

Maximum Permissible Exposure Evaluation

FCC ID:2AUDF-CQ425B&IC:29207-CQ425B

1. General Information about EUT

1.1 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

1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	Smart Battery Camera	
Models No.	:	CQ1,X85,X88,D3,D3B,D3K,D3KD,BC3,BC52,A16-V66P, CN-V30PB,KP-CA189, PBC1001,SC-2028WS,SC-2028WSP, SN-VP01,Uho-B85,V-B1S,VIS-SMAR505,BY-X85,CQ1S, CQ1H ,CQ1F ,CQ1X ,CQ1K ,CQ1D,CQ4	
HVIN	:	CQ125	
Model Different	:	All these models are identical in the same PCB, layout and electrical circuit, The only difference is model name.	
Brand Name	:	N/A	
Sample ID	:	HC-C-202409-0194-01-01	
Product Description	:	Operation Frequency:	BLE: 2402MHz~2480MHz 802.11b/g/n(HT20): 2412MHz~2462MHz
Power Rating	:	USB Input:5V DC 3.7V 4400mAh Rechargeable Li-ion battery (XL18650-2200-2P) DC 3.6V 4400mAh Rechargeable Li-ion battery (INR18650) (Battery differences are mainly based on the applicant and model and capacity differences, only the worst mode is assessed (INR18650)	
Software Version	:	V1.14.0	
Hardware Version	:	CQ425_C01_V3	



1.3 Antenna Information

Band	Antenna Type	Antenna Gain(dBi)
		Antenna
Bluetooth	PCB	0.5
2.4G Wi-Fi	FPC	3.85
Remark: 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.		



2. Method of Measurement for FCC

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

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:

$$\sum \text{ of MPE ratios } \leq 1.0$$



3. Test Result:

Test Mode	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	Max. ANT Gain (dBi) [G]	Distance (cm) [R]	Power Density (mW/ cm ²) [S]
Bluetooth	1.119	1±1	2	0.5	20	0.00035
2.4G b	16.99	16±1	17	3.85	20	0.02420
2.4G g	14.06	14±1	15	3.85	20	0.01527
2.4G n20	12.71	12±1	13	3.85	20	0.00963



4. 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: 2402~2480MHz&2412~2462MHz

MPE limit S: 1mW/ cm²

The MPE is calculated as $0.0242\text{mW} / \text{cm}^2 < \text{limit } 1\text{mW} / \text{cm}^2$.

5. Summary simultaneous transmission results

Bluetooth and WiFi support Synchronization transmitter

Maximum MPE ratio Bluetooth	Maximum MPE ratio WiFi	ΣMPE ratios	Limit	Results
0.00035	0.02420	0.02455	1	PASS

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.



3. Method Of Measurement for IC

3.1. 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.

3.2. Evaluation Method and Limit

According to RSS-102 Issue 6 5.3.2. Table 7, RF field strength and power density limits for devices used by the general public (uncontrolled environment)

Frequency range (MHz)	Electric field (V _{RMS} /m)	Magnetic field (A _{RMS} /m)	Power density (W/m ²)	Reference period (minutes)
10-20	27.46	0.0728	2	6
20-48	58.07 / $f^{0.25}$	0.1540 / $f^{0.25}$	8.944 / $f^{0.5}$	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 $f^{0.3417}$	0.008335 $f^{0.3417}$	0.02619 $f^{0.6834}$	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ $f^{1.2}$
150000-300000	0.158 $f^{0.5}$	$4.21 \times 10^{-4} f^{0.5}$	$6.67 \times 10^{-5} f$	616000/ $f^{1.2}$

Note: f is frequency in MHz.

Frequency Band	f (MHz)	Limit of Power Density (W/m ²)
Bluetooth	2402	5.35
2.4G WLAN	2412	5.37
Note: Limit= $0.02619 f^{0.6834}$ (where f is in MHz). The f in the limit is the frequency of the lowest Channel.		



3.3. Calculation Formula

Prediction of power density at the distance of the applicable MPE limit:

$$S = \frac{PG}{4\pi R^2} = \text{Power density (in appropriate units, e.g. W/m}^2\text{)}$$

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:

$$\sum \text{ of MPE ratios} \leq 1.0$$



3.4. Evaluation Results

Test Mode	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	Max. ANT Gain (dBi) [G]	Distance (m) [R]	Power Density (W/m ²) [S]	MPE ratio
Bluetooth	1.119	1±1	2	0.5	0.2	0.0035	0.0007
2.4G b	16.99	16±1	17	3.85	0.2	0.2420	0.0450
2.4G g	14.06	14±1	15	3.85	0.2	0.1527	0.0284
2.4G n20	12.71	12±1	13	3.85	0.2	0.0963	0.0179

Summary simultaneous transmission results

Bluetooth and WiFi support Synchronization transmitter

Maximum MPE ratio Bluetooth	Maximum MPE ratio WiFi	ΣMPE ratios	Limit	Results
0.0007	0.0450	0.0457	1	PASS

Remark:

1. Output power including turn-up tolerance;
2. MPE evaluate distance is 20cm from user manual provide by manufacturer.

Note

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

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

