RF EXPOSURE Test Report

Product: Smart Plug

Trade Mark: Loocam

Model Number: MK1

FCC ID: 2BCLE-MK1

Prepared for

Zhongshan Vzzon Energy Tech Co., Ltd.

Zone A, 2nd And 3rd Floors, No.8, Liantangxia Road, Wushi Village, Sanxiang Town, Zhongshan, GuangDong, 528463 China

Prepared by

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TEST RESULT CERTIFICATION

Applicant's Name..... :	Zhongshan Vzzon Energy Tech Co., Ltd.
Address ..... :	Zone A, 2nd And 3rd Floors, No.8, Liantangxia Road, Wushi Village, Sanxiang Town, Zhongshan, GuangDong, 528463 China
Manufacturer's Name ..... :	Zhongshan Vzzon Energy Tech Co., Ltd.
Address ..... :	Zone A, 2nd And 3rd Floors, No.8, Liantangxia Road, Wushi Village, Sanxiang Town, Zhongshan, GuangDong, 528463 China

Product description

Product name ..... :	Smart Plug
Model Number ..... :	MK1
Standards ..... :	FCC CFR 47 PART 1 , 1.1310
Test procedure..... :	KDB 447498 D01 v06

This device described above has been tested by Shenzhen HongBiao Certification& Testing Co,.Ltd and the test results show that the equipment under test (EUT) is in compliance with the EMC requirements. And it is applicable only to the tested sample identified in the report.

Date of Test .....:

Date (s) of performance of tests .....:	August 14. 2023~August 23. 2023
Test Result.....:	**Pass**

Testing Engineer : Zoe Su

(Zoe Su)

Technical Manager : Gary Lu

(Gary Lu)

Authorized Signatory : Leo Su

(Leo Su)

HONGBIAO CERTIFICATION&TESTING CO., LTD. SHENZHEN
HONG BIAO 弘标认证 APPROVAL

Revision History

Revised No.	Date of Issue	Description
01	August 24. 2023	Original

1 General Description

1.1 Description of EUT

Product name:	Smart Plug
Model name:	MK1
Series Model:	-
Different of series model:	N/A
Operation frequency:	802.11b/g/n20:2412~2462 MHz BLE: 2402-2480MHz
Modulation type:	IEEE 802.11b : DSSS (DBPSK, DQPSK, CCK) IEEE 802.11g/n (HT20) : OFDM (64QAM, 16QAM, QPSK, BPSK) BLE: GFSK
Bit Rate of transmitter:	802.11b:11/5.5/2/1 Mbps 802.11g:54/48/36/24/18/12/9/6Mbps 802.11n(20MHz) use 800 ns GI: 65.0/58.5/52.0/39.0/26.0/19.5/13.0/6.5 Mbps (MCS0~MCS7) BLE: 1 Mbps
Antenna type:	PCB Antenna
Antenna gain:	2.5dBi
Max. output power:	802.11b/g/n20: 10.08dBm BLE: -0.52dBm
Hardware version:	HW.V1.MKE
Software version:	SKET.V1.0.0
Battery:	N/A
Power supply:	Input: AC 120V-60Hz Output: AC 120V-60Hz 10A MAX
Adapter information:	N/A

1.2 Test Mode

Pretest Test Mode	Description of Mode
1	TX
2	/
3	/

1.3 Ancillary Equipment

Equipment	Model	S/N	Manufacturer

2 Test Facilities and Accreditations

2.1 Test Laboratory

Test Site	Shenzhen HongBiao Certification& Testing Co., Ltd
Test Site Location	Room 102, 201, Building 2, Yuanwanggu RFID Industrial Park, Tongguan Road, Tianliao Community, Yutang Street, Guangming District, Shenzhen, China
Telephone:	(86-755) 2998 9321
Fax:	(86-755) 2998 5110
FCC Registration No.:	CN1341
A2LA Certificate No.:	6765.01

2.2 Environmental Conditions

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

Temperature:	15ºC~35ºC
Relative Humidity:	20%~75%
Air Pressure:	98kPa~101kPa

2.3 Measurement Uncertainty

The reported uncertainty of measurement y ± 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 %.

Measurement Frequency Range	U，(dB)	Note
RF frequency	$2x\ 10^{-5}$	
RF power, conducted	± 0.57 dB	
Conducted emission(150kHz~30MHz)	± 2.5 dB	
Radiated emission(30MHz~1GHz)	± 4.2 dB	
Radiated emission (above 1GHz)	± 4.7 dB	
Temperature	±1 degree	
Humidity	± 5 %	

2.4 Test Software

Software name	Manufacturer	Model	Version
Conducted test system	MWRF-test	MTS 8310	V2.0.0

3 List of Test Equipment

RF							
Item	Equipment No.	Equipment name	Manufacturer	Model	Serial No.	Calibration date	Due date
1	HB-E041	MXG Anaiog Signal Generator	Agilent	N5181A	MY47070421	2023-05-11	2024-05-10
2	HB-E042	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW500	132108	2023-05-11	2024-05-10
3	HB-E043	MXG Anaiog Signal Generator	Agilent	N5182A	US46240335	2023-05-11	2024-05-10
4	HB-E044	Signal& spectrum Analyzer	R&S	FSV3044	101264	2023-05-11	2024-05-10
5	HB-E045	RF Control Box	Noyetec	NY100-RFCB	N/A	/	/
6	HB-E058	Thermometer Clock Humidity Monitor	N/A	HTC-1	N/A	/	/

Note: the calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

4 RF Exposure

4.1 Standalone SAR test exclusion considerations

4.1.1. Limit

According to FCC 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).

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

MPE Calculation Method
Friis transmission formula: Pd= (Pout*G)\ (4*pi*R2)
Where
Pd= Power density in mW/cm2
Pout=output power to antenna in mW
G= Numeric gain of the antenna relative to isotropic antenna
Pi=3.1415926
R= distance between observation point and center of the radiator in cm(20cm)
Pd the limit of MPE, 1mW/cm2.
If we know the maximum gain of the antenna and total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

4.1.2. Test Result

BLE:
Operation Frequency: 2402-2480MHz,
Power density limited: 1mW/ cm^2
2.4GWiFi:
Operation Frequency: WIFI 802.11b/g/n HT20: 2412-2462MHz
Power density limited: 1mW/ cm^2

Antenna Type: PCB Antenna;
antenna gain: 2.5dBi
R=20cm
mW=10^(dBm/10)
antenna gain Numeric=10^(dBi/10)= 10^(2.5/10)=1.78

BLE:

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Max tune-up power (mW)	Antenna Gain (dBi)	Antenna Gain Numeric	Evaluation result (mW/cm^2)	Power density Limits (mW/cm^2)
2402	GFSK	-2.13	-1±1	0	1.000	2.5	1.78	0.00035	1
2440		-0.99	-1±1	0	1.000	2.5	1.78	0.00035	1
2480		-0.52	-1±1	0	1.000	2.5	1.78	0.00035	1

2.4GWiFi：

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Max tune-up power (mW)	Antenna Gain Numeric	Evaluation result at 20cm Power density(mW/cm^2)	Power density Limits (mW/cm^2)
		Ant A	Ant A	Ant A	Ant A	Ant A	Ant A	
2412	802.11b	10.08	10±1	11	12.589	1.78	0.00445	1
2437		9.84	10±1	11	12.589	1.78	0.00445	1
2462		10.02	10±1	11	12.589	1.78	0.00445	1
2412	802.11g	7.69	7±1	8	6.310	1.78	0.00223	1
2437		7.58	7±1	8	6.310	1.78	0.00223	1
2462		7.82	7±1	8	6.310	1.78	0.00223	1
2412	802.11n H20	7.11	7±1	8	6.310	1.78	0.00223	1
2437		7.07	7±1	8	6.310	1.78	0.00223	1
2462		7.25	7±1	8	6.310	1.78	0.00223	1

Conclusion:

The WiFi mode and Bluetooth BLE not transmit at the same time.

For the max result: 0.00445≤1g SAR, No SAR is required.

******** END OF REPORT ********