

# Maximum Permissible Exposure Evaluation

## FCC ID:2AUDF-DB2

### 1. Client Information

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

### 2. General Description of EUT

<b>EUT Name</b>	:	Smart Battery Video Doorbell
<b>Model(s) No.</b>	:	DB2
<b>Model Difference</b>	:	----
<b>Product Description</b>	:	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
<b>Power Supply</b>	:	Input: DC 5V, 1.5A DC 3.7V by 4000mAh Rechargeable Li-ion battery
<b>Software Version</b>	:	V0.9.1
<b>Hardware Version</b>	:	DB223_C01_V4
<b>Remark:</b> 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 <sub>TX</sub>	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 <sup>2</sup> ) [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<sub>TX</sub>= 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 dB $\mu$ V/m,

EIRP = equivalent isotropic radiated power in dBm

D = specified measurement distance in meters.

$$\text{EIRP} = E - 104.8 + 20\log D = 68.07 - 104.8 + 20\log 3 = -28.19 \text{ dBm}$$

Frequency (MHz)	Measured Power (dBm)	Tune up Tolerance $\pm$ (dB)	Output power (Max. Turn-up Procedure) (mW)	Limit (mW)
433.92	-29.19	-29 $\pm$ 1	0.002	0.29

Note: At separation distance of >20 mm

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

where:

E = electric field strength in dB $\mu$ V/m,

EIRP = equivalent isotropic radiated power in dBm

D = specified measurement distance in meters.

$$\text{EIRP} = E - 104.8 + 20\log D = 76.85 - 104.8 + 20\log 3 = -18.41 \text{ dBm}$$

Frequency (MHz)	Measured Power (dBm)	Tune up Tolerance $\pm$ (dB)	Output power (Max. Turn-up Procedure) (mW)	Limit (mW)
915	-18.41	-18 $\pm$ 1	0.020	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 <sup>2</sup> )
300-1,500	F/1500
1,500-100,000	1.0

For BLE&2.4GWIFI&433.92&915  
MPE limit S: 1mW/ cm<sup>2</sup>

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-----