

RF EXPOSURE EVALUATION

EUT Specification

EUT	smart lock
Model	F05
Series Model	F05-P, F05-F, F05-V, F06, F07, F08, F08A, K13
FCC ID	2A5ZQ-F05SERIES
Antenna Gain	2.64dBi
Operation Frequency	2402 MHz to 2480 MHz
Modulation	GFSK
Ratings	DC 3.7V or DC 5V
Max. output power	-4.28dBm

Test Requirement:

According to FCC 1.1310: 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 ²)	Average Time
(A) Limits for Occupational/Control Exposures				
300-1500	--	--	F/300	6
1500-100000	--	--	5	6
(B) Limits for General Population/Uncontrol Exposures				
300-1500	--	--	F/1500	6
1500-100000	--	--	1	30

Friis transmission formula: $P_d = \frac{P_{out} \cdot G}{4 \cdot \pi \cdot R^2}$

Where

P_d = Power density in mW/cm^2

P_{out} = output power to antenna in mW

G = Numeric gain of the antenna relative to isotropic antenna

$\pi = 3.1416$

R = distance between observation point and center of the radiator in cm = 20cm

P_d the limit of MPE, $1\text{mW}/\text{cm}^2$. If we know the maximum gain of the antenna and total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

Measurement Result

Antenna gain: 2.64dBi

BLE:

Mode	Channel Freq. (MHz)	Measured power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Antenna Gain (Numeric)	Evaluation result (mW/cm ²)	Power density Limits (mW/cm ²)
GFSK	2402	-4.82	-5±1	-4	1.84	0.000146	1
GFSK	2440	-4.44	-4±1	-3	1.84	0.000183	1
GFSK	2480	-4.28	-4±1	-3	1.84	0.000183	1

Signature:

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