

RF EXPOSURE EVALUATION

EUT Specification

EUT	Robot Vacuum Cleaner
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 ~ 5825GHz <input type="checkbox"/> Others(Bluetooth: 2.402GHz ~ 2.480GHz)
Device category	<input type="checkbox"/> Portable (<20cm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others ____
Antenna diversity	<input checked="" type="checkbox"/> Single antenna <input type="checkbox"/> Multiple antennas <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input type="checkbox"/> Tx/Rx diversity
Max. output power	17.96dBm(62.52mW)
Antenna gain	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)
300-1500	--	--	F/1500
1500-100000	--	--	1

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

π = 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

Channel	Channel Frequency (MHz)	Max Output power (dBm)	Max Output power (mW)	Power density at 20cm (mW/cm^2)	Power density Limits (mW/cm^2)
Test mode: IEEE 802.11b					
Low	2412	17.96	62.52	0.01244	1
Middle	2437	17.85	60.95	0.01213	1
High	2462	17.50	56.23	0.01119	1
Test mode: IEEE 802.11g					
Low	2412	17.18	52.24	0.01039	1
Middle	2437	17.18	52.24	0.01039	1
High	2462	16.91	49.09	0.00977	1
Test mode: IEEE 802.11n(HT20)					
Low	2412	15.49	35.40	0.00704	1
Middle	2437	15.29	33.81	0.00673	1
High	2462	15.01	31.70	0.00631	1

According to the test result of power density at separation distance 20cm, compliance with RF Exposure requirement.