

RF EXPOSURE EVALUATION

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)

FCC ID: 2AOKB-T8020

EUT Specification

EUT	Wi-Fi Doorbell Chime
Frequency band (Operating)	<input checked="" type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz <input type="checkbox"/> WLAN: 5.18GHz ~ 5.24GHz <input type="checkbox"/> WLAN: 5.745GHz ~ 5.825GHz <input checked="" type="checkbox"/> Others: 2.402GHz~2.480GHz BLE
Device category	<input type="checkbox"/> Portable (<20cm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others ____
Exposure classification	<input type="checkbox"/> Occupational/Controlled exposure (S = 5mW/cm ²) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm ²)
Antenna diversity	<input type="checkbox"/> Single antenna <input checked="" type="checkbox"/> Multiple antennas <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input type="checkbox"/> Tx/Rx diversity
Max. output power	BLE: -2.048dBm (0.0006W) 2.4G WiFi ANT A: 19.81dBm (0.0957W) 2.4G WiFi ANT B: 19.77dBm (0.0948W)
Antenna gain (Max)	0 dBi
Evaluation applied	<input checked="" type="checkbox"/> MPE Evaluation <input type="checkbox"/> SAR Evaluation

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: $P_d = \frac{P_{out} * G}{4 * \pi * R^2}$

Where

P_d = Power density in mW/cm^2

P_{out} = output power to antenna in Mw

G = gain of antenna in linear scale

$\pi = 3.1416$

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

P_d the limit of MPE, $1mW/cm^2$. 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

2.4GHz WiFi ANT A:

Operating Mode	Channel Frequency	Measured Power	Tune up tolerance	Max. Tune up Power	Antenna Gain	Power density at 20cm	Power density Limits (mW/cm^2)
	(MHz)	(dBm)	(dBm)	(dBm)	(dBi)	(mW/cm^2)	
802.11b	2412	19.81	19.81 ± 1	20.81	0	0.0240	1
	2437	19.26	19.26 ± 1	20.26	0	0.0211	1
	2462	18.86	18.86 ± 1	19.86	0	0.0193	1
802.11g	2412	17.89	17.89 ± 1	18.89	0	0.0154	1
	2437	18.06	18.06 ± 1	19.06	0	0.0160	1
	2462	17.55	17.55 ± 1	18.55	0	0.0142	1
802.11n (HT20)	2412	18.66	18.66 ± 1	19.66	0	0.0184	1
	2437	17.24	17.24 ± 1	18.24	0	0.0133	1
	2462	17.55	17.55 ± 1	18.55	0	0.0142	1
802.11n (HT40)	2422	18.07	18.07 ± 1	19.07	0	0.0161	1
	2437	17.24	17.24 ± 1	18.24	0	0.0133	1
	2452	18.72	18.72 ± 1	19.72	0	0.0187	1

2.4GHz WiFi ANT B:

Operating Mode	Channel Frequency	Measured Power	Tune up tolerance	Max. Tune up Power	Antenna Gain	Power density at 20cm	Power density Limits (mW/cm ²)
	(MHz)	(dBm)	(dBm)	(dBm)	(dBi)	(mW/ cm ²)	
802.11b	2412	19.77	19.77±1	20.77	0	0.0238	1
	2437	19.26	19.26±1	20.26	0	0.0211	1
	2462	18.86	18.86±1	19.86	0	0.0193	1
802.11g	2412	18.58	18.58±1	19.58	0	0.0181	1
	2437	18.79	18.79±1	19.79	0	0.0190	1
	2462	18.34	18.34±1	19.34	0	0.0171	1
802.11n (HT20)	2412	18.18	18.18±1	19.18	0	0.0165	1
	2437	17.94	17.94±1	18.94	0	0.0156	1
	2462	17.55	17.55±1	18.55	0	0.0142	1
802.11n (HT40)	2422	17.99	17.99±1	18.99	0	0.0158	1
	2437	17.91	17.91±1	18.91	0	0.0155	1
	2452	17.65	17.65±1	18.65	0	0.0146	1

BT:

Operating Mode	Channel Frequency	Measured Power	Tune up tolerance	Max. Tune up Power	Antenna Gain	Power density at 20cm	Power density Limits (mW/cm ²)
	(MHz)	(dBm)	(dBm)	(dBm)	(dBi)	(mW/ cm ²)	
BLE	1M-2402	-2.057	-2.057±1	-1.057	0	0.0002	1
	1M-2440	-2.478	-2.478±1	-1.478	0	0.0001	1
	1M-2480	-3.250	-3.250±1	-2.250	0	0.0001	1
	2M-2402	-2.048	-2.048±1	-1.048	0	0.0002	1
	2M-2440	-2.447	-2.447±1	-1.447	0	0.0001	1
	2M-2480	-3.228	-3.228±1	-2.228	0	0.0001	1

Note: BT and 2.4G WIFI cannot support simultaneous transmission and 2.4G WIFI cannot support simultaneous MIMO.