TEST REPORT

Report No.: SHATBL2407020W10

Applicant	:	Shanghai AllyNav Technology Co.,Ltd.
Product Name	:	Orchard Sparying Robot
Brand Name	:	N/A
Model Name	:	Aries300N
FCC ID	:	2AT4H-ARIES300N
Test Standard	:	FCC 47 CFR Part 2.1091
Date of Test	:	2024.08.14-2025.02.25

Report Prepared by : Emily

(Emily)

Report Approved by : Guozheng Li

(Guozheng Li)

Authorized Signatory : Terry Yang

(Terry Yang)

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REVISION HISTORY

Rev.	Issue Date	Revisions	Revised by
00	2025.02.25	Initial Release	Guozheng Li

DECLARATION OF REPORT

1. The device has been tested by ATBL, and the test results show that the equipment under test (EUT) is in compliance with the requirements of 47 CFR Part 2.1091. And it is applicable only to the tested sample identified in the report.

2. This report shall not be reproduced except in full, without the written approval of ATBL, this document only be altered or revised by ATBL, personal only, and shall be noted in the revision of the document.

3. The general information of EUT in this report is provided by the customer or manufacture, ATBL is only responsible for the test data but not for the information provided by the customer or manufacture.

4. The results in this report is only apply to the sample as tested under conditions. The customer or manufacturer is responsible for ensuring that the additional production units of this model have the same electrical and mechanical components.

1. GENERAL DESCRIPTION

1.1. Applicant

Name : Shanghai AllyNav Technology Co.,Ltd.

Address : Room 201, Buliding 1,No 215, Gaoguang RD,Qingpu District,Shanghai,China

1.2. Manufacturer

Name : Shanghai AllyNav Technology Co.,Ltd.

Address : Room 201, Buliding 1,No 215, Gaoguang RD,Qingpu District,Shanghai,China

1.3. Factory

Name : Shanghai AllyNav Technology Co.,Ltd.

Address : Room 201, Buliding 1,No 215, Gaoguang RD,Qingpu District,Shanghai,China

1.4. General Information of EUT

General Information	
Equipment Name	Orchard Sparying Robot
Brand Name	N/A
Model Name	Aries300N
Series Model	Aries300N-1
Model Difference	The model is changed according to the difference of overseas customers, and its composition and key parts are exactly the same
Sample No	202400515007001
Power Input	DC 48V
Adapter	N/A
Battery	Model: Lead acid battery Brand:TianNeng Capacity: 10-19AH
Hardware version	Aries300N-1
Software version	1.2.2.25RC
Connecting I/O Port(s)	Refer to the remark below.

Remark:

The above information of EUT was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.5. Equipment Specification

Equipment Specification		
BT		2402-2480 MHz
Antenna Information	Antenna Type:	PCB Antenna
	Antenna Gain:	The antenna gain of all bands is 2.7 dBi.

Equipment Specification		
BLE		2402-2480 MHz
Antenna Information	Antenna Type:	PCB Antenna
	Antenna Gain:	The antenna gain of all bands is 2.7 dBi.

Equipment Specification		
WLAN	2.4GHz	2412-2472 MHz
Antenna Information	Antenna Type:	PCB Antenna
	Antenna Gain:	The antenna gain of all bands is 2.7 dBi.

Equipment Specification		
WWAN		LTE
Antenna Information	Antenna Type:	PCB Antenna
	Antenna Gain:	Band 2 : 2.3 dBi Band 4: 0.5 dBi Band 5: 1.1 dBi Band 12: -7.5 dBi Band 41: 1.7 dBi

1.6. Modification of EUT

No modifications are made to the EUT during all test items.

1.7. Laboratory Information

Company Name	:	Shanghai ATBL Technology Co., Ltd.
Address	:	5F., Unit 1, No.8, Free Trade One Life Science and Sci-Tech Industrial Park, No.160, Basheng Road, Pudong New District, Shanghai, China
Telephone	:	+86(0)21-51298625

1.8. Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

Standard	Description
47 CFR Part 15.247	Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz.
47 CFR Part 2	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
47 CFR Part 22	Subpart H - Cellular Radiotelephone Service
47 CFR Part 24	Subpart E - Broadband PCS
47 CFR Part 27	Subpart C - Technical Standards
47 CFR Part 2.1091	Radiofrequency radiation exposure evaluation: mobile devices.
KDB 447498 D01 V06	Rf Exposure Procedures And Equipment Authorization Policies For Mobile And Portable Devices

Remark:

All test items were verified and recorded according to the standards and without any deviation during the test.

2. RF EXPOSURE EVALUATION

2.1. 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)
(i) Limits for Occupational/Controlled Exposure				
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
300–1,500			f/300	<6
1,500–100,000			5	<6
(ii) 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
300–1,500			f/1500	<30
1,500–100,000			1.0	<30

Note:

f = frequency in MHz.

* = Plane-wave equivalent power density.

2.2. Formula

Below method describes a theoretical approach to calculate possible exposure to electromagnetic radiation around a base station transceiver antenna. Precise statements are basically only possible either with measurements or complex calculations considering the complexity of the environment (e.g. soil conditions, near buildings and other obstacles) which causes reflections, scattering of electromagnetic fields. The maximum output power (given in EIRP) of a base station is usually limited by license conditions of the network operator. A rough estimation of the expected exposure in power flux density on a given point can be made with the following equation.

$$Pd_{(mW/cm^2)} = \frac{P_{(mW)} * G_{numeric}}{4 * r^2_{(cm)} * \pi}$$

Pd = Power Density

P = Maximum output power

G numeric = Numeric gain of the antenna relative to isotropic antenna

r = distance between the antenna and the point of exposure

If we know the maximum gain of the antenna and the total output power to the antenna, through calculation, we will know MPE value at distance 20cm.

2.3. MPE Result

Turn up

Mode	Detector	Turn up Power
2.4GHz	Peak	24±1dBm
BT	Peak	10±1dBm
BLE	Peak	-5±1dBm
LTE Band 2	AV	24±1dBm
LTE Band 4	AV	24±1dBm
LTE Band 5	AV	24±1dBm
LTE Band 12	AV	24±1dBm
LTE Band 41	AV	24±1dBm

Operating Band	Frequency (MHz)	Ant. Gain (dBi)	Max Conducted Average Output Power (dBm)	EIRP/ERP (dBm)	EIRP/ERP Limit (dBm)	EIRP/ERP (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit (mW/cm^2)	Result
2.4GHz	2462	2.7	25.00	27.7	36.00	588.84	0.1172	1.0000	Pass
BT	2402	2.7	11.00	13.7	36.00	23.44	0.0046	1.0000	Pass
BLE	2402	2.7	-4.00	-1.3	36.00	0.741	0.0001	1.0000	Pass
LTE Band 2	1850	2.3	25.00	25.44	33.00	349.95	0.0697	1.0000	Pass
LTE Band 4	1710	0.5	25.00	23.45	30.00	221.31	0.0441	1.0000	Pass
LTE Band 5	824	1.1	25.00	23.88	38.45	244.34	0.0486	0.5498	Pass
LTE Band 12	699	-7.5	25.00	15.77	34.77	37.76	0.0075	0.4665	Pass
LTE Band 41	2496	1.7	25.00	24.09	33.00	256.43	0.0512	1.0000	Pass

2.4. For BT and WWAN and WLAN work simultaneously

Maximum $\frac{Evaluated_k}{Exposure\ Limit_k}$ Mode	Frequency (MHz)	Power Density at R = 20 cm (mW/cm²)	Limit (mW/cm²)	$\frac{Evaluated_k}{Exposure\ Limit_k}$	Sum	Limit (mW/cm²)	Result
BT	2402	0.0046	1.0000	0.0046	0.2102	1.0000	Pass
2.4GHz	2462	0.1172	1.0000	0.1172			
LTE Band 5	824	0.0486	0.5498	0.0884			

Note1:The Maxinum power is less than the limit, complies with the exemption requirements.
Note2:The DUT can not realize synchronous transmission function.

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