

## FCC RF Exposure

EUT Description:Smart Lock

Test type.:B29

Series model:B12,B25

FCC ID: 2BMEM-B29

Equipment type: Mobile equipment

Test procedures according to the technical standards: KDB 447498 D01 V06 and FCC 2.1091.

### 1. Limits

The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

#### Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
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
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	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

Formula:  $Pd = (Pout \cdot G) / (4 \cdot \pi \cdot r^2)$

Where :

Pd = power density in mW/cm<sup>2</sup>,

Pout = output power to antenna in mW;

G = gain of antenna in linear scale,

$\pi = 3.14$ ;

R = distance between observation point and center of the radiator in cm

Pd is the limit of MPE, 1 mW/cm<sup>2</sup>. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

### 2. Test Procedure

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

### 3. Test Result of RF Exposure Evaluation

BLE

Modulation	Channel Freq. (MHz)	Conducted power (dBm)	Max tune-up power (mW)	Antenna Gain (dBi)	Antenna gain numeric	Evaluation result (mW/cm <sup>2</sup> )	Power density Limits (mW/cm <sup>2</sup> )
GFSK	2402	1.86	1.534616	1.2232	1.325	0.000404731	1
	2440	-1.98	0.633869	1.2232	1.325	0.000167173	1
	2480	-1.57	0.696626	1.2232	1.325	0.000183724	1

Conclusion: the max result : 0.00023≤ 1.0 compliance with FCC's RF Exposure.

TX frequency range: 13.56 MHz

Operation Frequency: NFC: 13.56MHz Power density limited: 4.89466(mW/cm<sup>2</sup>) Antenna

Type: Induction coil

R=20cm

$$\text{EIRP} = E - 104.7 + 20 \log D = 62.45 - 104.7 + 20 \log 3 = -32.707 \text{ dBm}$$

Maximum Conducted Output Power: -32.707 dBm

NFC

Frequency(MHz)	EIRP Power (dBm)	EIRP Power (mW)	Turn-up (dBm)	Max Turn-up (dBm)	Evaluation result (mW/cm <sup>2</sup> )	Power density Lmits (mW/cm <sup>2</sup> )
13.56	-32.70	0.0005	-32± 1	-31	0.0000050	4.89466

Conclusion: the max result :BLE:0.00023+NFC:0.0000050=0.000235≤1.0 compliance with FCC's RF Exposure.

Conclusion: No SAR is required