1. RF Exposure Requirements

1.1 General Information

Client Information

Applicant:	Jiangmen Purevox Science and Technology Co., Ltd.
Address of applicant:	Floor 3, Building 5, No. 46-1, Xiyongli, Pengjiang District, Jiangmen, Guangdong, China
Manufacturer:	Jiangmen Purevox Science and Technology Co., Ltd.
Address of manufacturer:	Floor 3, Building 5, No. 46-1, Xiyongli, Pengjiang District, Jiangmen, Guangdong, China

General Description of EUT:

Product Name:	Wireless Speakers
Trade Name	/
Model No.:	YYS-K1
Adding Model(s):	YYS-K3, YYS-K5, YYS-K1Micro, YYS-K8, YYS-K9, YYS-K9Micro, YYS-K11, YYS-K6, YYS-K6Micro, YYS-K7, YYS-K10, BT-2309, LS-12, LS-12M, HM-A9, HM-A9Pro, 2403, 2310, 2312, 2312Micro, DPV-S001, DPV-S002, DPV-S003, DPV-S004, DPV-S005, DPV-S006, DPV-S007, DPV-S008, DPV-S009, DPV-S010, DPV-S011, DPV-S012, DPV-S013, DPV-S014, DPV-S015, DPV-S016, DPV-S017, DPV-S018, DPV-S019, DPV-S020, DPV-S021, DPV-S022, DPV-S023, DPV-S024, DPV-S025, DPV-S026, DPV-S027, DPV-S028, DPV-S029, DPV-S030, DPV-S031, DPV-S032, DPV-S033, DPV-S034, DPV-S035, DPV-S036, DPV-S037, DPV-S038, DPV-S039, DPV-S040, DPV-S041, DPV-S042, DPV-S043, DPV-S044, DPV-S045, DPV-S046, DPV-S047, DPV-S048, DPV-S049, DPV-S050
Rated Voltage:	Type-C Port: DC5V2A / DC5V3A/DC9V2A Battery:DC3.7V
Battery Capacity:	2400mAh
Adapter Model:	/
FCC ID:	2BDNT-YYS-K1
Equipment Type:	Mobile device

Technical Characteristics of EUT:

Bluetooth

Bluetooth Version:	V5.2 (BR/EDR mode)
Frequency Range:	2402-2480MHz
RF Output Power:	0.71dBm (Conducted)
Data Rate:	1Mbps, 2Mbps, 3Mbps
Modulation:	GFSK, π/4 DQPSK, 8DPSK

Quantity of Channels:	79
Channel Separation:	1MHz
Type of Antenna:	PCB Antenna
Antenna Gain:	-0.58dBi

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:

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

Where

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

and

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

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 λ/2π, 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^2f

1,500-100,000	$19.2R^2$

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	2402	0.71	-0.58	100	1.00	-1.73

Frequency (MHz)	Option	Min. Distance (cm)	Max. Power (dBm)	Max. Power (mW)	Exposure Limit (mW)	Ratio	Result Pass/Fail
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
Bluetooth + Wireless Charger	0.45	0.36/1.63	0.67	1	Pass

Result: Pass