

RF EXPOSURE EVALUATION

EUT Specification

EUT	WiFi Door & Window Sensor
Model Number	iSB04
FCC ID	EMOISB04
Frequency band (Operating)	☒ WLAN: 2.412GHz ~ 2.462GHz ☐ WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz ☐ WLAN: 5.745GHz ~ 5.825GHz ☐ Others
Device category	☐ Portable (<20cm separation) ☒ Mobile (>20cm separation) ☐ Others ____
Exposure classification	☐ Occupational/Controlled exposure (S = 5mW/cm ²) ☒ General Population/Uncontrolled exposure (S=1mW/cm ²)
Antenna diversity	☒ Single antenna ☐ Multiple antennas ☐ Tx diversity ☐ Rx diversity ☐ Tx/Rx diversity
Antenna gain (Max)	1.8dBi
Max. output power	802.11b: 15.69dBm 802.11g: 13.94 dBm 802.11n(HT20): 13.16dBm
Input Rating	DC 2*1.5V Battery
Evaluation applied	☒ MPE Evaluation ☐ SAR Evaluation

Applicable Standard:

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J. Section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2m Normally can be maintained between the user and the device.

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				
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/Uncontrol Exposures				
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

Friis transmission formula: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where P_d = Power density in mW/cm², P_{out} =output power to antenna in Mw G = gain of antenna in linear scale, $P_i=3.1416$ R = distance between observation point and center of the radiator in cm P_d the limit of MPE, 1mW/cm². 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

Max power Result:

Operation Mode	Channel Number	Channel Frequency (MHz)	Peak Output Power (dBm)	Limit (dBm)	Verdict
802.11b	1	2412	13.42	30	PASS
	6	2437	15.69	30	PASS
	11	2462	14.31	30	PASS
802.11g	1	2412	13.92	30	PASS
	6	2437	13.94	30	PASS
	11	2462	12.14	30	PASS
802.11n (HT20)	1	2412	12.63	30	PASS
	6	2437	13.04	30	PASS
	11	2462	13.16	30	PASS

Operating Mode	Test Channel	Tune up tolerance (dBm)	Max tune up conducted power(dBm)	Output Peak power (mW)	Ant. Gain (dBi)	Ant. Gain (numeric)	Power density at 20cm (mW/cm ²)	Power density Limits (mW/cm ²)
802.11b	1	13 $\pm$ 1	14	25.119	1.8	1.514	0.00756	1
	6	16 $\pm$ 1	17	50.119	1.8	1.514	0.01509	1
	11	14 $\pm$ 1	15	31.623	1.8	1.514	0.00952	1
802.11g	1	14 $\pm$ 1	15	31.623	1.8	1.514	0.00952	1
	6	14 $\pm$ 1	15	31.623	1.8	1.514	0.00952	1
	11	12 $\pm$ 1	13	19.953	1.8	1.514	0.00601	1
802.11n (HT20)	1	13 $\pm$ 1	14	25.119	1.8	1.514	0.00756	1
	6	13 $\pm$ 1	14	25.119	1.8	1.514	0.00756	1
	11	13 $\pm$ 1	14	25.119	1.8	1.514	0.00756	1