TEST REPORT

Applicant:	Autel New Energy Co., Ltd.
Address:	Room 101, Building B2, Zhiyuan, No.1001 Xueyuan Avenue, Changyuan Community, Taoyuan Road, Nanshan District, Shenzhen, 518055, China
Equipment Type:	MaxiCharger AC Wallbox Commercial
Model Name:	Maxi US AC W12-L-4G (refer section 2.4)
Brand Name:	AUTEL
FCC ID:	2A5NP-AUTELNEACL
Test Standard:	47 CFR Part 2.1091 KDB 447498 D01 v06
Test Date:	Nov. 01, 2017 - Jun. 02, 2022
Date of Issue:	Jun. 14, 2022

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

Tested by: Yu Yingyuan **Checked by:** Zong Liyao **Approved by:** Tolan Tu

(Testing Director)

Revision History

Version	Issue Date	Revisions Content
Rev. 01	Jun. 08, 2022	Initial Issue
Rev. 02	Jun. 14, 2022	Added Bluetooth power data (from report: RXA1710-0352RF01R1&RXA1710-0352RF02)

TABLE OF CONTENTS

1 GENERAL INFORMATION

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1/F, Baisha Science and Technology Park, Shahe West Road, Nanshan District, ShenZhen, GuangDong Province, China
Phone Number	+86 755 6685 0100

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1/F, Baisha Science and Technology Park, Shahe West Road, Nanshan District, ShenZhen, GuangDong Province, China
Accreditation Certificate	The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196.
Description	All measurement facilities used to collect the measurement data are located at Block B, 1/F, Baisha Science and Technology Park, Shahe West Road, Nanshan District, ShenZhen, GuangDong Province, China

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Autel New Energy Co., Ltd.
Address	Room 101, Building B2, Zhiyuan, No.1001 Xueyuan Avenue, Changyuan Community, Taoyuan Road, Nanshan District, Shenzhen, 518055, China

2.2 Manufacturer Information

Manufacturer	Autel New Energy Co., Ltd.
Address	Room 101, Building B2, Zhiyuan, No.1001 Xueyuan Avenue, Changyuan Community, Taoyuan Road, Nanshan District, Shenzhen, 518055, China

2.3 Factory Information

Factory	Autel New Energy Co., Ltd.
Address	Room 101, Building B2, Zhiyuan, No.1001 Xueyuan Avenue, Changyuan Community, Taoyuan Road, Nanshan District, Shenzhen, 518055, China

2.4 General Description for Equipment under Test (EUT)

EUT Name	MaxiCharger AC Wallbox Commercial
Model Name Under Test	Maxi US AC W12-L-4G
Series Model Name	Maxi US AC W12-4G, Maxi US AC W10-N14-4G Maxi US AC W10-N6-4G, Maxi US AC W7-N14-4G Maxi US AC W7-N6-4G, Maxi US AC W12-4G-H Maxi US AC W10-N14-4G-H, Maxi US AC W10-N6-4G-H Maxi US AC W7-N14-4G-H, Maxi US AC W7-N6-4G-H Maxi US AC W10-N14-L-4G, Maxi US AC W10-N6-L-4G Maxi US AC W7-N14-L-4G, Maxi US AC W7-N6-L-4G Maxi US AC W12-L- 4G-H, Maxi US AC W10-N14-L-4G-H Maxi US AC W10-N6-L-4G-H, Maxi US AC W7-N14-L-4G-H Maxi US AC W7-N6-L-4G-H
Description of Model name differentiation	W12, W10, W7 means maximum rated output power, we tested the max rated output power W12 here, N6, N14 means different power supply plug, it doesn't influent the test result. Charging cable of W7 is different from W12 and W10, we added the test for W7 model. -L means whether the product has LCD display. We tested the product has LCD display. The product name of the model without -L is MaxiCharger AC Wallbox Home. -H means the product whether attached a separate holster, The model we tested has a built-in holster on the charger; The others are the same.
Hardware Version	N/A
Software Version	N/A
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.5 Ancillary Equipment

Note: Not applicable.

2.6 Technical Information

Network and Wireless connectivity	3G Network WCDMA/HSDPA/HSUPA Band 2/4/5 4G Network LTE FDD Band 2/4/5/12/13/14/66/71 Bluetooth (BR+EDR+BLE) 2.4G WIFI 802.11b, 802.11g, 802.11n(HT20/40), NFC

The requirement for the following technical information of the EUT was tested in this report:

Operating Mode	WCDMA, LTE, Bluetooth, WLAN	
Frequency Range	WCDMA Band 2	1850 MHz ~ 1910 MHz
	WCDMA Band 4	1710 MHz ~ 1755 MHz
	WCDMA Band 5	824 MHz ~ 849 MHz
	LTE Band 2	1850 MHz ~ 1910 MHz
	LTE Band 4	1710 MHz ~ 1755 MHz
	LTE Band 5	824 MHz ~ 849 MHz
	LTE Band 12	699 MHz ~ 716 MHz
	LTE Band 13	777 MHz ~ 787 MHz
	LTE Band 14	788 MHz ~ 798 MHz
	LTE Band 66	1710 MHz ~ 1780 MHz
	LTE Band 71	663 MHz ~ 698 MHz
	Bluetooth	2400 ~ 2483.5 MHz
	802.11b/g/n(HT20/40)	2400 ~ 2483.5 MHz
Antenna Type	WWAN	Internal Antenna
	Bluetooth	Internal Antenna
	WLAN	Internal Antenna
Exposure Category	General Population/Uncontrolled Exposure	
EUT Stage	Mobile Device	

3 SUMMARY OF TEST RESULT

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 2.1091	Radiofrequency radiation exposure evaluation: mobile devices
2	KDB 447498 D01 v06	447498 D01 General RF Exposure Guidance D01 v06

4 DEVICE CATEGORY AND LEVELS LIMITS

Mobile Derives:

CFR Title 47 §2.1091(b)

(b) For purposes of this section, a mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons.

FCC KDB 447498 D01 General RF Exposure Guidance v06 Limit

Devices operating in standalone mobile exposure conditions may contain a single transmitter or multiple transmitters that do not transmit simultaneously. A minimum test separation distance ≥ 20 cm is required between the antenna and radiating structures of the device and nearby persons to apply mobile device exposure limits. The distance must be fully supported by the operating and installation configurations of the transmitter and its antenna(s), according to the source-based time-averaged maximum power requirements of § 2.1091(d)(2). In cases where cable losses or other attenuations are applied to determine compliance, the most conservative operating configurations and exposure conditions must be evaluated. The minimum test separation distance required for a device to comply with mobile exposure conditions must be clearly identified in the installation and operating instructions, for all installation and exposure conditions, to enable users and installers to comply with RF exposure requirements. For mobile devices that have the potential to operate in portable device exposure conditions, similar to the configurations described in § 2.1091(d)(4), a KDB inquiry is required to determine the SAR test requirements for demonstrating compliance.

When the categorical exclusion provision of § 2.1091(c) applies, the minimum test separation distance may be estimated, when applicable, by simple calculations according to plane-wave equivalent conditions, to ensure the transmitter and its antenna(s) can operate in manners that meet or exceed the estimated distance. The source-based time-averaged maximum radiated power, according to the maximum antenna gain, must be applied to calculate the field strength and power density required to establish the minimum test separation distance. When the estimated test separation distance becomes overly conservative and does not support compliance, MPE measurement or computational modeling may be used to determine the required minimum separation distance.

According to FCC Part 1.1307, systems operating under the provisions of this section shall be operated in a manner the ensures that the public is not exposed to radio frequency energy level in excess of the commission's guidelines.

Limits for General Population/ Uncontrolled Exposure			
Frequency Range (MHz)	Electric Field Strength(E)(V/m)	Magnetic Field Strength (H)(A/m)	Power Density (S)(mW/cm^2)
0.3-1.34	614	1.63	(100)*
1.34-30	824/f	2.19/f	(180/f2)*
30-300	27.5	0.073	0.2
300-1500			f/1500
1500-100,000			1.0

MPE calculation formula

$$S = \frac{PG}{4\pi R^2}$$

Where:

S = power density

P = output power (mW)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = Separation distance between radiator and human body (cm)

5 ASSESSMENT RESULT

5.1 Output Power

Bluetooth 1			
Mode	BR+EDR		
	GFSK	π/4-DQPSK	8-DPSK
Peak Power (dBm)	-0.24	-0.24	-0.37
Antenna Gain (dBi)	3.00		
EIRP (dBm)	**2.76**	**2.76**	2.63
Note: This report listed the worst case peak power value, please refer to Report No. BL-SZ2250922-601 for more details.			

Bluetooth 2			
Mode	BR+EDR		
	GFSK	π/4-DQPSK	8-DPSK
Peak Power (dBm)	2.22	4.14	4.58
Antenna Gain (dBi)	3.70		
EIRP (dBm)	5.92	7.84	**8.28**
Note: The Peak Output Power result reference from original test report: RXA1710-0352RF02 (issued by TA Technology (Shanghai) Co., Ltd. On Dec. 18, 2017) 5.1. Peak Power Output – Conducted.			

Bluetooth 2			
Mode	BLE		
	Low Channel	Middle Channel	High Channel
Average Power (dBm)	-0.65	-0.05	-0.05
Antenna Gain (dBi)	3.70		
EIRP (dBm)	3.05	**3.65**	**3.65**
Note: The Average Output Power result reference from original test report: RXA1710-0352RF01R1 (issued by TA Technology (Shanghai) Co., Ltd. On Dec. 18, 2017) 5.1. Average Power Output – Conducted.			

2.4G WIFI				
Mode	802.11b	802.11g	802.11n20	802.11n40
Average Power (dBm)	18.01	17.85	18.00	17.66
Antenna Gain (dBi)	3.70			
EIRP (dBm)	**21.71**	21.55	21.70	21.36
Note: The Average Output Power result reference from original test report: RXA1710-0352RF01R1 (issued by TA Technology (Shanghai) Co., Ltd. On Dec. 18, 2017) 5.1. Average Power Output – Conducted.				

WCDMA			
Mode	Band 2	Band 4	Band 5
ERP/EIRP (dBm)	**29.54**	**29.54**	26.55
Note: This report listed the worst case ERP/EIRP value, please refer to Report No. BL-SZ2250922-501 for more details.			

LTE					
Mode	Band 2	Band 4	Band 5	Band 12	Band 13
ERP/EIRP (dBm)	**28.52**	28.05	28.34	26.58	26.05
Mode	Band 14	Band 66	Band 71	/	/
ERP/EIRP (dBm)	25.76	25.87	26.71	/	/
Note: This report listed the worst case ERP/EIRP value, please refer to Report No. BL-SZ2250922-501 for more details.					

5.2 Turn-up power

Mode		Range
Bluetooth 1		(-1.00)-3.00
Bluetooth 2		2.50-8.50
2.4G WIFI		19.00-22.00
WCDMA	Band 2	29.00-30.00
	Band 4	29.00-30.50
	Band 5	26.00-27.00
LTE	Band 2	28.00-29.00
	Band 4	28.00-29.00
	Band 5	28.00-28.50
	Band 12	26.00-27.00
	Band 13	26.00-27.50
	Band 14	25.00-26.00
	Band 66	25.00-26.50
	Band 71	26.00-27.00

5.3 RF Exposure Evaluation Result

Evolution mode		Maximum ERP/EIRP (dBm)	Antenna Gain (typical) (dBi):	Total Power (mw)	Distance (cm)	Limit of Power Density (mW/cm²)	Power Density (mW/cm²)	Power Density / Limit	Verdict
Bluetooth 1		3.00	3.0	1.9953	20	1.0000	0.0004	0.00040	Pass
Bluetooth 2		8.50	3.7	7.0795	20	1.0000	0.0014	0.00140	Pass
2.4G WIFI		22.00	3.7	158.4893	20	1.0000	0.0315	0.03150	Pass
WCDMA	Band 2	30.00	5.0	1000.0000	20	1.0000	0.1989	0.19890	Pass
	Band 4	30.50	5.0	1122.0185	20	1.0000	0.2232	0.22320	Pass
	Band 5	27.00	5.0	501.1872	20	0.5490	0.0997	0.18160	Pass
LTE	Band 2	29.00	5.0	794.328	20	1.0000	0.1580	0.15800	Pass
	Band 4	29.00	5.0	794.328	20	1.0000	0.1580	0.15800	Pass
	Band 5	28.50	5.0	707.946	20	0.5490	0.1408	0.25647	Pass
	Band 12	27.00	5.0	501.187	20	0.4660	0.0997	0.21395	Pass
	Band 13	27.50	5.0	562.341	20	0.5180	0.1119	0.21602	Pass
	Band 14	26.00	5.0	398.107	20	0.5250	0.0792	0.15086	Pass
	Band 66	26.50	5.0	446.684	20	1.0000	0.0889	0.08890	Pass
	Band 71	27.00	5.0	501.187	20	0.4420	0.0997	0.22557	Pass

5.4 Collocated Power Density Calculation

Evolution mode	Frequency(MHz)	Power Density/Limit	Σ(Power Density / Limit) of Bluetooth (BR+EDR) + Bluetooth (BLE) + WLAN + WWAN	Verdict
Bluetooth 1	2400MHz ~ 2483.5MHz	0.00040	**0.28977**	Pass
Bluetooth 2	2400MHz ~ 2483.5MHz	0.00140		
2.4G WIFI	2400MHz ~ 2483.5MHz	0.03150		
LTE Band 5	824 MHz ~ 849 MHz	0.25647		

Note:

1. Σ(Power Density / Limit): This is a summation of [(power density for each transmitter/ antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for Bluetooth 1 + Bluetooth 2 + WLAN + WWAN.
2. Both of the Bluetooth 1/Bluetooth 2/WLAN/WWAN can transmit simultaneously, the formula of calculated the MPE is
   CPD1 / LPD1 + CPD2 / LPD2 + ……etc. < 1
   CPD = Calculation power density
   LPD = Limit of power density
3. The worst-case situation is 0.28977, which is less than “1”. This confirmed that the device comply with FCC 1.1310 MPE limit.
4. The DUT work frequency range used is 824 MHz ~ 849 MHz, 2400 MHz ~ 2483.5 MHz the result close to the limit by the above formula, so we select worst case power to calculate the exclusion power threshold.
5. More power list please refer to RF test report.

5.5 Conclusion

This EUT is deemed to comply with the reference level limits, therefore the basic restrictions are compliant with human exposure limits.

Statement

1. The laboratory guarantees the scientificity, accuracy and impartiality of the test, and is responsible for all the information in the report, except the information provided by the customer. The customer is responsible for the impact of the information provided on the validity of the results.
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--END OF REPORT--