



Maximum Permissible Exposure Evaluation

FCC ID: 2BCSS-EARFREEI5

1. General Information about EUT

1.1 Client Information

Applicant	:	Chengdu Rose Technics Co.,Ltd.
Address	:	Room 1204, 12th Floor, Building 7,188 Jinhe West 1st Street, High-tech Zone,Chengdu, Sichuan Pilot Free Trade Zone, China
Manufacturer	:	Chengdu Rose Technics Co.,Ltd.
Address	:	Room 1204, 12th Floor, Building 7,188 Jinhe West 1st Street, High-tech Zone,Chengdu, Sichuan Pilot Free Trade Zone, China

1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	EARFREE i5	
Models No.	:	EARFREE i5, EARFREE i3s, EARFREE i3pro, EARFREE i3x, EARFREE i5x, EARFREE i5s, EARFREE i5pro, EARFREE i7, EARFREE i9, EARFREE i	
Model Different	:	All these models are identical in the same PCB, layout and electrical circuit, The only difference is model name, brand name and product name.	
Brand Name	:	roseselsa	
Sample ID	:	HC-C-202405-0117-01-01	
Product Description	:	Operation Frequency:	Bluetooth&BLE: 2402MHz~2480MHz
		Antenna Gain:	2.5dBi Chip antenna
Power Rating	:	USB Input:5V Charger Box: DC 3.7V 500mAh by rechargeable Li-ion battery Earphone: DC 3.85V 41mAh by rechargeable Li-ion battery	
Software Version	:	V1.1.4	
Hardware Version	:	V3.0	
Remark: The adapter provided by the TOBY ,the antenna gain from the manufacturer, the verified for the RF conduction test provided by TOBY test lab.The above antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.			

SAR Test Exclusion Calculations

1. FCC: According to KDB 447498 D01 Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies v06.

(1) Clause 4.3: General SAR test reduction and exclusion guidance

Sub clause 4.31: Standalone SAR test exclusion considerations

1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6GHz at test separation distance ≤ 5 mm are determined by:

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation, mm})] \cdot [\sqrt{f_{(\text{GHz})}}] \leq 3.0 \text{ for 1-g SAR}$$

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation, mm})] \cdot [\sqrt{f_{(\text{GHz})}}] \leq 7.5.0 \text{ for 10-g SAR}$$

2. Summary simultaneous transmission for SAR Exclusion

The SAR exemption limits outlined in clause 4.3.2(b) of KDB 447498 have been derived based on an approximate SAR value of 0.4 W/kg using half-wave dipole antennas Footnote 1. As such, when simultaneous transmitter SAR evaluations include transmitters that have been exempt from routine SAR evaluation, the SAR must be estimating based on the ratio between the maximum tune-up tolerance limit of the transmitter that has been exempt and the exemption limit at the specific distance and frequency for that transmitter. This ratio must be multiplied by 0.4 W/kg (2.0 W/kg for controlled use and 1.0 W/kg for limb worn devices) in order to calculate the estimated SAR level.

The estimate SAR value is calculated based the following equation:

(maximum power level including tune-up tolerance for transmitter A / maximum power level of exemption at the same frequency and distance) * 0.4W/kg

$$1) \left[\frac{(\text{max. power of channel, including tune-up tolerance, mW})}{(\text{min. test separation distance, mm})} \right] \cdot [\sqrt{f_{(\text{GHz})}/x}] \text{ W/kg, for test separation distances } \leq 50 \text{ mm;}$$

where $x = 7.5$ for 1-g SAR and $x = 18.75$ for 10-g SAR.

$$2) 0.4 \text{ W/kg for 1-g SAR and } 1.0 \text{ W/kg for 10-g SAR, when the test separation distance is } > 50 \text{ mm.}^{37}$$

The $[\sum \text{ of (the highest measured or estimated SAR for each standalone antenna configuration, adjusted for maximum tune-up tolerance) / } 1.6 \text{ W/kg}] + [\sum \text{ of MPE ratios}] \leq 1.0$.

The SAR to peak location separation ratios of all simultaneously transmitting antenna pairs operating in portable device exposure conditions are all ≤ 0.04 , and the $[\sum \text{ of MPE ratios}] \leq 1.0$.



3. Calculation:

Test separation: 5mm						
Bluetooth Mode (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)	Calculation Value	Threshold Value
2402	3.781	4±1	5	3.162	0.980	3.0
2441	4.275	4±1	5	3.162	0.988	3.0
2480	4.274	4±1	5	3.162	0.996	3.0
Bluetooth Mode (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)	Calculation Value	Threshold Value
2402	4.028	4±1	5	3.162	0.980	3.0
2441	4.89	4±1	5	3.162	0.988	3.0
2480	4.714	4±1	5	3.162	0.996	3.0
Bluetooth Mode (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)	Calculation Value	Threshold Value
2402	2.702	3±1	4	2.512	0.779	3.0
2441	3.727	3±1	4	2.512	0.785	3.0
2480	3.592	3±1	4	2.512	0.791	3.0
BLE 1M Mode						
Frequency (GHz)	Conducted Power (dBm)	Turn-up Power Tolerance (dB)	Max power of tune up tolerance (dbm)	Max power of tune up tolerance (mw)	Calculation Value	Threshold Value
2402	6.587	7±1	8	6.310	1.956	3.0
2440	7.481	7±1	8	6.310	1.972	3.0
2480	7.463	7±1	8	6.310	1.987	3.0
BLE 2M Mode						
Frequency (GHz)	Conducted Power (dBm)	Turn-up Power Tolerance (dB)	Max power of tune up tolerance (dbm)	Max power of tune up tolerance (mw)	Calculation Value	Threshold Value
2402	4.21	5±1	6	3.981	1.234	3.0
2440	5.405	5±1	6	3.981	1.244	3.0
2480	5.718	5±1	6	3.981	1.254	3.0

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.

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