

Maximum Permissible Exposure Evaluation

FCC ID:2AUDF-DB2

1. Client Information

Applicant	:	Shenzhen ADDX Innovation Technology co., LTD.
Address	:	NO.2902, Building 9A-1.Shenzhen Bay Technology and Ecological Park, Nanshan District, Shenzhen, China
Manufacturer	:	Shenzhen ADDX Innovation Technology co., LTD.
Address	:	NO.2902, Building 9A-1.Shenzhen Bay Technology and Ecological Park, Nanshan District, Shenzhen, China

2. General Description of EUT

EUT Name	:	Smart Battery Video Doorbell	
Model(s) No.	:	DB2	
Model Difference	:	----	
Product Description	:	Operation Frequency:	433.92 MHz& 915 MHz Bluetooth V5.0(BLE):2402MHz~2480MHz 2.4G WiFi: 2412MHz~2462MHz
	:	Antenna Gain:	0.5dBi PCB Antenna for BLE 1.47dBi Iron sheet Antenna for 2.4G WiFi -3.13dBi FPC Antenna for 433.92 MHz -0.49dBi FPC Antenna for 915 MHz
Power Supply	:	Input: DC 5V, 1.5A DC 3.7V by 5000mAh Rechargeable Li-ion battery	
Software Version	:	V0.9.1	
Hardware Version	:	DB223_C01_V4	
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.

MPE Calculations

1. Antenna Gain:

PCB Antenna for BLE: 0.5dBi.

Iron Plate Antenna for 2.4G WiFi: 1.47dBi.

FPC Antenna for 433.92: -3.13dBi.

FPC Antenna for 915: -0.49dBi.

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. Test Result:

Worst Maximum MPE Result								
BLE								
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]
1Mbps	1	2402	-3.27	-3±1	-2	0.5	20	0.00014
		2440	-3.949	-4±1	-3	0.5	20	0.00011
		2480	-4.052	-4±1	-3	0.5	20	0.00011
2.4G WiFi								
802.11b	1	2412	17.004	17±1	18	1.47	20	0.0176
	1	2437	17.438	17±1	18	1.47	20	0.0176
	1	2462	16.201	16±1	17	1.47	20	0.0140
802.11g	1	2412	15.27	15±1	16	1.47	20	0.0111
	1	2437	16.19	16±1	17	1.47	20	0.0140
	1	2462	15.257	15±1	16	1.47	20	0.0111
802.11n20	1	2412	14.985	15±1	16	1.47	20	0.0111
	1	2437	15.323	15±1	16	1.47	20	0.0111
	1	2462	14.992	15±1	16	1.47	20	0.0111
Note:								
(1) N _{TX} = Number of Transmit Antennas								
(2) RF Output power specifies that Maximum Conducted Peak Output Power.								

$$E = \text{EIRP} - 20\log D + 104.8$$

where:

E = electric field strength in dBμV/m,

EIRP = equivalent isotropic radiated power in dBm

D = specified measurement distance in meters.

$$\text{EIRP} = E - 104.8 + 20\log D = 68.09 - 104.8 + 20\log 3 = -27.17\text{dBm}$$

Frequency (MHz)	Measured Power (dBm)	Tune up Tolerance ± (dB)	Output power (Max. Turn-up Procedure) (mW)	Limit (mW)
433.92	-27.17	-27 ± 1	0.003	0.29
Note: At separation distance of >20 mm				

$$E = \text{EIRP} - 20\log D + 104.8$$

where:

E = electric field strength in dBμV/m,

EIRP = equivalent isotropic radiated power in dBm

D = specified measurement distance in meters.

$$\text{EIRP} = E - 104.8 + 20\log D = 77.80 - 104.8 + 20\log 3 = -17.46\text{dBm}$$

Frequency (MHz)	Measured Power (dBm)	Tune up Tolerance ± (dB)	Output power (Max. Turn-up Procedure) (mW)	Limit (mW)
915	-17.46	-17 ± 1	0.025	0.61
Note: At separation distance of >20 mm				

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&2.4GWIFI&433.92&915
MPE limit S: 1mW/ cm²

WIFI MPE (Ratio)	BLE MPE (Ratio)	915 MPE (Ratio)	simultaneous MPE (Ratio)	MPE Limits (Ratio)
0.0176	0.00014	0.04	0.04574	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.

Note

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

6. Conclusion:

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

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