



Shenzhen Huaxia Testing Technology Co., Ltd

1F., Block A of Tongsheng Technology Building, Huahui Road, Dalang Street, Longhua District, Shenzhen, China

Telephone: +86-755-26648640

Fax: +86-755-26648637

Website: www.cqa-cert.com

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Test Report

Report No. : CQASZ20180800088E

Applicant: Hong Qiangxing(Shenzhen) electronics Limited

Address of Applicant: 4F, Jingcheng Building, Xicheng Industrial Zone, Xixiang Road, Bao'an District, Shenzhen City, Guangdong Province, China

Manufacturer: Hong Qiangxing(Shenzhen) electronics Limited

Address of Manufacturer: 4F, Jingcheng Building, Xicheng Industrial Zone, Xixiang Road, Bao'an District, Shenzhen City, Guangdong Province, China

Equipment Under Test (EUT):

Product: Physiotherapeutic instrument

Model No.: SM9180

Brand Name: N/A

FCC ID: 2AMYM-SM9180

Standards: 47 CFR PART 15, Subpart B

Date of Test: 2018-08-23 to 2018-09-05

Date of Issue: 2018-09-06

Test Result : **PASS***

Tested By:

Tiny You

(Tiny You)

Reviewed By:

Aaron Ma

(Aaron Ma)

Approved By:

Jack Ai

(Jack Ai)



* In the configuration tested, the EUT complied with the standards specified above.

The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CQA, this report can't be reproduced except in full.

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20180800088E	Rev.01	Initial report	2018-09-06

2 Test Summary

Test	Test Requirement	Test Method	Class / Severity	Result
Radiated Emission (30MHz to 13GHz)	47 CFR PART 15,Subpart B	ANSI C63.4:2014	Class B	PASS
Conducted Emission (150kHz to 30MHz)	47 CFR PART 15,Subpart B	ANSI C63.4:2014	Class B	PASS

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement Range (MHz)
Below 1.705	30
1.705 to 108	1000
108 to 500	2000
500 to 1000	5000
Above 1000	5 th harmonic of the highest frequency or 40GHz, whichever is lower

Remark:

The highest frequency of the internal sources of the EUT is 2450 MHz.

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4 General Information

4.1 Details of E.U.T.

Name:	Physiotherapeutic instrument
Model No.:	SM9180
Trade Mark :	N/A
Hardware Version:	V1.0
Software Version:	V1.0
Frequency Range:	2450 MHz (only receive)
Modulation Type:	GFSK
Antenna Type:	PCB antenna
Antenna Gain:	0dBi
Power Supply:	Rechargeable li-ion battery: DC3.7V 180mA

4.2 Description of Support Units

The EUT has been tested with associated equipment below.

Description	Manufacturer	Model No.	Remark	FCC certification
USB cable	/	0.8m	Provide by lab	/
AC/DC Adapter	I.T.E	SC050050-US	Provide by client	DOC

4.3 Measurement Uncertainty

The data and results referenced in this document are true and accurate.

The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities.

The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the **Shenzhen Huaxia Testing Technology Co., Ltd** quality system acc. to DIN EN ISO/IEC 17025.

Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for **CQA** laboratory is reported:

Test	Range	Uncertainty	Notes
Radiated Emission	Below 1GHz	$\pm 5.12\text{dB}$	(1)
Radiated Emission	Above 1GHz	$\pm 4.60\text{dB}$	(1)
Conducted Disturbance	0.15~30MHz	$\pm 3.34\text{dB}$	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

4.4 Test Location

All tests were performed at:

Shenzhen Huaxia Testing Technology Co., Ltd.,

1F., Block A of Tongsheng Technology Building, Huahui Road, Dalang Street, Longhua District, Shenzhen, China

4.5 Test Facility

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

- **CNAS (No. CNAS L5785)**

CNAS has accredited Shenzhen Huaxia Testing Technology Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **ISED Registration No.: 22984-1**

The 3m Semi-anechoic chamber of Shenzhen Huaxia Testing Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

- **A2LA (Certificate No. 4742.01)**

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4742.01.

- **FCC Registration No.: 522263**

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.:522263

5 Equipment List

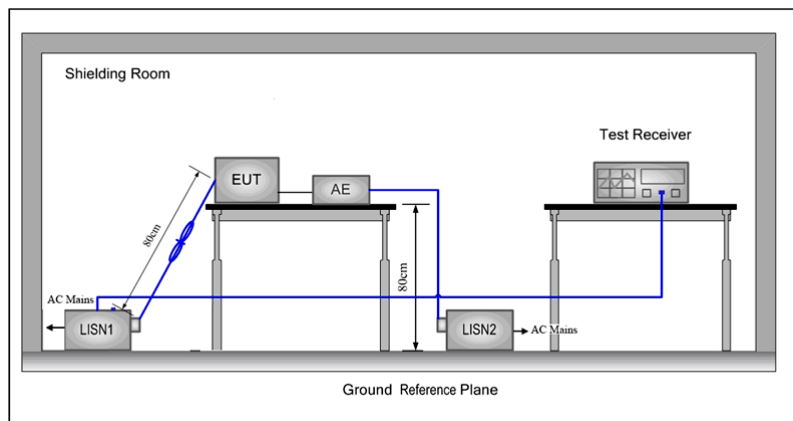
Radiated Emission					
Test Equipment	Manufacturer	Model No.	Instrument No.	Calibration Date	Calibration Due Date
Horn Antenna	R&S	HF906	CQA-012	2017/9/25	2018/9/24
Bilog Antenna	R&S	HL562	CQA-011	2017/9/25	2018/9/24
EMI Test Receiver	R&S	ESR7	CQA-005	2017/9/25	2018/9/24
Spectrum analyzer	R&S	FSU26	CQA-038	2017/9/25	2018/9/24
Preamplifier	MITEQ	AFS4-00010300-18-10P-4	CQA-035	2017/9/25	2018/9/24
Preamplifier	MITEQ	AMF-6D-02001800-29-20P	CQA-036	2017/9/25	2018/9/24
Coaxial cable (1GHz~40GHz)	CQA	N/A	C019	2017/10/18	2018/10/17
Coaxial cable (9KHz~1GHz)	CQA	N/A	C020	2017/10/18	2018/10/17

Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Instrument No.	Due Date
EMI Test Receiver	R&S	ESPI3	CQA-005	2017/9/25	2018/9/24
LISN	R&S	ENV216	CQA-003	2017/9/25	2018/9/24
Coaxial cable (9KHz~300MHz)	CQA	N/A	C009	2017/10/18	2018/10/17

6 Test Results

6.1 Conducted Emissions Mains Terminals, 150kHz to 30MHz

Test Requirement:	47 CFR PART 15, Subpart B
Test Method:	ANSI C63.4
Frequency Range:	150kHz to 30MHz
Class / Severity:	Class B
Limit:	
0.15M-0.5MHz	66dB(dB μ V)-56dB(dB μ V) quasi-peak, 56dB(dB μ V)-46dB(dB μ V) average
0.5M-5MHz	56dB(dB μ V) quasi-peak, 46dB(dB μ V) average
5M-30MHz	60dB(dB μ V) quasi-peak, 50dB(dB μ V) average
Test Setup:	



Test Procedure:

- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a $50\Omega/50\mu\text{H} + 5\Omega$ linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.

Detector:

Peak for pre-scan (9kHz Resolution Bandwidth)

Quasi-Peak if maximised peak within 6dB of Quasi-Peak limit

6.1.1 E.U.T. Operation

Operating Environment:

Temperature: 25.0 °C Humidity: 55% RH Atmospheric Pressure: 1015 mbar

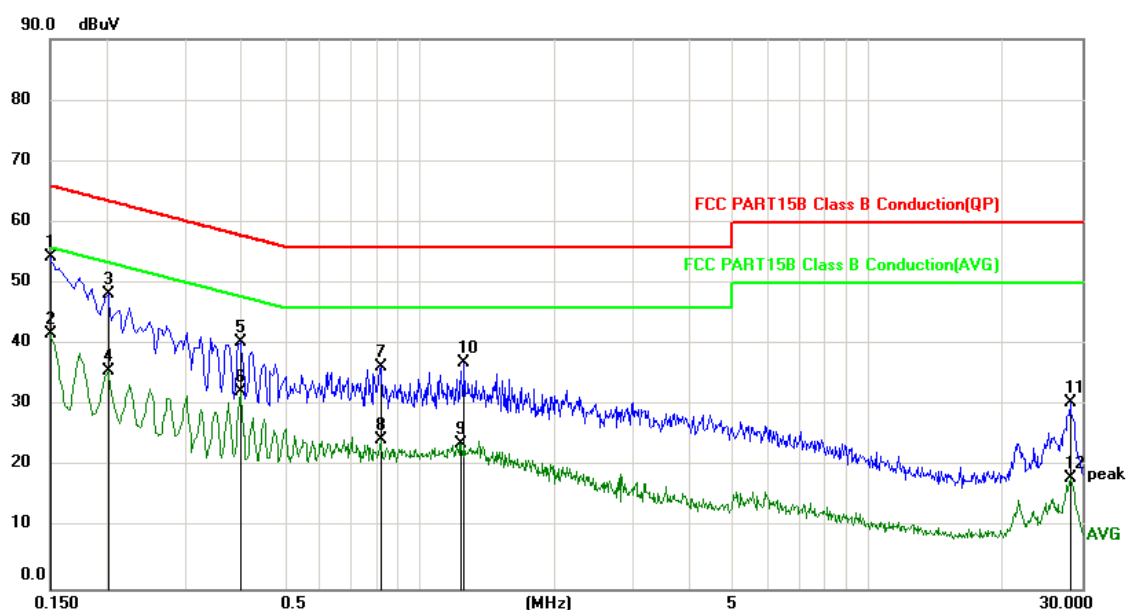
EUT Operation: Mode a: Charging +2450MHz receive

Test Status: Pretest the EUT at different test mode and found the mode a which is worst case, the test worst case mode is recorded in the report.

Test voltage: 120V/50Hz

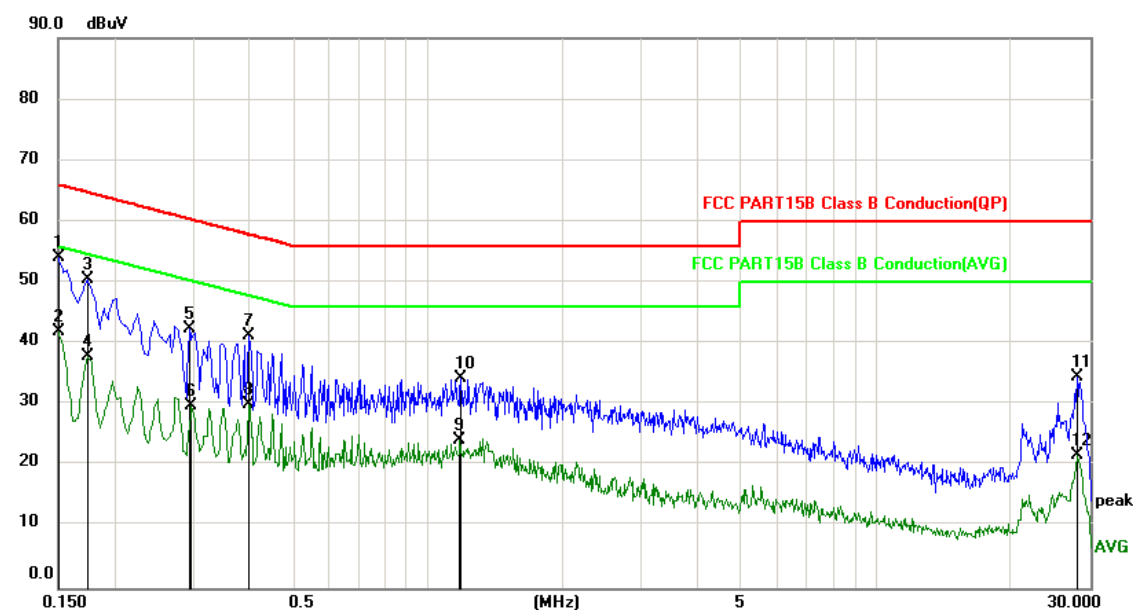
6.1.2 Measurement Data

Neutral line



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1500	44.62	9.79	54.41	66.00	-11.59	peak	
2		0.1500	31.84	9.79	41.63	56.00	-14.37	AVG	
3		0.2020	38.57	9.80	48.37	63.53	-15.16	peak	
4		0.2020	25.82	9.80	35.62	53.53	-17.91	AVG	
5		0.3980	30.52	9.80	40.32	57.90	-17.58	peak	
6		0.3980	22.39	9.80	32.19	47.90	-15.71	AVG	
7		0.8180	26.56	9.80	36.36	56.00	-19.64	peak	
8		0.8180	14.72	9.80	24.52	46.00	-21.48	AVG	
9		1.2340	13.99	9.83	23.82	46.00	-22.18	AVG	
10		1.2579	27.25	9.83	37.08	56.00	-18.92	peak	
11		28.1620	20.44	9.99	30.43	60.00	-29.57	peak	
12		28.3460	8.11	9.99	18.10	50.00	-31.90	AVG	

Live line



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1500	44.30	9.73	54.03	66.00	-11.97	peak	
2		0.1500	32.29	9.73	42.02	56.00	-13.98	AVG	
3		0.1740	40.89	9.73	50.62	64.77	-14.15	peak	
4		0.1740	28.29	9.73	38.02	54.77	-16.75	AVG	
5		0.2940	32.60	9.74	42.34	60.41	-18.07	peak	
6		0.2980	20.03	9.74	29.77	50.30	-20.53	AVG	
7		0.3980	31.48	9.74	41.22	57.90	-16.68	peak	
8		0.3980	20.30	9.74	30.04	47.90	-17.86	AVG	
9		1.1820	14.43	9.75	24.18	46.00	-21.82	AVG	
10		1.1900	24.62	9.75	34.37	56.00	-21.63	peak	
11		28.1500	24.63	9.84	34.47	60.00	-25.53	peak	
12		28.1500	11.86	9.84	21.70	50.00	-28.30	AVG	

Remark:

1. The following Peak, Quasi-Peak and Average measurements were performed on the EUT:
2. Correct Factor= LISN Factor + Cable Loss
3. Final Test Level =Receiver Reading + Correct Factor.
4. Over Limit= Final Test Level - Limit

6.2 Radiated Emissions, 30MHz to 13GHz

Test Requirement:	47 CFR PART 15, Subpart B
Test Method:	ANSI C63.4
Frequency Range:	30MHz to 13GHz
Measurement Distance:	3m
Class:	Class B
Limit:	40.0 dB μ V/m between 30MHz & 88MHz 43.5 dB μ V/m between 88MHz & 216MHz 46.0 dB μ V/m between 216MHz & 960MHz / 54.0 dB μ V/m above 960MHz
The highest frequency:	74 dB μ V/m above 960MHz for peak 54 dB μ V/m above 960MHz for average

Test Setup:

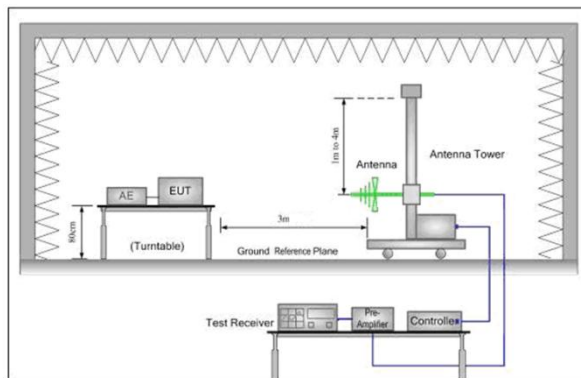


Figure 1. 30MHz to 1GHz

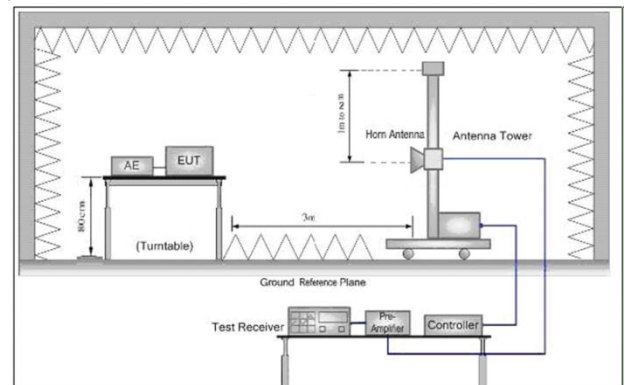


Figure 2. Above 1 GHz

- Test Procedure:
- 1) The radiated emissions were tested in a semi-anechoic chamber.
 - 2) The EUT is placed on a turntable, which is 0.8m above ground plane.
 - 3) The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
 - 4) EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions.
 - 5) Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
 - 6) And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
 - 7) Repeat above procedures until the measurements for all frequencies are complete.

Detector: Peak for pre-scan (120kHz resolution bandwidth)
Quasi-Peak if maximised peak within 6dB of limit

6.2.1 E.U.T. Operation

Operating Environment:

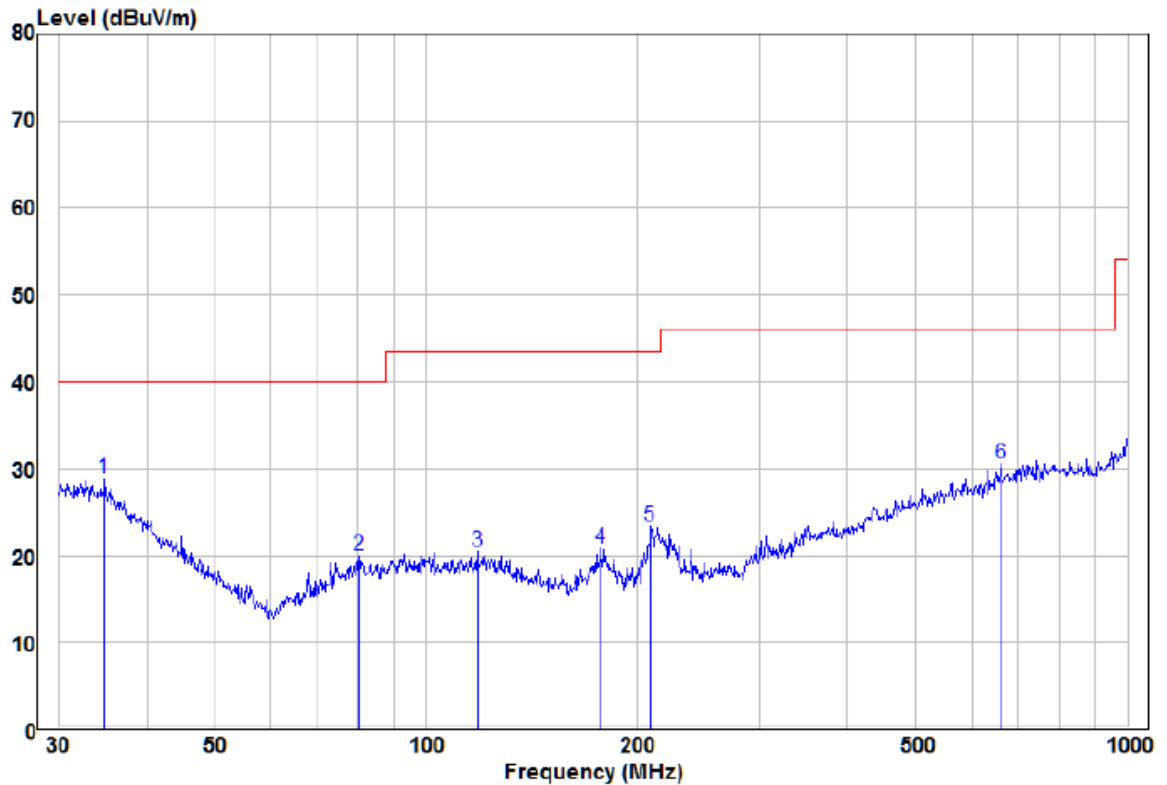
Temperature: 22.0 °C Humidity: 54 % RH Atmospheric Pressure: 1015 mbar

EUT Operation: Mode a: Charging +2450MHz receive

Test Status: Pretest the EUT at different test mode and found the mode a which is worst case, the test worst case mode is recorded in the report.

6.2.2 Measurement Data

Horizontal



	Read		Limit	Over			
Freq	Level	Factor	Level	Line	Limit	Remark	Pol/Phase
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1 pp	34.88	10.31	18.52	28.83	40.00	-11.17 Peak	HORIZONTAL
2	80.36	10.01	9.90	19.91	40.00	-20.09 Peak	HORIZONTAL
3	118.60	9.92	10.63	20.55	43.50	-22.95 Peak	HORIZONTAL
4	178.13	12.61	8.29	20.90	43.50	-22.60 Peak	HORIZONTAL
5	209.31	13.36	9.98	23.34	43.50	-20.16 Peak	HORIZONTAL
6	661.15	11.02	19.48	30.50	46.00	-15.50 Peak	HORIZONTAL

Remark:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic

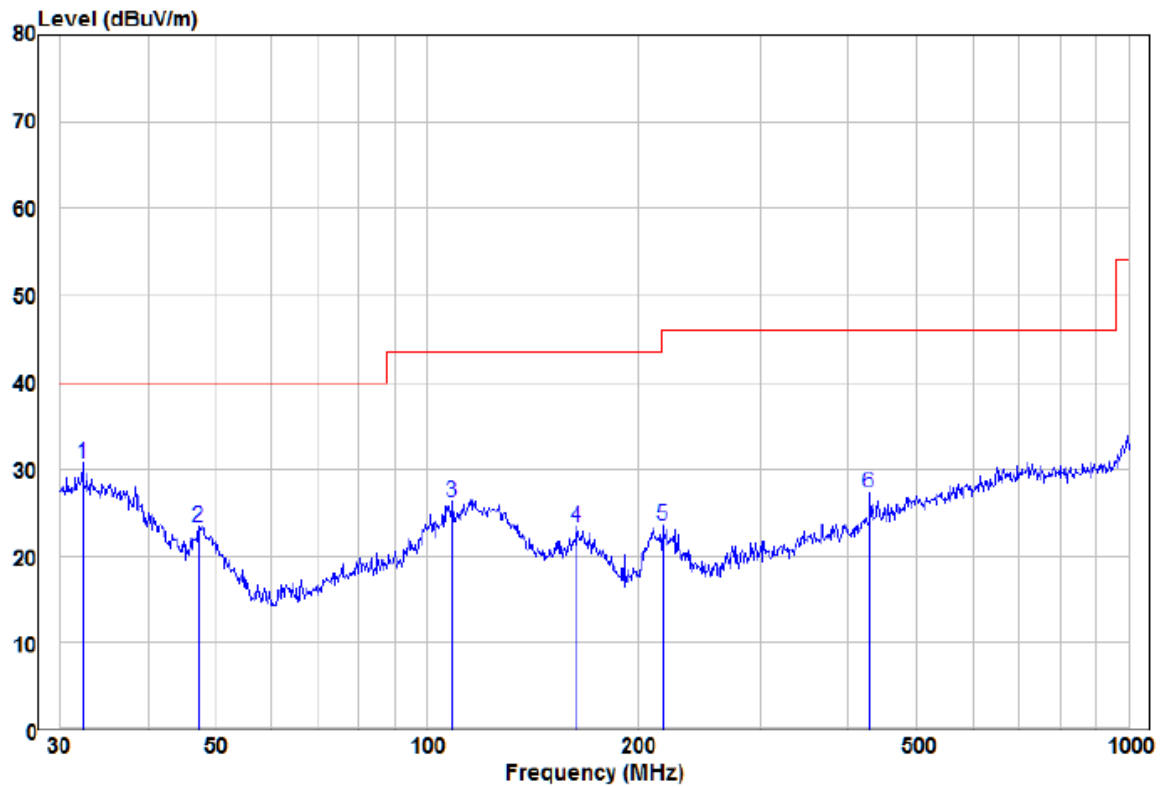
equation with a sample calculation is as follows:

Factor= Antenna Factor + Cable Factor – Preamplifier Factor,

Level = Read Level + Factor,

Over Limit=Level-Limit Line.

Vertical



		Read			Limit	Over		
	Freq	Level	Factor	Level	Line	Limit	Remark	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	pp	32.29	11.95	18.73	30.68	40.00	-9.32 Peak	VERTICAL
2		47.33	12.70	10.73	23.43	40.00	-16.57 Peak	VERTICAL
3		109.03	15.90	10.30	26.20	43.50	-17.30 Peak	VERTICAL
4		163.76	15.63	7.72	23.35	43.50	-20.15 Peak	VERTICAL
5		216.78	13.67	9.96	23.63	46.00	-22.37 Peak	VERTICAL
6		428.02	12.35	14.96	27.31	46.00	-18.69 Peak	VERTICAL

Remark:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic

equation with a sample calculation is as follows:

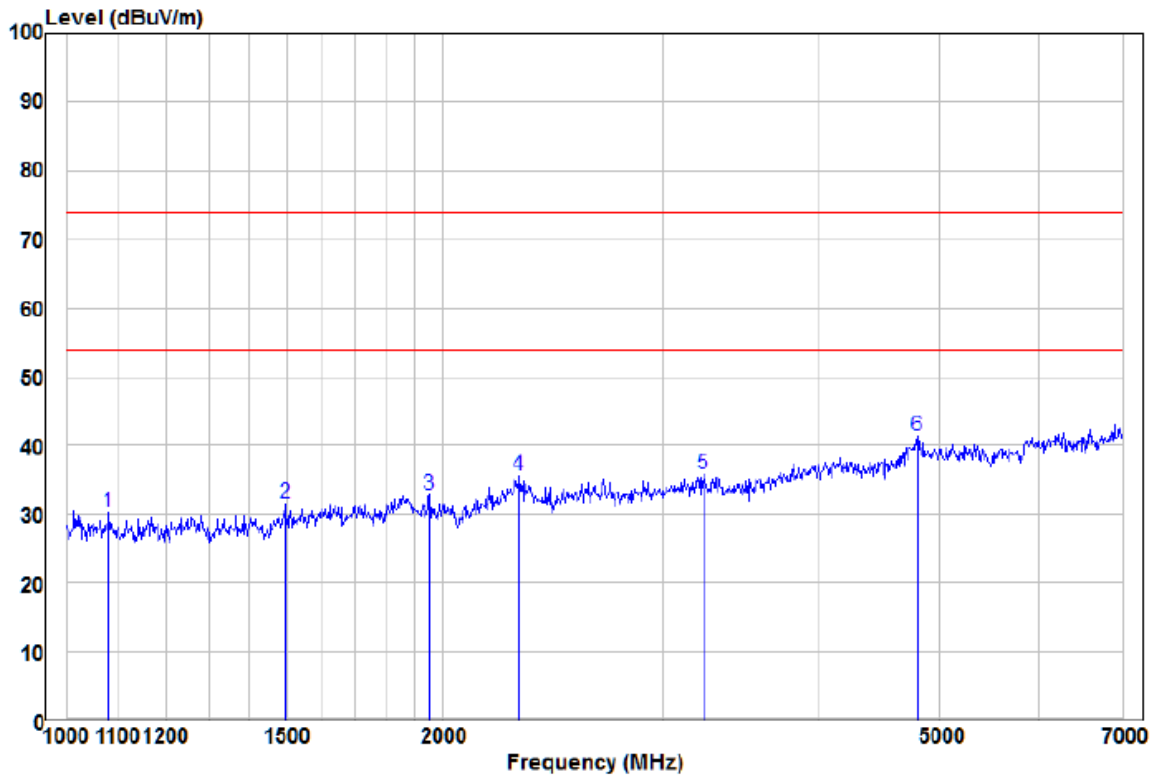
Factor= Antenna Factor + Cable Factor – Preamplifier Factor,

Level = Read Level + Factor,

Over Limit=Level-Limit Line.

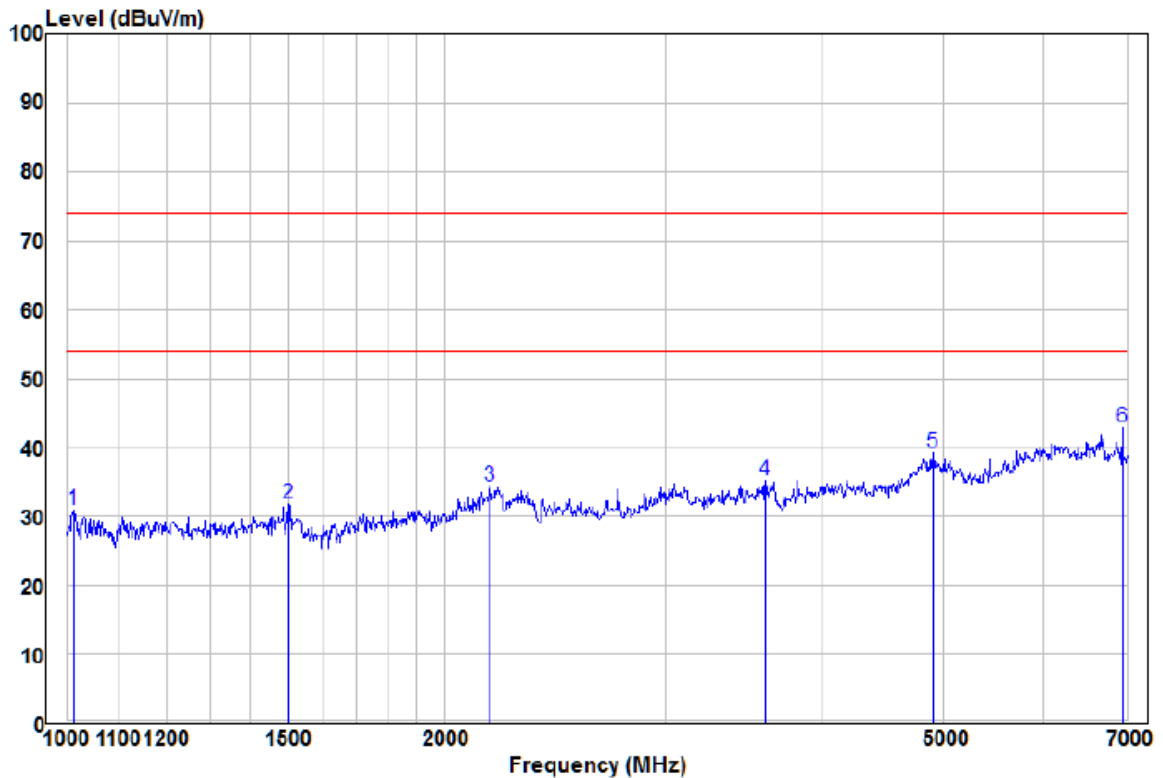
Above 1 GHz

Horizontal



	Read			Limit	Over		
Freq	Level	Factor	Level	Line	Limit	Remark	Pol/Phase
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	1080.95	48.06	-17.80	30.26	74.00	-43.74 Peak	HORIZONTAL
2	1496.01	47.67	-16.01	31.66	74.00	-42.34 Peak	HORIZONTAL
3	1953.05	45.90	-13.04	32.86	74.00	-41.14 Peak	HORIZONTAL
4	2304.34	44.56	-9.00	35.56	74.00	-38.44 Peak	HORIZONTAL
5	3232.91	45.77	-9.90	35.87	74.00	-38.13 Peak	HORIZONTAL
6 pp	4798.98	45.38	-3.98	41.40	74.00	-32.60 Peak	HORIZONTAL

Vertical



	Read			Limit	Over		
Freq	Level	Factor	Level	Line	Limit	Remark	Pol/Phase
MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	1011.74	47.84	-17.00	30.84	74.00	-43.16 Peak	VERTICAL
2	1501.85	47.65	-15.97	31.68	74.00	-42.32 Peak	VERTICAL
3	2173.67	45.17	-10.94	34.23	74.00	-39.77 Peak	VERTICAL
4	3605.12	44.22	-9.02	35.20	74.00	-38.80 Peak	VERTICAL
5	4902.81	43.19	-4.05	39.14	74.00	-34.86 Peak	VERTICAL
6 pp	6945.73	42.84	-0.04	42.80	74.00	-31.20 Peak	VERTICAL

Remark:

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

2) Scan from 1GHz to 13GHz, the disturbance above 7GHz was very low. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.

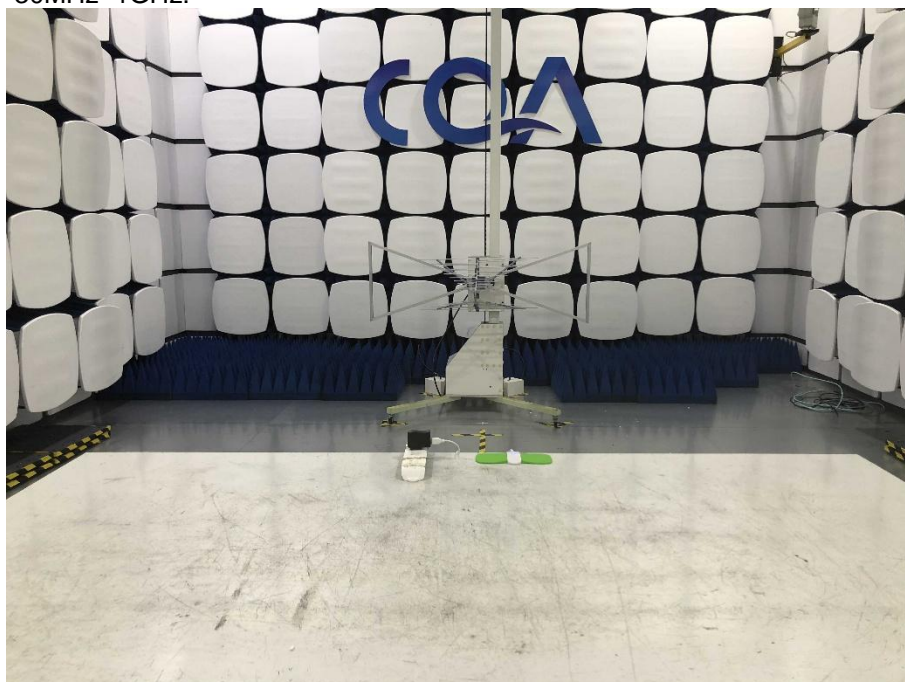
7 Photographs

7.1 Conducted Emission Test Setup



7.2 Radiated Emission Test Setup

30MHz~1GHz:

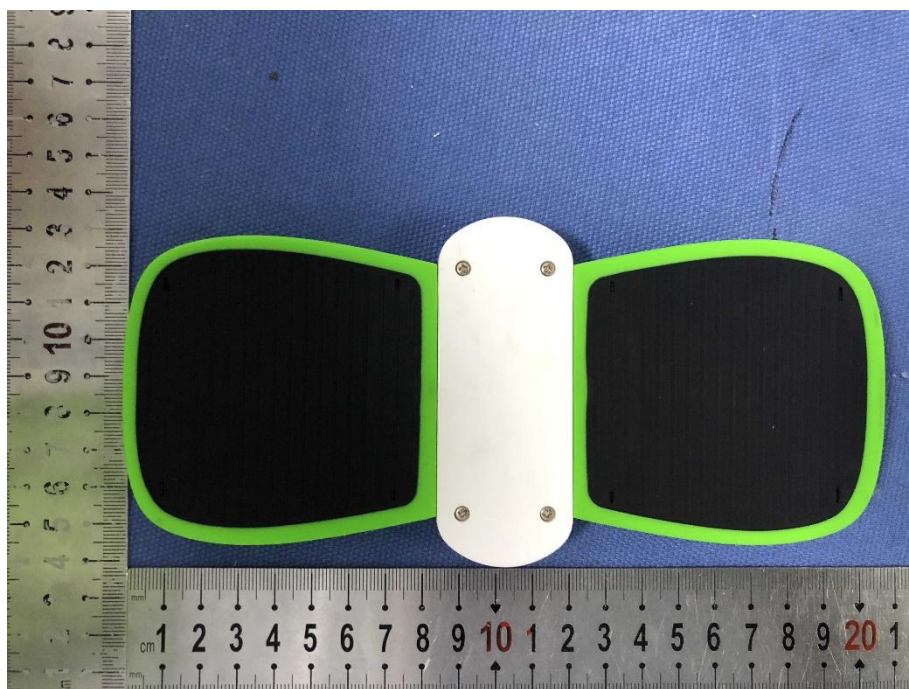
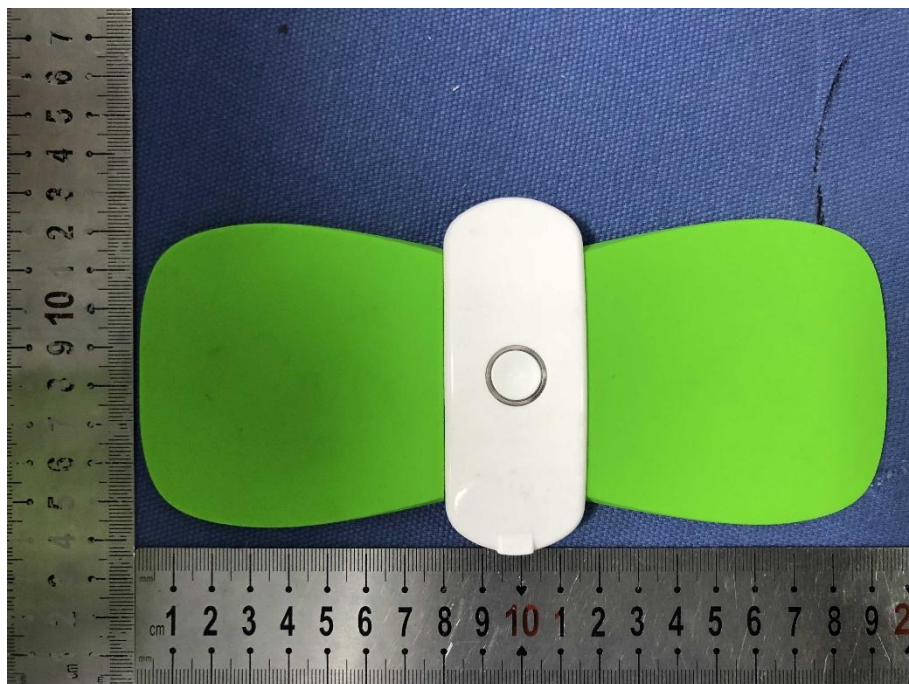


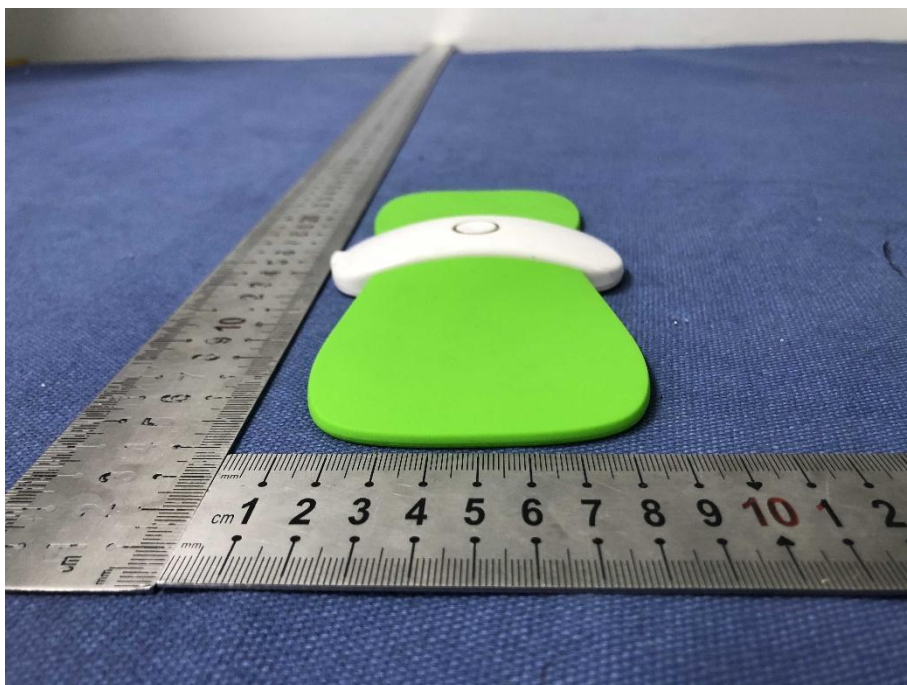
Above 1GHz:

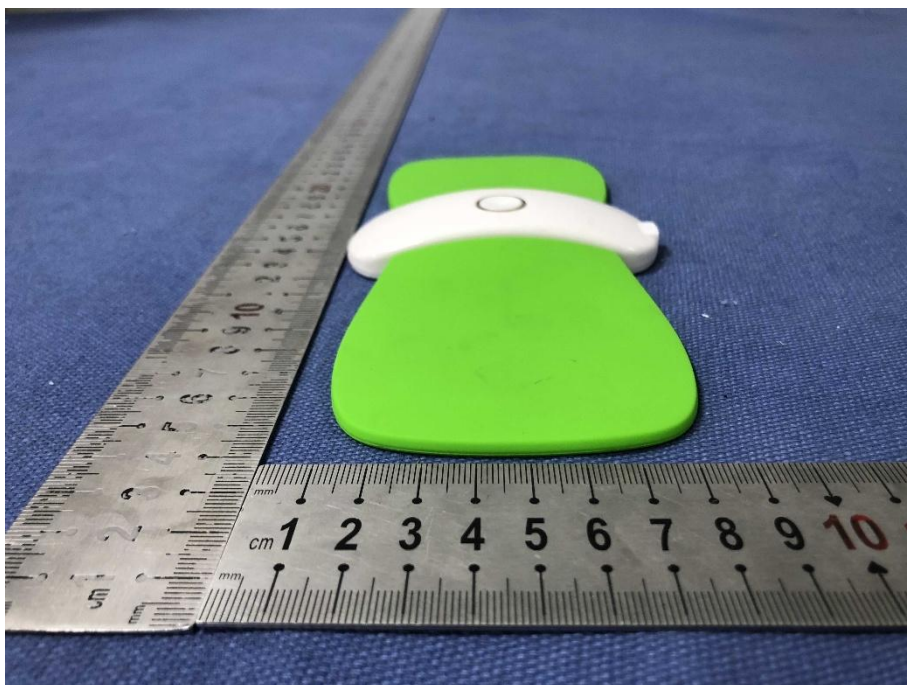
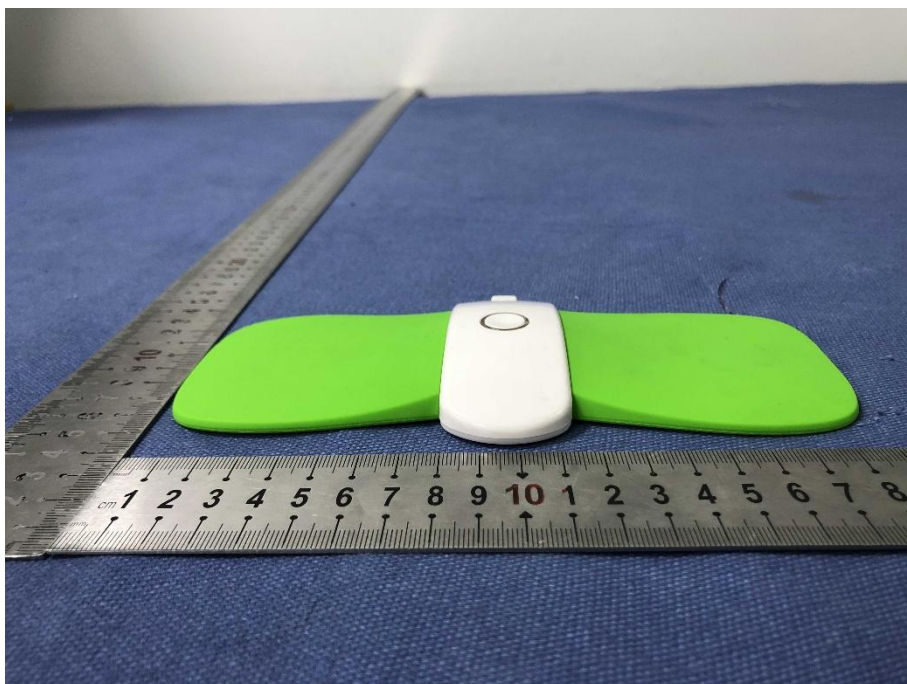


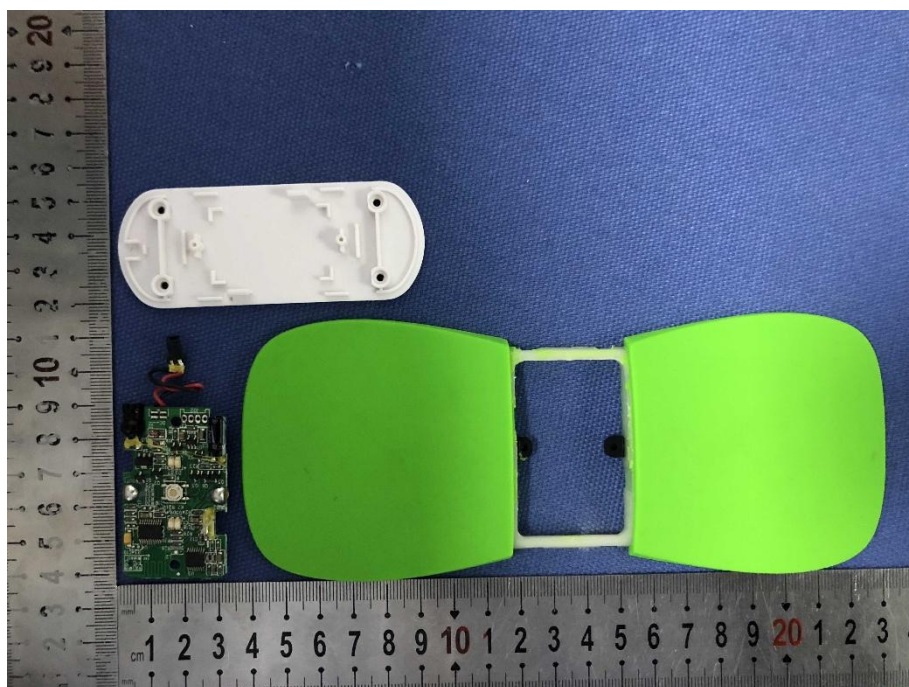
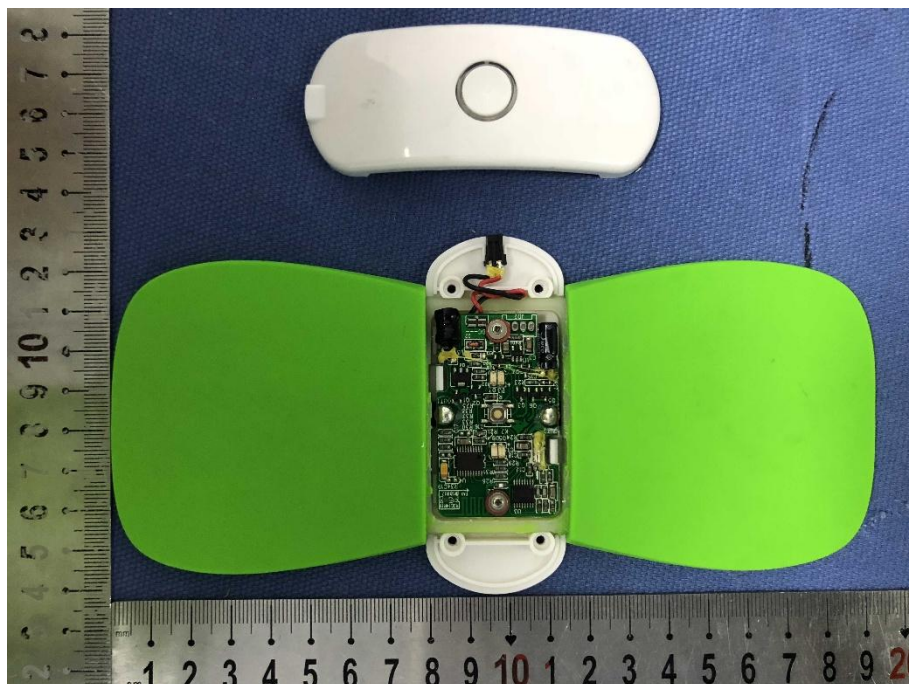
7.3 EUT Constructional Details

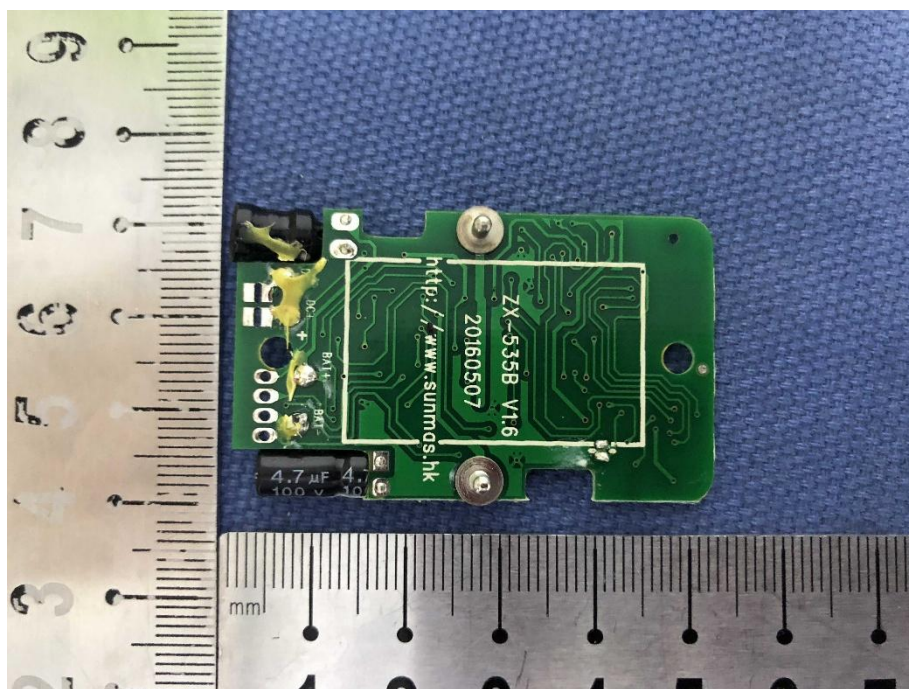
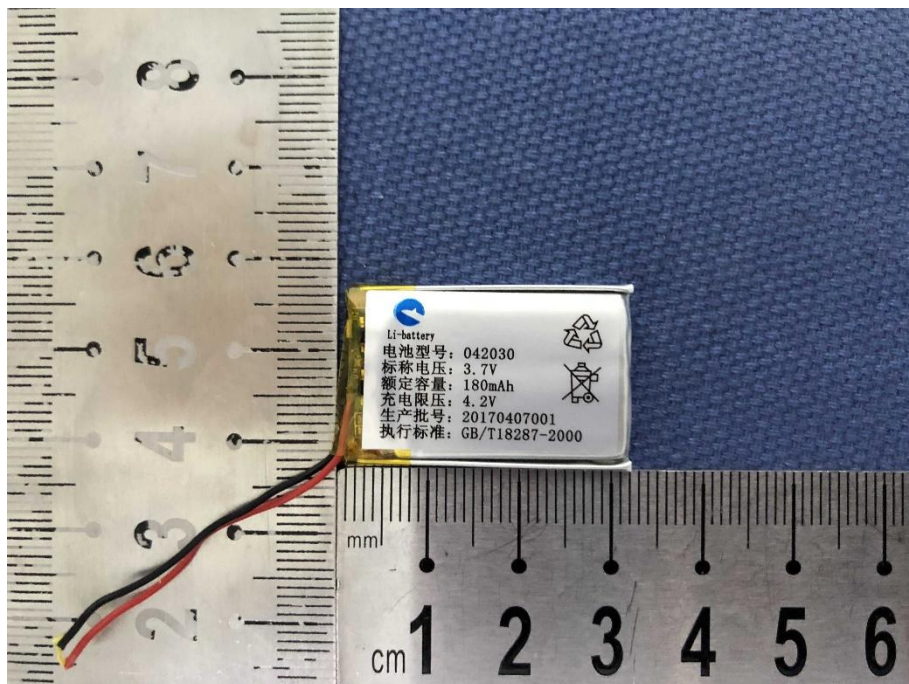


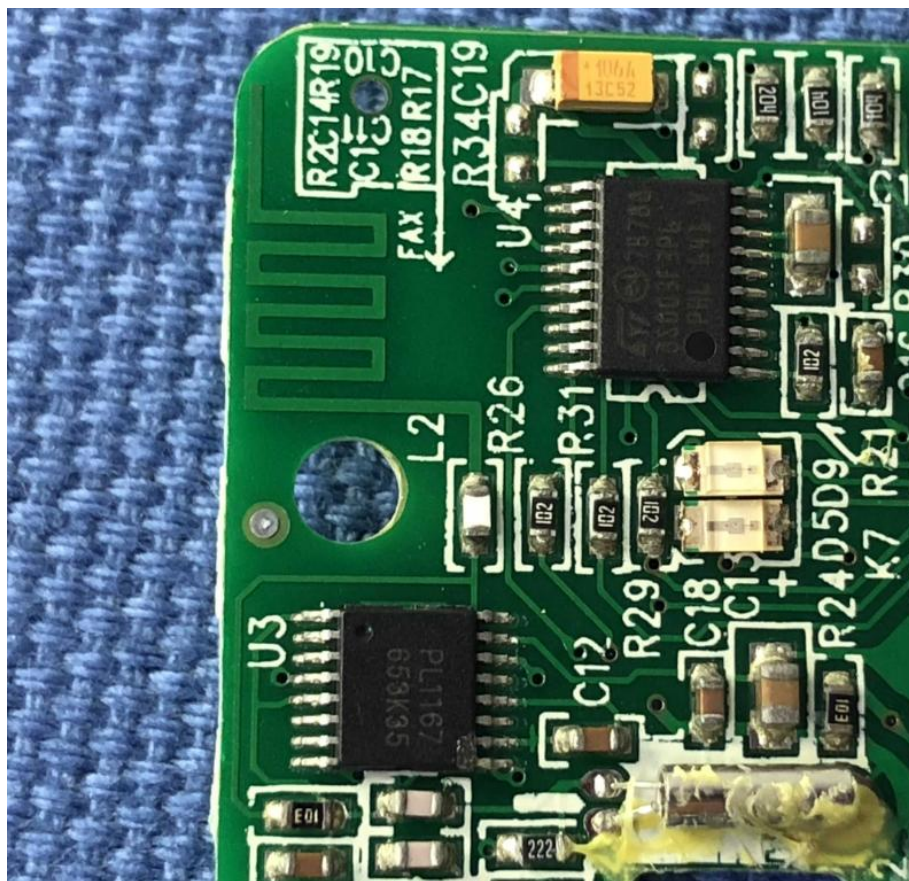












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