

## Maximum Permissible Exposure Report

### 1. Product Information

FCC ID : 2AD99B001E  
EUT : IP Video Door Station  
Test Model : D1812  
Power Supply : Adapter Input: 100-240V~, 50/60Hz, 0.4A  
Adapter Output: 15V=1.0A  
POE Input:DC by 48V  
Hardware Version : 1.0  
Software Version : 130

#### RFID

Frequency Range : 13.56MHz  
Modulation Type : ASK  
Antenna Description : PCB Antenna  
Exposure category : General population/uncontrolled environment  
EUT Type : Production Unit  
Device Type : Mobile Device

## 2. Evaluation Method

Systems operating under the provisions of FCC 47 CFR section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as mobile device whereby a distance of 0.2m normally can be maintained between the user and the device, and below RF Permissible Exposure limit shall comply with.

In accordance with KDB447498D01 for 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 modelled or measured field strengths or power density, is  $\leq 1.0$ . The MPE ratio of each antenna is determined at the minimum test separation distance required by the operating configurations and exposure conditions of the host device, according to the ratio of field strengths or power density to MPE limit, at the test frequency. Either the maximum peak or spatially averaged results from measurements or numerical simulations may be used to determine the MPE ratios. Spatial averaging does not apply when MPE is estimated using simple calculations based on far-field plane-wave equivalent conditions. The antenna installation and operating requirements for the host device must meet the minimum test separation distances required by all antennas, in both standalone and simultaneous transmission operations, to satisfy compliance.

## 3. Limit

### 3.1 Refer Evaluation Method

[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 1 RF Exposure Guidance v06](#): Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.

[FCC CFR 47 part1 1.1310](#): Radiofrequency radiation exposure limits.

[FCC CFR 47 part2 2.1091](#): Radiofrequency radiation exposure evaluation: mobile devices

### 3.2 Limit

Limits for Maximum Permissible Exposure (MPE)/Controlled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100)*	6
3.0 – 30	1842/f	4.89/f	(900/f <sup>2</sup> )*	6
30 – 300	61.4	0.163	1.0	6
300 – 1500	/	/	f/300	6
1500 – 100,000	/	/	5	6

Limits for Maximum Permissible Exposure (MPE)/Uncontrolled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100)*	30
3.0 – 30	824/f	2.19/f	(180/f <sup>2</sup> )*	30
30 – 300	27.5	0.073	0.2	30
300 – 1500	/	/	f/1500	30
1500 – 100,000	/	/	1.0	30

F=frequency in MHz

\*=Plane-wave equivalent power density

#### 4. MPE Calculation Method

Predication of MPE limit at a given distance  
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 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

#### 5. Antenna Information

Shanghai Armour Technology Co., Ltd. can only use antennas certificated as follows provided by manufacturer;

Antenna type and antenna number	Operate frequency band	Maximum antenna gain
RFID Antenna	13.56 MHz	/
BT Antenna	2402~2480 MHz	1.0 dBi
Sensor Modular Antenna	24.15~24.25 GHz	7.2dBi

#### 6. Conducted Power

[BT Max Average Power]

	Modulation	Channel	Max Average Power (dBm)
BLE	GFSK	LCH	-4.08
		MCH	-3.87
		HCH	-3.98

[Sensor Modular EIRP Power]

	Channel	Max EIRP (dBm)
Sensor Modular	1	13.0

#### 7. Manufacturing Tolerance

[BT Max Conducted Power]

	Channel	Max Conducted Power (dBm)	ANT Max. Tune Up Power (dBm)
BLE	LCH	-4.08	-4.0±1.0
	MCH	-3.87	-3.0±1.0
	HCH	-3.98	-3.0±1.0

[Sensor Modular EIRP Power]

	Channel	Max EIRP (dBm)	ANT Max. Tune Up Power (dBm)
Sensor Modular	1	13.0	13.0±1.0

## 8. Measurement Results

### 8.1 Standalone MPE Evaluation

As declared by the Applicant, the EUT is a wireless device used in a fix application, at least 20 cm from any body part of the user or nearby persons; from the maximum EUT RF output power, the minimum separation distance,  $r = 20\text{cm}$ , as well as the gain of the used antenna refer to antenna information, the RF power density can be obtained.

Function	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE ( $\text{mW}/\text{cm}^2$ )	MPE Limits ( $\text{mW}/\text{cm}^2$ )
	dBm	mW				
BT	-2.0	0.6310	1.0	1.2589	0.0025	1.0

Function	EIRP Power		MPE ( $\text{mW}/\text{cm}^2$ )	MPE Limits ( $\text{mW}/\text{cm}^2$ )
	dBm	mW		
Sensor Modular	14.0	25.1189	0.0800	1.0

Remark:

1. Output power including turn-up tolerance;
2. MPE evaluate distance is 20cm from user manual provide by manufacturer;
3. We choose the lowest frequency operate to calculate MPE limit as higher frequency will have higher MPE limits;
4. MPE values =  $PG/4\pi R^2$ .

### 8.2 Simultaneous Transmission MPE

The sample support one BT Antenna and another one Sensor Modular transmit antenna, so need consider simultaneous transmission;

Simultaneous transmission MPE

According to KDB447498 for Transmitters used in mobile exposure conditions for simultaneous transmission operations;

$\Sigma$  of MPE ratios  $\leq 1.0$

Mode	$\Sigma$ MPE max ratios	Limit	Results
BT + Sensor Modular	0.0825	1.0	Pass

## 9. Conclusion

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

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