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Report No.: T210106W01-MF

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Rev.: 01

KDB 447498 D03
47 C.F.R. Part 1, Subpart I, Section 1.1310
47 C.F.R. Part 2, Subpart J, Section 2.1091

RF EXPOSURE REPORT

For

ASTROS Station

**Model: AS-201, AWIP-201, WPS-201, AS-101, AWIP-101,
WPS-101**

Trade Name: ASTROS

Issued to

Astrogate Inc.

11F-6, No. 120, Qiaohe Rd., Zhonghe Dist., New Taipei City 235, Taiwan

Issued by

Compliance Certification Services Inc.

Wugu Laboratory

**No.11, Wugong 6th Rd., Wugu Dist.,
New Taipei City, Taiwan. (R.O.C.)**

Issue Date: May 11, 2021

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	April 22, 2021	Initial Issue	ALL	Doris Chu
01	May 11, 2021	See the following Note Rev. (01)	ALL	Doris Chu

Rev. (01)

- 1.Revised test data.
- 2.Revised Model Discrepancy.



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1. TEST RESULT CERTIFICATION

We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10: 2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.207, 15.209, 15.247.

The test results of this report relate only to the tested sample EUT identified in this report.

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
KDB 447498 D03 47 C.F.R. Part 1, Subpart I, Section 1.1310 47 C.F.R. Part 2, Subpart J, Section 2.1091	No non-compliance noted
Statements of Conformity	
Determination of compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.	

Approved by:

Kevin Tsai
Deputy Manager
Compliance Certification Services Inc.

2. LIMIT

According to §15.247(i), 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 levels in excess of the Commission's guidelines. See § 1.1307(b)(1) of this chapter.

§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), except in the case of portable devices which shall be evaluated according to the provisions of FCC part 2.1093 of the chapter.

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 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
(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
300-1,500			f/1500	30
1,500-100,000			1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

Note 1 to Table 1: Occupational/controlled exposure limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when a person is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

Note 2 to Table 2: General population/uncontrolled exposure limits apply in situations in which the general public may be exposed, or in which persons who are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

3. EUT SPECIFICATION

EUT	ASTROS Station		
Model	AS-201, AWIP-201, WPS-201, AS-101, AWIP-101, WPS-101		
Model Discrepancy	Model	color	spec
	AS-101	Black	Simultaneous sources x2
	AWIP-101		
	WPS-101		
	AS-201	Silver	Simultaneous sources x4
	AWIP-201		
	WPS-201		
	All the above models are identical except for the designation of trade names and model numbers.		
Frequency band (Operating)	☐ Bluetooth: 2402MHz-2480MHz ☒ 802.11b/g/n HT20: 2412MHz ~ 2462 MHz ☒ 802.11n HT40: 2422MHz ~ 2452MHz ☒ 802.11a/n HT20: 5180MHz ~ 5240MHz / 5745MHz ~ 5825MHz ☒ 802.11n HT40: 5190MHz ~ 5230MHz / 5755MHz ~ 5795MHz ☒ 802.11ac VHT80: 5210MHz / 5775MHz ☐ Others		
Device category	☐ Portable (<20cm separation) ☒ Mobile (>20cm separation) ☐ Others		
Exposure classification	☐ Occupational/Controlled exposure (S = 5mW/cm²) ☒ General Population/Uncontrolled exposure (S=1mW/cm²)		

Antenna Specification	Dipole Antenna WIFI 2.4GHz: Chain 0: Gain: 2 dBi Chain 1: Gain: 2 dBi Power Directional Gain: 5.01 dBi WIFI 5GHz: Chain 0: Gain: 2 dBi Chain 1: Gain: 2 dBi Power Directional Gain: 5.01 dBi <table><tr><td>2.4GHz:</td><td>Directional Gain :</td><td>5.01 dBi</td><td>(Numeric gain:</td><td>3.17)</td><td>Worst</td></tr><tr><td>5GHz:</td><td>Directional Gain :</td><td>5.01 dBi</td><td>(Numeric gain:</td><td>3.17)</td><td>Worst</td></tr></table>						2.4GHz:	Directional Gain :	5.01 dBi	(Numeric gain:	3.17)	Worst	5GHz:	Directional Gain :	5.01 dBi	(Numeric gain:	3.17)	Worst																		
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Maximum Measurement Average Power	<table><tr><td>2.4GHz</td><td></td><td></td></tr><tr><td>IEEE 802.11b Mode:</td><td>14.85 dBm</td><td>(30.549 mW)</td></tr><tr><td>IEEE 802.11g Mode:</td><td>17.03 dBm</td><td>(50.466 mW)</td></tr><tr><td>IEEE 802.11n HT 20 Mode:</td><td>15.91 dBm</td><td>(38.994 mW)</td></tr><tr><td>IEEE 802.11n HT 40 Mode:</td><td>16.13 dBm</td><td>(41.020 mW)</td></tr><tr><td>5GHz</td><td></td><td></td></tr><tr><td>IEEE 802.11a Mode:</td><td>15.08 dBm</td><td>(32.197 mW)</td></tr><tr><td>IEEE 802.11n HT 20 Mode:</td><td>14.93 dBm</td><td>(31.116 mW)</td></tr><tr><td>IEEE 802.11n HT 40 Mode:</td><td>13.87 dBm</td><td>(24.352 mW)</td></tr><tr><td>IEEE 802.11ac VHT 80 Mode:</td><td>14.58 dBm</td><td>(28.693 mW)</td></tr></table>						2.4GHz			IEEE 802.11b Mode:	14.85 dBm	(30.549 mW)	IEEE 802.11g Mode:	17.03 dBm	(50.466 mW)	IEEE 802.11n HT 20 Mode:	15.91 dBm	(38.994 mW)	IEEE 802.11n HT 40 Mode:	16.13 dBm	(41.020 mW)	5GHz			IEEE 802.11a Mode:	15.08 dBm	(32.197 mW)	IEEE 802.11n HT 20 Mode:	14.93 dBm	(31.116 mW)	IEEE 802.11n HT 40 Mode:	13.87 dBm	(24.352 mW)	IEEE 802.11ac VHT 80 Mode:	14.58 dBm	(28.693 mW)
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Evaluation applied	☒ MPE Evaluation* ☐ SAR Evaluation ☐ N/A																																			
Received Date	January 6, 2021																																			

Remark:

1. Disclaimer: Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.
2. Disclaimer: The variant model numbers / trademarks are assessed as identical in hardware and software to each other, hence all variants are fully covered by the test results in this test report without further verification test.
3. The AVG power referred the test report T210106W01-RP1, T210106W01-RP2 for RF Exposure assessment purpose.

4. TEST RESULTS

No non-compliance noted.

Calculation

Given $E = \frac{\sqrt{30 \times P \times G}}{d}$ & $S = \frac{E^2}{377}$

Where E = Field strength in Volts / meter

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{377 d^2}$$

Changing to units of mW and cm, using:

P (mW) = P (W) / 1000 and

d (cm) = d(m) / 100

Yields

$$S = \frac{30 \times (P/1000) \times G}{377 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2} \text{Equation 1}$$

Where d = Distance in cm

P = Power in mW

G = Numeric antenna gain

S = Power density in mW / cm²

5. MAXIMUM PERMISSIBLE EXPOSURE

Substituting the MPE safe distance using $d = 20$ cm into Equation 1:

$$S = 0.000199 \times P \times G$$

Where P = Power in mW

G = Numeric antenna gain

S = Power density in mW / cm²

IEEE 802.11b mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
6	2437	30.549	3.17	20	0.0193	1

IEEE 802.11g mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
11	2462	50.466	3.17	20	0.0318	1

IEEE 802.11n HT20 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
1	2412	38.994	3.17	20	0.0246	1

IEEE 802.11n HT40 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
3	2422	41.020	3.17	20	0.0259	1

IEEE 802.11a mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
48	5240	32.197	3.17	20	0.0203	1

IEEE 802.11n HT20 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
44	5220	31.116	3.17	20	0.0196	1

IEEE 802.11n HT40 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
38	5190	24.352	3.17	20	0.0154	1

IEEE 802.11ac VHT80 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm2)
42	5210	28.693	3.17	20	0.0181	1

--End of Report--