

RF Exposure Evaluation

FCC ID:2A9CD-TWS

1. Client Information

Applicant	:	Shenzhen Senyang Zhiyuan Technology Co., Ltd
Address	:	505, Floor 5, West Block, Building 405, Sanda Industrial Zone, Futian District, Shenzhen.China.
Manufacturer	:	Shenzhen Senyang Zhiyuan Technology Co., Ltd
Address	:	No. 18, Lane 18, Beiyuan, Mei2, Huicheng Town, Huilai County, Jieyang City, Guangdong Province.China.

2. General Description of EUT

EUT Name	:	Wireless headset						
Model(s) No.	:	TWS, H6, H01, H02, H03, H04, H05, H06, H07, H08, H09, H10, H11, H12, H13, H14, H15, H16, H17, H18, H19, H20, H21, H22, H23, H24, H25, H26, H27, H28, H29, H30, H31, H32, H33, H34, H35, H36, H37, H38, H39, H40, H41, H42, H43, H44, H45, H46, H47, H48, H49, H50, H51, H52, H53, H54, H55, H56, H57, H58, H59, H60, H61, H62, H63, H64, H65, H66, H67, H68, H69, H70, H71, H72, H73, H74, H75, H76, H77, H78, H79, H80, H81, H82, H83, H84, H85, H86, H87, H88, H89, H90, H91, H92, H93, H94, H95, H96, H97, H98, H99, Y60, Y70, Y80, Y90, Y100, PRO6, PRO60, PRO70, PRO80, PRO90, PRO100, A6S, E6S, E10, AIR1, AIR2, AIR3						
Model Difference	:	All PCB boards and circuit diagrams are the same, the only difference is that appearance and packaging.						
Product Description	:	<table border="1"> <tr> <td>Operation Frequency:</td> <td>Bluetooth 5.3(BDR+EDR): 2402MHz~2480MHz</td> </tr> <tr> <td>RF Output Power:</td> <td>BT: 1.786dBm</td> </tr> <tr> <td>Antenna Gain:</td> <td>-8.46dBi PCB Antenna</td> </tr> </table>	Operation Frequency:	Bluetooth 5.3(BDR+EDR): 2402MHz~2480MHz	RF Output Power:	BT: 1.786dBm	Antenna Gain:	-8.46dBi PCB Antenna
Operation Frequency:	Bluetooth 5.3(BDR+EDR): 2402MHz~2480MHz							
RF Output Power:	BT: 1.786dBm							
Antenna Gain:	-8.46dBi PCB Antenna							
Power Supply (Earphone)	:	DC 3.7V by 30mAh Rechargeable Li-ion battery						
Power Supply (Charge box)	:	Input: DC 5V, 40mAh						
Software Version	:	V-800_AC6969A2_H6_221108_A47D3F69_update- 2(25)-R V-800_AC6969A2_H6_221108_09792EB1_update- 2(25)-L						
Hardware Version	:	E6S-6969-4L-5V						
Remark: The antenna gain provided by the applicant, the adapter and verified for the RF conduction test and adapter provided by TOBY test lab.								

Note: More test information about the EUT please refer the RF Test Report.

The RF Exposure Evaluation for FCC:

SAR Test Exclusion Calculations

FCC: According to 447498 D04 Interim General RF Exposure Guidance v01.

The SAR-based exemption formula of § 1.1307(b)(3)(i)(B), repeated here as Formula (B.2), applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold P_{th} (mW).

This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by Formula (B.2).

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

where

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

and f is in GHz, d is the separation distance (cm), and $ERP_{20 \text{ cm}}$ is per Formula (B.1). The example values shown in Table B.2 are for illustration only.

Table B.2—Example Power Thresholds (mW)

Frequency (MHz)	Distance (mm)									
	5	10	15	20	25	30	35	40	45	50
300	39	65	88	110	129	148	166	184	201	217
450	22	44	67	89	112	135	158	180	203	226
835	9	25	44	66	90	116	145	175	207	240
1900	3	12	26	44	66	92	122	157	195	236
2450	3	10	22	38	59	83	111	143	179	219
3600	2	8	18	32	49	71	96	125	158	195
5800	1	6	14	25	40	58	80	106	136	169

Calculation:

Test separation: 5mm					
Bluetooth GFSK					
Frequency (GHz)	Conducted Power (dBm)	Turn-up Power Tolerance (dB)	Max power of tune up tolerance (dBm)	Max power of tune up tolerance (mW)	Limit P _{th} (mW)
2.402	0.172	0±1	1	1.259	3
2.441	0.417	0±1	1	1.259	3
2.480	0.44	0±1	1	1.259	3
Bluetooth π/4-DQPSK					
Frequency (GHz)	Conducted Power (dBm)	Turn-up Power Tolerance (dB)	Max power of tune up tolerance (dBm)	Max power of tune up tolerance (mW)	Limit P _{th} (mW)
2.402	0.952	1±1	2	1.585	3
2.441	1.18	1±1	2	1.585	3
2.480	1.213	1±1	2	1.585	3
Bluetooth 8-DPSK					
Frequency (GHz)	Conducted Power (dBm)	Turn-up Power Tolerance (dB)	Max power of tune up tolerance (dBm)	Max power of tune up tolerance (mW)	Limit P _{th} (mW)
2.402	1.497	1±1	2	1.585	3
2.441	1.725	2±1	3	1.995	3
2.480	1.786	2±1	3	1.995	3

Conclusion:

The measurement results comply with the FCC Limit per 47 CFR 2.1093 for the uncontrolled RF Exposure and SAR Exclusion Threshold per KDB 447498 v06, No SAR is required.

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