

1. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

1.1 General Information

Client Information	
Applicant:	SpiderDoor
Address of applicant:	2284 Brock Circle, Birmingham, AL 35242
Manufacturer:	SpiderDoor
Address of manufacturer:	2284 Brock Circle, Birmingham, AL 35242
General Description of EUT:	
Product Name:	Access Control Keypad
Trade Name	/
Model No.:	S33
Adding Model(s):	/
Rated Voltage:	POE:DC56V
Battery Capacity:	/
Adapter Model:	/
FCC ID:	2BPNQ-S33
Equipment Type:	Mobile device
Technical Characteristics of EUT:	
Bluetooth	
Bluetooth Version:	V5.0 (BLE mode)
Frequency Range:	2402-2480MHz
RF Output Power:	1Mbps: 4.55dBm (Conducted) 2Mbps: 4.51dBm (Conducted)
Data Rate:	1Mbps, 2Mbps
Modulation:	GFSK
Quantity of Channels:	40
Channel Separation:	2MHz
Type of Antenna:	PCB Antenna
Antenna Gain:	-1dBi
LumenRadio	
Frequency Range:	2402-2480MHz
RF Output Power:	2.89dBm (Conducted)
Modulation:	GFSK
Quantity of Channels:	79
Channel Separation:	1MHz
Type of Antenna:	PCB Antenna
Antenna Gain:	-1dBi

1.2 Standard Applicable

According to §1.1307(b)(1) and KDB 447498 D01 General RF Exposure Guidance v06, system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

(a) Limits for Occupational / Controlled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Times E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500	/	/	F/300	6
1500-100000	/	/	5	6

(b) Limits for General Population / Uncontrolled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Times E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	F/1500	30
1500-100000	/	/	1	30

Note: f = frequency in MHz: * = Plane-wave equivalents power density

1.3 MPE Calculation Method

$$S = (30 \cdot P \cdot G) / (377 \cdot R^2)$$

S = power density (in appropriate units, e.g., mw/cm²)

P = power input to the antenna (in appropriate units, e.g., mw)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor is normally numeric gain.

R = distance to the center of radiation of the antenna (in appropriate units, e.g., cm)

1.4 MPE Calculation Result

Radio Access Technology	Prediction Frequency	Output Power	Antenna Gain	Directional gain (numeric gain)	Tune-Up Output Power	Power Input To The Antenna
	(MHz)	(dBm)	(dBi)		(dBm)	(mW)
Bluetooth	2402.00	4.55	-1.0	0.79	5.00	3.16
LumenRadio	2402.00	2.89	-1.0	0.79	3.00	2.00
LTE Band 2	1850.00	23.00	9.0	7.94	24.00	251.19
LTE Band 4	1710.00	23.00	6.0	3.98	24.00	251.19
LTE Band 5	824.00	23.00	10.4	10.96	24.00	251.19
LTE Band 8	897.50	23.00	10.78	11.97	24.00	251.19
LTE Band 12	699.00	23.00	9.6	9.12	24.00	251.19
LTE Band 13	777.00	23.00	10.1	10.23	24.00	251.19
LTE Band 14	788.00	23.00	10.2	10.47	24.00	251.19
LTE Band 17	704.00	23.00	9.7	9.33	24.00	251.19
LTE Band 25	1850.00	23.00	9.0	7.94	24.00	251.19
LTE Band 26	814.00	23.00	10.3	10.72	24.00	251.19
LTE Band 66	1710.00	23.00	6.0	3.98	24.00	251.19

Frequency	Min. Distance	Power Density	Limit	Result	Pass/Fail
(MHz)	(cm)	(mW/cm ²)	(mW/cm ²)		
2402.00	30.00	0.00	1.00	0.01	Pass
2402.00	30.00	0.00	1.00	0.01	Pass
1850.00	30.00	0.18	1.00	0.18	Pass
1710.00	30.00	0.09	1.00	0.09	Pass
824.00	30.00	0.24	0.55	0.44	Pass
897.50	30.00	0.27	0.60	0.44	Pass
699.00	30.00	0.20	0.47	0.43	Pass
777.00	30.00	0.23	0.52	0.44	Pass
788.00	30.00	0.23	0.53	0.44	Pass
704.00	30.00	0.21	0.47	0.44	Pass
1850.00	30.00	0.18	1.00	0.18	Pass
814.00	30.00	0.24	0.54	0.44	Pass
1710.00	30.00	0.09	1.00	0.09	Pass

Mode for Simultaneous Multi-band Transmission:

Radio Access Technology	Ratio 1	Ratio 2	Simultaneous Ratio	Limit	Result
					Pass/Fail
2.4G + LTE	0.01	0.44	0.45	1	Pass

Note:

- 1) Bluetooth and LumenRadio can't transmit at the same time;
- 2) For LTE Module (FCC ID: 2ANPO00NRF9160; the issue date: 06/29/2023)

Result: Pass