RF Exposure Evaluation

FCC ID: 2BDR4-M1A2

1. Client Information

Applicant	:	Guangdong Special Pie Technology Co., Ltd.
Address	:	Room 901, Building 31, No. 4, Keji 10th Road, Songshan Lake, Dongguan City, Guangdong Province, China
Manufacturer	:	Guangdong Special Pie Technology Co., Ltd.
Address	:	Room 901, Building 31, No. 4, Keji 10th Road, Songshan Lake, Dongguan City, Guangdong Province, China

2. General Description of EUT

EUT Name	:	Shot Timer	
Model(s) No.	:	M1A2, M1A2-W, M1A2-F, M1A2-FW, M4P1	
Model Difference	:	All PCB boards and circuit diagrams are the same, the only difference is that appearance color.	
Product Description	:	Operation Frequency:	Bluetooth 4.2(BLE): 2402MHz~2480MHz
		Number of Channel:	40 channels
		Antenna Gain:	1.9dBi PCB Antenna
		Modulation Type:	GFSK (1Mbps)
Power Supply	:	Input: DC 5V	
Li-ion Polymer Battery	:	DC 3.7V by 300mAh Rechargeable Li-ion battery	
Software Version	:	V2.0	
Hardware Version	:	V2.0	
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.

1 A/F., Building.6, Rundongsheng Industrial Zone, Longzhu, Xixiang, Bao'an, Shenzhen, Guangdong, China
Tel: +86 75526509301 Fax: +86 75526509195

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:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation, mm)]*[√ $f_{(GHz)}$] ≤3.0 for 1-g SAR

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation, mm)]*[√ $f_{(GHz)}$] ≤7.5.0 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) [(*max. power of channel, including tune-up tolerance, mW*) / (*min. test separation distance, mm*)]·[$\sqrt{f_{(GHz)}}/x$] W/kg, for *test separation distances* ≤ 50 mm;

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

2) 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the *test separation distance* is > 50 mm.[37]

The [Σ of (the highest measured or estimated SAR for each standalone antenna configuration, adjusted for maximum tune-up tolerance) / 1.6 W/kg] + [Σ of MPE ratios] is ≤ 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 [Σ of MPE ratios] is ≤ 1.0.

3. Calculation:

Test separation: 5mm						
BLE (1Mbps)						
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
2.402	-2.377	-2±1	-1	0.794	0.246	**3.0**
2.440	-3.1	-3±1	-2	0.631	0.197	**3.0**
2.480	-3.648	-3±1	-2	0.631	0.199	**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.

-----END OF REPORT-----