

TEST REPORT

Report No.: SHATBL2406001W07

Applicant : Bolyga(Chongqing)New Energy Technology Co.,Ltd

Product Name : Electric Bike

Brand Name : N/A

Model Name : Awaken-001

FCC ID : 2BH5Q-AWAKEN

Test Standard : 47 CFR Part 2, 22(H), 24(E), 27(L), 27(N)

Date of Test : 2024.06.14-2024.07.8

Report Prepared by : Chris Xu

(Chris Xu)



Report Approved by : Ghost Li.

(Ghost Li)

Authorized Signatory : Terry Yang

(Terry Yang)

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REVISION HISTORY

Rev.	Issue Date	Revisions	Revised by
00	2024.07.8	Initial Release	Ghost 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 FCC. 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 manufacturer, ATBL is only responsible for the test data but not for the information provided by the customer or manufacturer.
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.

SUMMARY OF TEST RESULT

Report Section	Standard Section	Test Item	Limit	Judg ment	Remark
3.1	§2.1046	Conducted Output Power	-	Report Only PASS	--
	§22.913(a)(5)	Effective Radiated Power (Band 5)	ERP < 7 Watt		
	§24.232(c)	Equivalent Isotropic Radiated Power (Band 2)	EIRP < 2 Watt		
	§27.50(b)(10) §27.50(c)(10)	Effective Radiated Power	ERP < 3 Watt		
	§27.50(d)(4)	Equivalent Isotropic Radiated Power (Band 4)	EIRP < 1 Watt		
3.2	§24.232(d)	Peak-to-Average Ratio	<13 dB	PASS	--
3.3	§2.1049	Occupied Bandwidth	-	Report Only	--
3.4	§2.1051 §22.917(a) §24.238(a) §27.53(h) §27.53(g)	Conducted Band Edge Measurement (Band 2) (Band 4) (Band 5)	< 43+10log10(P[Watts])	PASS	--
3.5	§2.1051 §22.917(a) §24.238(a) §27.53(h) §27.53(g)	Conducted Spurious Emission (Band 2) (Band 4) (Band 5)	< 43+10log10(P[Watts])	PASS	--
3.6	§2.1055 §22.355	Frequency Stability Temperature & Voltage	±2.5 ppm for Part 22	PASS	--
	§2.1055 §24.235 §27.54		Within Authorized Band		
3.7	§2.1053 §22.917(a) §24.238(a) §27.53(h) §27.53(g)	Radiated Spurious Emission (Band 2) (Band 4) (Band 5)	< 43+10log10(P[Watts])	PASS	--

1. GENERAL DESCRIPTION

1.1. Applicant

Name : Bolyga (Chongqing) New Energy Technology Co. , Ltd

Address : No. 1, No. 3 Kangmao Road, Liangjiang new district, Chongqing, 7-11

1.2. Manufacturer

Name : Bolyga (Chongqing) New Energy Technology Co. , Ltd

Address : No. 1, No. 3 Kangmao Road, Liangjiang new district, Chongqing, 7-11

1.3. Factory

Name : Changzhou Merry E BIKE Co.,ltd

Address : No.6, hedian Rd. Tianning District, CHANGZHOU JIANGSU 213017, CHINA

1.4. General Information of EUT

General Information	
Equipment Name	Electric Bike
Brand Name	N/A
Model Name	Awaken-001
Series Model	N/A
Model Difference	N/A
SN or IMEI Code	202400531020002
Adapter	Model:DPLC165v55-M Input:AC 110-240 V,50/60 Hz Output:DC 54.6V,3.0A
Battery	Model:WDDBLJ-LXZ Rated Voltage:48V Charge Limit Voltage:54.6V Capacity:25Ah
Hardware Version	BLJ-004
Software Version	LDCBB807C4825L1111212.
Antenna Type	FPC
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

Standards-related Product Specification		
Frequency		
Band	Tx Frequency Range	Rx Frequency Range
<input checked="" type="checkbox"/> Band 2	1850 MHz ~ 1910 MHz	1930 MHz ~ 1990 MHz
<input checked="" type="checkbox"/> Band 4	1710 MHz ~ 1755 MHz	2110 MHz ~ 2155 MHz
<input checked="" type="checkbox"/> Band 5	824 MHz ~ 849 MHz	869 MHz ~ 894 MHz
Bandwidth		
Band	Bandwidth	
<input checked="" type="checkbox"/> Band 2	1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz	
<input checked="" type="checkbox"/> Band 4	1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz	
<input checked="" type="checkbox"/> Band 5	1.4MHz / 3MHz / 5MHz / 10MHz	
Antenna Gain		
Band	Antenna Gain	
<input checked="" type="checkbox"/> Band 2	1.55dBi	
<input checked="" type="checkbox"/> Band 4	0.92dBi	
<input checked="" type="checkbox"/> Band 5	0.21dBi	
Maximum Output Power to Antenna		
Band	Maximum Output Power	
<input checked="" type="checkbox"/> Band 2	21.71dBm	
<input checked="" type="checkbox"/> Band 4	22.15dBm	
<input checked="" type="checkbox"/> Band 5	21.60dBm	
Type of Modulation		
<input checked="" type="checkbox"/> QPSK	<input checked="" type="checkbox"/> 16QAM	<input type="checkbox"/> 64QAM
<input type="checkbox"/>	<input type="checkbox"/> 256QAM	

Emission Designator					
Band	Bandwidth	Chanel	Max power	EIRP	
Band2	3MHz	19185	21.7	23.26	2M74G7D
Band2	20MHz	18900	21.43	22.98	17M9G7D
Band2	3MH	18615	20.7	22.25	4M52W7D
Band2	20MHz	19100	19.58	21.13	18M1W7D
Band4	3MHz	19965	21.36	22.28	2M74W7D
Band4	20MHz	20300	19.63	20.55	17M9W7D
Band4	20MHz	20175	22.15	23.07	17M9G7D
Band5	1.4MHz	20525	21.6	21.81	1M10G7D
Band5	10MHz	20525	21.56	21.77	8M94G7D
Band5	3MHz	20415	20.88	21.09	2M72W7D
Band5	10MHz	20600	21.7	21.91	8M97W7D

Note:

The maximum ERP/EIRP is calculated from max output power and max antenna gain, only the maximum ERP/EIRP is shown in the report.

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 :	Building 8, No.160 Basheng Road, Waigaoqiao Free Trade Zone, Pudong New Area, Shanghai
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:

47 CFR Part 2, 22(H), 24(E), 27(L) , 27(N)

ANSI C63.26-2015

FCC KDB 971168 D01 Power Meas License Digital Systems v03r01

FCC KDB 412172 D01 Determining ERP and EIRP v01r01

Remark:

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

2. TEST CONFIGURATION OF EQUIPMENT UNDER TEST

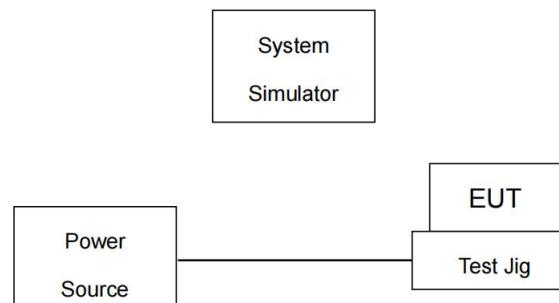
2.1. Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas License Digital Systems v03r01 with maximum output power.

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission. (X-Plane)

Test Items	Band	Bandwidth (MHz)						Modulation				RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	64QAM	256QAM	1	Half	Full	L	M	H
Max. Output Power	2	✓	✓	✓	✓	✓	✓	✓	✓			✓		✓	✓	✓	✓
	4	✓	✓	✓	✓	✓	✓	✓	✓			✓		✓	✓	✓	✓
	5	✓	✓	✓	✓			✓	✓			✓		✓	✓	✓	✓
Peak-to-Average Ratio	2							✓	✓	✓					✓	✓	
	4							✓	✓	✓					✓	✓	
	5				✓			✓	✓						✓	✓	
26dB and 99% Bandwidth	2	✓	✓	✓	✓	✓	✓	✓	✓	✓					✓	✓	
	4	✓	✓	✓	✓	✓	✓	✓	✓	✓					✓	✓	
	5	✓	✓	✓	✓	✓	✓	✓	✓	✓					✓	✓	
Conducted Band Edge	2	✓	✓	✓	✓	✓	✓	✓	✓	✓					✓	✓	✓
	4	✓	✓	✓	✓	✓	✓	✓	✓	✓					✓	✓	✓
	5	✓	✓	✓	✓	✓	✓	✓	✓	✓					✓	✓	✓
Conducted Spurious Emission	2	✓	✓	✓	✓	✓	✓	✓	✓	✓					✓	✓	✓
	4	✓	✓	✓	✓	✓	✓	✓	✓	✓					✓	✓	✓
	5	✓	✓	✓	✓	✓	✓	✓	✓	✓					✓	✓	✓
Frequency Stability	2				✓				✓						✓	✓	
	4				✓				✓						✓	✓	
	5				✓				✓						✓	✓	
E.R.P / E.I.R.P	2	✓	✓	✓	✓	✓	✓	✓	✓	✓					✓	✓	✓
	4	✓	✓	✓	✓	✓	✓	✓	✓	✓					✓	✓	✓
	5	✓	✓	✓	✓	✓	✓	✓	✓	✓					✓	✓	✓
Radiated Spurious Emission	2										Worst Case				✓	✓	✓
	4										Worst Case				✓	✓	✓
	5										Worst Case				✓	✓	✓
Note		1. The mark “✓” means that this configuration is chosen for testing. 2. When a cell is empty, it means it is not supported or does not require testing. 3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported. 4. The UE category is 1, so bandwidth greater than 5M does not support 16QAM.															

2.2. Connection Diagram of Test System



This example is connection diagram of EUT test configurations.

. For detail, please refer to test mode configuration and setup photographs for each test item.

2.3. Support Unit used in test configuration and system

NO.	Unit	Brand	Model	SN	Description
1	DC Power Supply	GWINSTEK	GPD-2303S	GEV915433	N/A
2	SIM Card	N/A	N/A	N/A	N/A

2.4. Frequency List of Low/Middle/High Channels

LTE Band 2 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	18700	18900	19100
	Frequency	1860	1880	1900
15	Channel	18675	18900	19125
	Frequency	1857.5	1880	1902.5
10	Channel	18650	18900	19150
	Frequency	1855	1880	1905
5	Channel	18625	18900	19175
	Frequency	1852.5	1880	1907.5
3	Channel	18615	18900	19185
	Frequency	1851.5	1880	1908.5
1.4	Channel	18607	18900	19193
	Frequency	1850.7	1880	1909.3

LTE Band 4 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	20050	20175	20300
	Frequency	1720	1732.5	1745
15	Channel	20025	20175	20325
	Frequency	1717.5	1732.5	1747.5
10	Channel	20000	20175	20350
	Frequency	1715	1732.5	1750
5	Channel	19975	20175	20375
	Frequency	1712.5	1732.5	1752.5
3	Channel	19965	20175	20385
	Frequency	1711.5	1732.5	1753.5
1.4	Channel	19957	20175	20393
	Frequency	1710.7	1732.5	1754.3

LTE Band 5 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
10	Channel	20450	20525	20600
	Frequency	829	836.5	844
5	Channel	20425	20525	20625
	Frequency	826.5	836.5	846.5
3	Channel	20415	20525	20635
	Frequency	825.5	836.5	847.5
1.4	Channel	20407	20525	20643
	Frequency	824.7	836.5	848.3

2.5. Equipment List

2.5.1. For Conducted Test

Equipment Name	Manufacturer	Model	Serial No.	Equipment No.	Calibration Date	Calibration Until
Vector signal generator	Agilent	N5182A	MY50143555	SHATBL-W037	2023.07.10	2024.07.09
Analog signal generator	Keysight	N5173B	MY60403026	SHATBL-W038	2023.07.10	2024.07.09
Spectrum analyzer	R&S	FSV40-N	101761	SHATBL-W036	2023.07.10	2024.07.09
Wideband radio communication tester	R&S	CMW500	101331	SHATBL-W007	2023.07.10	2024.07.09
Radio-frequency control box	MWRFtest	MW200-RFCB	MW220720 ATBL	SHATBL-W039	N/A	N/A
Filter box	MWRFtest	MW200-RFCB	MW220719 ATBL	SHATBL-W040	2023.07.10	2024.07.09
constant temperature and humidity test chamber	KSON	THS-B6C-150	9159K	SHATBL-W019	2024.03.28	2025.03.27
Thermometer	DeLi	DeLi	N/A	SHATBL-W011	2023.07.10	2024.07.09
Test Software	MWRFtest	MTS 8200	N/A	N/A	N/A	N/A

2.5.2. For Radiated Spurious Emission

Equipment Name	Manufacturer	Model	Serial No.	Equipment No.	Calibration Date	Calibration Until
Signal analyzer	Agilent	N9020A	MY50200811	SHATBL-E017	2024.03.28	2025.03.27
Amplifier	JPT	JPA0118-55-303A	1910001800055 000	SHATBL-E006	2024.03.28	2025.03.27
Amplifier	JPT	JPA-10M1G32	2101010003500 1	SHATBL-E005	2024.03.28	2025.03.27
Loop Antenna(9kHz-30MHz)	Daze	ZN30900C	20077	SHATBL-E042	2024.05.13	2025.05.12
Bilog Antenna	SCHWARZBEC K	VULB 9168	01174	SHATBL-E008	2024.05.17	2025.05.16
Broad-band Horn Antenna	SCHWARZBEC K	BBHA 9120D	02334	SHATBL-E009	2024.05.17	2025.05.16
Horn Antenna	COM-POWER	AH-1840	10100008	SHATBL-E043	2023.09.24	2024.09.23
Thermometer	DeLi	N/A	N/A	SHATBL-E015	2023.09.26	2024.09.25
Test Software	FALA	EMC-RI(Ver.4A2)	N/A	N/A	N/A	N/A

2.6. Measurement Uncertainty

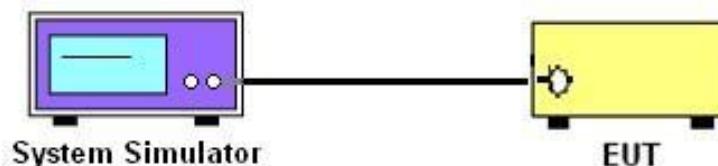
The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	RF output power, conducted	0.958dB
2	Conducted spurious emissions	2.988dB
3	Radiated Spurious Emission 9KHz-30MHz	2.35dB
4	All emissions, radiated 30MHz-1GHz	2.50dB
5	All emissions, radiated 1GHz-18GHz	3.51dB
6	Occupied bandwidth	23.20Hz
7	Power spectral density	0.886dB

3. TEST RESULT

3.1. Conducted Output Power and ERP/EIRP

3.1.1. Test Setup



3.1.2. Description of the Conducted Output Power Measurement and ERP/EIRP Measurement

A system simulator was used to establish communication with the EUT. Its parameters were set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

The ERP of mobile transmitters must not exceed 7 Watts for LTE Band 5 and Band 26.

The ERP of mobile transmitters must not exceed 3 Watts for LTE Band 71.

The EIRP of mobile transmitters must not exceed 2 Watts for LTE Band 2 and Band 25

The EIRP of mobile transmitters must not exceed 1 Watts for LTE Band 4 and Band 66.

According to KDB 412172 D01 Power Approach, $EIRP = P_T + G_T - L_C$, $ERP = EIRP - 2.15$, where P_T = transmitter output power in dBm, G_T = gain of the transmitting antenna in dBi, L_C = signal attenuation in the connecting cable between the transmitter and antenna in dB.

3.1.3. Test Procedures

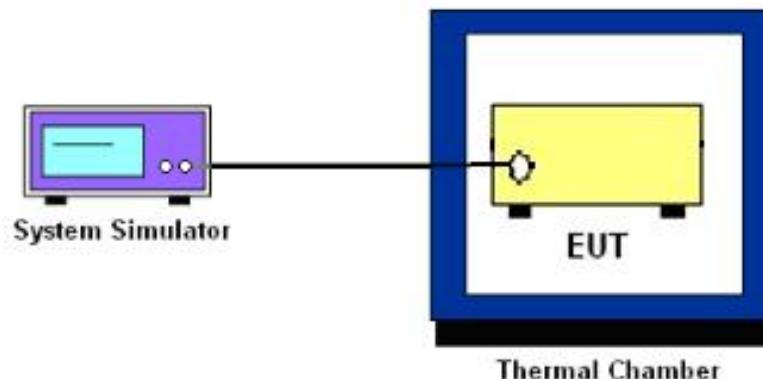
1. The testing follows ANSI C63.26 Section 5.2.
2. The transmitter output port was connected to the system simulator.
3. Set EUT at maximum power through the system simulator.
4. Select lowest, middle, and highest channels for each band and different modulation.
5. Measure and record the power level from the system simulator.

3.1.4. Test Result of Conducted Output Power and ERP/EIRP

Please refer to the Appendix A.

3.2. Frequency Stability

3.2.1. Test Setup



3.2.2. Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ ($\pm 2.5\text{ppm}$) of the center frequency.

3.2.3. Test Procedures for Temperature Variation

1. The testing follows ANSI C63.26 section 5.6.4.
2. The EUT was set up in the thermal chamber and connected with the system simulator.
3. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
4. With power OFF, the temperature was raised in 10°C step up to 50°C . The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

3.2.4. Test Procedures for Voltage Variation

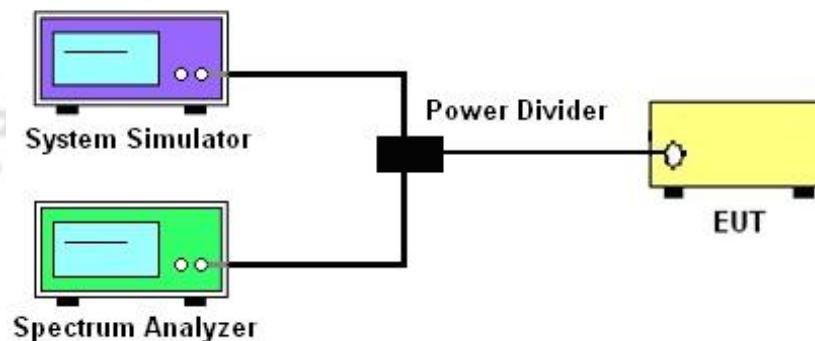
1. The testing follows ANSI C63.26 section 5.6.5
2. The EUT was placed in a temperature chamber at $20\pm 5^\circ\text{C}$ and connected with the system simulator.
3. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value for other than hand carried battery equipment.
4. For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.
5. The variation in frequency was measured for the worst case.

3.2.5. Test Result of Frequency Stability

Please refer to the Appendix A.

3.3. Peak-to-Average Ratio

3.3.1. Test Setup



3.3.2. Description of the PAR Measurement

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

3.3.3. Test Procedures

1. The testing follows ANSI C63.26 Section 5.2.3.4 (CCDF).
2. The EUT was connected to spectrum and system simulator via a power divider.
3. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
4. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
5. Record the deviation as Peak to Average Ratio.

3.3.4. Test Result of Peak-to-Average Ratio

Please refer to the Appendix A.