 f$
1,500-100,000	$19.2 R^2$

For Multiple RF sources: FCC Rule Part 1.1307(b)(3)(ii):

- (A) The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required).
- (B) In the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k} \leq 1$$

1.3 Calculated Result

Radio Access Technology	Prediction Frequency (MHz)	Output Power (dBm)	Antenna Gain (dBi)	Duty Cycle (%)	Tune-Up Time-Averaged Power (dBm)	ERP (dBm)
Bluetooth (LE mode)	2402	-0.11	1.86	100	0.00	-0.29
Bluetooth (BR/EDR mode)	2402	0.50	1.86	100	1.00	0.71

Frequency (MHz)	Option	Min. Distance (cm)	Max. Power (dBm) (mW)		Exposure Limit (mW)	Ratio	Result Pass/Fail
2402	B	0.5	0.00	1.00	2.788	0.36	Pass
2402	B	0.5	1.00	1.26	2.788	0.45	Pass

Note: 1. Time-Averaged Power=Output Power * Duty Cycle; ERP= Time-Averaged Power+ Antenna gain-2.15dB

2. Option A, B and C refers as clause 1.2.

3. For option B, Max (time-averaged power, effective radiated power (ERP)) converts to Max. Power. For option C, ERP converts to Max. Power;

4. For option B, P_{th} (mW) converts to Exposure Limit (mW); For option C, ERP (W) converts to Exposure Limit (mW).

5. Ratio= Tune-Up ERP (mW)/ Exposure Limit (mW)

Mode for Simultaneous Multi-band Transmission:

Radio Access Technology	Ratio 1	Ratio 2	Simultaneous Ratio	Limit	Result Pass/Fail
LE + BR/EDR	0.36	0.45	0.81	1	Pass

Result: Pass