

RF Exposure evaluation

Product Name : Auto Water Turn-Off System

Brand Name : AWTOS

Model : AWNASWS020

Series Model : N/A

FCC ID : 2BPRH-AWNASWS020

Applicant : Orion180 Technologies LLC

Address : 930 S.Harbor City Blvd., Suite 500 Melboure, FL 32901

Manufacturer : Orion180 Technologies LLC.

Address : 930 S.Harbor City Blvd., Suite 500 Melboure, FL 32901.

Standard(s) : 47CFR §1.1310, 47CFR §2.1091

KDB447498 D01 General RF Exposure Guidance v06

Date of Receipt: Apr. 25, 2025

Date of Test : Apr. 26, 2025~ May. 13, 2025

Issued Date : May. 13, 2025

Issued By: Guangdong Asia Hongke Test Technology Limited

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Reviewed by:

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Note: This device has been tested and found to comply with the standard(s) listed, this test report merely corresponds to the test sample. It is not permitted to copy extracts of these test result without the written permission of the test laboratory. This report shall not be reproduced except in full, without the written approval of Guangdong Asia Hongke Test Technology Limited. If there is a need to alter or revise this document, the right belongs to Guangdong Asia Hongke Test Technology Limited, and it should give a prior written notice of the revision document. This test report must not be used by the client to claim product endorsement.



Report Revise Record

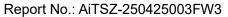
Report Version	Issued Date	Notes
M1	May. 13, 2025	Initial Release



Contents

Page 3 of 8

1 GI	ENERAL INFORMATION	4
1.1	Environmental conditions	
1.2	GENERAL DESCRIPTION OF EUT	
1.3	Test Facility	5
1.4	Measurement uncertainty	5
2 M	IETHOD OF MEASUREMENT	
Z IVI		
2.1	Applicable Standard	
2.2	LIMIT	6
2.3	MPE CALCULATION METHOD	7
2.4	Manufacturing Tolerance	7
2.5	Standalone MPE Result	8
2.6	Conclusion	





1 GENERAL INFORMATION

1.1 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C	
Relative Humidity:	55 %	
Air Pressure:	101 kPa	

1.2 General Description of EUT

Product Name:	Auto Water Turn-Off System
Model/Type reference:	AWNASWS020
Serial Model:	N/A
Power Rating:	Input: DC 3.0V
Hardware Version:	N/A
Software Version:	N/A
Sample(s) Status:	AiTSZ-250425003 -1(Normal sample) AiTSZ-250425003 -2(Engineer sample)
Bluetooth :	
Supported type:	Bluetooth BLE 1M
Modulation:	GFSK
Operation frequency:	2402MHz~2480MHz
Channel number:	79
Channel separation:	2MHz
Antenna type:	PCB antenna
Antenna gain:	1.90dBi
2.4G WIFI:	
Supported type:	802.11b/802.11g /802.11n(HT20)
Modulation:	802.11b(DSSS):CCK,DQPSK,DBPSK 802.11g(OFDM):BPSK,QPSK,16-QAM,64-QAM 802.11n(OFDM):BPSK,QPSK,16-QAM,64-QAM
Operation frequency:	802.11b/802.11g/802.11n(H20): 2412MHz~2462MHz
Channel number:	802.11b/802.11g/802.11n(H20): 11
Channel separation:	5MHz
Antenna type:	PCB antenna
Antenna gain:	1.90dBi



1.3 Test Facility

Test Laboratory:

Guangdong Asia Hongke Test Technology Limited

B1/F, Building 11, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Report No.: AiTSZ-250425003FW3

The test facility is recognized, certified or accredited by the following organizations:

FCC-Registration No.: 251906 Designation Number: CN1376

Guangdong Asia Hongke Test Technology Limited has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

IC —Registration No.: 31737 CAB identifier: CN0165

The 3m Semi-anechoic chamber of Guangdong Asia Hongke Test Technology Limited has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 31737

A2LA-Lab Cert. No.: 7133.01

Guangdong Asia Hongke Test Technology Limited has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

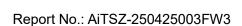
1.4 Measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report according to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods — Part 4: Uncertainty in EMC Measurements" and is documented in the Guangdong Asia Hongke Test Technology Limited's quality system according to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Asia Hongke laboratory is reported:

Test	Measurement Uncertainty	Notes
Power Line Conducted Emission	150KHz~30MHz ±1.20 dB	(1)
Radiated Emission	9KHz~30Hz ±3.10dB	(1)
Radiated Emission	9KHz~1GHz ±3.75dB	(1)
Radiated Emission	1GHz~18GHz ±3.88 dB	(1)
Radiated Emission	18GHz-40GHz ±3.88dB	(1)
RF power, conducted	30MHz~6GHz ±0.16dB	(1)
RF power density, conducted	±0.24dB	(1)
Spurious emissions, conducted	±0.21dB	(1)
Temperature	±1°C	(1)
Humidity	±3%	(1)
DC and low frequency voltages	±1.5%	(1)
Time	±2%	(1)
Duty cycle	±2%	(1)
Bandwidth	±1.5 x10 ⁻⁶	(1)

The report uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty Multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.



2 Method of measurement

2.1 Applicable Standard

According to §1.1307(b)(1), 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 level in excess of the Commission's guidelines.

According to §1.1310 and §2.1091 RF exposure is calculated.

FCC KDB447498 D01 General RF Exposure Guidance v06: Mobile and Portable Device, RF Exposure, Equipment Authorization Procedures

2.2 Limit

Limits for Maximum Permissible Exposure (MPE)/Controlled Exposure

Frequency	Electric Field	Magnetic Field	Power Density	Averaging Time	
Range(MHz)	Strength(V/m)	Strength(A/m)	(mW/cm²)	(minute)	
Limits for Occupational/Controlled Exposure					
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 – 100,000	/	1	5	6	

Limits for Maximum Permissible Exposure (MPE)/Uncontrolled Exposure

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Frequency	Electric Field	Magnetic Field	Power Density	Averaging Time	
Range(MHz)	Strength(V/m)	Strength(A/m)	(mW/cm²)	(minute)	
Limits for Occupational/Controlled Exposure					
0.3 - 3.0	614	1.63	(100) *	30	
3.0 - 30	824/f	2.19/f	(180/f)*	30	
30 – 300	27.5	0.073	0.2	30	
300 – 1500	1	1	f/1500	30	
1500 – 100,000	1	1	1.0	30	

F=frequency in MHz

^{*=}Plane-wave equivalent power density

Report No.: AiTSZ-250425003FW3



2.3 MPE Calculation Method

Predication of MPE limit at a given distance Equation from page 18 of OET Bulletin 65, Edition 97-01

S=PG/4πR²

Where: S=power density

P=power input to antenna

G=power gain of the antenna in the direction of interest relative to an isotropic radiator R=distance to the center of radiation of the antenna

2.4 Manufacturing Tolerance

Frequency	BLE-1M(Peak)				
(MHz)	2402	2440	2480		
Target (dBm)	-4.5	-4.5	-2.0		
Tolerance ± (dB)	1	1	1		
Frequency	BLE-2M(Peak)				
(MHz)	2402	2440	2480		
Target (dBm)	-4.5	-4.5	-2.0		
Tolerance ± (dB)	1	1	1		

Frequency	2.4G WIFI-IEEE 802.11b (Peak)			
(MHz)	2412	2437	2462	
Target (dBm)	13.5	14.5	13.5	
Tolerance ± (dB)	1	1	1	
Frequency	2.4G WIFI-IEEE 802.11g (Peak)			
(MHz)	2412	2437	2462	
Target (dBm)	14.5	15.5	15.0	
Tolerance ± (dB)	1	1	1	
Frequency	2.4G WIFI-IEEE 802.11n 20 (Peak)			
(MHz)	2412	2437	2462	
Target (dBm)	15.0	15.0	15.0	
Tolerance ± (dB)	1	1	1	



2.5 Standalone MPE Result

As declared by the Applicant, the EUT is a wireless device used in a fix application, at least 20 cm from any body part of the user or nearby persons; from the maximum EUT RF output power, the minimum separation distance, r =20cm, as well as the gain of the used antenna is refer to section 4, the RF power density can be obtained.

Page 8 of

Modulation Type		ower with e_up	Antenna Gain	I Δntenna (≟ain I		MPE Limits
	dBm	mW	(ubi)	, ,	,	(mW/cm2)
2.4G BLE	-1.0	0.79	1.90	1.55	0.0003	1
2.4G WIFI	16.0	39.81	0.65	1.55	0.0123	1

Remark:

- 1. Output power (Peak) including turn-up tolerance;
- 2. MPE evaluate distance is 20cm from user manual provide by manufacturer.

2.6 Conclusion

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

*******	End of	Report	*******
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