FCC REPORT

Applicant:	LEADER PREMIUMS LIMITED
Address of Applicant:	9/F., Hengfu Mansion, NO.858 Fuming Road, Ningbo, China
Manufacturer/Factory:	LEADER PREMIUMS LIMITED
Address of Manufacturer/Factory:	9/F., Hengfu Mansion, NO.858 Fuming Road, Ningbo, China
Equipment Under Test (EUT)	
Product Name:	Nebula Wireless Charging Pad with Integrated 2-in-1 Cable
Model No.:	AB0011, 7141-23
FCC ID:	2APYY-AB0011
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C
Date of sample receipt:	May 17, 2018
Date of Test:	May 18-22, 2018
Date of report issued:	May 23, 2018
Test Result :	PASS *

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

Authorized Signature:

Robinson Lo
Laboratory Manager

2 Version

Version No.	Date	Description
00	*May 23, 2018*	*Original*

Prepared By: Bill. Yuan ***Date:*** *May 23, 2018*

Project Engineer

Check By: Andy. Wu ***Date:*** *May 23, 2018*

Reviewer

3 Contents

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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Pass
AC Power Line Conducted Emission	15.207	Pass
Spurious Emission	15.209(a)(f)	Pass
20dB Bandwidth	15.215	Pass

Pass: The EUT complies with the essential requirements in the standard.

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz ~ 30MHz	± 4.34dB	(1)
Radiated Emission	30MHz ~ 1000MHz	± 4.24dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	± 3.45dB	(1)
Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.			

5 General Information

5.1 General Description of EUT

Product Name:	Nebula Wireless Charging Pad with Integrated 2-in-1 Cable
Model No.:	AB0011, 7141-23
Test Model No:	AB0011
Remark: All above models are identical in the same PCB layout, interior structure and electrical circuits. The differences are color and model name for commercial purpose.	
Serial No.:	AB0011
Test sample(s) ID:	GTS201805000139-1
Sample(s) Status	Engineer sample
Hardware:	wirelesscharging-08
Software:	leader.1804.01
Operation Frequency:	111.5kHz ~ 205KHz
Number of Frequency:	19 Channels
Modulation type:	MSK
Antenna Type:	Inductive loop coil Antenna
Antenna gain:	0dBi
Power supply:	Total Input: DC 5V/2A Wireless Input/ Output: DC 5V 1A/0.7A Cable Output: DC 5V/1A

Operation Frequency each of channel

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	0.1115	06	0.140	11	0.165	16	0.190
02	0.120	07	0.145	12	0.170	17	0.195
03	0.125	08	0.150	13	0.175	18	0.200
04	0.130	09	0.155	14	0.180	19	0.205
05	0.135	10	0.160	15	0.185		

Test channel	Frequency (MHz)
CH01	0.175MHz

5.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode
Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.	

5.3 Description of Support Units

Manufacturer	Description	Model	Serial Number	FCC Approval
SAMSUNG	Mobile Phone	S7EDGE	R28H835BJ2B	DOC
APPLE	USB Charger	A1399	N/A	DOC

5.4 Test Facility

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

● **FCC —Registration No.: 381383**

Global United Technology Services 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 files. Registration 381383, January 08, 2018.

● **Industry Canada (IC) —Registration No.: 9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, August 15, 2016

5.5 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.
No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102
Tel: 0755-27798480
Fax: 0755-27798960

5.6 Other Information Requested by the Customer

None.

6 Test Instruments list

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July 03 2015	July 02 2020
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June 28 2017	June 27 2018
4	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June 28 2017	June 27 2018
5	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June 28 2017	June 27 2018
6	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 28 2017	June 27 2018
7	Horn Antenna	ETS-LINDGREN	3160	GTS217	June 28 2017	June 27 2018
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
9	Coaxial Cable	GTS	N/A	GTS213	June 28 2017	June 27 2018
10	Coaxial Cable	GTS	N/A	GTS211	June 28 2017	June 27 2018
11	Coaxial cable	GTS	N/A	GTS210	June 28 2017	June 27 2018
12	Coaxial Cable	GTS	N/A	GTS212	June 28 2017	June 27 2018
13	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June 28 2017	June 27 2018
14	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	June 28 2017	June 27 2018
15	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 28 2017	June 27 2018
16	Band filter	Amindeon	82346	GTS219	June 28 2017	June 27 2018
17	Power Meter	Anritsu	ML2495A	GTS540	June 28 2017	June 27 2018
18	Power Sensor	Anritsu	MA2411B	GTS541	June 28 2017	June 27 2018
19	Loop Antenna	Zhinan	ZN30900A	GTS215	June. 28 2017	June. 27 2018

Conducted Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.16 2014	May.15 2019
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June 28 2017	June 27 2018
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June 28 2017	June 27 2018
4	Artificial Mains Network	SCHWARZBECK MESS	NSLK8127	GTS226	June 28 2017	June 27 2018
5	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Thermo meter	KTJ	TA328	GTS233	June 28 2017	June 27 2018

General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Barometer	ChangChun	DYM3	GTS257	June 28 2017	June 27 2018

7 Test results and Measurement Data

7.1 Antenna requirement:

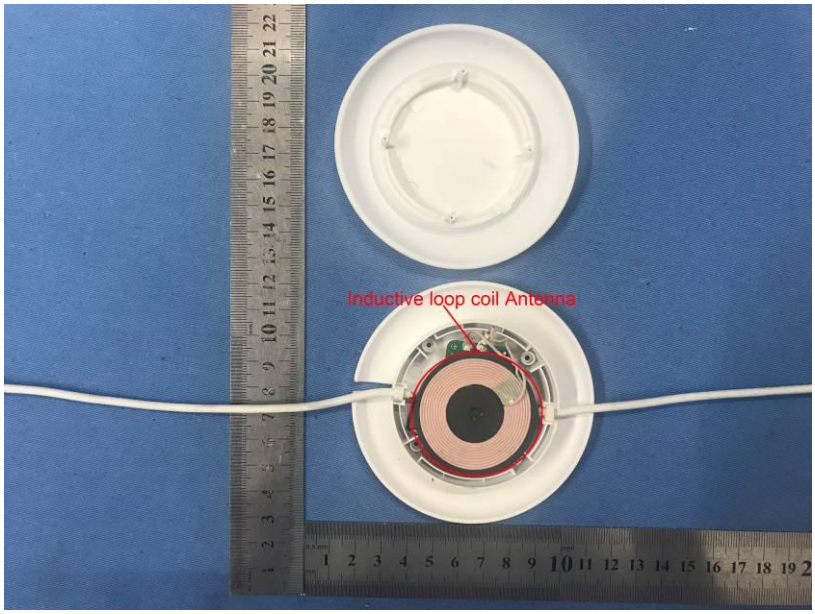
Standard requirement:	FCC Part15 C Section 15.203

15.203 requirement:

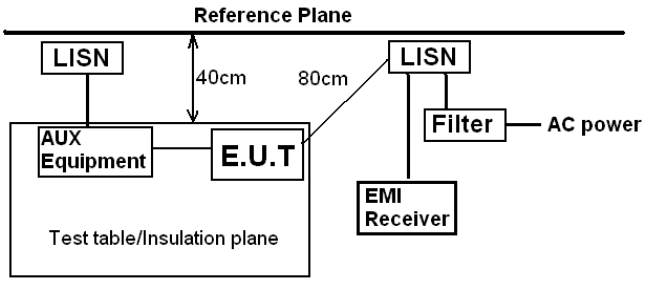
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna:

The antenna is Inductive loop coil Antenna, the best case gain of the antenna is 0dBi.

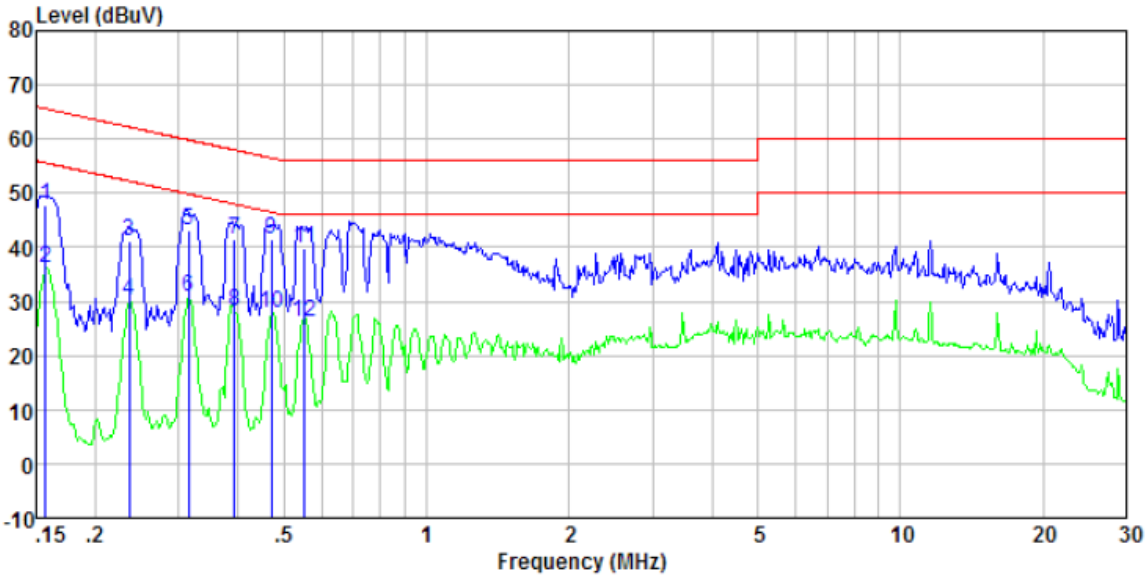


7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2013
Test Frequency Range:	150KHz to 30MHz
Class / Severity:	Class B
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto
Limit:	Frequency range (MHz) / Limit (dBuV): Quasi-peak / Average 0.15-0.5: 66 to 56* / 56 to 46* 0.5-5: 56 / 46 5-30: 60 / 50 * Decreases with the logarithm of the frequency.
Test setup:	 *Remark:* *E.U.T: Equipment Under Test* *LISN: Line Impedence Stabilization Network* *Test table height=0.8m*
Test procedure:	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

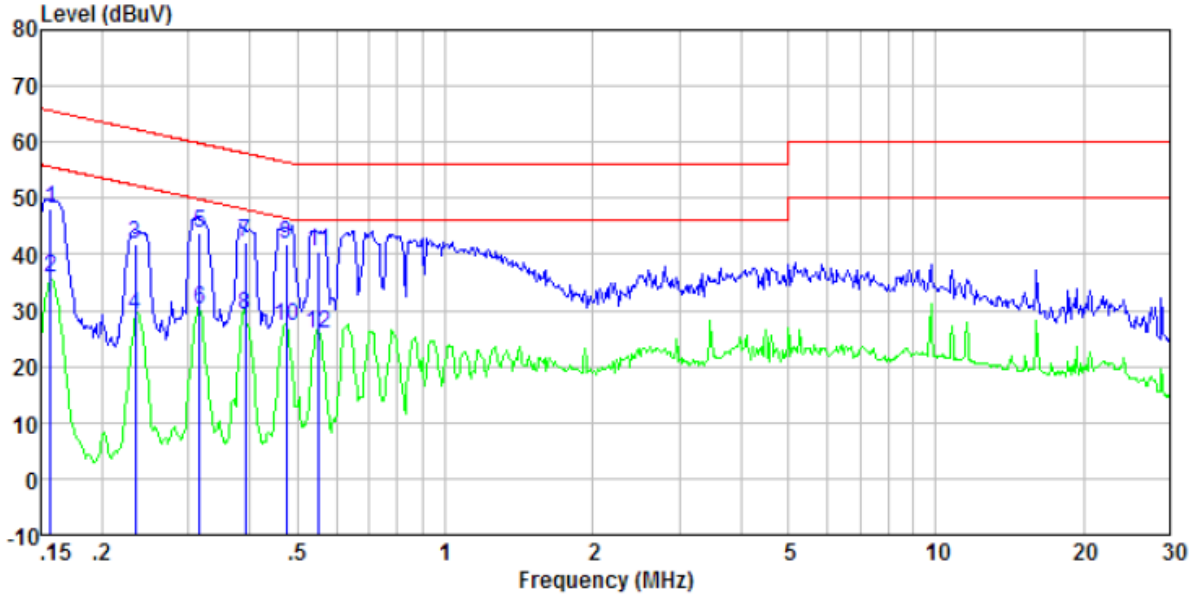
Measurement data:

Line:



Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.16	47.31	0.40	0.08	47.79	65.60	-17.81	QP
0.16	35.60	0.40	0.08	36.08	55.60	-19.52	Average
0.24	40.80	0.40	0.11	41.31	62.26	-20.95	QP
0.24	29.52	0.40	0.11	30.03	52.26	-22.23	Average
0.31	42.79	0.39	0.10	43.28	59.84	-16.56	QP
0.31	30.30	0.39	0.10	30.79	49.84	-19.05	Average
0.39	41.03	0.35	0.11	41.49	57.99	-16.50	QP
0.39	27.86	0.35	0.11	28.32	47.99	-19.67	Average
0.47	40.94	0.32	0.11	41.37	56.49	-15.12	QP
0.47	27.45	0.32	0.11	27.88	46.49	-18.61	Average
0.55	39.31	0.30	0.12	39.73	56.00	-16.27	QP
0.55	25.65	0.30	0.12	26.07	46.00	-19.93	Average

Neutral:



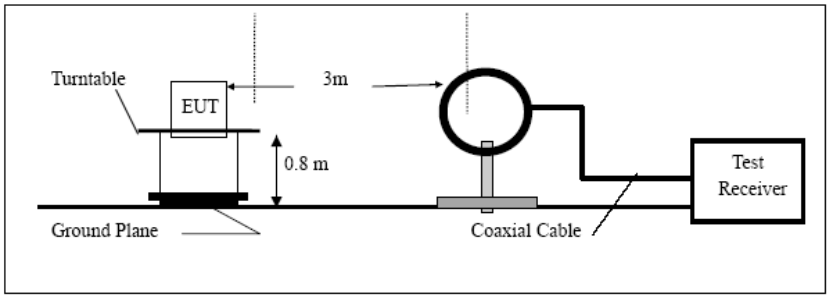
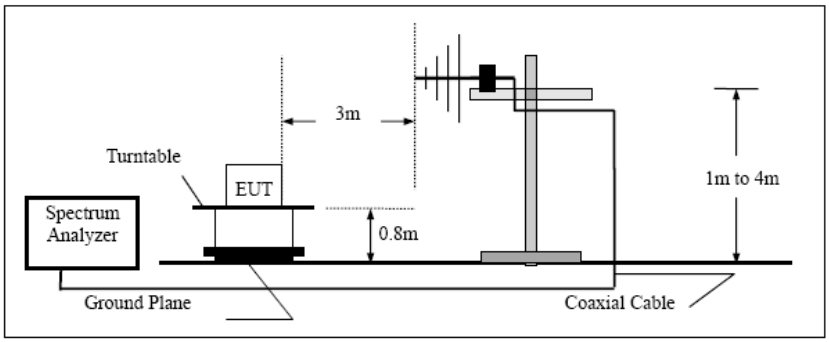
Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.16	47.52	0.40	0.08	48.00	65.60	-17.60	QP
0.16	35.33	0.40	0.08	35.81	55.60	-19.79	Average
0.23	41.32	0.40	0.11	41.83	62.30	-20.47	QP
0.23	28.70	0.40	0.11	29.21	52.30	-23.09	Average
0.32	43.27	0.39	0.10	43.76	59.80	-16.04	QP
0.32	29.72	0.39	0.10	30.21	49.80	-19.59	Average
0.39	41.71	0.36	0.11	42.18	58.03	-15.85	QP
0.39	28.68	0.36	0.11	29.15	48.03	-18.88	Average
0.47	41.39	0.32	0.11	41.82	56.45	-14.63	QP
0.47	26.87	0.32	0.11	27.30	46.45	-19.15	Average
0.55	39.95	0.30	0.12	40.37	56.00	-15.63	QP
0.55	25.30	0.30	0.12	25.72	46.00	-20.28	Average

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level =Receiver Read level + LISN Factor + Cable Loss
4. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

7.3 Spurious Emission

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.209</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2013</td></tr>
<tr><td>Test Frequency Range:</td><td>9kHz to 1GHz</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Remark</th></tr>
<tr><td>9kHz- 30MHz</td><td>Quasi-peak</td><td>10kHz</td><td>30kHz</td><td>Quasi-peak Value</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120kHz</td><td>300kHz</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td>Peak</td><td>1MHz</td><td>10Hz</td><td>Average Value</td></tr>
</table>
Remark: For the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission test in these three bands are based on measurements employing an average detector.
</td></tr>
<tr><td>Limit:
(Spurious Emissions)</td><td>
Limits for frequency below 30MHz
<table>
<tr><th>Frequency</th><th>Limit (uV/m)</th><th>Measurement Distance(m)</th><th>Remark</th></tr>
<tr><td>0.009-0.490</td><td>2400/F(kHz)</td><td>300</td><td>Quasi-peak Value</td></tr>
<tr><td>0.490-1.705</td><td>24000/F(kHz)</td><td>30</td><td>Quasi-peak Value</td></tr>
<tr><td>1.705-30</td><td>30</td><td>30</td><td>Quasi-peak Value</td></tr>
</table>
Limits for frequency Above 30MHz
<table>
<tr><th>Frequency</th><th>Limit (dBuV/m @3m)</th><th>Remark</th></tr>
<tr><td>30MHz-88MHz</td><td>40.00</td><td>Quasi-peak Value</td></tr>
<tr><td>88MHz-216MHz</td><td>43.50</td><td>Quasi-peak Value</td></tr>
<tr><td>216MHz-960MHz</td><td>46.00</td><td>Quasi-peak Value</td></tr>
<tr><td>960MHz-1GHz</td><td>54.00</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>54.00</td><td>Average Value</td></tr>
<tr><td>74.00</td><td>Peak Value</td></tr>
</table>
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.
</td></tr>
<tr><td>Test Procedure:</td><td>
1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10dB lower than the
</td></tr>
</table>

	limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. 7. The radiation measurements are performed in X, Y, Z axis positioning. And found the Y axis positioning which it is worse case, only the test worst case mode is recorded in the report.
Test setup:	Below 30MHz  30MHz ~ 1000MHz 
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

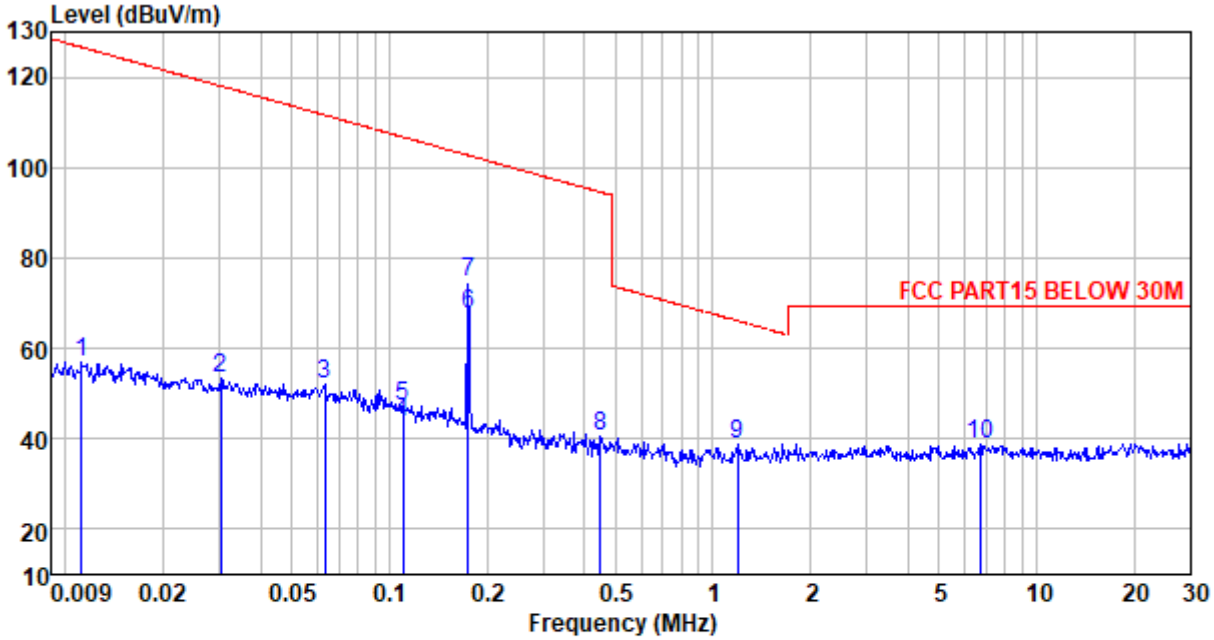
Measurement data:

Measurement data:

Note: Limit dBuV/m @3m = Limit dBuV/m @300m+ 80

Limit dBuV/m @3m = Limit dBuV/m @30m + 40

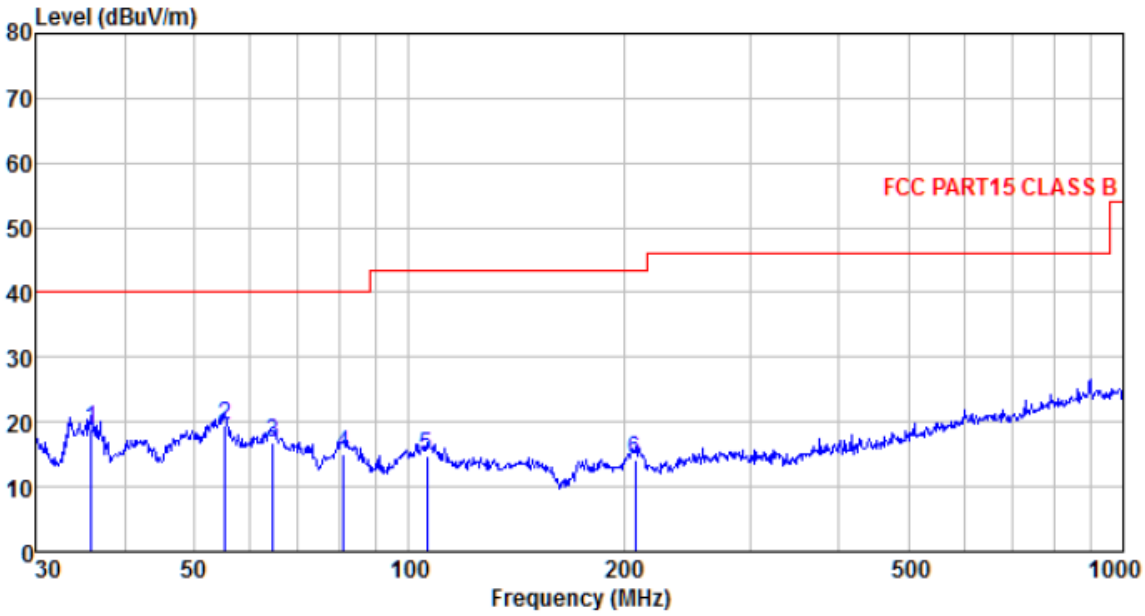
9 kHz~30 MHz



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
0.011	35.04	21.72	0.02	0.00	56.78	126.61	-69.83	Peak
0.030	33.15	19.97	0.08	0.00	53.20	118.02	-64.82	Peak
0.063	29.43	22.44	0.13	0.00	52.00	111.61	-59.61	Peak
0.110	19.39	24.12	0.17	0.00	43.68	106.78	-63.10	Average
0.110	22.71	24.12	0.17	0.00	47.00	106.78	-59.78	Peak
0.175	45.02	22.54	0.20	0.00	67.76	102.73	-34.97	Average
0.175	52.09	22.54	0.20	0.00	74.83	102.73	-27.90	Peak
0.449	19.27	20.85	0.27	0.00	40.39	94.56	-54.17	Peak
1.189	17.65	20.93	0.34	0.00	38.92	66.11	-27.19	Peak
6.689	15.68	22.83	0.46	0.00	38.97	69.54	-30.57	Peak

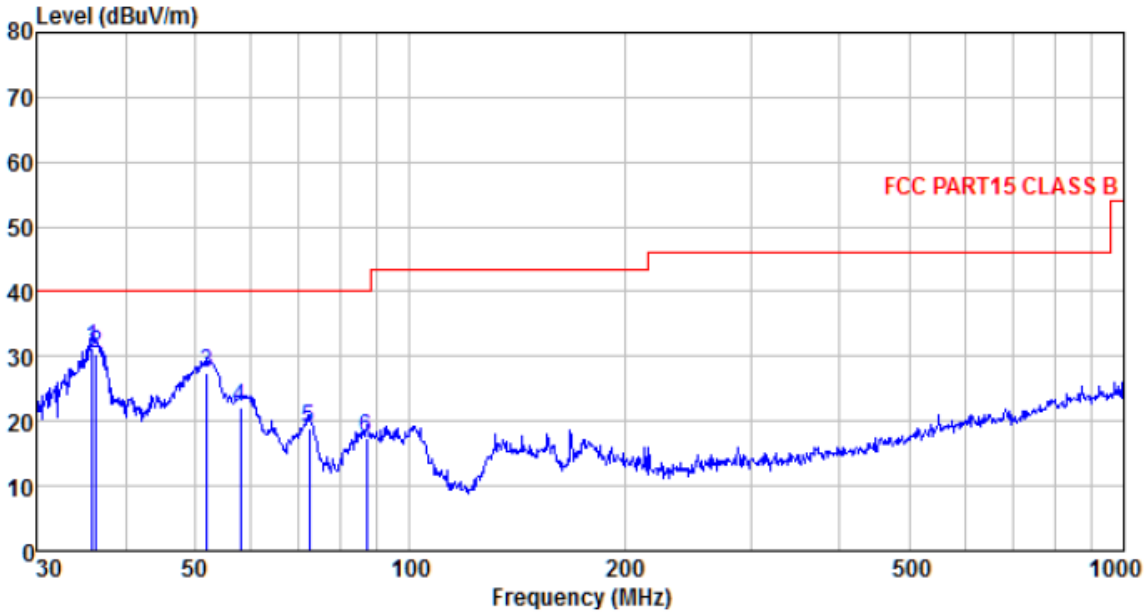
30MHz~1GHz

Horizontal



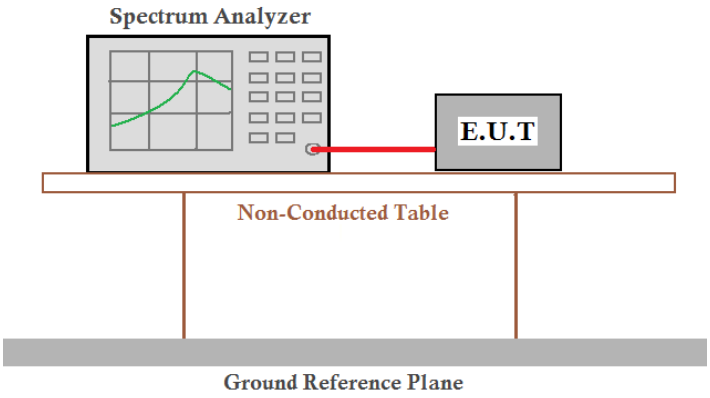
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
35.875	42.24	11.49	0.62	35.41	18.94	40.00	-21.06	QP
55.221	43.04	11.78	0.82	36.26	19.38	40.00	-20.62	QP
64.433	42.65	9.57	0.90	36.38	16.74	40.00	-23.26	QP
80.927	42.96	7.65	1.04	36.56	15.09	40.00	-24.91	QP
106.013	38.73	11.52	1.25	36.77	14.73	43.50	-28.77	QP
207.123	38.91	10.69	1.88	37.34	14.14	43.50	-29.36	QP

Vertical

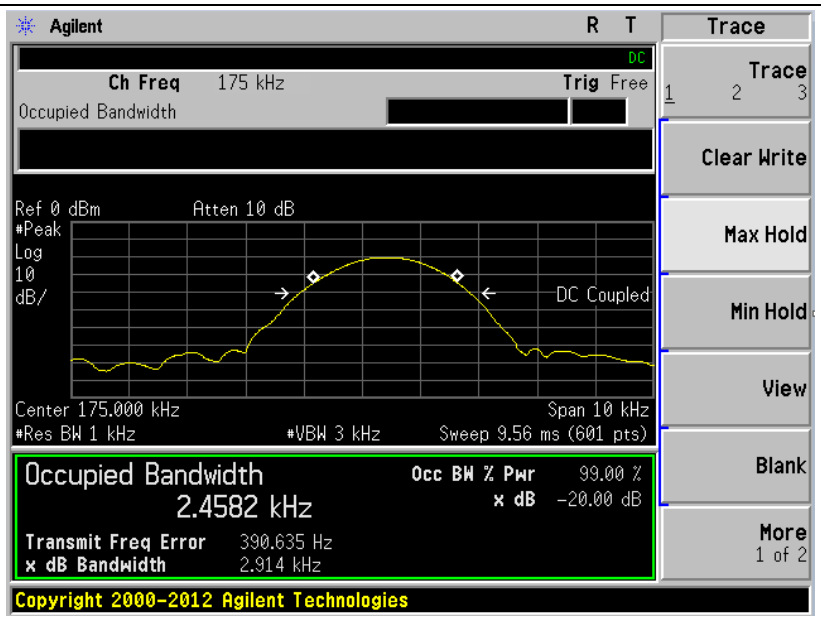


Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV	dBuV/m	dB	
35.875	54.61	11.49	0.62	35.41	31.31	40.00	-8.69	QP
36.381	53.79	11.58	0.62	35.45	30.54	40.00	-9.46	QP
52.025	50.74	12.07	0.79	36.21	27.39	40.00	-12.61	QP
57.999	46.20	11.50	0.84	36.30	22.24	40.00	-17.76	QP
72.338	47.07	7.48	0.96	36.47	19.04	40.00	-20.96	QP
87.112	43.36	9.68	1.09	36.61	17.52	40.00	-22.48	QP

7.4 20dB Occupy Bandwidth

Test Requirement:	FCC Part15 C Section 15.215
Test Method:	ANSI C63.10:2013
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

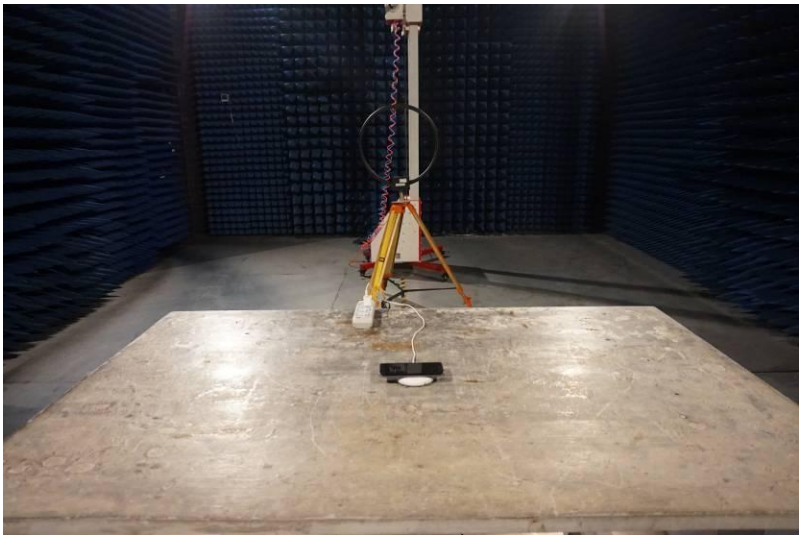
Measurement Data

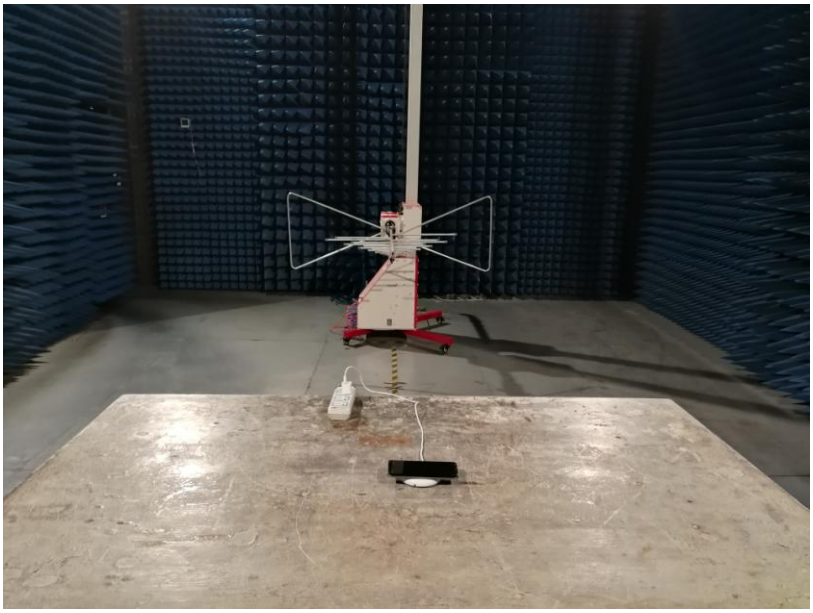


175kHz: 20dB BW=2.914kHz

8 Test Setup Photo

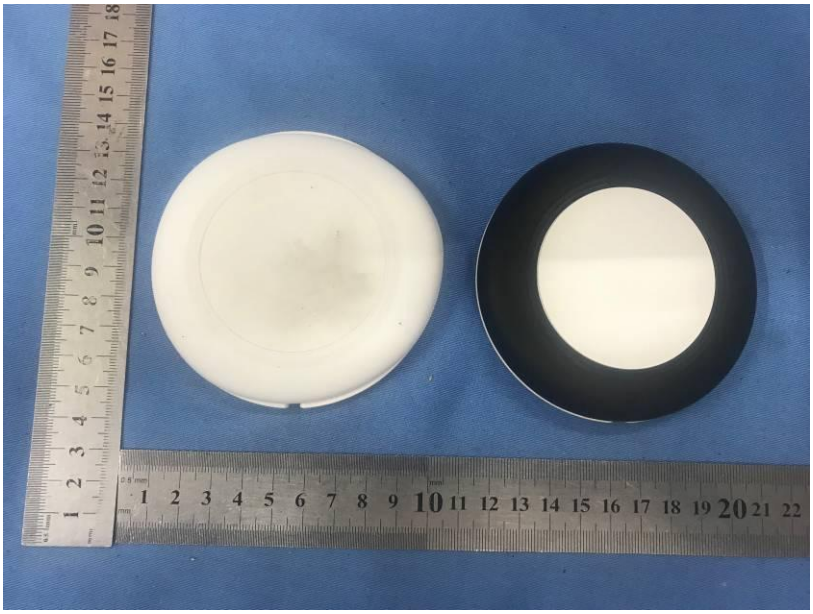
Radiated Emission

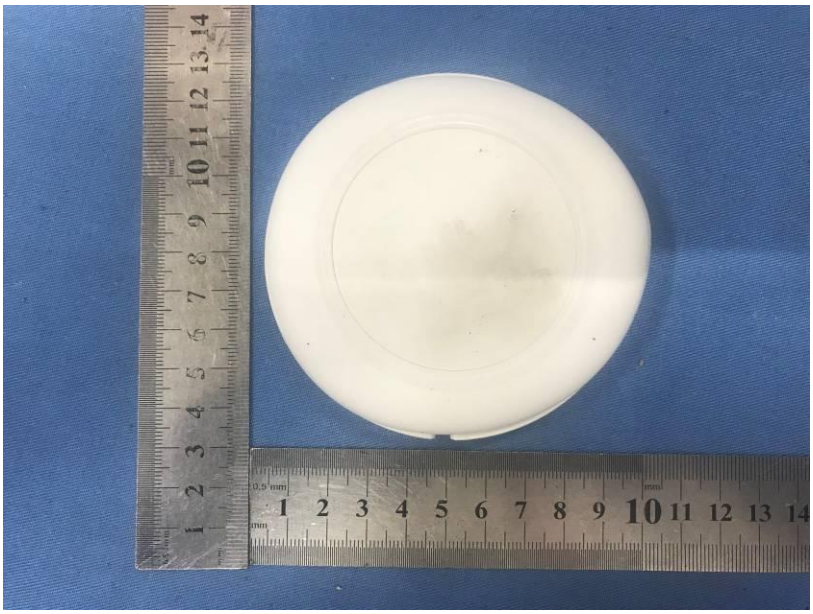


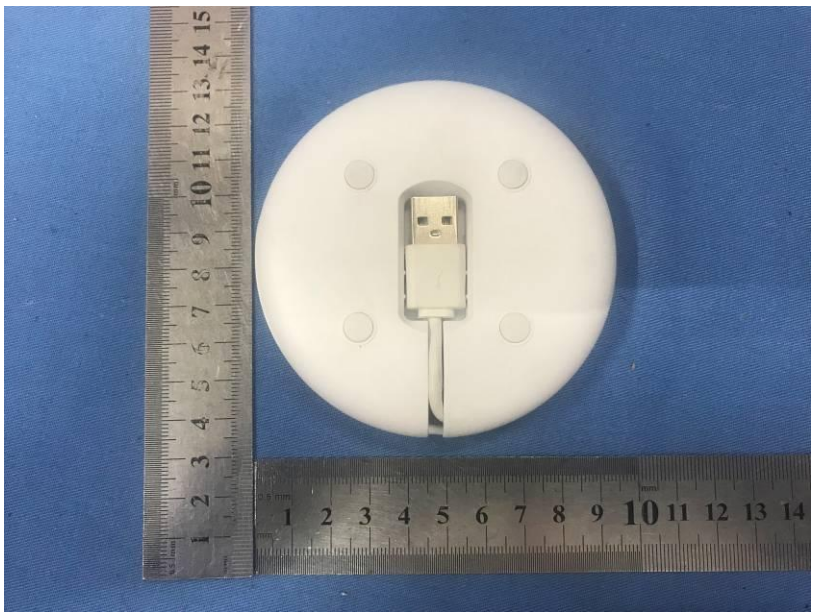


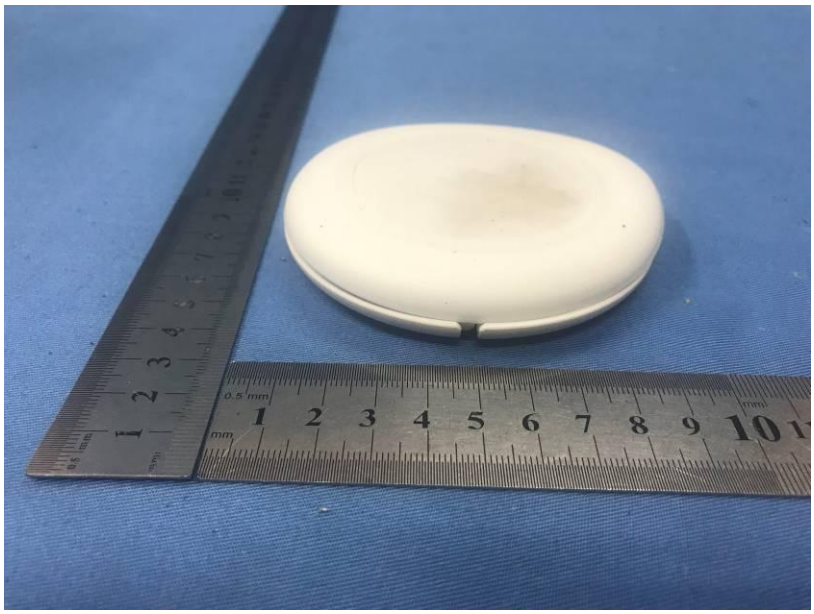
Conducted Emission

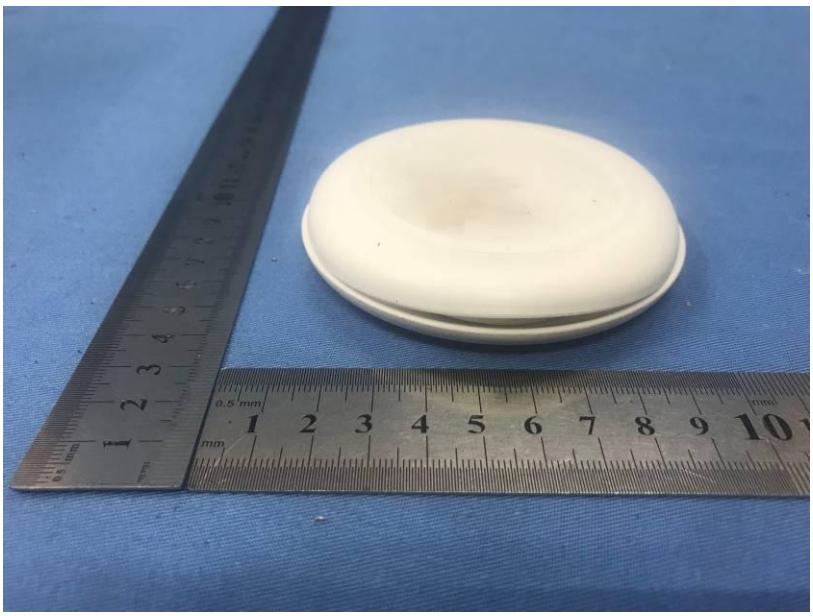
9 EUT Constructional Details

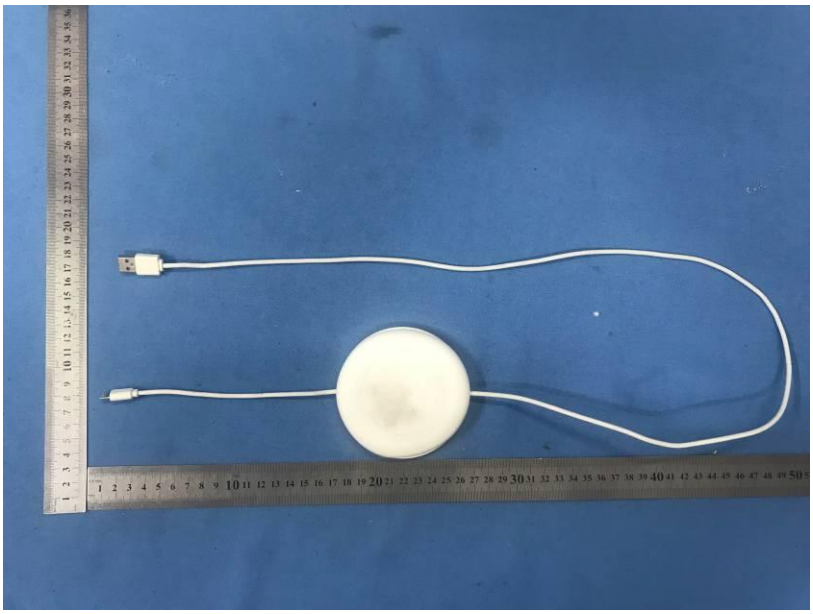


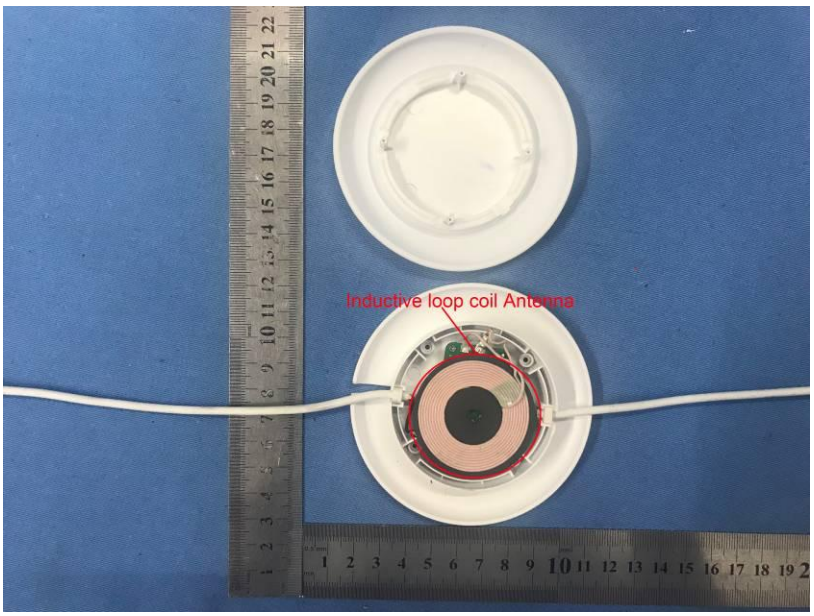


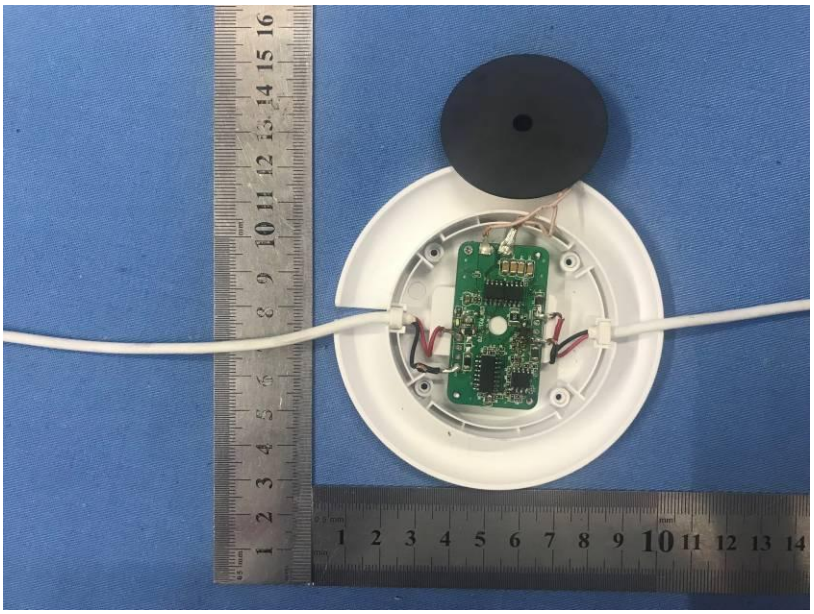


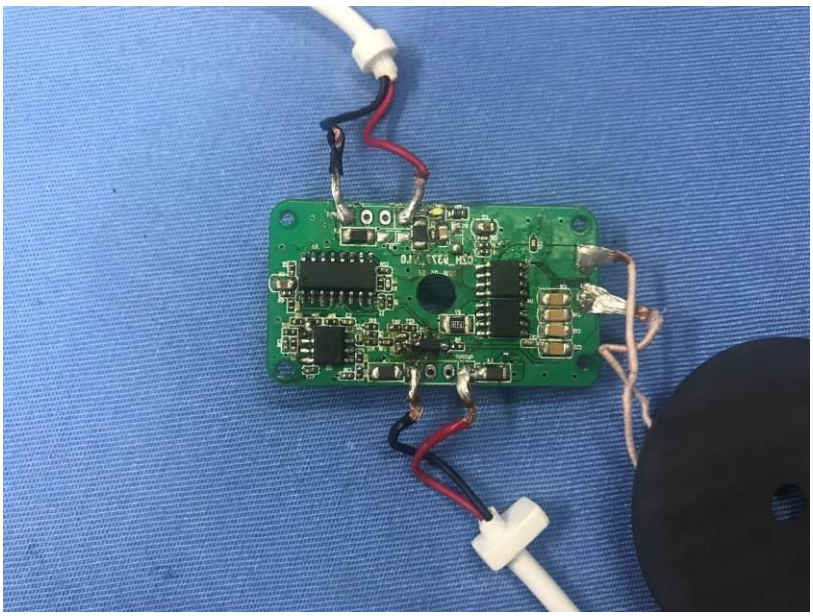


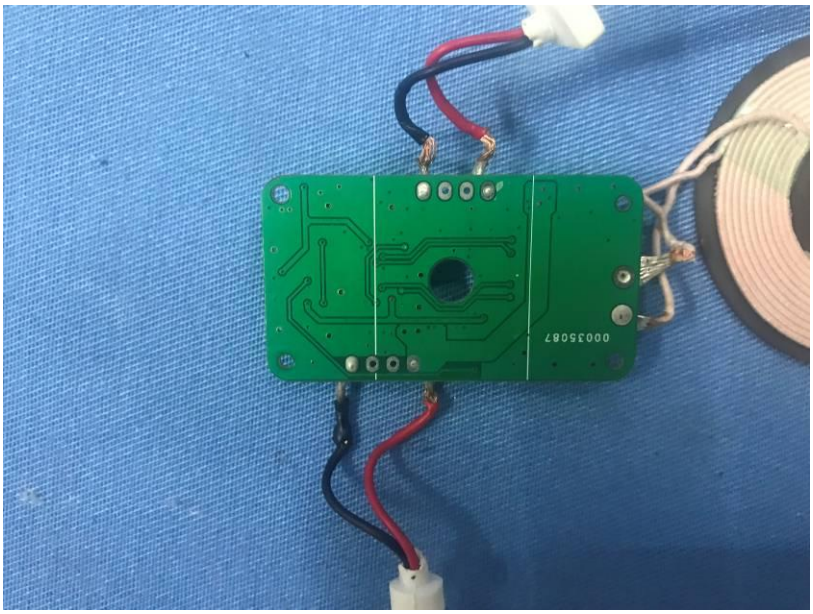





Inductive loop coil Antenna







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