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## RADIO TEST REPORT

Report No: STS2202031H01

Issued for

Shen zhen shi zhi qin zi dong hua you xian gong si

China shenzhenshi baoanqu shiyanjiedao  
kengweidadao44hao chuangweida gongyeyuan silou

<b>Product Name:</b>	Bluetooth beanie hat
<b>Brand Name:</b>	Keains
<b>Model Name:</b>	KE-01
<b>Series Model:</b>	KE-02, KE-03
<b>FCC ID:</b>	2A4HL-K12792225
<b>Test Standard:</b>	FCC 47CFR §2.1093

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## Test Report Certification

**Applicant's Name**..... : Shen zhen shi zhi qin zi dong hua you xian gong si  
**Address** ..... : China shenzhen shi baoanqu shiyanjiedao kengweidadao44hao  
chuangweida gongyeyuan silou  
**Manufacturer's Name** ..... : YIWU FENGZE ELECTRONICE TECHNOLOGY CO.,LTD  
**Address** ..... : NO.339 TASHAN RD, YINAN INDUSTRIAL ZONE, ZHENJIANG,  
CHINA

### Product Description

**Product Name**..... : Bluetooth beanie hat  
**Brand Name** ..... : Keains  
**Model Name** ..... : KE-01  
**Series Model**..... : KE-02, KE-03

**Standards**..... : FCC 47CFR §2.1093

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**Date of Test**..... :

**Date of receipt of test item** ..... : 14 Feb. 2022

**Date (s) of performance of tests**..... : 16 Feb. 2022 ~ 28 Feb. 2022

**Date of Issue**..... : 28 Feb. 2022

**Test Result**..... : **Pass**

Testing Engineer :

(Chris Chen)

Technical Manager :

(Sean she)

Authorized Signatory :

(Vita Li)





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**Revision History**

Rev.	Issue Date	Report No.	Effect Page	Contents
00	28 Feb. 2022	STS2202031H01	ALL	Initial Issue





## 1. GENERAL INFORMATION

### 1.1 GENERAL DESCRIPTION OF THE EUT

Product Name	Bluetooth beanie hat	
Brand Name	Keains	
Model Name	KE-01	
Series Model	KE-02, KE-03	
Model Difference	Only the product appearance and model name are different, and the design principles are the same.	
Product Description	The EUT is Bluetooth beanie hat	
	Operation Frequency:	2402~2480 MHz
	Modulation Type:	GFSK(1Mbps), $\pi/4$ -DQPSK(2Mbps), 8DPSK(3Mbps)
	Antenna gain:	-0.68dBi
	Antenna Designation:	PCB Antenna
Battery	Rated Voltage:3.7V Charge Limit Voltage:4.2V Capacity: 180mAh	
Hardware version number	SST263_V07	
Software versionnumber	V003	

### 1.2 TEST FACTORY

SHENZHEN STS TEST SERVICES CO., LTD

Add. : A 1/F, Building B, Zhuoke Science Park, No.190 Chongqing Road, HepingShequ, Fuyong Sub-District, Bao'an District, Shenzhen, Guang Dong, China

FCC test Firm Registration Number: 625569

IC test Firm Registration Number: 12108A

A2LA Certificate No.: 4338.01



## 2. FCC 47CFR §2.1093 REQUIREMENT

### 2.1 TEST STANDARDS

The limit for Maximum Permissible Exposure (MPE) specified in KDB 447498 D01 General RF Exposure Guidance v06 is followed. The gain of the antennas used in the product is extracted from the Antenna data sheets provided and also the maximum total power input to the antenna is measured. Through the Friis transmission formula and the maximum gain of the antenna, we can calculate the distance, away from the product, where the limit of MPE is reached.

Although the Friis Transmission formula is far field assumption, the calculated result of that is an over-prediction for near field power density. It is taken as worst case to specify the safety range.

### 2.2 LIMIT

Approximate SAR Test Exclusion Power Thresholds at Selected Frequencies and Test Separation Distances are illustrated in the following Table.

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	SAR Test Exclusion Threshold (mW)
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	
MHz	30	35	40	45	50	mm
150	232	271	310	349	387	SAR Test Exclusion Threshold (mW)
300	164	192	219	246	274	
450	134	157	179	201	224	
835	98	115	131	148	164	
900	95	111	126	142	158	
1500	73	86	98	110	122	
1900	65	76	87	98	109	
2450	57	67	77	86	96	
3600	47	55	63	71	79	
5200	39	46	53	59	66	
5400	39	45	52	58	65	
5800	37	44	50	56	62	



The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances  $\leq 50$  mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$  for 1-g SAR and  $\leq 7.5$  for 10-g extremity SAR, where  $f(\text{GHz})$  is the RF channel transmit frequency in GHz.

Power and distance are rounded to the nearest mW and mm before calculation

The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is  $\leq 50$  mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is  $< 5$  mm, a distance of 5 mm is applied to determine SAR test exclusion.





## 2.3 TEST RESULT

Maximum measured transmitter power.

BT The Worst Case

Mode	frequency	Maximum AV Output Power	Tune up tolerance	Max Tune up
	GHz	dBm	dBm	dBm
GFSK	2.402	-6.39	-6±1	-5

Remark: The worst case gain of the antenna is -0.68dBi.

-0.68dBi logarithmic terms convert to numeric result is nearly 0.855.

Maximum Tune up Power<sub>(2402)</sub>= 0.316mW

$$[(\text{GFSK power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] = 0.316/5 \cdot \sqrt{2.402} = 0.980 \leq 3.0$$

Threshold at which no SAR required is  $0.980 \leq 3.0$  for 1-g SAR, Separation distance  $\leq 5\text{mm}$ .

\*\*\*\*\*END OF THE REPORT\*\*\*\*\*