Maximum Permissible Exposure Evaluation

FCC ID:2AUDF-CG625A
IC: 29207-CG625A

1. Client Information

Applicant	:	Shenzhen ADDX Innovation Technology co., LTD.
Address	:	NO.2013, Building 9B-3. Shenzhen Bay, Technology and Ecological Park, Nanshan District, shenzhen, China
Manufacturer	:	Shenzhen ADDX Innovation Technology co., LTD.
Address	:	NO.2013, Building 9B-3. Shenzhen Bay, Technology and Ecological Park, Nanshan District, shenzhen, China

2. General Description of EUT

EUT Name	:	Smart Battery Camera	
Model(s) No.	:	CG6, CG3A, CRS300, X82, X83, X84, CG6S, CG6F, CG6X, CG6H, CG6D, CG6K, CG6E, CG6C, BC01, BCam-02, HB911	
HVIN	:	CG625	
Model Difference	:	All these models are identical in the same PCB, layout and electrical circuit, the only difference is different customers, different model name.	
Sample ID	:	202407-0308-6-1#&202407-0308-6-2#	
Product Description	:	Operation Frequency:	Bluetooth 5.0(BLE): 2402MHz~2480MHz 802.11b/g/n(HT20): 2412MHz~2462MHz
Power Rating	:	Input: DC 5V, 1.5A	
Li-ion Polymer Battery	:	DC 3.7V by 4400mAh Rechargeable Li-ion battery	
Software Version	:	V1.14.0	
Hardware Version	:	CG625_C01_V1	
Connecting I/O Port(S)	:	Please refer to the User's Manual	
Remark	:	the MPE report used the EUT-2	

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Method of Measurement for FCC

MPE Calculations

1. Antenna Gain:

Antenna	Brand	Model Name	Type	Antenna Gain(dBi)
Bluetooth	N/A	N/A	PCB	0.5

Antenna	Brand	Model Name	Type	Antenna Gain(dBi)
2.4G WIFI	N/A	N/A	Sheet Iron	-2.48

2. EUT Operation Condition:

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

3. Exposure Evaluation:

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S=(PG)/4\pi R^2$$

Where

S: power density
P: power input to the antenna
G: power gain of the antenna in the direction of interest relative to an isotropic radiator.
R: distance to the center of radiation of the antenna

4. Simultaneous transmission MPE Considerations

According to KDB447498: All transmitters and antennas in the host must be either evaluated for MPE compliance, by measurement or computational modeling, or qualify for the standalone MPE test exclusion in section 7.1. Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modeled or measured field strengths or power density, is ≤ 1.0.

This means that:

∑ of MPE ratios ≤ 1.0

5. Standalone MPE Evaluation:

Bluetooth Worst Maximum MPE Result								
Mode	N_{TX}	Freq. (MHz)	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	ANT Gain (dBi) [G]	Distance (cm) [R]	Power Density (mW/cm^2) [S]
GFSK	1	2402	-1.662	-2±1	-1	0.5	20	0.0002
		2440	0.677	1±1	2	0.5	20	0.0004
		2480	0.96	1±1	2	0.5	20	0.0004
Note: N_{TX}= Number of Transmit Antennas RF Output power specifies that Maximum Conducted Peak Output Power.								

2.4G Wi-Fi Worst Maximum MPE Result								
Mode	N_{TX}	Freq. (MHz)	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	ANT Gain (dBi) [G]	Distance (cm) [R]	Power Density (mW/cm^2) [S]
802.11b	1	2412	15.54	16±1	17	-2.48	20	0.0056
		2437	15.05	15±1	16	-2.48	20	0.0045
		2462	14.85	15±1	16	-2.48	20	0.0045
802.11g	1	2412	15.45	15±1	16	-2.48	20	0.0045
		2437	14.39	14±1	15	-2.48	20	0.0036
		2462	14.24	14±1	15	-2.48	20	0.0036
802.11n (HT20)	1	2412	13.23	13±1	14	-2.48	20	0.0028
		2437	14.09	14±1	15	-2.48	20	0.0036
		2462	13.38	13±1	14	-2.48	20	0.0028
Note: N_{TX}= Number of Transmit Antennas RF Output power specifies that Maximum Conducted Peak Output Power.								

Remark:
1. Output power including turn-up tolerance;
2. Output power was adjust to duty cycle at 100% if measured duty cycle less than 98%;
3. MPE evaluate distance is 20cm from user manual provide by manufacturer.
4. Only the worst power was evaluated for each wireless function

6. Conclusion:

As specified in Table 1B of 47 CFR 1.1310- Limits for Maximum Permissible Exposure (MPE),

Limits for General Population/ Uncontrolled Exposure

Frequency Range (MHz)	Power density (mW/cm^2)
300-1,500	F/1500
1,500-100,000	1.0

7. Summary simultaneous transmission information

The sample supports two antennas for Bluetooth and WLAN.
The Bluetooth and WLAN can transmit simultaneous.
The Bluetooth and WLAN with two different Antenna.
According to KDB447498 for Transmitters used in mobile exposure conditions for simultaneous transmission operations;
∑ of MPE ratios ≤ 1.0

8. Summary simultaneous transmission results

Bluetooth + 2.4G WIFI Maximum Simultaneous transmission MPE Ratios is

0.0004+0.0056=0.0060⩽1.0

9. Conclusion:

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

Method Of Measurement for IC

1. Applicable Standard

Radio Standards Specification 102, Radio Frequency (RF) Exposure Compliance of Radio communication Apparatus (All Frequency Bands), sets out the requirements and measurement techniques used to evaluate radio frequency (RF) exposure compliance of radio communication apparatus designed to be used within the vicinity of the human body.

ANSI C95.1–1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

FCC KDB publication 447498 D01 General RF Exposure Guidance v06: Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.

2. Evaluation Method and Limit

According to RSS-102 §6 Table 7, RF Filed Strength Limits for Devices Used by the General Public (Uncontrolled Environment)

Frequency Band	*f* (MHz)	Limit of Power Density (W/m^2)
2.4G	2402	5.35
Note: Limit=$0.02619f^{0.6834}$ (where *f* is in MHz). The *f* in the limit is the frequency of the lowest Channel.		

3. Calculation Formula

Prediction of power density at the distance of the applicable MPE limit:
$S=PG/4\pi R^2$=Power density(in appropriate units, e.g W/m^2）

P=power input to antenna (in appropriate units, e.g W）
G=power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.
R=distance to the center of radiation of the antenna(in appropriate units, e.g m）

Simultaneous transmission MPE Considerations

According to KDB447498: All transmitters and antennas in the host must be either evaluated for MPE compliance, by measurement or computational modeling, or qualify for the standalone MPE test exclusion in section 7.1.Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modeled or measured field strengths or power density, is ≤ 1.0.
This means that:

∑ of MPE ratios ≤ 1.0

4. Evaluation Results

Bluetooth Worst Maximum MPE Result								
Mode	N_{TX}	Freq. (MHz)	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	ANT Gain (dBi) [G]	Distance (m) [R]	Power Density (W/m^2) [S]
GFSK	1	2402	-1.662	-2±1	-1	0.5	0.2	0.002
		2440	0.677	1±1	2	0.5	0.2	0.004
		2480	0.96	1±1	2	0.5	0.2	0.004
Note: N_{TX}= Number of Transmit Antennas RF Output power specifies that Maximum Conducted Peak Output Power.								

2.4G Wi-Fi Worst Maximum MPE Result								
Mode	N_{TX}	Freq. (MHz)	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	ANT Gain (dBi) [G]	Distance (m) [R]	Power Density (W/m^2) [S]
802.11b	1	2412	15.54	16±1	17	-2.48	0.2	0.056
		2437	15.05	15±1	16	-2.48	0.2	0.045
		2462	14.85	15±1	16	-2.48	0.2	0.045
802.11g	1	2412	15.45	15±1	16	-2.48	0.2	0.045
		2437	14.39	14±1	15	-2.48	0.2	0.036
		2462	14.24	14±1	15	-2.48	0.2	0.036
802.11n (HT20)	1	2412	13.23	13±1	14	-2.48	0.2	0.028
		2437	14.09	14±1	15	-2.48	0.2	0.036
		2462	13.38	13±1	14	-2.48	0.2	0.028
Note: N_{TX}= Number of Transmit Antennas RF Output power specifies that Maximum Conducted Peak Output Power.								

Remark:
1. Output power including turn-up tolerance;
2. Output power was adjust to duty cycle at 100% if measured duty cycle less than 98%;
3. MPE evaluate distance is 20cm from user manual provide by manufacturer.
4. Only the worst power was evaluated for each wireless function

Summary simultaneous transmission results

Bluetooth + 2.4G WIFI Maximum Simultaneous transmission MPE Ratios is

(0.004+0.056)/5.35=0.011≤1.0

For a more detailed features description, please refer to the RF Test Report.

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