FCC TEST REPORT

Product Name:	BIOQUANT LED Device
Trade Mark:	BIOQUANT
Model No.:	BIOQUANT LED
Report Number:	190814001EMC-1
Test Standards:	FCC 47 CFR Part 18
FCC ID:	2AULL-BQLEDWDBWM
Test Result:	PASS
Date of Issue:	September 29, 2019

Prepared for:

Yalong Trade s.r.o.
M.Bodickeho 1517/14, Revuca Slovensko 05001 Slovakia

Prepared by:

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Date: September 29, 2019

Version

Version No.	Date	Description
V1.0	September 29, 2019	Original

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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	Yalong Trade s.r.o.
Address of Applicant:	M.Bodickeho 1517/14, Revuca Slovensko 05001 Slovakia
Manufacturer:	Yalong Trade s.r.o.
Address of Manufacturer:	M.Bodickeho 1517/14, Revuca Slovensko 05001 Slovakia

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	BIOQUANT LED Device
Model No.:	BIOQUANT LED
Trade Mark:	BIOQUANT
DUT Stage:	Production Unit
Rated Voltage:	☒ 110-240V~50/60Hz, 1.0A and/or 3.7Vdc (1x3.7V Li-ion Rechargeablebattery)
Type of equipment:	Medical diathermy_Any non-ISM frequency
Highest Internal Frequency:	8 MHz
Sample Received Date:	August 14, 2019
Sample Tested Date:	August 14, 2019 to September 28, 2019

1.2.2 Description of Accessories

Adapter	
Model No.:	LXCP12-005100DEG
Input:	100-240 V~50/60 Hz 0.5 A Max
Output:	5.0 V ⎓ 1.0 A
DC Cable:	1.00 Meter, Unshielded without ferrite
Manufacturer:	Shenzhen Longxc Power Supply Co., Ltd

Cable	
Model No.:	L133A
Description:	USB Micro-B Plug Cable
Cable Type:	Shielded without ferrite
Length:	1.00 Meter

1.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested independently

1.4 TEST LOCATION

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: 16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China 518109
Telephone: +86 (0) 755 2823 0888
Fax: +86 (0) 755 2823 0886

1.5 TEST FACILITY

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L9069
The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC/EN 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

A2LA-Lab Certificate No.: 4312.01
Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

ISED Wireless Device Testing Laboratories
CAB identifier: CN0032

FCC Accredited Lab.
Designation Number: CN1194
Test Firm Registration Number: 259480

1.6 DEVIATION FROM STANDARDS

None.

1.7 ABNORMALITIES FROM STANDARD CONDITIONS

None.

1.8 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

1.9 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

No.	Item	Measurement Uncertainty
1	Conducted emission 9KHz-150KHz	±3.8 dB
2	Conducted emission 150KHz-30MHz	±3.4 dB
3	Radiated emission 9KHz-30MHz	±4.9 dB
4	Radiated emission 30MHz-1GHz	±4.7 dB
5	Radiated emission 1GHz-18GHz	±5.1 dB
6	Radiated emission 18GHz-26GHz	±5.2 dB
7	Radiated emission 26GHz-40GHz	±5.2 dB

2. TEST SUMMARY

FCC 47 CFR Part 18 Test Cases			
Test Item	**Test Requirement**	**Test Method**	**Result**
Conducted Emission	FCC 47 CFR Part 18.307	FCC/OET MP–5	PASS
Radiated Emission	FCC 47 CFR Part 18.305	FCC/OET MP–5	PASS

Note:

1) N/A: In this whole report not applicable.

3. EQUIPMENT LIST

Radiated Emission Test Equipment List						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date (mm dd, yyyy)**	**Cal. Due date (mm dd, yyyy)**
☒	3M Chamber & Accessory Equipment	ETS-LINDGREN	3M	N/A	Dec. 03, 2018	Dec. 03, 2021
☒	Receiver	R&S	ESIB26	100114	Nov. 24, 2018	Nov. 24, 2019
☒	Loop Antenna	ETS-LINDGREN	6502	00202525	Dec. 03, 2018	Dec. 03, 2019
☒	Broadband Antenna	ETS-LINDGREN	3142E	00201566	Dec. 08, 2018	Dec. 08, 2019
☒	6dB Attenuator	Talent	RA6A5-N-18	18103001	Dec. 08, 2018	Dec. 08, 2019
☒	Preamplifier	HP	8447F	2805A02960	Nov. 24, 2018	Nov. 24, 2019
☐	Broadband Antenna (Pre-amplifier)	ETS-LINDGREN	3142E-PA	00201891	May 19, 2018	May 18, 2020
☐	6dB Attenuator	Talent	RA6A5-N-18	18103002	Nov. 24, 2018	Nov. 24, 2019
☐	Horn Antenna	ETS-LINDGREN	3117	00164202	Dec. 08, 2018	Dec. 08, 2019
☐	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201874	May 22, 2018	May 18, 2020
☐	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3116C-PA	00202652	Jan. 05, 2019	Jan. 05, 2020
☒	Multi device Controller	ETS-LINDGREN	7006-001	00160105	N/A	N/A
☒	Test Software	Audix	e3	Software Version: 9.160323		

Conducted Emission Test Equipment List						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date (mm dd, yyyy)**	**Cal. Due date (mm dd, yyyy)**
☒	Receiver	R&S	ESR7	1316.3003K07 -101181-K3	Nov. 24, 2018	Nov. 24, 2019
☒	Pulse Limiter	R&S	ESH3-Z2	0357.8810.54	Nov. 24, 2018	Nov. 24, 2019
☒	LISN	R&S	ESH2-Z5	860014/024	Nov. 24, 2018	Nov. 24, 2019
☐	LISN	ETS-Lindgren	3816/2SH	00201088	Nov. 24, 2018	Nov. 24, 2019
☒	Test Software	Audix	e3	Software Version: 9.160323		

4. TEST CONFIGURATION

4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

4.1.1 Normal or Extreme Test Conditions

Environment Parameter	Selected Values During Tests		
Test Condition	Ambient		
	Temperature (°C)	Voltage (V)	Relative Humidity (%)
NT/NV	+15 to +35	120 VAC	20 to 75
Remark: 1) NV: Normal Voltage; NT: Normal Temperature			

4.1.2 Record of Normal Environment

Test Item	Temperature (°C)	Relative Humidity (%)	Pressure (kPa)	Tested by
Conducted Emission	25.2	56	100.02	Andy Lin
Radiated Emission	25.2	52	100.02	Andy Lin

4.2 TEST MODES

Test Item	EMI Test Modes
Radiated Emission	Mode 1: Charging from 120 Vac + Working(LED electromagnetic waves) Mode 2: Battery + Working(LED electromagnetic waves)
Conducted Emission	Mode 1: Charging from 120 Vac + Working(LED electromagnetic waves)

4.3 TEST SETUP

4.3.1 For Radiated Emissions test setup

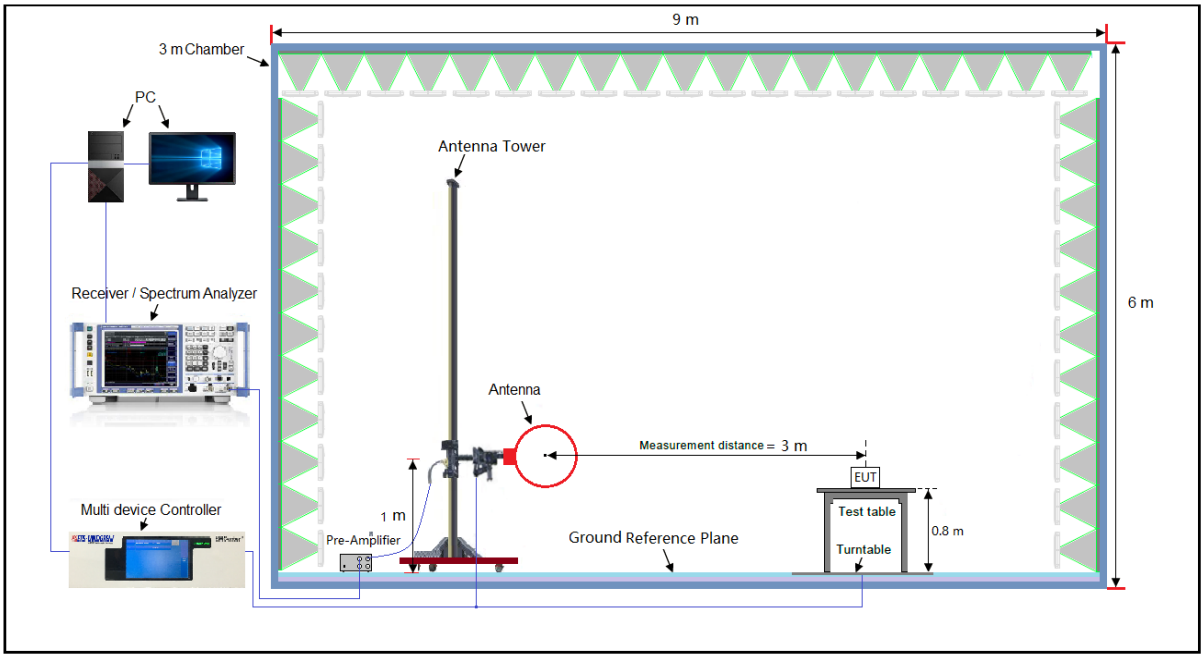


Figure 1. Below 30MHz

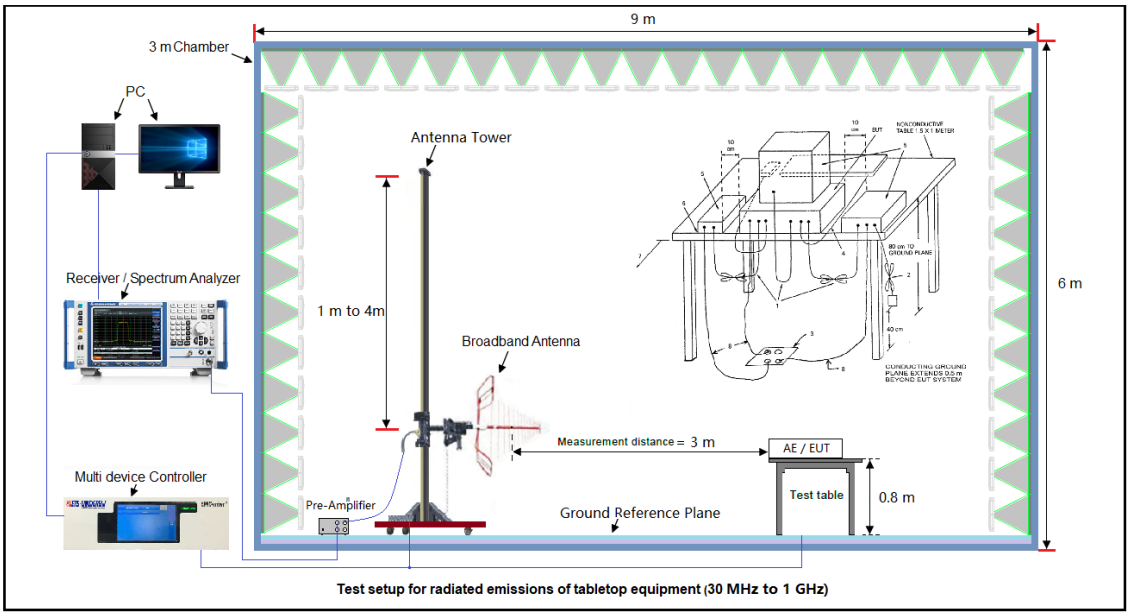


Figure 2. 30MHz to 1GHz

4.3.2 For Conducted Emissions test setup

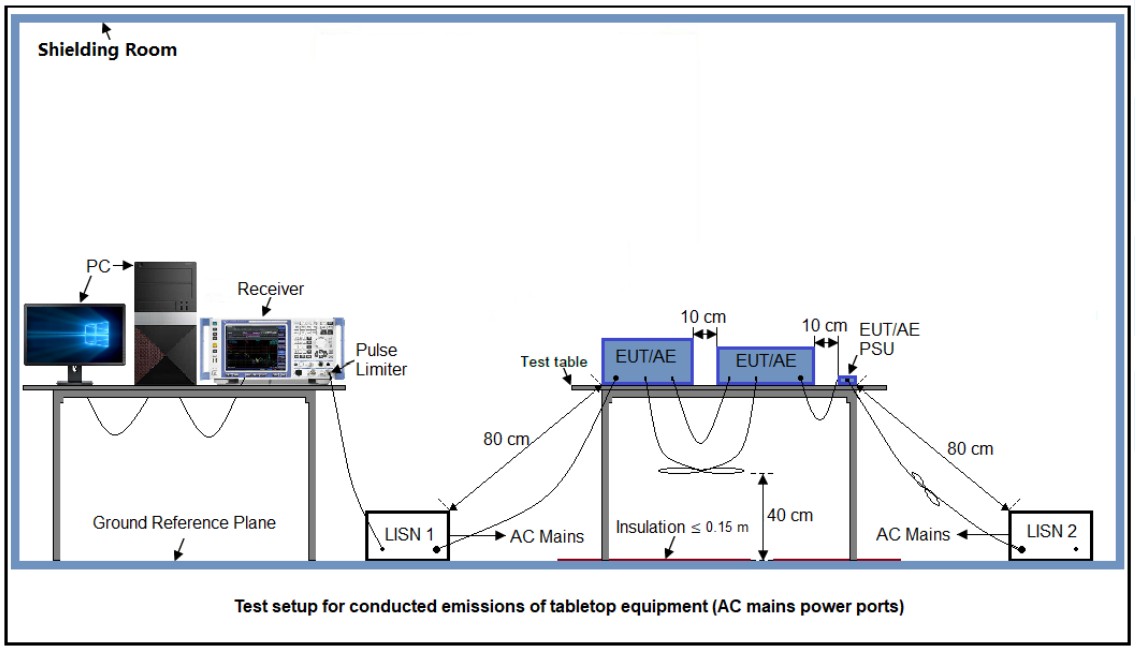


Figure 3. Conducted Emissions setup

5. REFERENCE DOCUMENTS FOR TESTING

No.	Identity	Document Title
1	FCC 47 CFR Part18	Industrial, scientific, and medical equipment
2	FCC/OET MP–5	Methods of Measurements of Radio Noise Emissions from Industrial, Scientific and Medical equipment

6. EMC REQUIREMENTS SPECIFICATION

6.1 RADIATED EMISSION

Test Requirement: FCC 47 CFR Part 18.305

Test Method: FCC/OET MP–5

Receiver Setup:

Frequency: (f) (MHz)	Detector type	RBW
0.009 ≤ f ≤ 0.15	Quasi Peak	200 Hz
0.15 ≤ f ≤ 30	Quasi Peak	9 kHz
30 ≤ f ≤ 1 000	Quasi Peak	100 kHz
f ≥1000	Peak	1 MHz
	Average	1 MHz

Measured frequency range

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Range of frequency measurement (MHz)
Below 1.705	0.009 to 30
1.705 to 30	0.009 to 400
30 to 500	25 to 1000 or tenth harmonic
500 to 1000	100 to 1000 or tenth harmonic
Above 1000	100 MHz to tenth harmonic

Limits:

(a) ISM equipment operating on a frequency specified in §18.301 is permitted unlimited radiated energy in the band specified for that frequency.

(b) The field strength levels of emissions which lie outside the bands specified in §18.301, unless otherwise indicated, shall not exceed the following:

Equipment	Operating frequency	RF Power generated by equipment (watts)	Field strength limit (uV/m)	Distance (meters)
Any type unless otherwise specified (miscellaneous)	Any ISM frequency	Below 500 500 or more	25 25 × SQRT(power/500)	300 [1]300
	Any non-ISM frequency	Below 500 500 or more	15 15 × SQRT(power/500)	300 [1]300
Industrial heaters and RF stabilized arc welders	On or below 5,725 MHz Above 5,725 MHz	Any Any	10[(2)]	1,600[(2)]
Medical diathermy	Any ISM frequency Any non-ISM frequency	Any Any	25 15	300 300

Ultrasonic	Below 490 kHz	Below 500 500 or more	2,400/F(kHz) 2,400/F(kHz) × SQRT(power/500)	300 [3]300
	490 to 1,600 kHz Above 1,600 kHz	Any Any	24,000/F(kHz) 15	30 30
Induction cooking ranges	Below 90 kHz On or above 90 kHz	Any Any	1,500 300	[4]30 [4]30

[1]Field strength may not exceed 10 μV/m at 1600 meters. Consumer equipment operating below 1000 MHz is not permitted the increase in field strength otherwise permitted here for power over 500 watts.

[2]Reduced to the greatest extent possible.

[3]Field strength may not exceed 10 μV/m at 1600 meters. Consumer equipment is not permitted the increase in field strength otherwise permitted here for over 500 watts.

[4]Induction cooking ranges manufactured prior to February 1, 1980, shall be subject to the field strength limits for miscellaneous ISM equipment.

(c) The field strength limits for RF lighting devices shall be the following:

Frequency (MHz)	Field strength limit at 30 meters (μV/m)
Non-consumer equipment:	
30-88	30
88-216	50
216-1000	70
Consumer equipment:	
30-88	10
88-216	15
216-1000	20

Notes:
1. The tighter limit shall apply at the boundary between two frequency ranges.

2. Testing for compliance with these limits may be made at closer distances, provided a sufficient number of measurements are taken to plot the radiation pattern, to determine the major lobes of radiation, and to determine the expected field strength level at 30, 300, or 1600 meters. Alternatively, if measurements are made at only one closer fixed distance, then the permissible field strength limits shall be adjusted using 1/d as an attenuation factor.

Remark:
1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBμV/m) = 20 log Emission level (μV/m).

Test Setup: Refer to section 4.3.1 for details.

Test Procedures:

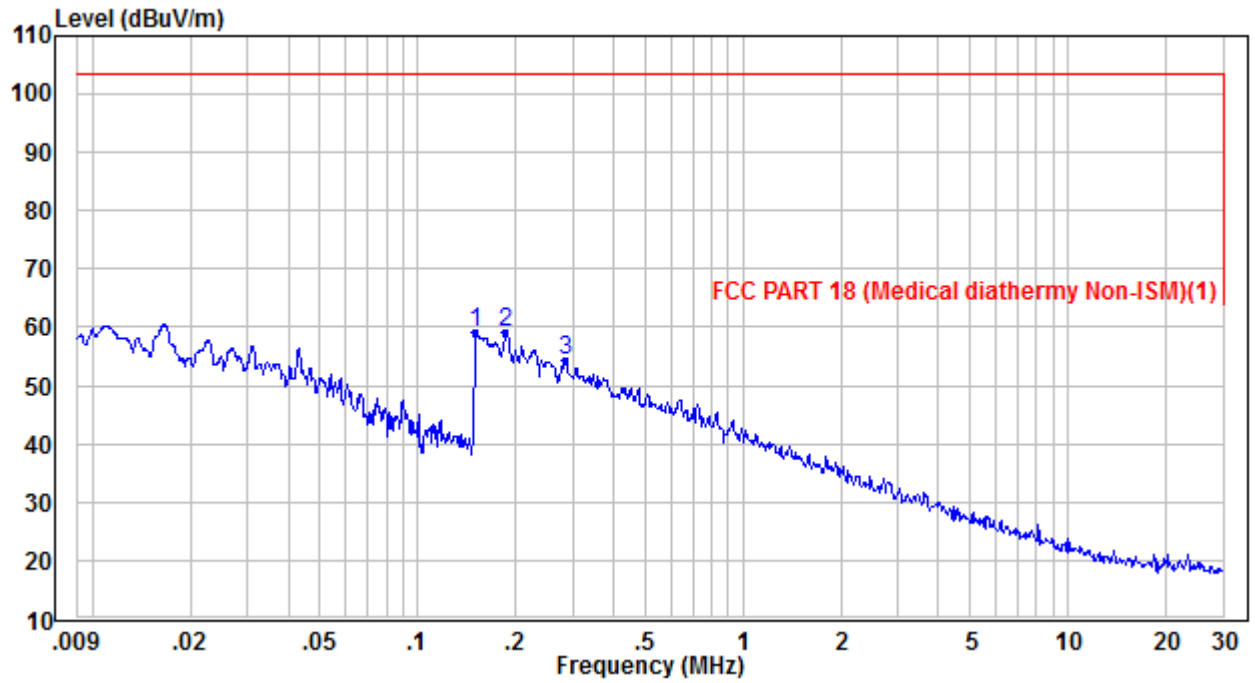
1) The Product was placed on the non-conductive turntable 0.8 m above the ground at a chamber.
2) Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
3) For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.

Equipment Used: Refer to section 3 for details.

Test Result: Pass

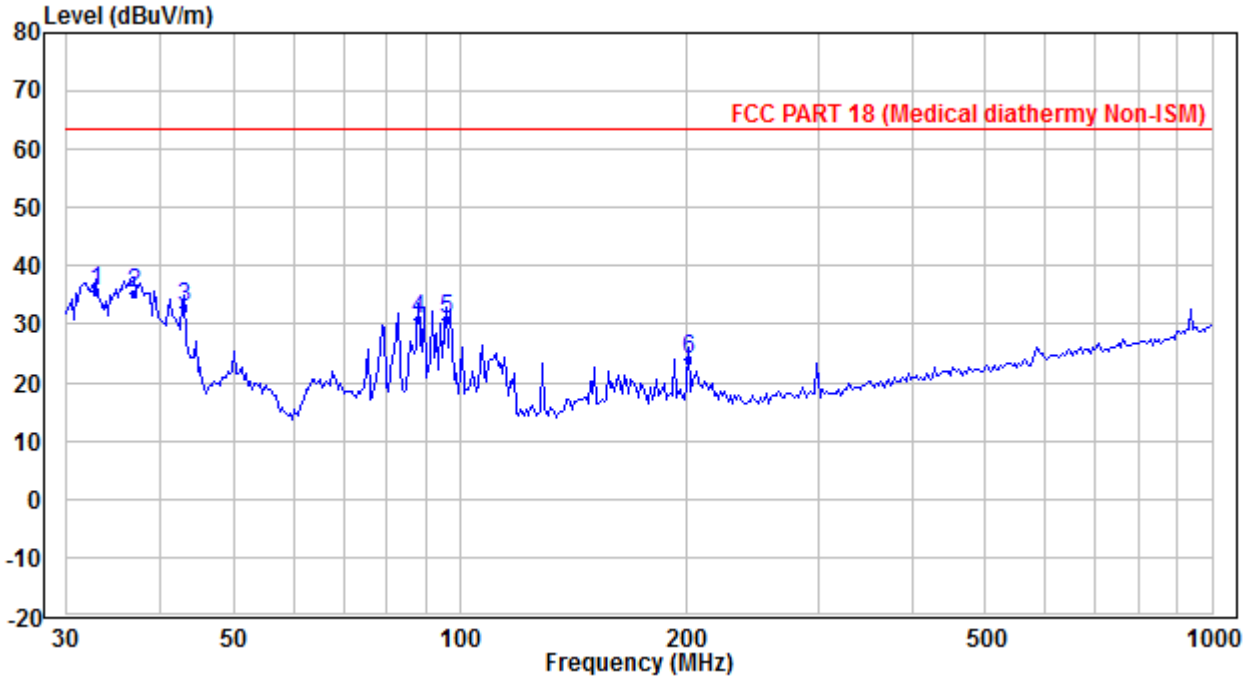
The measurement data as follows:

9KHz to 30MHz:



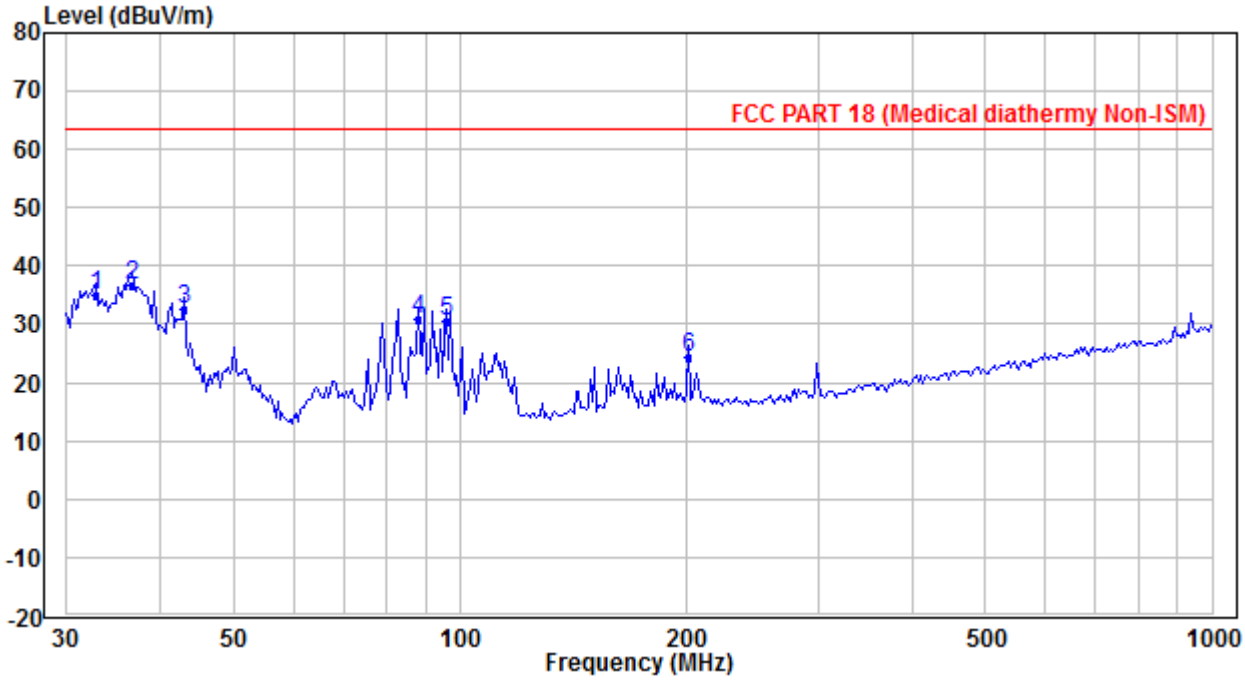
No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	0.150	75.91	-16.89	59.02	103.50	-44.48	Peak
2	0.186	75.92	-16.89	59.03	103.50	-44.47	Peak
3	0.284	71.30	-16.88	54.42	103.50	-49.08	Peak

30 MHz to 1GHz:
Mode1
Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	32.870	41.73	-6.14	35.59	63.50	-27.91	QP
2	36.781	43.97	-8.79	35.18	63.50	-28.32	QP
3	42.931	44.49	-11.42	33.07	63.50	-30.43	QP
4	87.914	43.60	-12.86	30.74	63.50	-32.76	QP
5	95.649	42.78	-11.96	30.82	63.50	-32.68	QP
6	201.454	34.35	-10.26	24.09	63.50	-39.41	QP

Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	32.870	41.13	-6.14	34.99	63.50	-28.51	QP
2	36.524	45.28	-8.67	36.61	63.50	-26.89	QP
3	42.931	44.16	-11.42	32.74	63.50	-30.76	QP
4	87.914	43.81	-12.86	30.95	63.50	-32.55	QP
5	95.649	42.65	-11.96	30.69	63.50	-32.81	QP
6	201.454	34.51	-10.26	24.25	63.50	-39.25	QP

Remark:

1. Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain, the value was added to Original Receiver Reading by the software automatically.
2. Result = Reading + Correct Factor.
3. Margin = Result – Limit

6.2 CONDUCTED EMISSION

Test Requirement: FCC 47 CFR Part 18.307

Test Method: FCC/OET MP–5

Limits:

(a) All Induction cooking ranges and ultrasonic equipment:

Frequency range (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.009 to 0.05	110	--
0.05 to 0.15	90-80*	--
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

*Decreases with the logarithm of the frequency.

(b) All other part 18 consumer devices:

Frequency range (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

*Decreases with the logarithm of the frequency.

(c) RF lighting devices:

Frequency range (MHz)	Maximum RF line voltage measured with a 50 uH/50 ohm LISN (uV)
Non-consumer equipment:	
0.45 to 1.6	1000
1.6 to 30	3000
Consumer equipment:	
0.45 to 2.51	250
2.51 to 3.0	3000
3.0 to 30	250

(d) If testing with a quasi-peak detector demonstrates that the equipment complies with the average limits specified in the appropriate table in this section, additional testing to demonstrate compliance using an average detector is not required.

(e) These conduction limits shall apply only outside of the frequency bands specified in §18.301.

(f) For ultrasonic equipment, compliance with the conducted limits shall preclude the need to show compliance with the field strength limits below 30 MHz unless requested by the Commission.

(g) The tighter limits shall apply at the boundary between two frequency ranges.

Test Setup: Refer to section 4.3.2 for details.

Test Procedures:

1) The Product was placed on a nonconductive table 0.8 m above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N).
2) The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak and AVG detector in Max Hold mode. Run the receiver's pre-scan to record the maximum disturbance generated from Product in all power lines in the full band.
3) For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values

and record.

Equipment Used: Refer to section 3 for details.

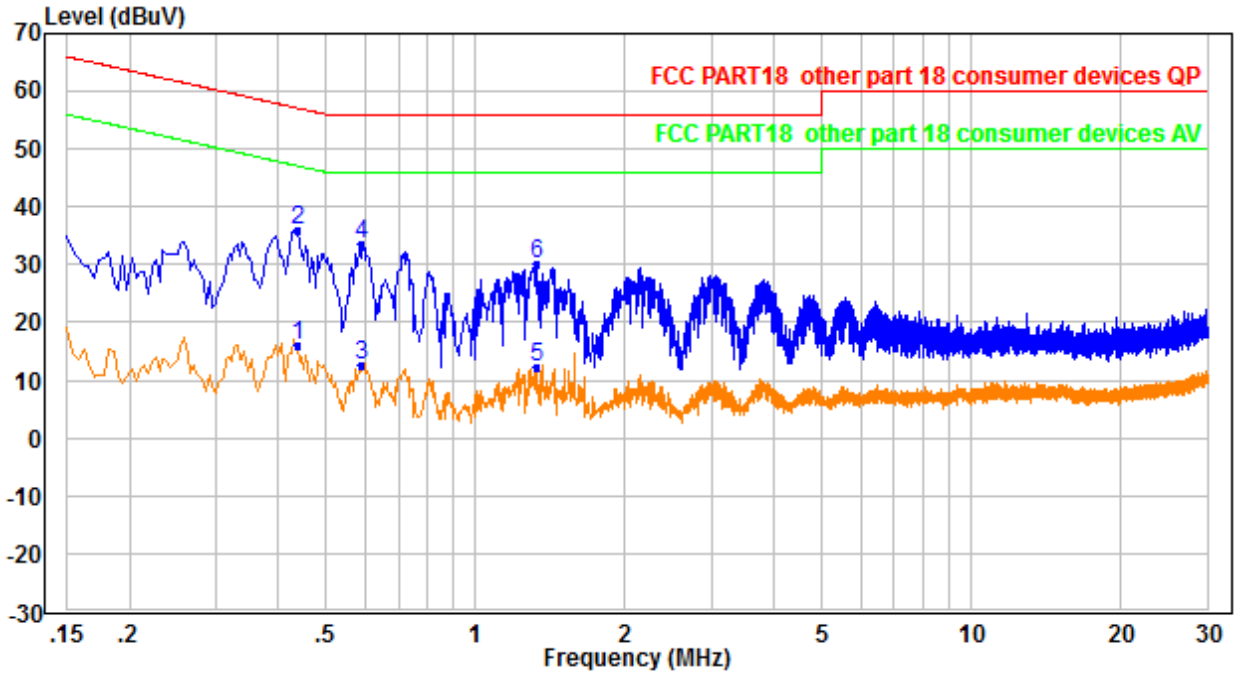
Test Result: Pass

The measurement data as follows:

Quasi Peak and Average:

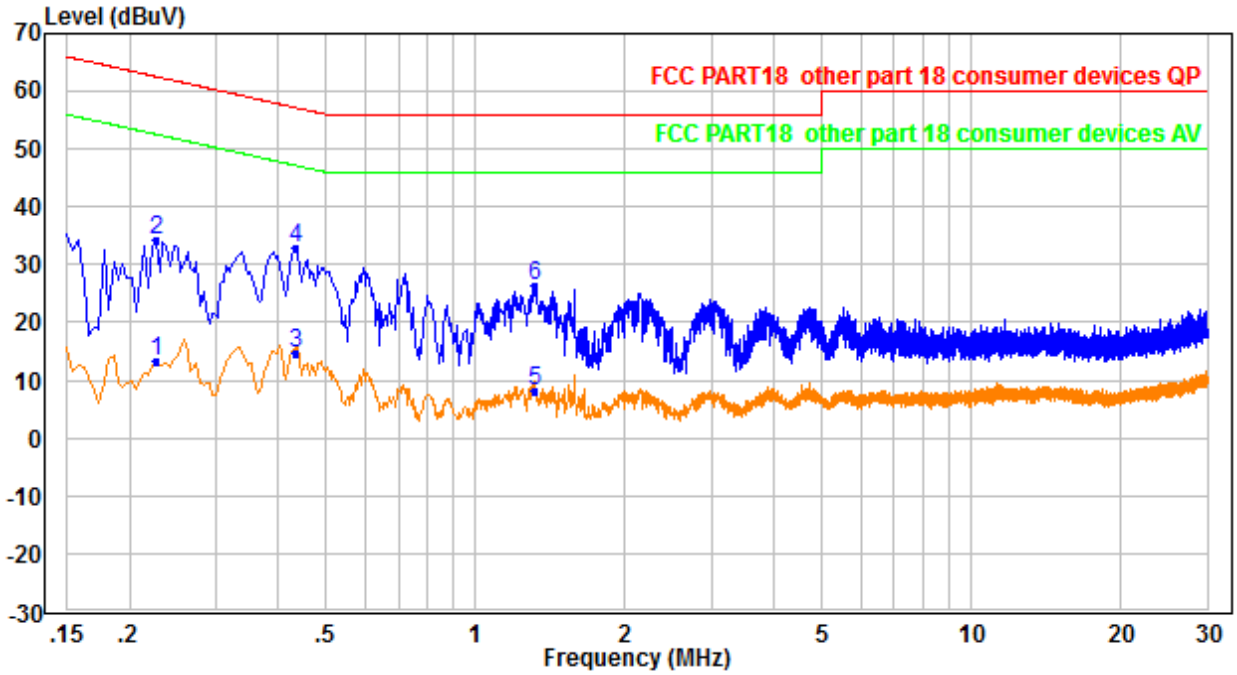
Mode 1

Live Line



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.438	5.94	9.99	15.93	47.10	-31.17	Average
2	0.438	25.94	9.99	35.93	57.10	-21.17	QP
3	0.586	2.44	10.00	12.44	46.00	-33.56	Average
4	0.586	23.44	10.00	33.44	56.00	-22.56	QP
5	1.326	2.09	10.13	12.22	46.00	-33.78	Average
6	1.326	20.09	10.13	30.22	56.00	-25.78	QP

Neutral Line



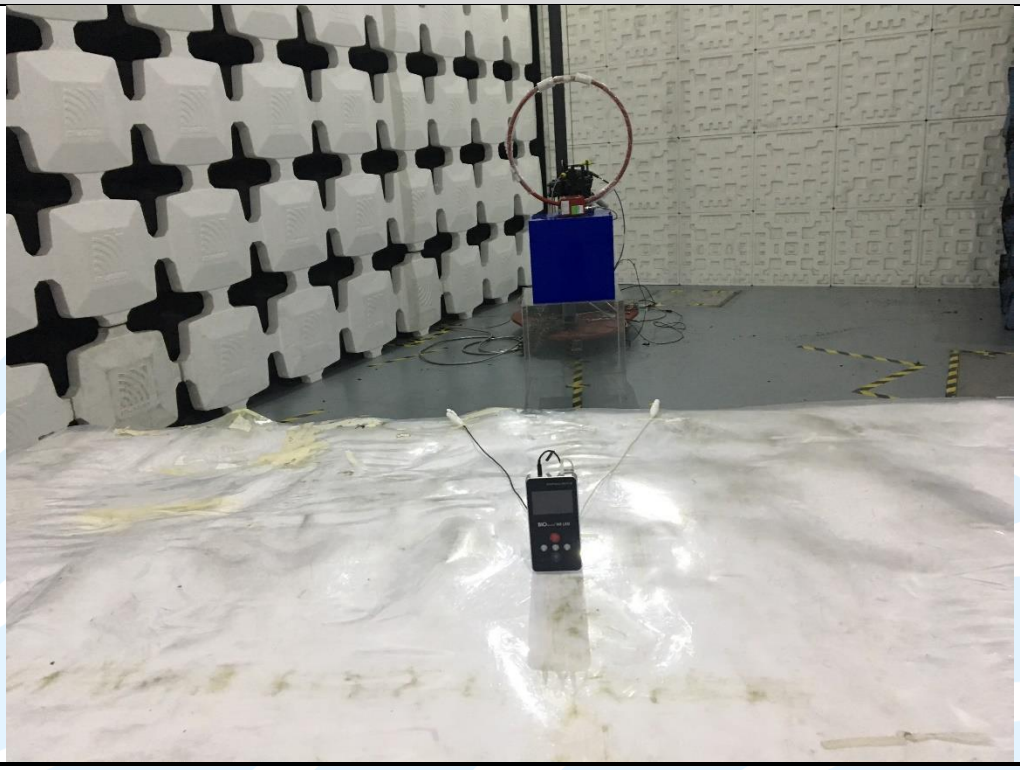
No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.226	3.27	9.98	13.25	52.60	-39.35	Average
2	0.226	24.27	9.98	34.25	62.60	-28.35	QP
3	0.434	4.87	9.97	14.84	47.18	-32.34	Average
4	0.434	22.87	9.97	32.84	57.18	-24.34	QP
5	1.318	-1.84	10.12	8.28	46.00	-37.72	Average
6	1.318	16.16	10.12	26.28	56.00	-29.72	QP

Remark:

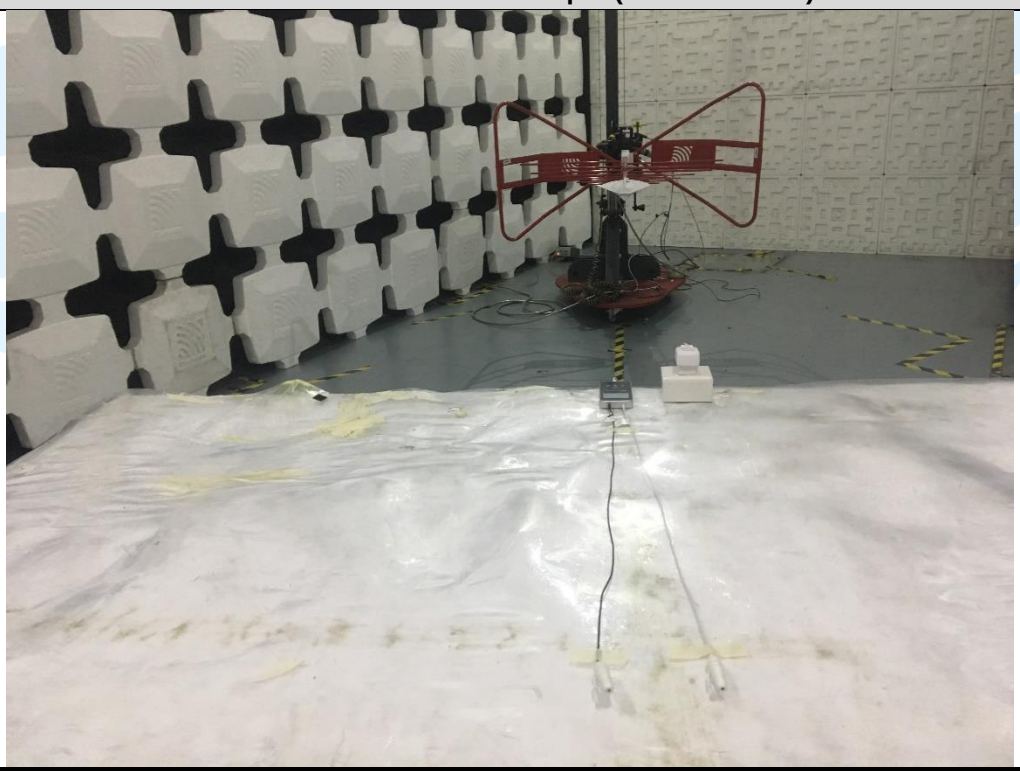
1. Correct Factor = LISN Factor + Cable Loss + Pulse Limiter Factor, the value was added to Original Receiver Reading by the software automatically.
2. Result = Reading + Correct Factor.
3. Margin = Result - Limit
4. An initial pre-scan was performed on the Phase and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

APPENDIX 1 PHOTOS OF TEST SETUP

Radiated emission Test Setup-1 (9 KHz~30 MHz)



Radiated emission Test Setup-2 (30 MHz~1 GHz)



Conducted Emission Test Setup-3

APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS

EUT EXTERNAL PHOTOS

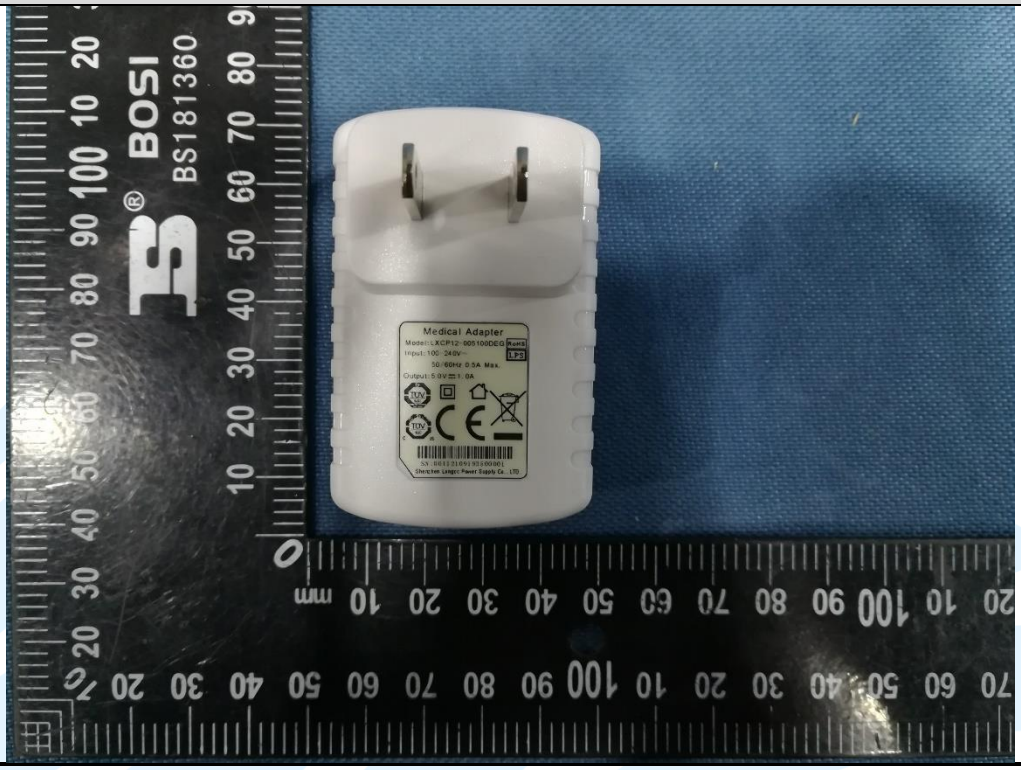
EUT Photo

EUT Photo

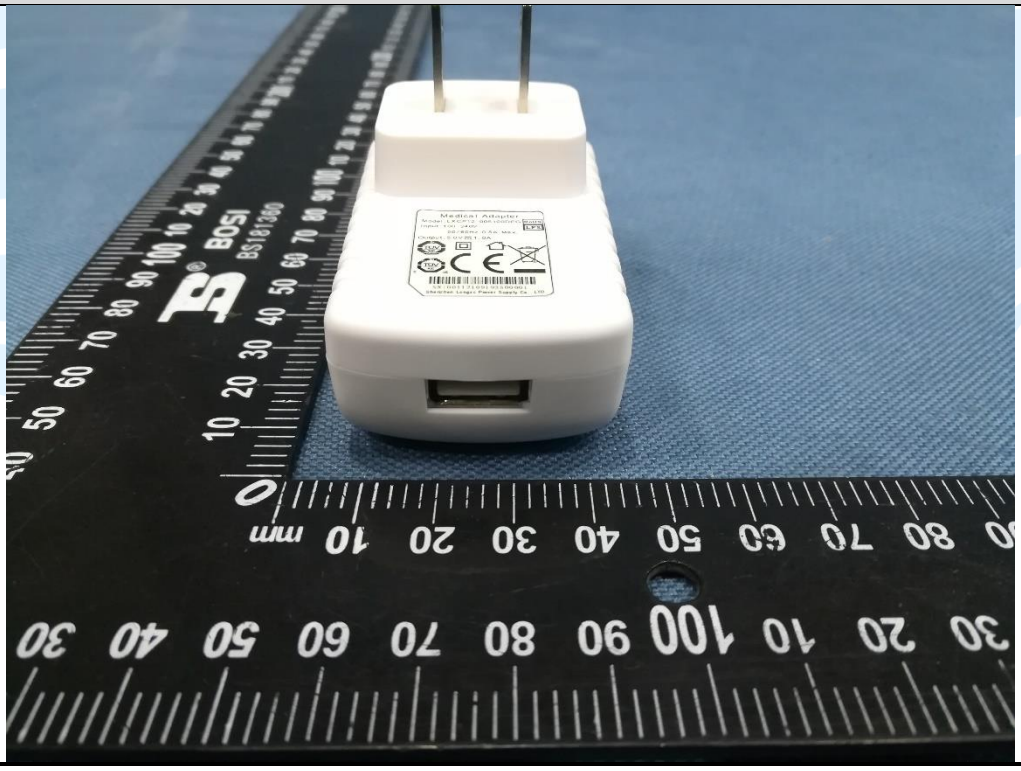
EUT Photo

EUT Photo

EUT Photo



EUT Photo



EUT Photo

EUT Photo

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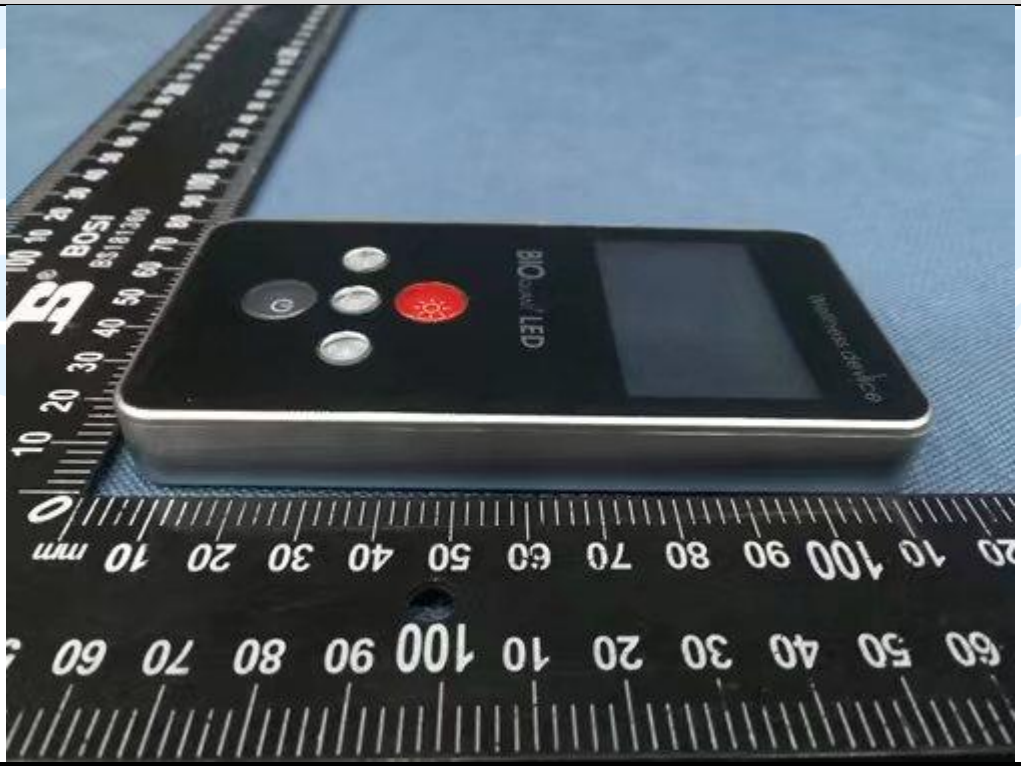
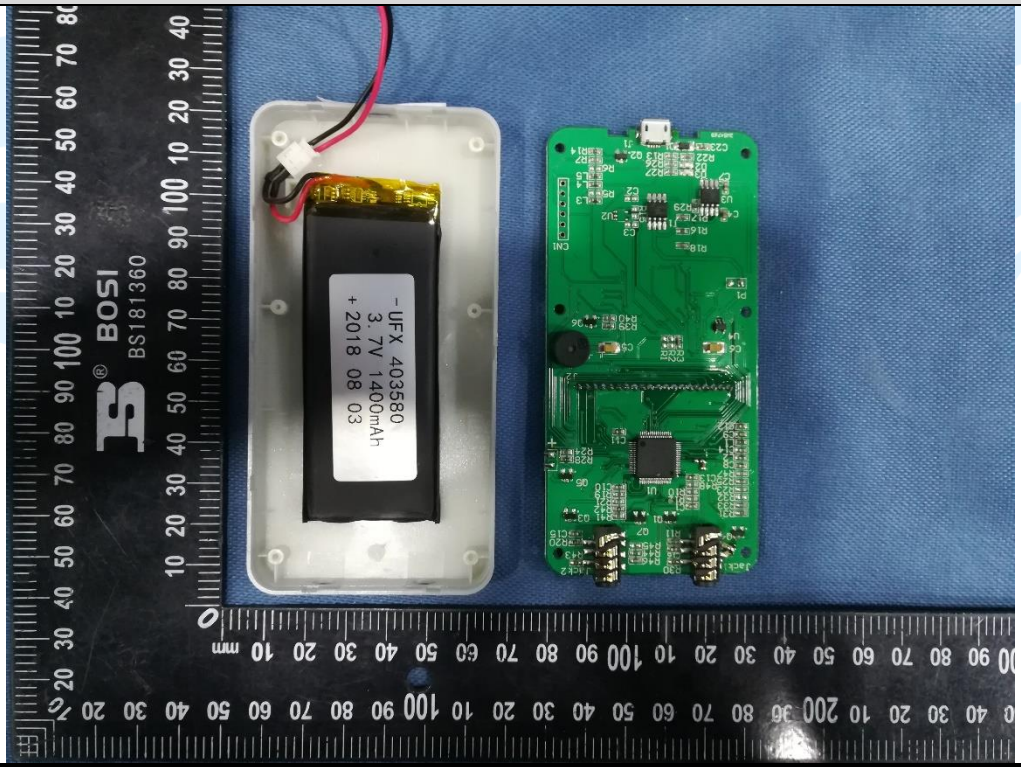


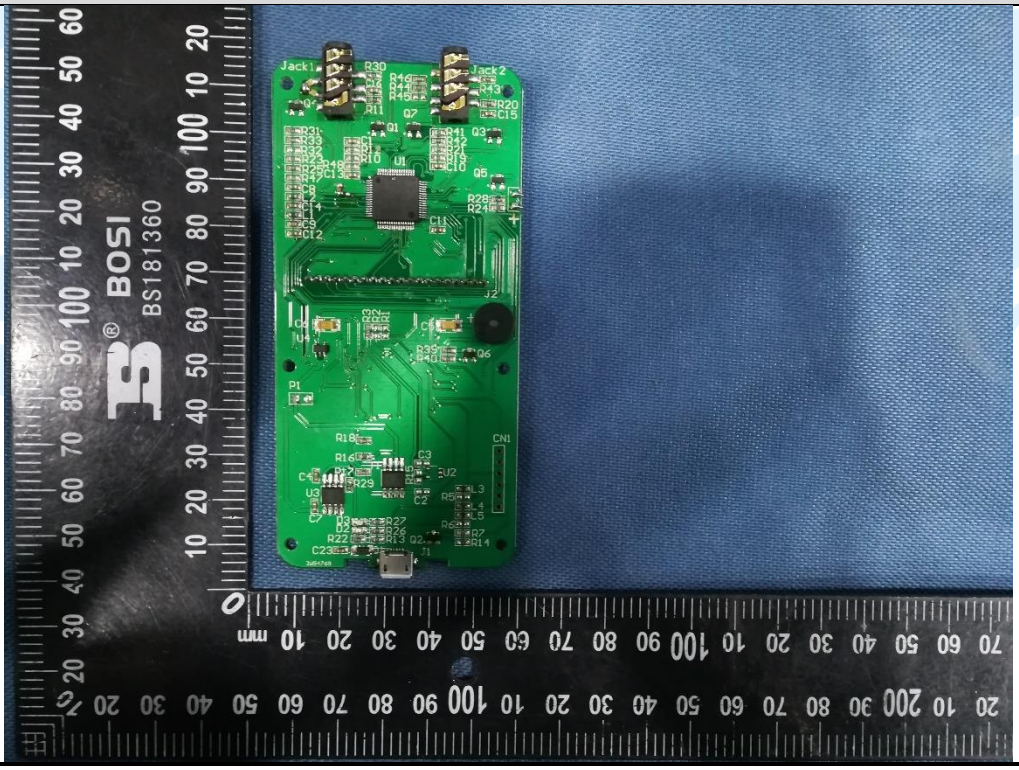
EUT INTERNAL PHOTOS

EUT Photo

EUT Photo


EUT Photo

EUT Photo



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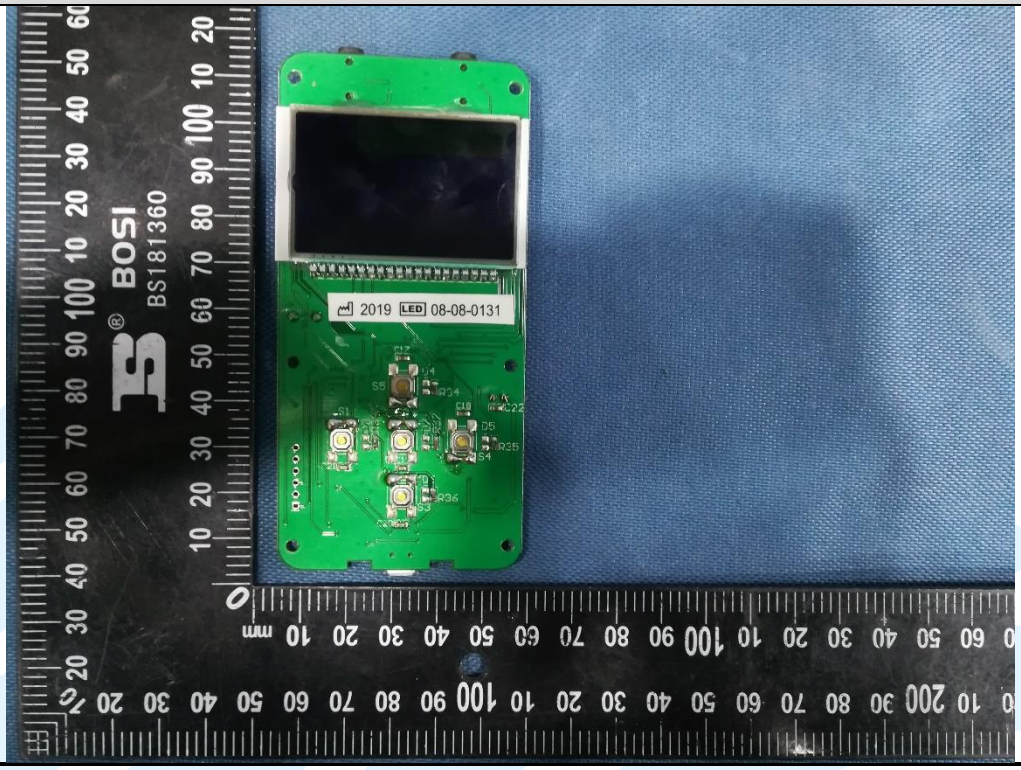

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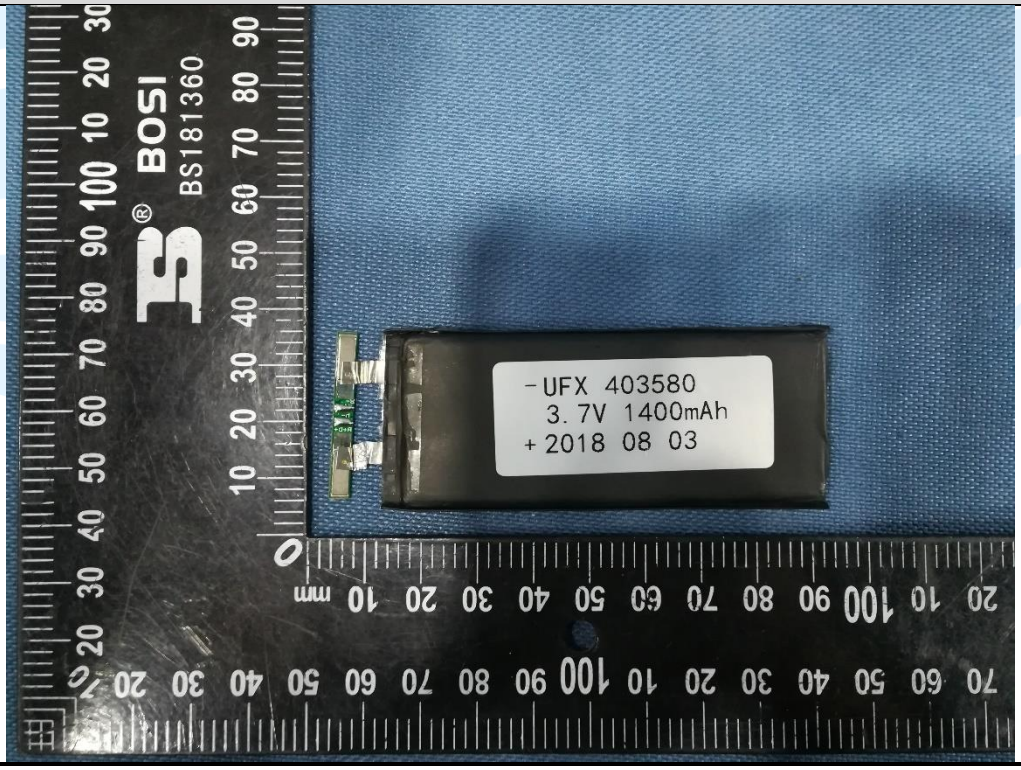

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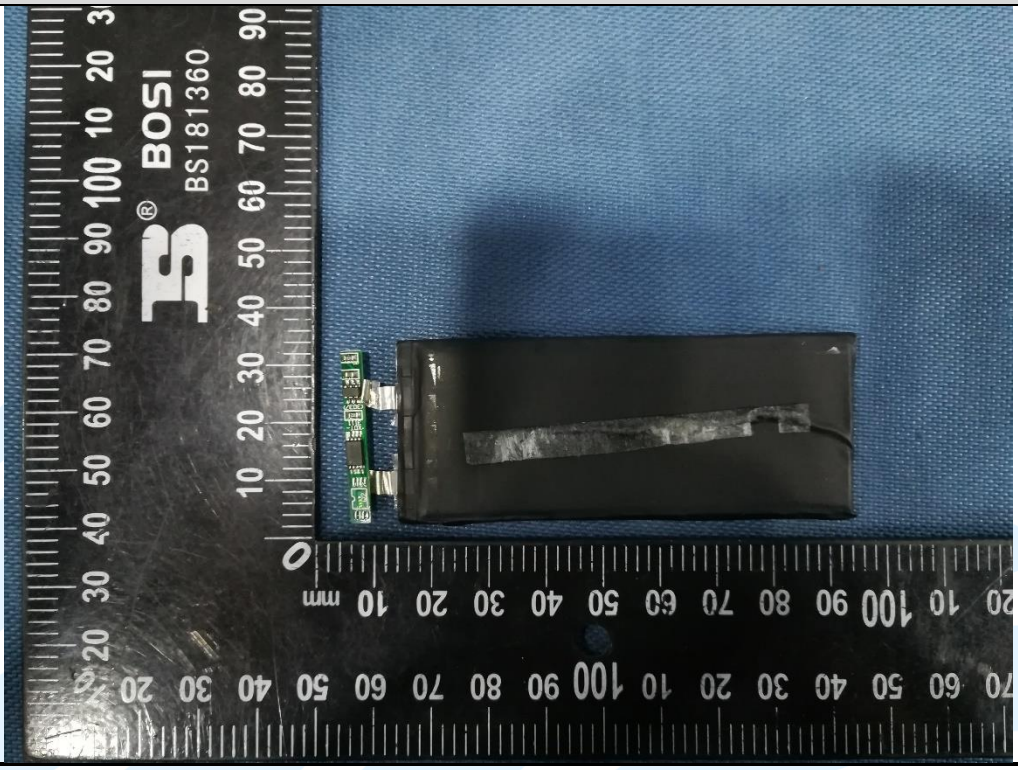

********** End of Report **********

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