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Maximum Permissible Exposure Evaluation

FCC ID: 2ATCHA900

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)

EUT Specification

EUT	Robot Vacuum Cleaner
Frequency band (Operating)	☒ WLAN: 2.412GHz ~ 2.462GHz ☐ EDR: 2.402GHz ~ 2.480GHz ☐ BLE: 2.402GHz ~ 2.480GHz ☐ Others
Device category	☐ Portable (<20cm separation) ☐ Mobile (>20cm separation) ☒ fixed (>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
Max. output power	WLAN: 802.11n (HT20): 17..01dBm
Antenna gain (Max)	2.5dBi
Evaluation applied	☒ MPE Evaluation ☐ 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

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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

π = 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

2.4G WIFI:

Support type	Operating Mode	Channel Frequency (MHz)	Max. Measured Power (dBm)	Tune up tolerance (dBm)	Max. Tune up Power (dBm)	Antenna Gain (dBi)	Power density at 20cm (mW/cm ²)	Power density Limits (mW/cm ²)
WIFI	802.11b	2412	16.59	16.59±1	17.59	2.5	0.02031	1
WIFI	802.11b	2437	17.01	17.01±1	18.01	2.5	0.02237	1
WIFI	802.11b	2462	16.27	16.27±1	17.27	2.5	0.01887	1
WIFI	802.11g	2412	14.91	14.91±1	15.91	2.5	0.01380	1
WIFI	802.11g	2437	14.74	14.74±1	15.74	2.5	0.01327	1
WIFI	802.11g	2462	14.45	14.45±1	15.45	2.5	0.01241	1
WIFI	802.11n (HT20)	2412	12.96	12.96±1	13.96	2.5	0.00881	1
WIFI	802.11n (HT20)	2437	13.27	13.27±1	14.27	2.5	0.00946	1
WIFI	802.11n (HT20)	2462	12.76	12.76±1	13.76	2.5	0.00841	1
WIFI	802.11n (HT40)	2422	11.49	11.49±1	12.49	2.5	0.00628	1
WIFI	802.11n (HT40)	2437	11.72	11.72±1	12.72	2.5	0.00662	1
WIFI	802.11n (HT40)	2452	11.88	11.88±1	12.88	2.5	0.00687	1

Note

The transmitter signals are correlated:

For a more detailed features description, please refer to the RF Test Report.

*****THE END*****