Maximum Permissible Exposure Evaluation

FCC ID:*2AXEK-X89*

1. Client Information

Applicant	:	SHENZHEN GENERAL TECHNOLOGY CO.,LTD
Address	:	Floor 1-3, Building A,Floor 1-4 ,Building B , No. 11 Xiantian Road, Xinsheng Community, Longgang Sub-District, Longgang District, Shenzhen, China
Manufacturer	:	SHENZHEN GENERAL TECHNOLOGY CO.,LTD
Address	:	Floor 1-3, Building A,Floor 1-4 ,Building B , No. 11 Xiantian Road, Xinsheng Community, Longgang Sub-District, Longgang District, Shenzhen, China

2. General Description of EUT

EUT Name	:	Smart Battery Camera	
Models No.	:	X89, X73, X74, X75, X76, X77, X78, X79, X85, X88B, X88, ZY-B9	
Model Different	:	All these models are identical in the same PCB, layout and electrical circuit, the only difference name.	
Product Description	:	Operation Frequency:	802.11b/g/n(HT20): 2412MHz~2462MHz Bluetooth 5.0(BLE): 2402MHz~2480MHz
Power Rating	:	Input: DC 5V	
Li-ion Polymer Battery	:	DC 3.7V by 4400mAh Rechargeable Li-ion battery	
Software Version	:	----	
Hardware Version	:	----	
Connecting I/O Port(S)	:	Please refer to the User's Manual	

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MPE Calculations

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

2. **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

3. **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. Test Result:

2.4G WIFI worst reported.

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	15.91	16±1	17	3.85	0.2	0.0242
		2437	15.66	16±1	17	3.85	0.2	0.0242
		2462	15.66	16±1	17	3.85	0.2	0.0242
802.11g	1	2412	14.8	15±1	16	3.85	0.2	0.0192
		2437	15.08	15±1	16	3.85	0.2	0.0192
		2462	14.9	15±1	16	3.85	0.2	0.0192
802.11 n20	1	2412	12.93	13±1	14	3.85	0.2	0.0121
		2437	13.18	13±1	14	3.85	0.2	0.0121
		2462	13.58	14±1	15	3.85	0.2	0.0153
BLE 1Mbps	1	2402	-1.99	-1±1	0	0.5	0.2	0.0002
		2440	-2.141	-2±1	-1	0.5	0.2	0.0002
		2480	-2.328	-2±1	-1	0.5	0.2	0.0002

Note:
N_{TX}= Number of Transmit Antennas
RF Output power specifies that Maximum Conducted Peak Output Power.

5. 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

For BLE&WIFI

MPE limit S: 1mW/ cm^2
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6. Summary simultaneous transmission results

WIFI and Bluetooth support simultaneous transmit the

BLE MPE (Ratio)	WIFI MPE (Ratio)	simultaneous MPE (Ratio)	MPE Limits (Ratio)
0.0002	0.0242	0.0244	1.0000

So, RF exposure limit warning or SAR test are not required.

The EUT will only be used with a separation of 20cm or greater between the antenna and nearby persons and can therefore be considered a mobile transmitter per 47 CFR2.1091 (b). The RF Exposure Information page from the manual is included here for reference.

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