

RF Exposure Evaluation

Test report
On Behalf of
Shenzhen Guarder Secure Technology Co.,Ltd.
For
UV Air Sterilzier

**Model List : SC-B-148, SC-B-252, SC-B-500,
SC-B-1500, SC-B-2000**

FCC ID: 2ARVP-SC200

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Date of Test: **Jun. 28, 2020 -- Aug. 28, 2020**

Date of Report: **Aug. 28, 2020**

1 General Description of EUT

Product Name:	UV Air Sterilizer
Model/Type reference:	SC-B-148
Serial Model:	SC-B-252, SC-B-500, SC-B-1500, SC-B-2000
Model difference:	The product has multiple models, but the electrical principles of PCB and circuit in all models are the same, only the name is different, so the test sample is: SC-B-148
Trade Mark	N/A
FCC ID	2ARVP-SC200
Hardware Version:	V1.2
Software Version:	V2.5.3
Operation frequency	802.11b/g/n20: 2412~2462 MHz 802.11n40: 2422~2452 MHz
Number of Channels	802.11b/g/n20: 11CH 802.11n40: 7 CH
Modulation Type	CCK/DSSS/OFDM
Antenna type:	Glue stick Antenna
Antenna gain:	1.8dBi

2 RF Exposure Compliance Requirement

2.1 Standard Requirement

According to FCC Part1.1310: 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 part1.1307(b)

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3~3.0	614	1.63	*(100)	6
3.0~30	1842/f	4.89/f	*(900/f ²)	6
30~300	61.4	0.163	1.0	6
300~1500 .....	.....	.....	f/300	6
1500~100,000 .....	.....	.....	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3~1.34	614	1.63	*(100)	30
1.34~30	824/f	2.19/f	*(180/f ²)	30
30~300	27.5	0.073	0.2	30
300~1500 .....	.....	.....	f/1500	30
1500~100,000 .....	.....	.....	1.0	30

F= Frequency in MHz Friis

Formula

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

$\pi = 3.1416$

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

Pd is the limit of MPE. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

3 EUT RF Exposure

Antenna Gain: 1.8Bi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is in linear scale. Output Power Into Antenna & RF Exposure Evaluation Distance:

Measurement Data

802.11b mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	15.95	15±1	16	39.811
Middle(2437MHz)	16.44	16±1	17	50.119
Highest(2462MHz)	15.54	15±1	16	39.811

802.11g mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	12.16	12±1	13	19.953
Middle(2437MHz)	12.48	13±1	14	25.119
Highest(2462MHz)	12.10	12±1	13	19.953

802.11n(HT20)mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	12.61	12±1	13	19.953
Middle(2437MHz)	12.44	13±1	14	25.119
Highest(2462MHz)	12.02	12±1	13	19.953

802.11n(HT40)mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2422MHz)	11.38	11±1	12	15.849
Middle(2437MHz)	11.59	12±1	13	19.953
Highest(2452MHz)	11.36	11±1	12	15.849

Worst case: 802.11b mode Lowest (2412MHz)
Using the maximum value of the test report

Maximum tune-up Power (mW)	Antenna Gain (dBi)	Power Density at R =20 cm (mW/cm ²)	Limit	Result
50.119	1.8	0.0151	1	PASS

Remark: The Max Conducted Peak Output Power data refer to report Report No.: HK2008072126-E
Value : $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2) = 0.0151 \text{ mW/cm}^2$