



FCC TEST REPORT

FCC ID: 2AP2N-SILIPAD

On Behalf of

Shenzhen Esorun Technology Co., LTD

3 Coils Wireless Charger

Model No.: Sili Pad II, Sili Pad III

Prepared for : Shenzhen Esorun Technology Co., LTD
Address : 425(E02), No. 5 Golf Avenue, Guangpei Community, Guanlan
Street, Longhua District, Shenzhen, China

Prepared By : Shenzhen Alpha Product Testing Co., Ltd.
Address : Building i, No.2, Lixin Road, Fuyong Street, Bao'an District,
518103, Shenzhen, Guangdong, China

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TEST REPORT DECLARATION

Applicant : Shenzhen Esorun Technology Co., LTD
 Address : 425(E02), No. 5 Golf Avenue, Guangpei Community, Guanlan Street, Longhua District, Shenzhen, China
 Manufacturer : Shenzhen Esorun Technology Co., LTD
 Address : 425(E02), No. 5 Golf Avenue, Guangpei Community, Guanlan Street, Longhua District, Shenzhen, China
 EUT Description : 3 Coils Wireless Charger
 (A) Model No. : Sili Pad II, Sili Pad III
 (B) Trademark : ESORUN

Measurement Standard Used:
FCC CFR Title 47 Part 15 Subpart C Section 15.209

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed full responsibility for the accuracy and completeness of test. Also, this report shows that the EUT is technically compliant with the FCC CFR Title 47 Part 15 Subpart C Section 15.209 requirements.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

Tested by (name + signature).....: Lucas Pang
 Project Engineer



Approved by (name + signature).....: Simple Guan
 Project Manager



Date of issue.....: September 2, 2020

Revision History

Revision	Issue Date	Revisions	Revised By
V0	September 2, 2020	Initial released Issue	Simple Guan

1. Test Result Summary

Requirement	CFR 47 Section	Result
Antenna requirement	§15.203	PASS
AC Power Line Conducted Emission	§15.207	PASS
Spurious Emission	§15.209(a)(f)	PASS
Occupied Bandwidth	§15.215 (c)	PASS

Note:

1. *PASS: Test item meets the requirement.*
2. *Fail: Test item does not meet the requirement.*
3. *N/A: Test case does not apply to the test object.*
4. *The test result judgment is decided by the limit of test standard.*

2. General Information

2.1. Description of Device (EUT)

EUT Name	:	3 Coils Wireless Charger
Model No.	:	Sili Pad II, Sili Pad III
DIFF.	:	There is no difference between the models except the appearance color. So all the test were performed on the model Sili Pad II.
Trademark	:	ESORUN
Power supply	:	USB Type-C Input: 12V/1.67A, 9V/2A, 9V/1.34A, 5V/2A Wireless Output: 15W, 10W, 7.5W, 5W
Operation frequency	:	125-205KHz
Modulation	:	MSK
Antenna Type	:	Coil Antenna, Maximum Gain is 4dBi(This value is supplied by applicant).
Connector cable loss	:	0.5dB (This value is supplied by applicant).

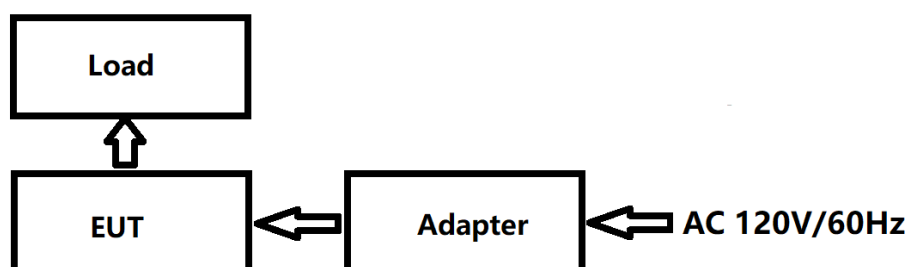
2.2. Accessories of Device (EUT)

Accessories1 : /
 Manufacturer : /
 Model : /
 Ratings : /

2.3. Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number	Certification or SDOC
1	Load	--	--	--	--
2	Adapter	YIBOYUAN	QC08	--	--

2.4. Block Diagram of connection between EUT and simulators



2.5. Description of Test Modes

Channel	Frequency (KHz)	Channel	Frequency (KHz)	Channel	Frequency (KHz)	Channel	Frequency (KHz)
1	125	6	150	11	175	16	200
2	130	7	155	12	180	17	205
3	135	8	160	13	185	18	
4	140	9	165	14	190	19	
5	145	10	170	15	195	20	

Note: Pre-San all output power mode, and only worst data listed in report.

2.6. Test Conditions

Items	Required	Actual
Temperature range:	15-35°C	26°C
Humidity range:	25-75%	54%
Pressure range:	86-106kPa	980kPa

2.7. Test Facility

Shenzhen Alpha Product Testing Co., Ltd

Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen, Guangdong, China

June 21, 2018 File on Federal Communication Commission

Registration Number: 293961

September 15, 2019 Certificated by IC

Registration Number: CN0085

2.8. Measurement Uncertainty

(95% confidence levels, k=2)

Item	MU	Remark
Uncertainty for Conducted Emission Test	2.74dB	
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	2.13 dB	Polarize: V
	2.57dB	Polarize: H
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.77dB	Polarize: V
	3.80dB	Polarize: H
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	4.13dB	Polarize: H
	4.16dB	Polarize: V
Uncertainty for radio frequency	5.4×10^{-8}	
Uncertainty for conducted RF Power	0.37dB	

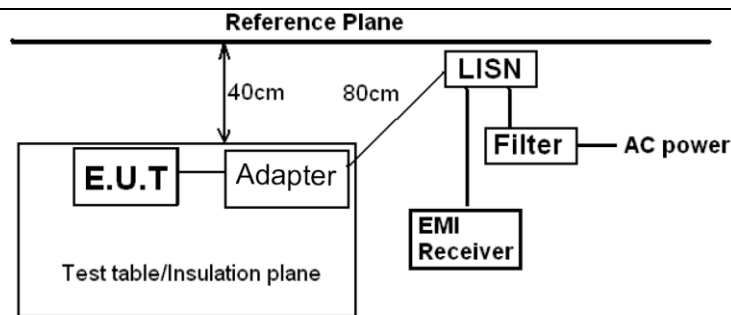
2.9. Test Equipment List

Equipment	Manufacture	Model No.	Serial No.	Last cal.	Cal Interval
9*6*6 anechoic chamber	CHENYU	9*6*6	N/A	2019.09.06	3Year
Spectrum analyzer	ROHDE&SC HWARZ	FSV40-N	102137	2019.09.05	1Year
Spectrum analyzer	Agilent	N9020A	MY499100060	2019.09.05	1Year
Receiver	ROHDE&SC HWARZ	ESR	1316.3003K03-10 2082-Wa	2019.09.06	1Year
Receiver	R&S	ESCI	101165	2019.09.05	1Year
Bilog Antenna	Schwarzbeck	VULB 9168	VULB9168-438	2019.09.07	2Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D(1201)	2020.04.12	2Year
Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00059	2019.09.07	2Year
Cable	Resenberger	N/A	No.1	2019.09.05	1Year
Cable	Resenberger	N/A	No.2	2019.09.05	1Year
Cable	Resenberger	N/A	No.3	2019.09.05	1Year
Pre-amplifier	HP	HP8347A	2834A00455	2019.09.05	1Year
Pre-amplifier	Agilent	8449B	3008A02664	2019.09.05	1Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	8126466	2019.09.05	1Year
L.I.S.N.#2	ROHDE&SC HWARZ	ENV216	101043	2019.09.05	1 Year
20db Attenuator	ICPROBING	IATS1	82347	2019.08.26	1 Year
Horn Antenna	SCHWARZBECK	BBHA9170	00946	2019.09.07	2 Year
Preamplifier	SKET	LNPA_1840-50	SK2018101801	2019.09.06	1 Year
Power Meter	Agilent	E9300A	MY41496625	2019.09.06	1 Year
Temp. & Humid. Chamber	Weihuang	WHTH-1000-4 0-880	100631	2019.09.06	1 Year
Switching Mode Power Supply	JUNKE	JK12010S	20140927-6	2019.09.05	1 Year

3. Test Results and Measurement Data

3.1. Conducted Emission

3.1.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.207														
Test Method:	ANSI C63.10:2013														
Frequency Range:	150 kHz to 30 MHz														
Receiver setup:	RBW=9 kHz, VBW=30 kHz, Sweep time=auto														
Limits:	<table border="1"> <thead> <tr> <th rowspan="2">Frequency range (MHz)</th> <th colspan="2">Limit (dBuV)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15-0.5</td> <td>66 to 56*</td> <td>56 to 46*</td> </tr> <tr> <td>0.5-5</td> <td>56</td> <td>46</td> </tr> <tr> <td>5-30</td> <td>60</td> <td>50</td> </tr> </tbody> </table>	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
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													
Test Setup:	 <p><i>Remark</i> E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p>														
Test Mode:	Transmitting Mode														
Test Procedure:	<ol style="list-style-type: none"> 1. The E.U.T is connected to an adapter 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: 2013 on conducted measurement. 														
Test Result:	PASS														

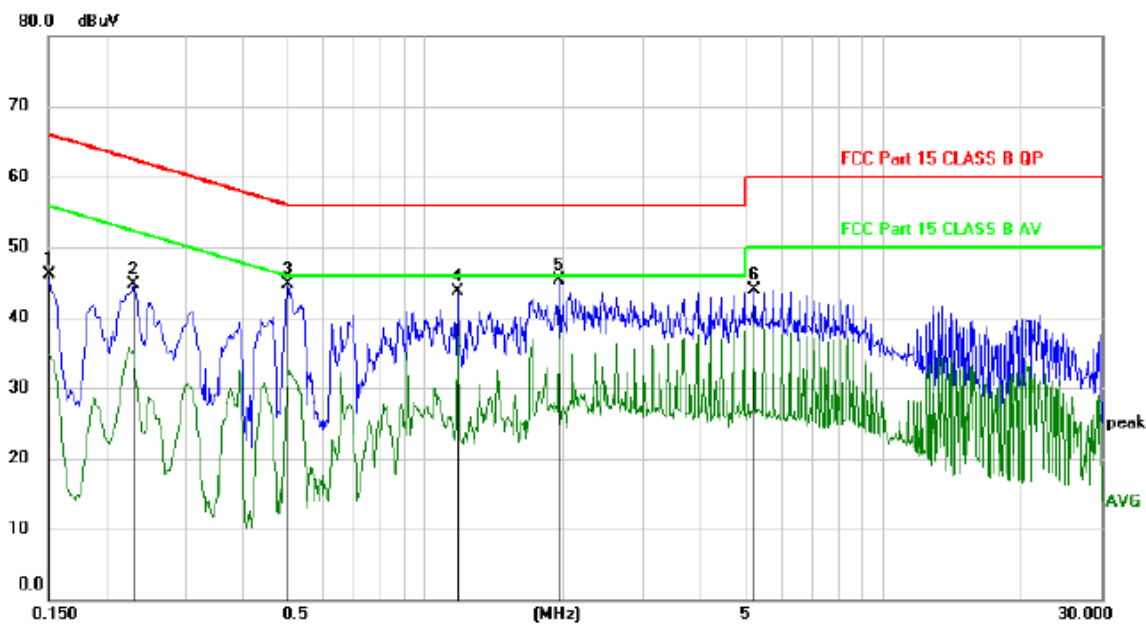
3.1.2. Test data

Please refer to following diagram for individual

Test Mode : Full load, Half load, Empty load
Test Results : PASS
Note: The test results are listed in next pages. This mode is worst case mode, so this report only reflected the worst mode. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector and quasi-peak detector need not be carried out. If the limits for the measurement with the average detector are met when using a receiver with a quasi-peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out.

Test result for Channel 125KHz, AC 120V/ 60Hz(Full Load Mode 15W)

Line:



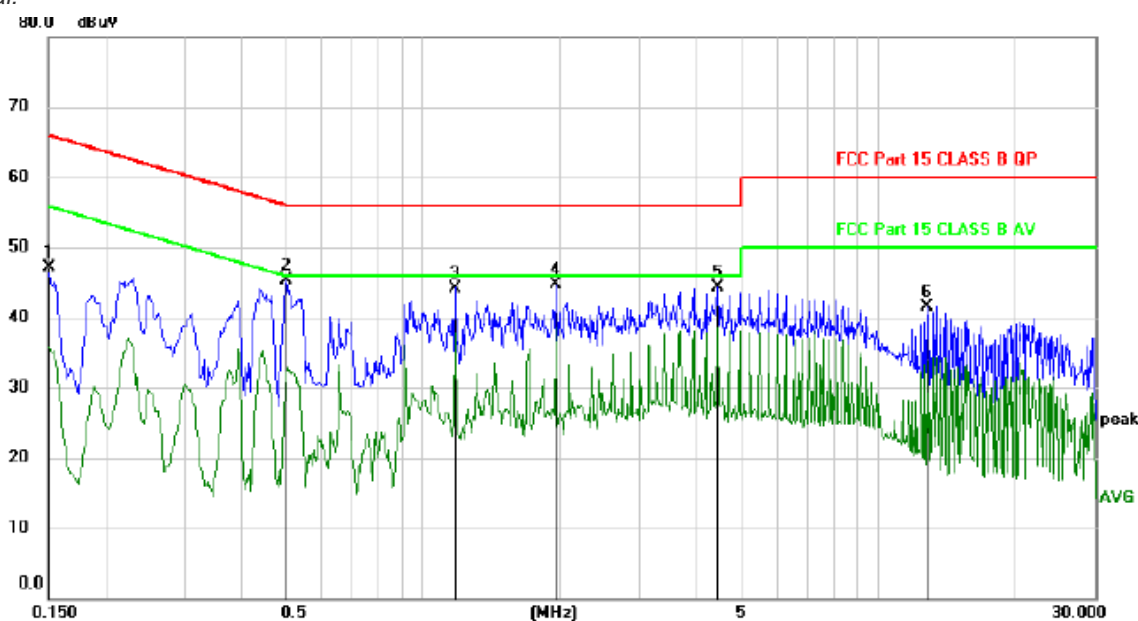
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1500	36.14	9.94	46.08	66.00	-19.92	peak	
2		0.2310	34.72	9.95	44.67	62.41	-17.74	peak	
3		0.5010	34.75	9.96	44.71	56.00	-11.29	peak	
4		1.1754	33.81	9.89	43.70	56.00	-12.30	peak	
5	*	1.9616	35.38	9.88	45.26	56.00	-10.74	peak	
6		5.2320	33.83	10.05	43.88	60.00	-16.12	peak	

*:Maximum data x:Over limit !:over margin

⟨Reference Only

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

Neutral:



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1500	37.14	9.94	47.08	66.00	-18.92	peak	
2	*	0.5010	35.25	9.96	45.21	56.00	-10.79	peak	
3		1.1754	34.31	9.89	44.20	56.00	-11.80	peak	
4		1.9616	34.88	9.88	44.76	56.00	-11.24	peak	
5		4.4489	34.40	10.00	44.40	56.00	-11.60	peak	
6		12.8490	31.31	10.28	41.59	60.00	-18.41	peak	

*:Maximum data x:Over limit !:over margin

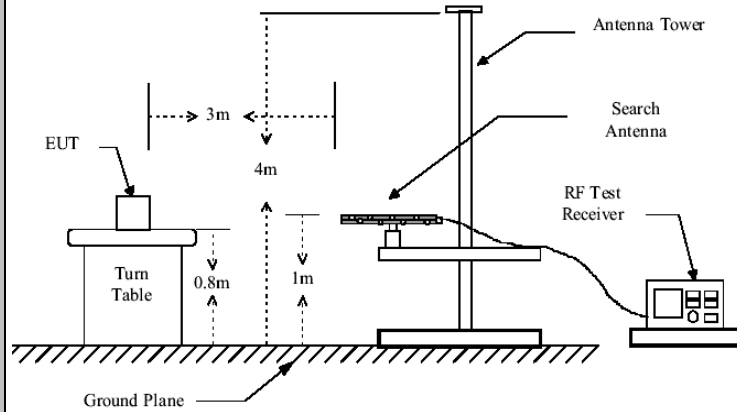
<Reference Only

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

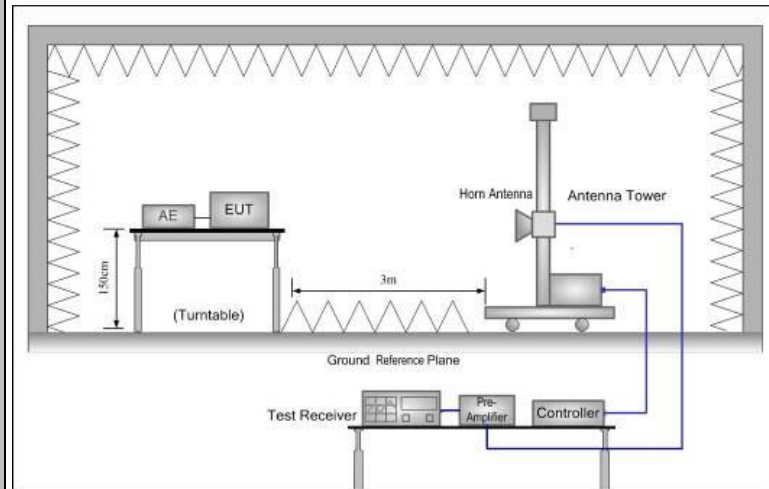
3.2. Radiated Spurious Emission Measurement

3.2.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.209					
Test Method:	ANSI C63.10: 2013					
Frequency Range:	9 kHz to 25 GHz					
Measurement Distance:	3 m					
Antenna Polarization:	Horizontal & Vertical					
Operation mode:	Refer to item 4.1					
Receiver Setup:	Frequency	Detector	RBW	VBW	Remark	
	9kHz- 150kHz	Quasi-peak	200Hz	1kHz	Quasi-peak Value	
	150kHz- 30MHz	Quasi-peak	9kHz	30kHz	Quasi-peak Value	
	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value	
	Above 1GHz	Peak	1MHz	3MHz	Peak Value	
		Peak	1MHz	10Hz	Average Value	
Limit:	Frequency	Field Strength (microvolts/meter)	Measurement Distance (meters)			
	0.009-0.490	2400/F(KHz)	300			
	0.490-1.705	24000/F(KHz)	30			
	1.705-30	30	30			
	30-88	100	3			
	88-216	150	3			
	216-960	200	3			
	Above 960	500	3			
	Frequency	Field Strength (microvolts/meter)	Measurement Distance (meters)	Detector		
	Above 1GHz	500	3	Average		
	5000	3	Peak			
Test setup:	For radiated emissions below 30MHz					
	<p>The diagram illustrates the test setup for radiated emissions below 30MHz. It shows an Equipment Under Test (EUT) on a turn table, positioned at a distance of 3 meters from a circular antenna. The antenna is mounted on a ground plane. The antenna is connected to a Pre-Amplifier, which is connected to a Receiver, which is connected to a Computer.</p>					
	30MHz to 1GHz					



Above 1GHz

**Test Procedure:**

1. For the radiated emission test below 1GHz:
The EUT was placed on a turntable with 0.8 meter above ground. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high PASS filter are used for the test in order to get better signal level.
- For the radiated emission test above 1GHz:
Place the measurement antenna on a turntable with 1.5 meter above ground, which is away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which

	<p>maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.</p> <ol style="list-style-type: none"> 2. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level 3. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported. 4. Use the following spectrum analyzer settings: <ol style="list-style-type: none"> (1) Span shall wide enough to fully capture the emission being measured; (2) Set RBW=100 kHz for $f < 1$ GHz; $VBW \geq RBW$; Sweep = auto; Detector function = peak; Trace = max hold; (3) Set RBW = 1 MHz, $VBW = 3$ MHz for $f \geq 1$ GHz for peak measurement. <p>For average measurement: $VBW = 10$ Hz, when duty cycle is no less than 98 percent. $VBW \geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.</p>
Test mode:	Refer to section 4.1 for details
Test results:	PASS

3.2.2. Test Data

Please refer to following diagram for individual

Frequency Range	: 9KHz~30MHz
Test Mode	: TX: channel low, channel mid, channel high
Test Results	: PASS
Note:	<p>1. The test results are listed in next pages.</p> <p>2. This mode is worst case mode, so this report only reflected the worst mode.</p> <p>3. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the quasi-peak detector need not be carried out.</p>

Freq.	Reading	Antenna Factor	Cable loss	Amp Factor	Result	Limit	Margin	Detect or	State
(MHz)	(dBuV/m)	dB/m	dB	dB	(dBuV/m)	(dBuV/m) at 3 m	(dB)		P/F
0.125	24.14	48.34	0.16	29.87	42.77	126.77	-84.0	PK	PASS
0.125	19.11	48.34	0.16	29.87	37.74	106.77	-69.0	AV	PASS
0.175	92.44	48.34	0.16	29.87	111.07	122.95	-11.9	PK	PASS
0.175	69.48	48.34	0.16	29.87	88.11	102.95	-14.8	AV	PASS
0.205	49.42	48.38	0.17	29.89	68.08	120.76	-52.7	PK	PASS
0.205	46.50	48.38	0.17	29.89	65.16	100.76	-35.6	AV	PASS
0.35	45.02	48.44	0.19	29.89	63.76	117.78	-54.0	PK	PASS
0.35	42.62	48.44	0.19	29.89	61.36	97.78	-36.4	AV	PASS
0.45	45.31	48.47	0.19	29.89	64.08	115.35	-51.3	PK	PASS
0.45	41.95	48.47	0.19	29.89	60.72	95.35	-34.6	AV	PASS
1.928	18.12	49.12	0.2	29.94	37.50	60	-22.5	QP	PASS
1.920	21.41	49.12	0.2	29.94	40.79	60	-19.2	QP	PASS

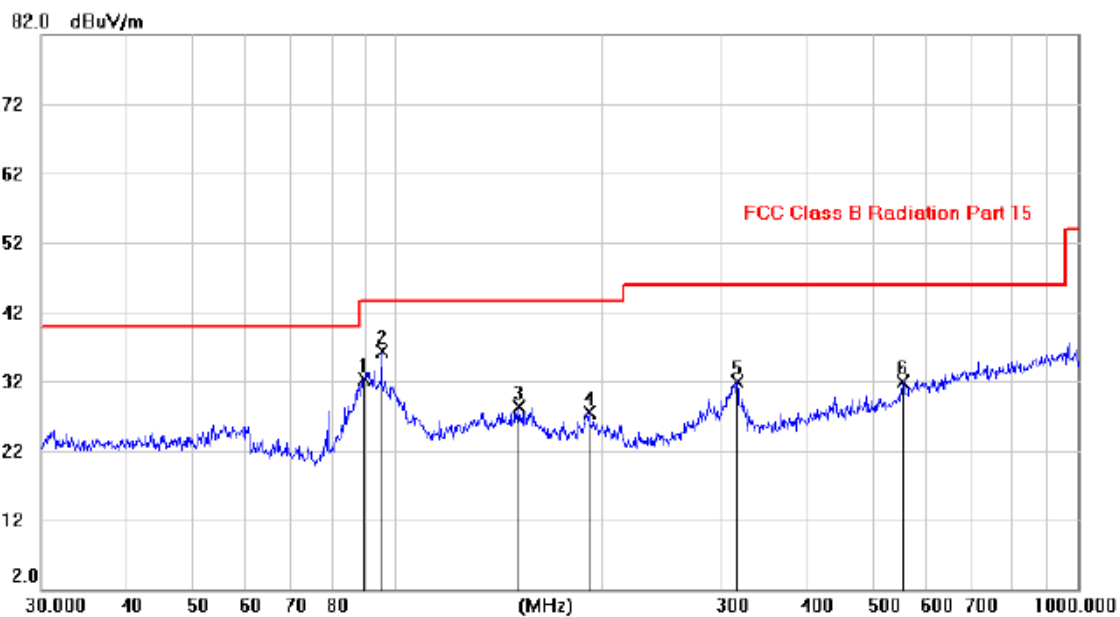
Frequency Range	: 30MHz~1000MHz
Test Mode	: Full load, Half load, Empty load
Test Results	: PASS
Note:	<p>1. The test results are listed in next pages.</p> <p>2. This mode is worst case mode, so this report only reflected the worst mode.</p> <p>3. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the quasi-peak detector need not be carried out.</p>

Frequency Range	: Above 1GHz		
EUT	: /	Test Date	: /
M/N	: /	Temperature	: /
Test Engineer	: /	Humidity	: /
Test Mode	: /		
Test Results	: N/A		
Note:	<p>1. The highest frequency of the internal sources of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz. So the frequency rang above 1GHz radiation test not applicable.</p>		

Test result for Channel 125KHz, AC 120V/ 60Hz(Full Load Mode 15W)

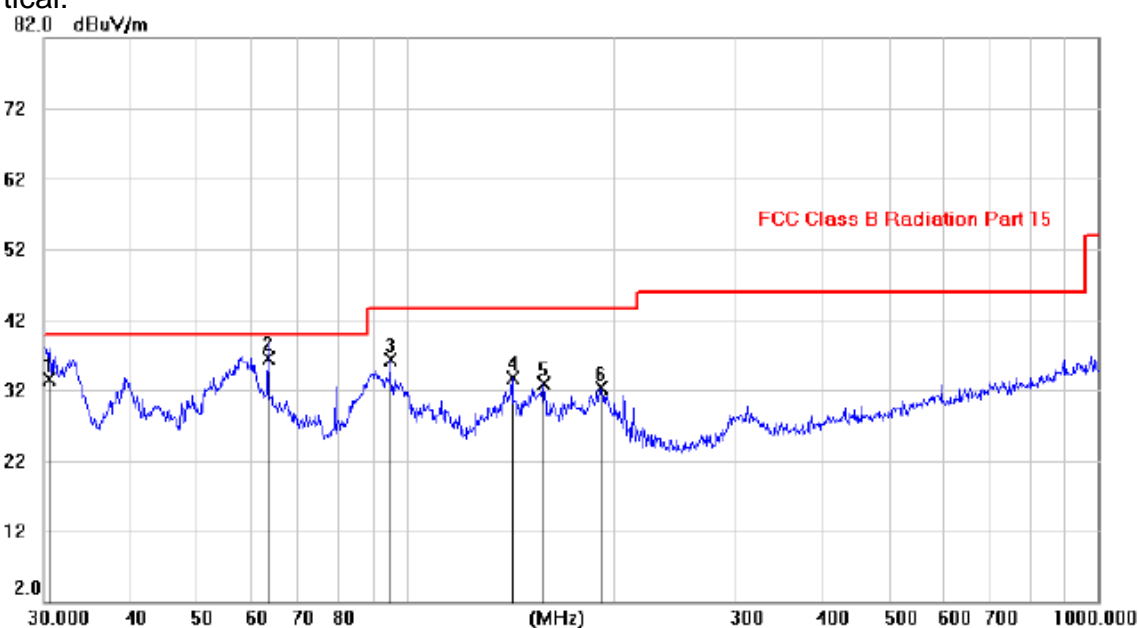
30MHz-1GHz

Horizontal:



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Antenna Height cm	Table Degree degree	Comment
1		89.3703	22.32	10.04	32.36	43.50	-11.14	peak			
2	*	94.9929	25.82	10.52	36.34	43.50	-7.16	peak			
3		151.4378	13.19	15.06	28.25	43.50	-15.25	peak			
4		191.1408	16.05	11.40	27.45	43.50	-16.05	peak			
5		316.5889	17.37	14.53	31.90	46.00	-14.10	peak			
6		554.2418	12.69	19.27	31.96	46.00	-14.04	peak			

Vertical:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		30.4665	19.89	13.55	33.44	40.00	-6.56	100	360	
2	*	63.3770	23.94	12.51	36.45	40.00	-3.55	100	0	
3		94.9261	25.89	10.51	36.40	43.50	-7.10			peak
4		142.3742	19.27	14.48	33.75	43.50	-9.75			peak
5		158.2230	17.84	15.04	32.88	43.50	-10.62			peak
6		192.2161	21.04	11.34	32.38	43.50	-11.12			peak

Note:

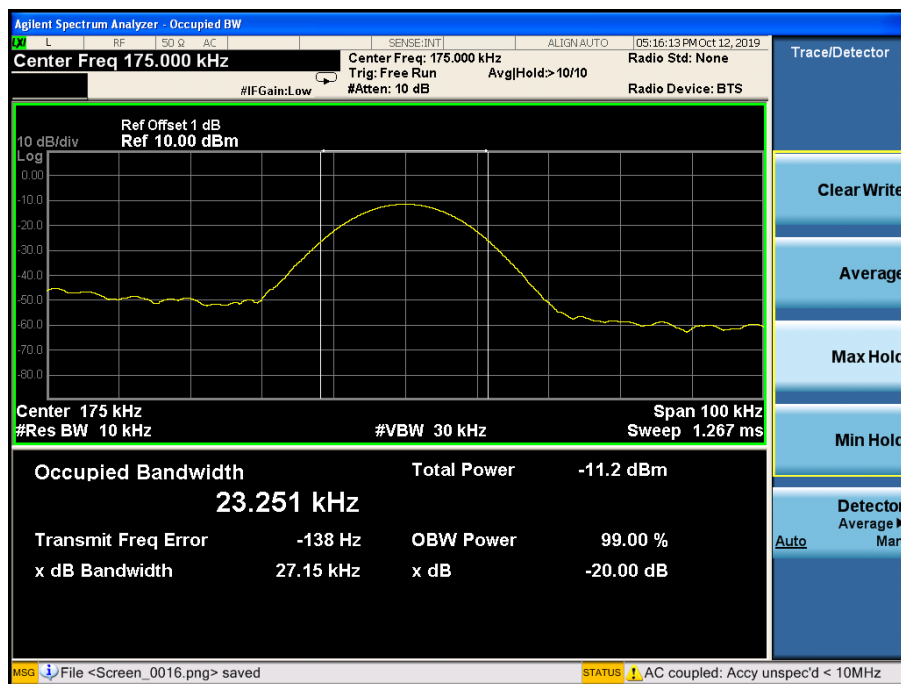
Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

3.3.2. Test data

Frequency(KHz)	20dB Occupy Bandwidth (kHz)	Limit (kHz)	Conclusion
175.0	27.15	---	PASS

Test plots as follows:

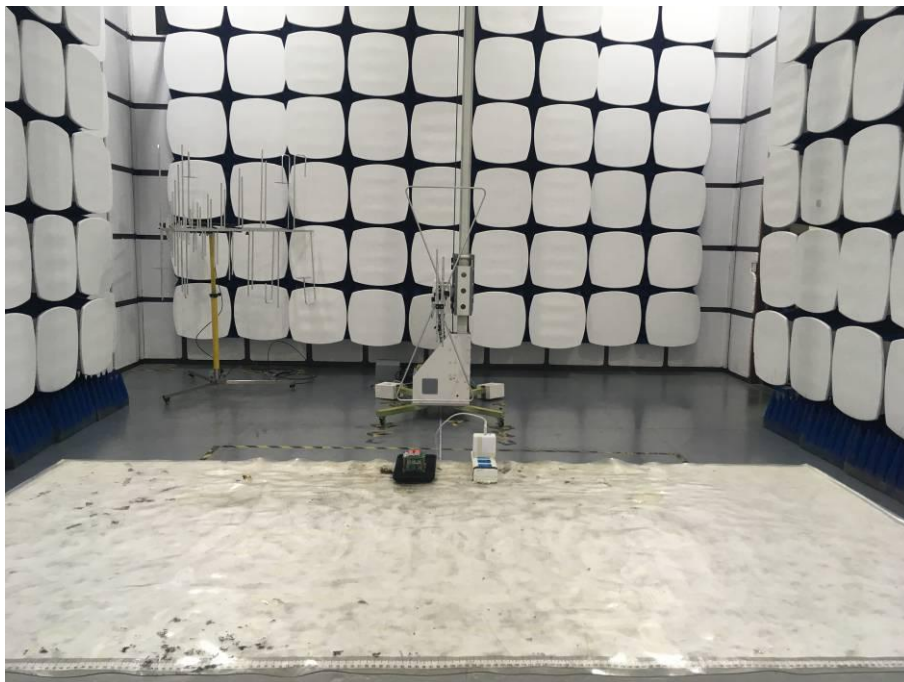
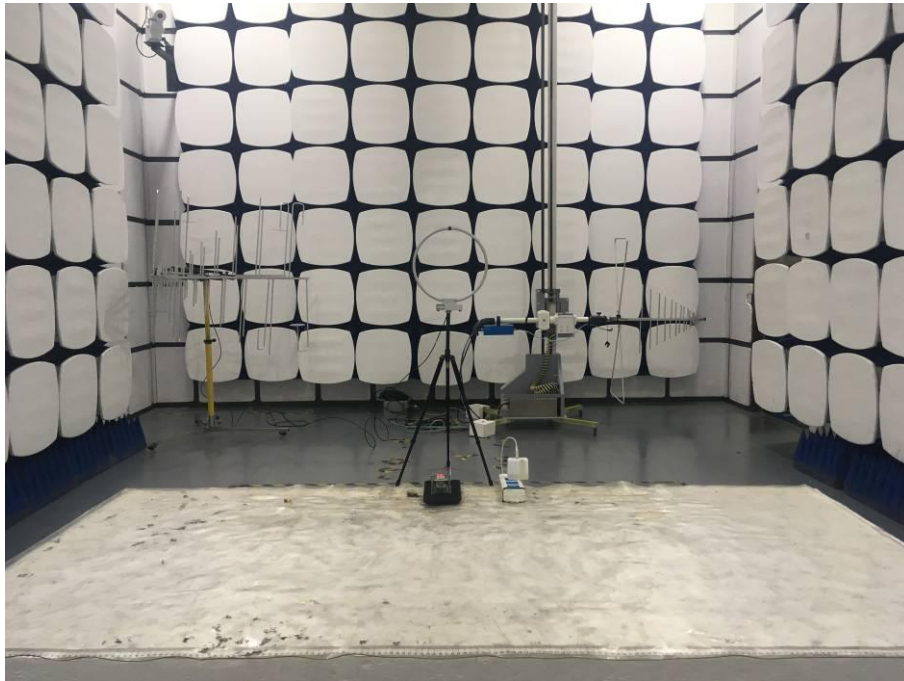
Mid channel



Note: The Bandwidth of the three coil antennas is exactly the same.

4. Photos of test setup

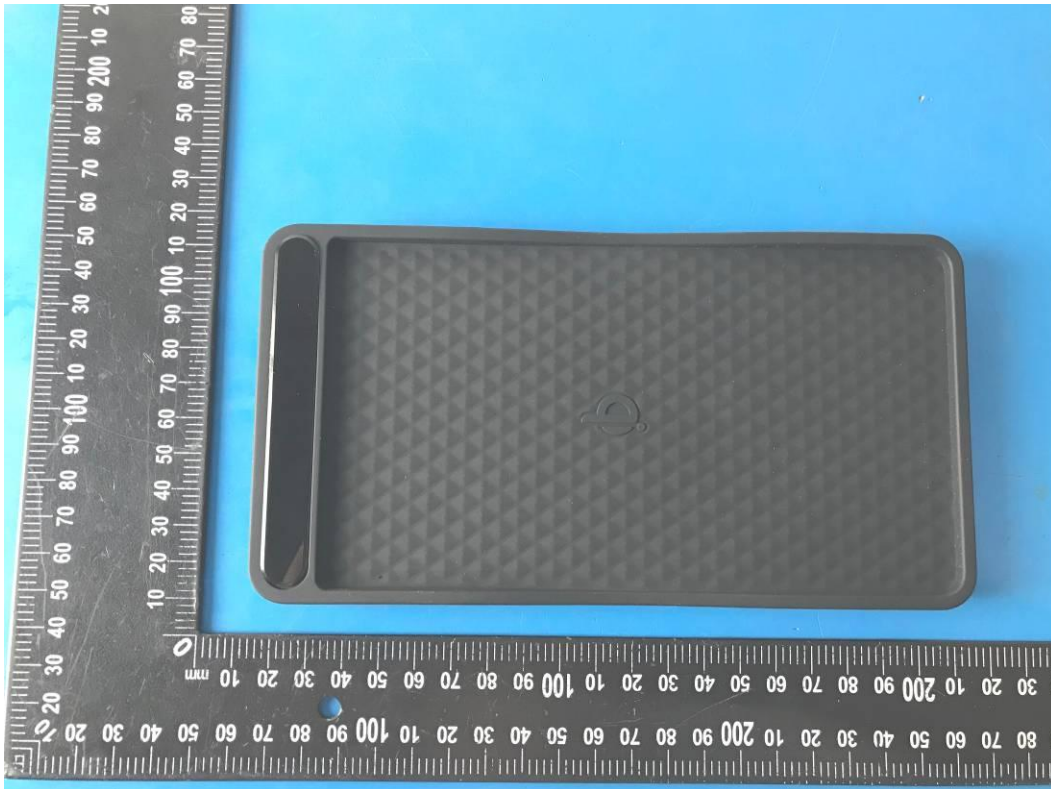
Radiated Emission

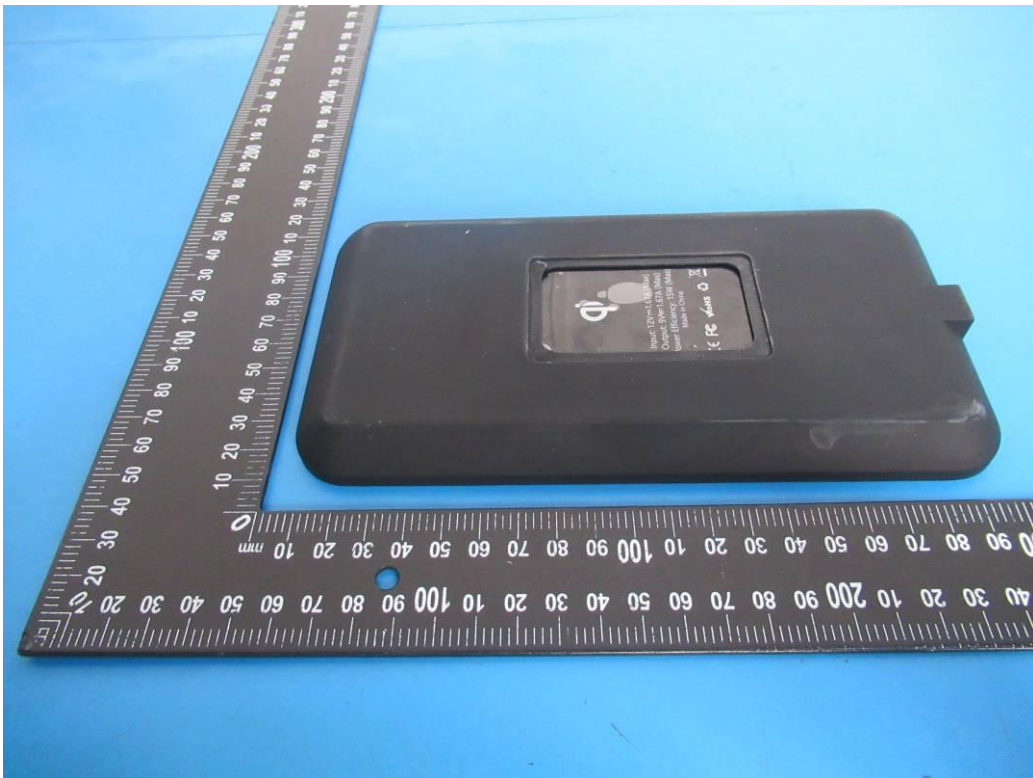
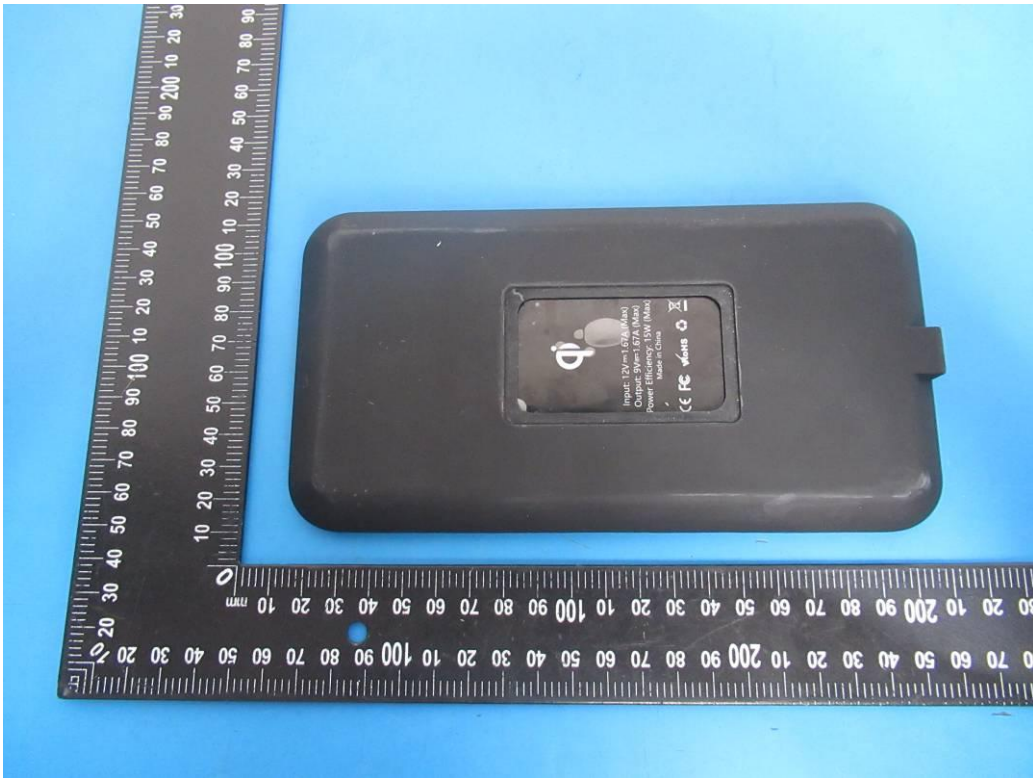


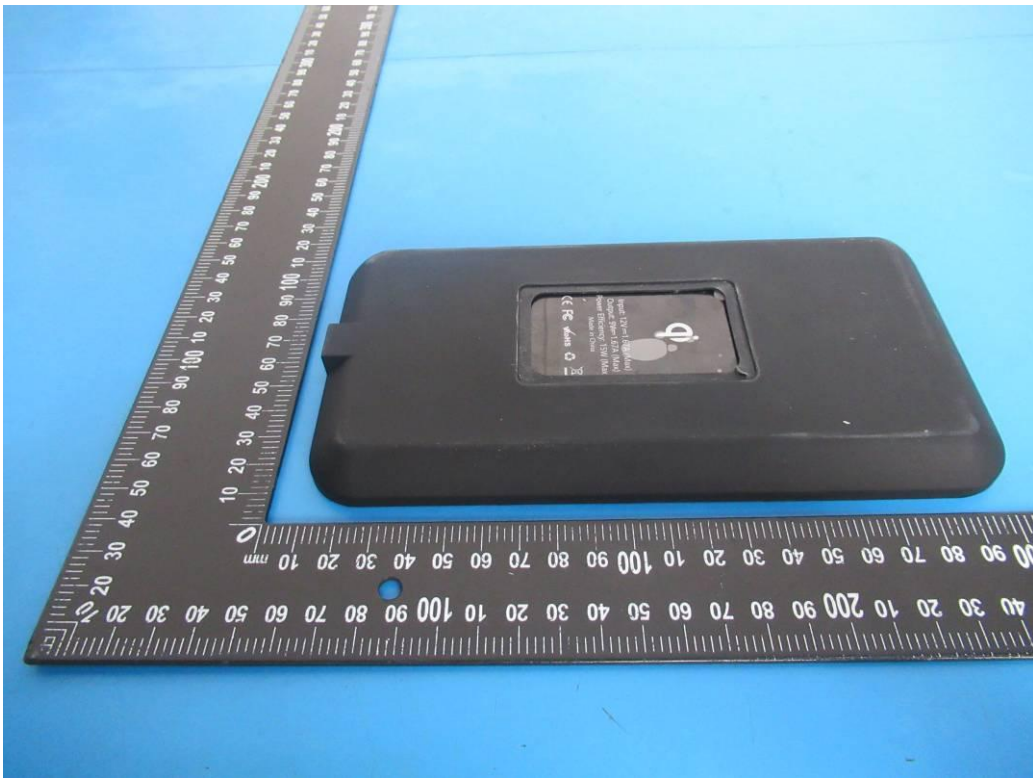
Conducted Emission

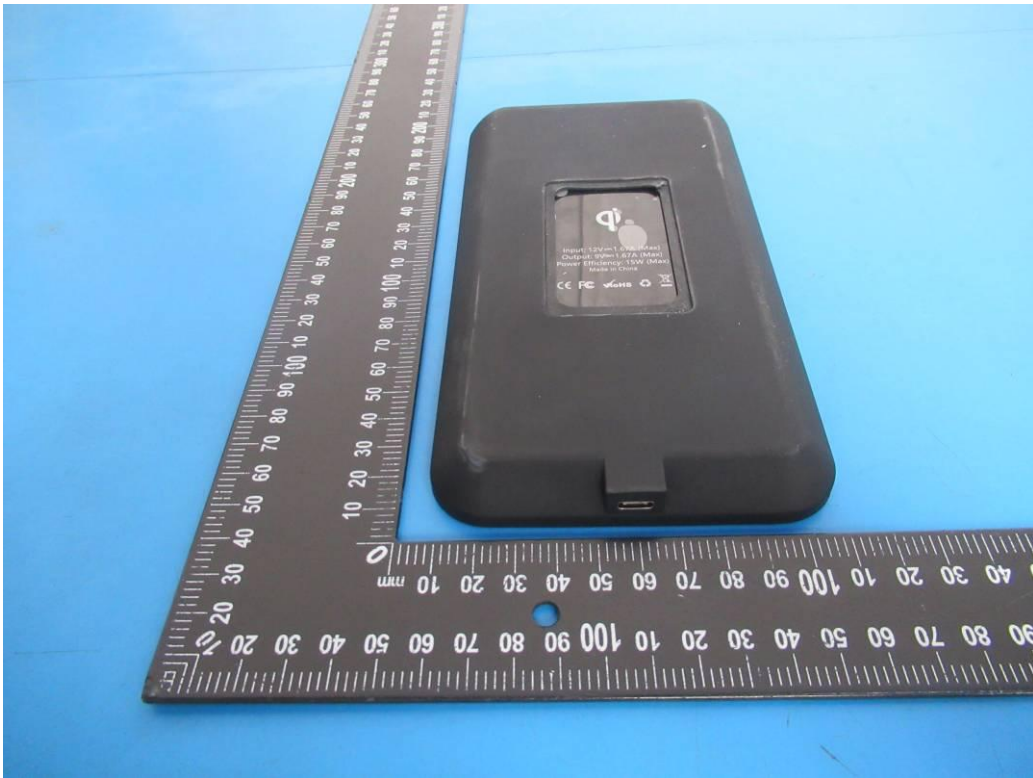


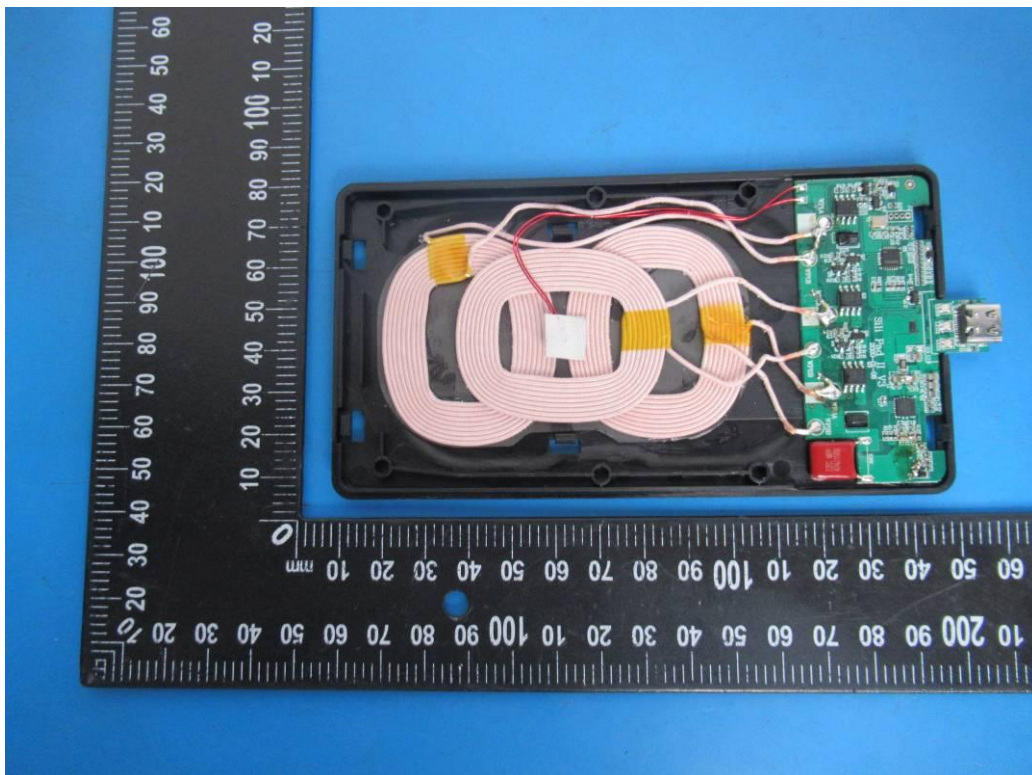
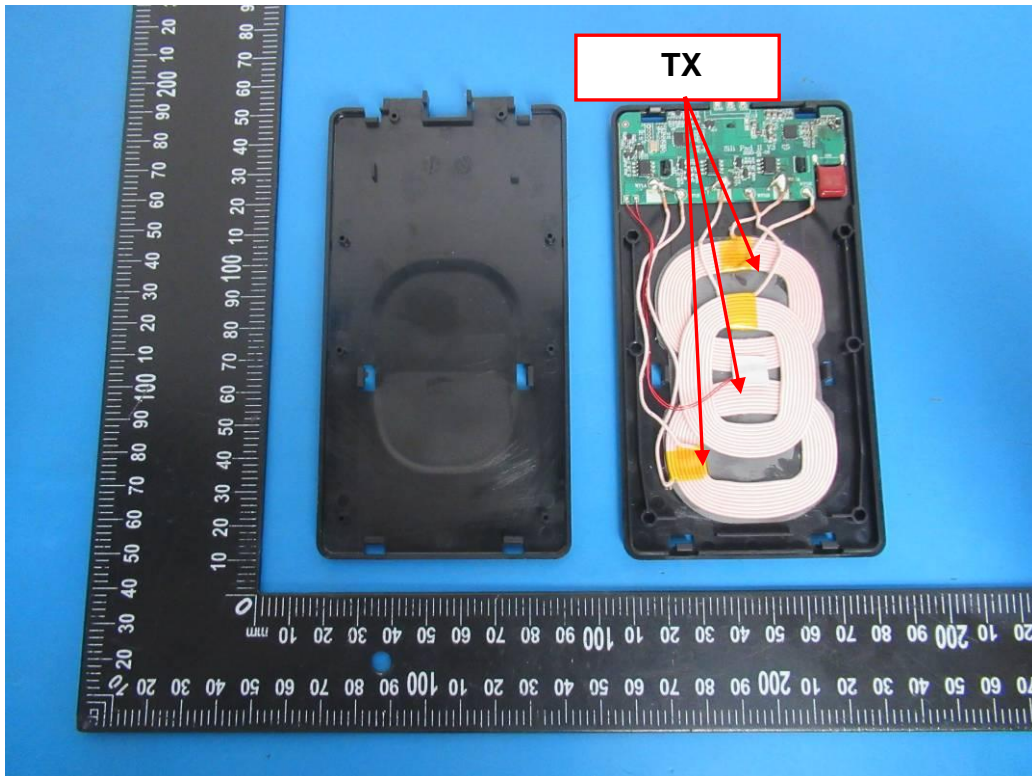
5. Photographs of EUT

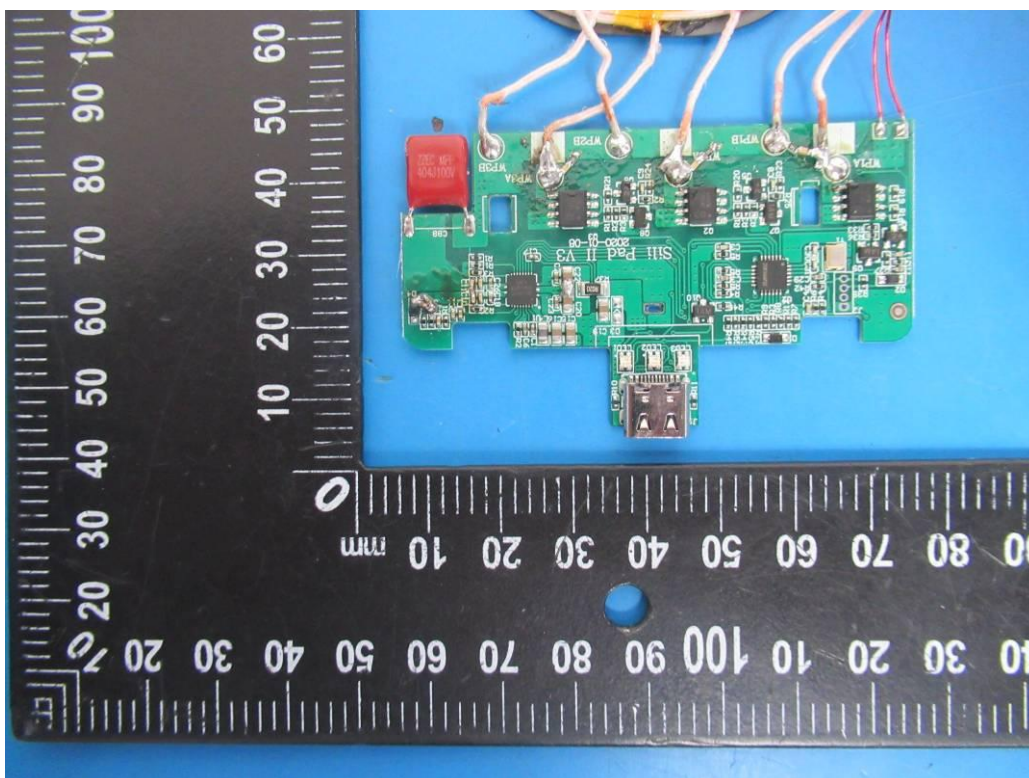
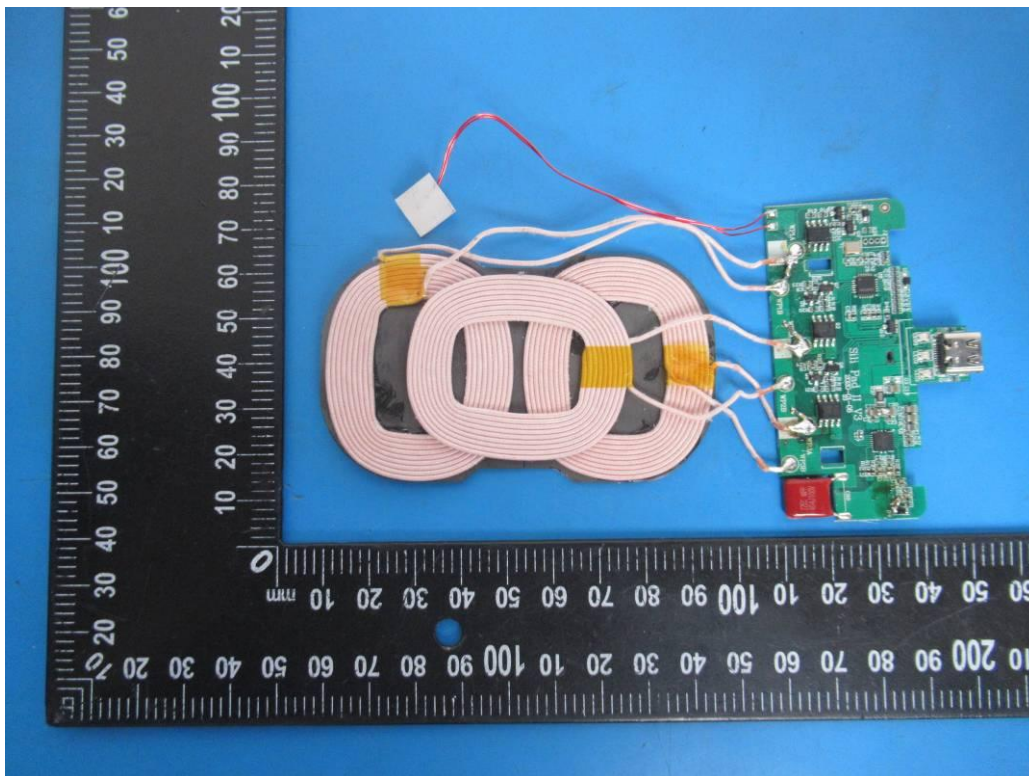


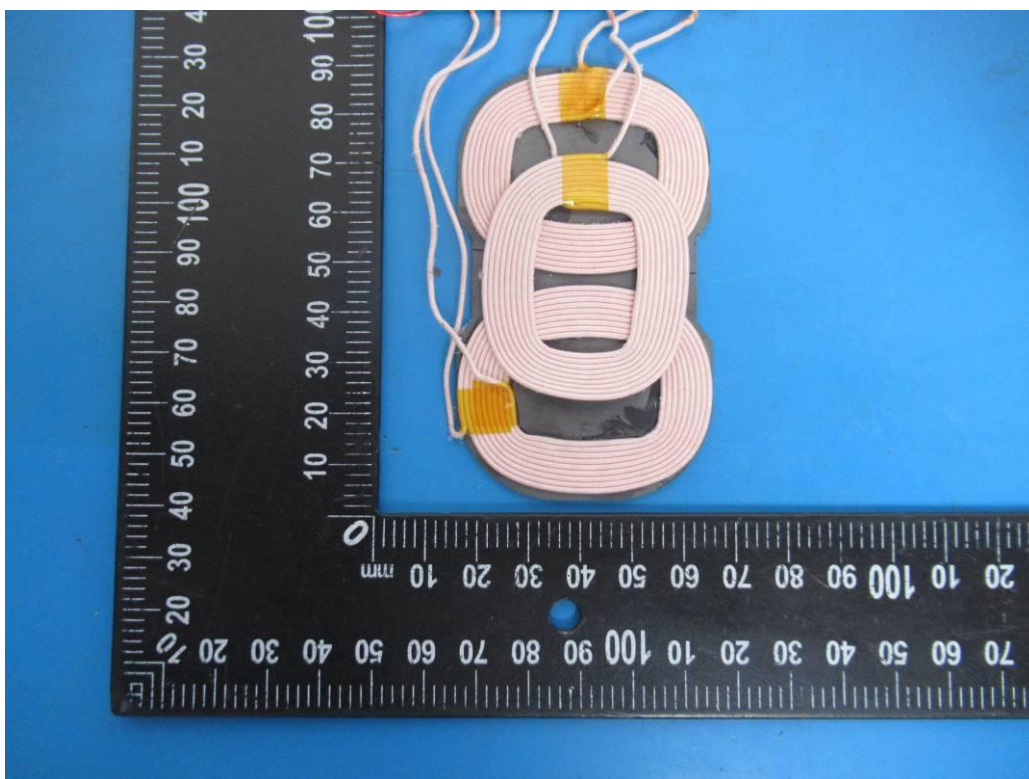
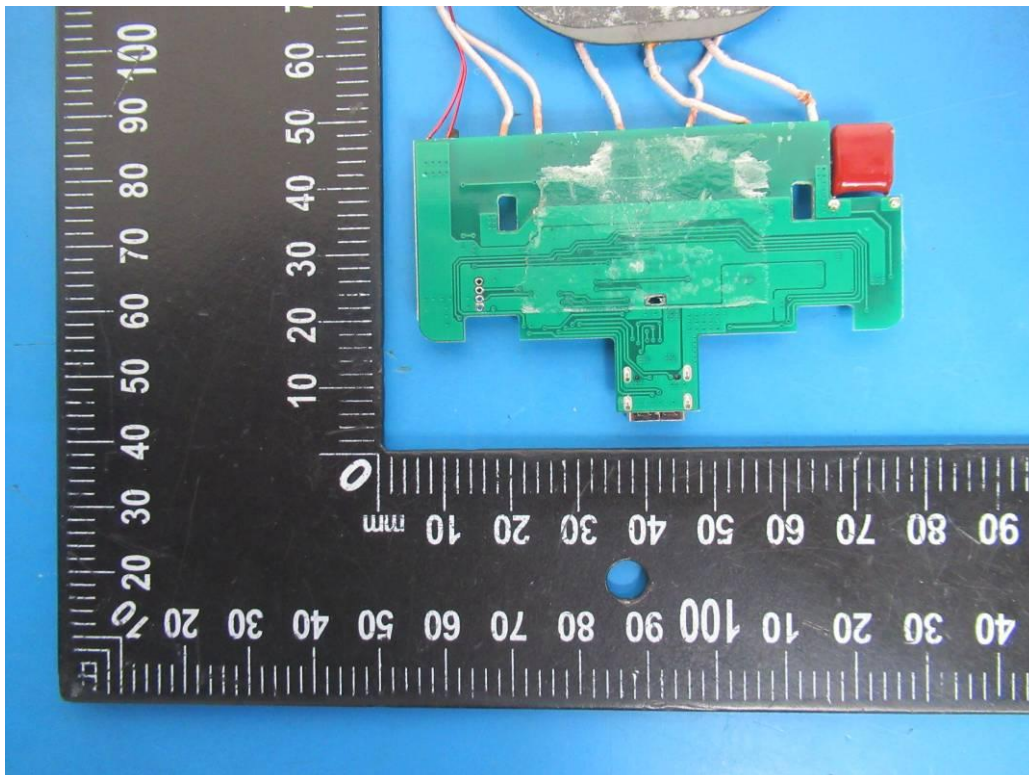


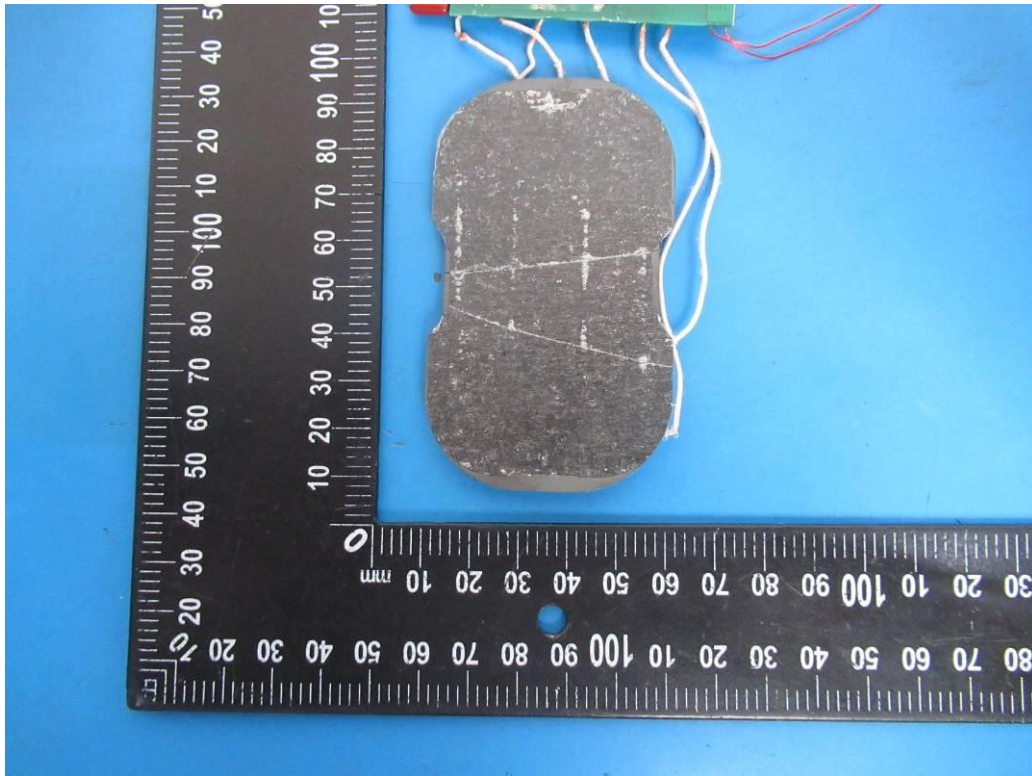












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