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

Report Template Version: V03
Report Template Revision Date: Mar.1st, 2017

Test Report

Report No.:	CQASZ20190400261E-01
Applicant:	TYLT, inc.
Address of Applicant:	685 Cochran St. Suite 200, Simi Valley, California 93065, United States
Manufacturer:	TYLT, inc.
Address of Manufacturer:	685 Cochran St. Suite 200, Simi Valley, California 93065, United States
Factory:	DONGGUAN KINTEC DIGITAL TECHNOLOGY CO.,LIMITED
Address of Factory:	8F, JINYE BUILDING, NO.306, CHANGQING SOUTH ROAD, CHANG'AN, DONGGUANG CITY, GUANGDONG, CHINA

Equipment Under Test (EUT):

Product:	Wireless charger
Model No.:	QIVENTBK3-T, 4588L, KQI-C32SM
Test Model No.:	QIVENTBK3-T
Brand Name:	N/A
FCC ID:	2AOAF-120
Standards:	47 CFR Part 15, Subpart C
Date of Test:	2019-04-22 to 2019-04-28
Date of Issue:	2019-04-28
Test Result :	**PASS***

Tested By: Daisy Qin

(Daisy Qin)

Reviewed By: Aaron Ma

(Aaron Ma)

Approved By:

(Jack Ai)

SHENZHEN HUAXIA TESTING TECHNOLOGY CO.,LTD 华夏准测 APPROVED

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

1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20190400261E-01	Rev.01	Initial report	2019-04-28

2 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15, Subpart C Section 15.203	ANSI C63.10 2013	PASS
AC Power Line Conducted Emission	47 CFR Part 15, Subpart C Section 15.207	ANSI C63.10 2013	PASS
20dB Occupied Bandwidth	47 CFR Part 15, Subpart C Section 15.215	ANSI C63.10 2013	PASS
Radiated Emission , Radiated Spurious Emissions	47 CFR Part 15, Subpart C Section 15.209	ANSI C63.10 2013	PASS

3 Contents

4 General Information

4.1 Client Information

Applicant:	TYLT, inc.
Address of Applicant:	685 Cochran St. Suite 200, Simi Valley, California 93065, United States
Manufacturer:	TYLT, inc.
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Factory:	DONGGUAN KINTEC DIGITAL TECHNOLOGY CO.,LIMITED
Address of Factory:	8F, JINYE BUILDING, NO.306, CHANGQING SOUTH ROAD, CHANG'AN, DONGGUANG CITY, GUANGDONG, CHINA

4.2 General Description of EUT

Product Name:	Wireless charger
Model No.:	QIVENTBK3-T, 4588L, KQI-C32SM
Test Model No.:	QIVENTBK3-T
Brand Name:	N/A
Hardware Version:	M05-C151-110
Software Version:	0x4955A4
Equipment Category	Non-ISM frequency
Operation Frequency range	110-205KHz
Modulation Type:	Induction
Antenna Type:	Induction coil
Antenna Gain:	0dBi
EUT Power Supply:	DC 5V

Note:

1. All model: QIVENTBK3-T, 4588L, KQI-C32SM

Only the model QIVENTBK3-T was tested, since the electrical circuit design, layout, components used and internal wiring were identical for the above models, with difference being color of appearance and model name.

2. In section 15.31(m), regards to the operating frequency range less 1 MHz.

4.3 Test Environment

Operating Environment:	
Temperature:	25.0 °C
Humidity:	53 % RH
Atmospheric Pressure:	1010mbar
Test Mode:	
Mode a:	Wireless charging Mode at 5V (Full load)
Mode b:	Wireless charging Mode at 5V (half load)
Mode c:	Wireless charging Mode at 5V (Null load)
Note: The mode a was the worst case and only the data of the worst case record in this report.	

4.4 Description of Support Units

The EUT has been tested with associated equipment below.

Description	Manufacturer	Model No.	Remark	FCC certification
Adaptor	Samsung	EP-TA50CBC	Provide by lab	Verification
Wireless electronic Load	-	-	Provide by lab	-

4.5 Statement of the 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:

No.	Item	Uncertainty	Notes
1	Radiated Emission (Below 1GHz)	±5.12dB	(1)
2	Radiated Emission (Above 1GHz)	±4.60dB	(1)
3	Occupied Bandwidth	1.1%	(1)
4	Temperature test	0.8℃	(1)
5	Humidity test	2.0%	(1)

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

4.6 Test Location

Shenzhen Huaxia Testing Technology Co., Ltd,

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

4.7 Test Facility

• **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

4.8 Deviation from Standards

None.

4.9 Other Information Requested by the Customer

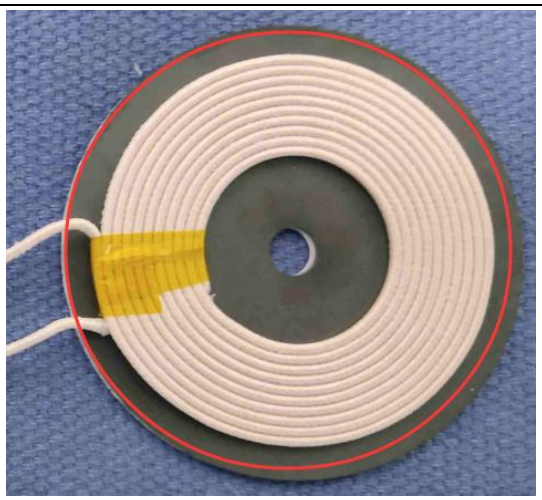
None.

4.10 Equipment List

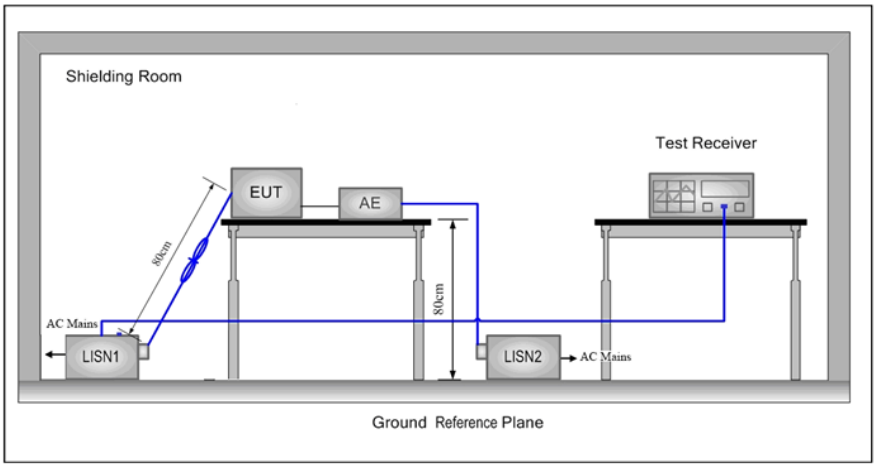
Test Equipment	Manufacturer	Model No.	Instrument No.	Calibration Date	Calibration Due Date
EMI Test Receiver	R&S	ESR7	CQA-005	2018/9/26	2019/9/25
Preamplifier	MITEQ	AFS4-00010300-18-10P-4	CQA-035	2018/9/26	2019/9/25
Loop antenna	Schwarzbeck	FMZB1516	CQA-087	2018/10/28	2020/10/27
Bilog Antenna	R&S	HL562	CQA-011	2018/9/26	2020/9/25
Coaxial Cable (Above 1GHz)	CQA	N/A	C019	2018/9/26	2019/9/25
Coaxial Cable (Below 1GHz)	CQA	N/A	C020	2018/9/26	2019/9/25
EMI Test Receiver	R&S	ESPI3	CQA-013	2018/9/26	2019/9/25
LISN	R&S	ENV216	CQA-003	2018/11/5	2019/11/4
Coaxial cable	CQA	N/A	CQA-C009	2018/9/26	2019/9/25

5 Test results and Measurement Data

5.1 Antenna Requirement

Standard requirement:	47 CFR Part 15C 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. 15.247(b) (4) requirement: The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.	
EUT Antenna:	
The antenna is Induction coil. The best case gain of the antenna is 0dBi.	

5.2 Conducted Emissions

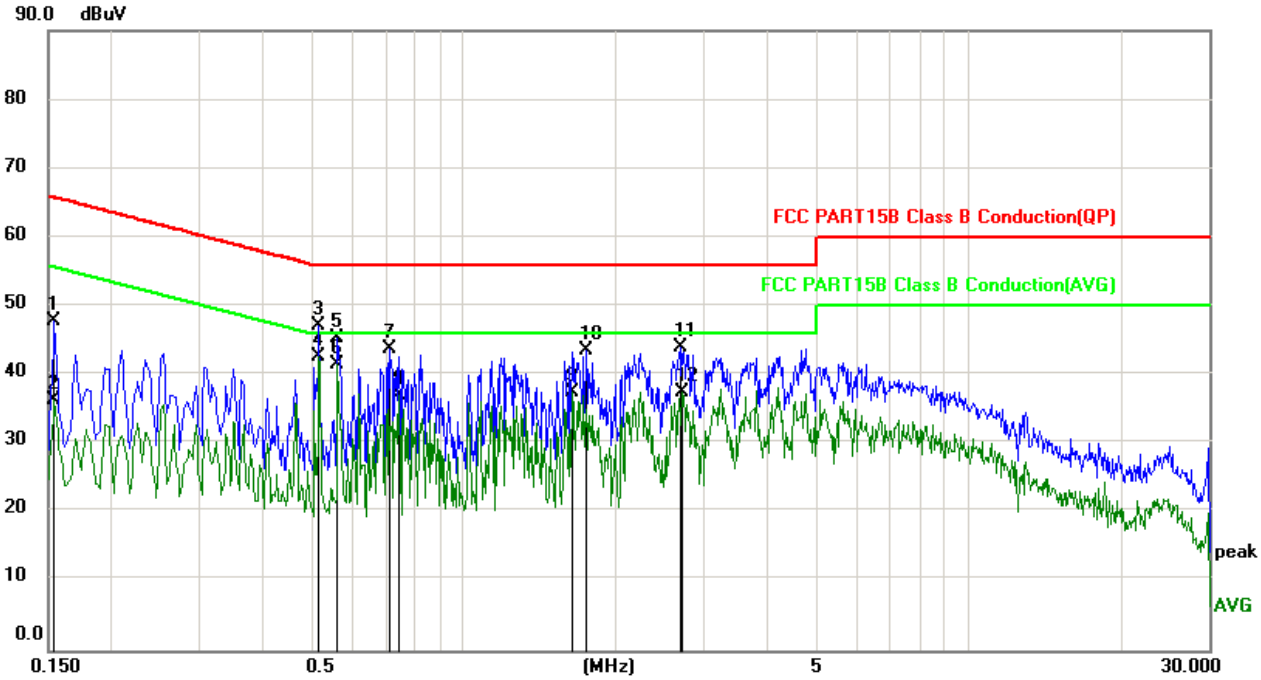
<table>
<tr><td>Test Requirement:</td><td>47 CFR Part 15C Section 15.207</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10: 2013</td></tr>
<tr><td>Test Frequency Range:</td><td>150kHz to 30MHz</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><td rowspan="2">Frequency range (MHz)</td><td colspan="2">Limit (dBuV)</td></tr>
<tr><td>Quasi-peak</td><td>Average</td></tr>
<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>
</table>
* Decreases with the logarithm of the frequency.
</td></tr>
<tr><td>Test Procedure:</td><td>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 50Ω/50μH + 5Ω 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.
5) 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.</td></tr>
<tr><td>Test Setup:</td><td> 
</td></tr>
<tr><td>Test Results:</td><td>Pass</td></tr>
</table>

Measurement Data

the worst case

Mode a:

Live line:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1539	38.10	9.73	47.83	65.79	-17.96	peak	
2		0.1539	26.53	9.73	36.26	55.79	-19.53	AVG	
3		0.5180	37.33	9.74	47.07	56.00	-8.93	peak	
4	*	0.5180	32.91	9.74	42.65	46.00	-3.35	AVG	
5		0.5620	35.56	9.74	45.30	56.00	-10.70	peak	
6		0.5620	31.69	9.74	41.43	46.00	-4.57	AVG	
7		0.7140	33.94	9.74	43.68	56.00	-12.32	peak	
8		0.7460	27.30	9.74	37.04	46.00	-8.96	AVG	
9		1.6380	27.68	9.76	37.44	46.00	-8.56	AVG	
10		1.7500	33.87	9.76	43.63	56.00	-12.37	peak	
11		2.6900	34.24	9.77	44.01	56.00	-11.99	peak	
12		2.7180	27.80	9.77	37.57	46.00	-8.43	AVG	

Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:

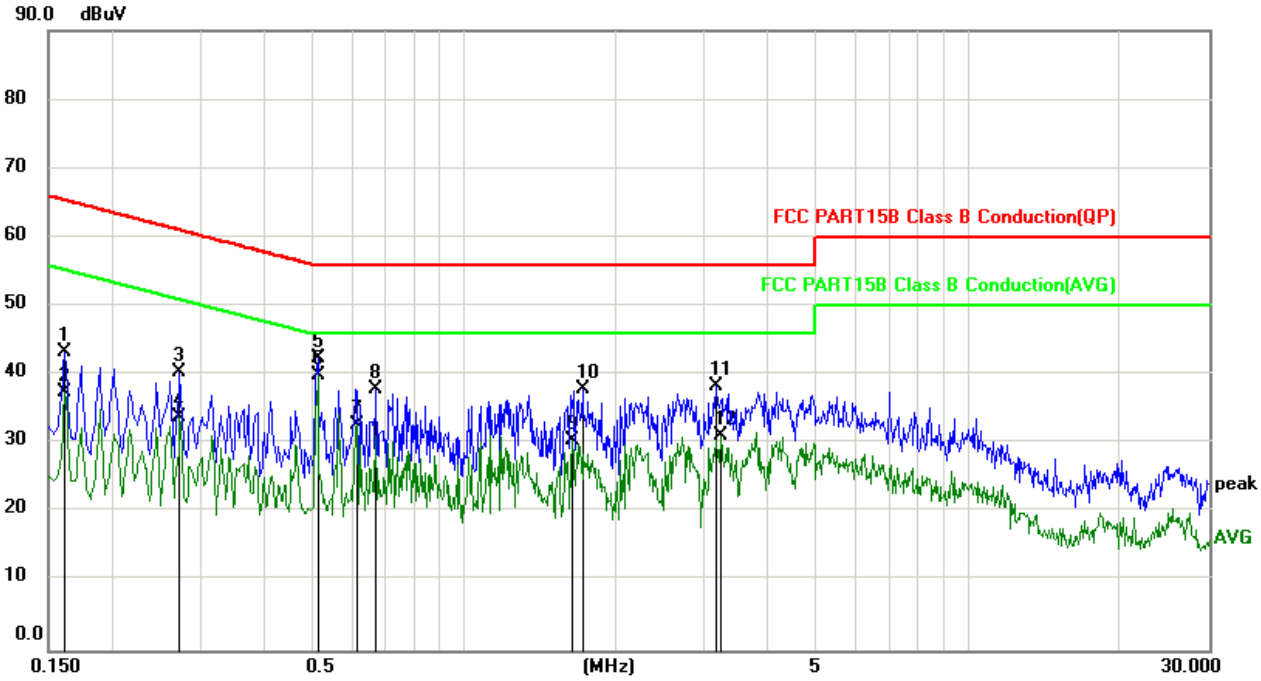
2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.

3. If the Peak value under Average limit, the Average value is not recorded in the report.

the worst case

Mode a:

Neutral line:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1620	33.55	9.79	43.34	65.36	-22.02	peak	
2		0.1620	27.76	9.79	37.55	55.36	-17.81	AVG	
3		0.2740	30.57	9.80	40.37	61.00	-20.63	peak	
4		0.2740	24.07	9.80	33.87	51.00	-17.13	AVG	
5		0.5140	32.54	9.80	42.34	56.00	-13.66	peak	
6	*	0.5140	30.13	9.80	39.93	46.00	-6.07	AVG	
7		0.6140	23.02	9.80	32.82	46.00	-13.18	AVG	
8		0.6700	28.14	9.80	37.94	56.00	-18.06	peak	
9		1.6420	20.74	9.85	30.59	46.00	-15.41	AVG	
10		1.7180	28.07	9.86	37.93	56.00	-18.07	peak	
11		3.1660	28.47	9.84	38.31	56.00	-17.69	peak	
12		3.2300	21.22	9.84	31.06	46.00	-14.94	AVG	

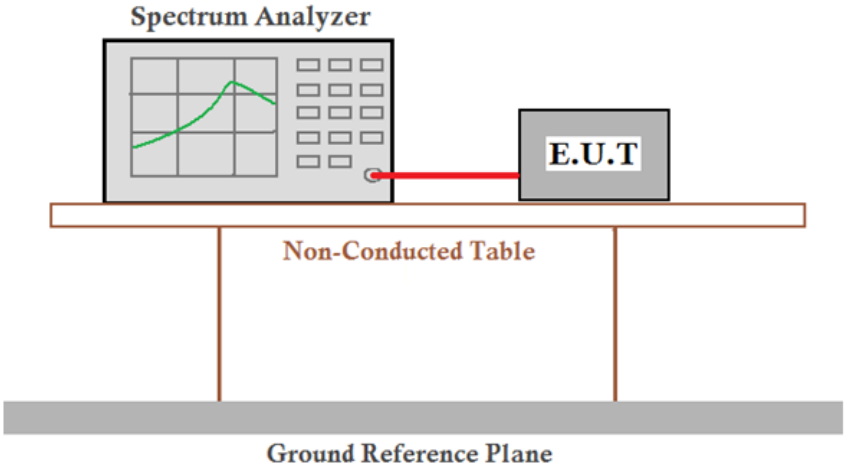
Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:

2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.

3. If the Peak value under Average limit, the Average value is not recorded in the report.

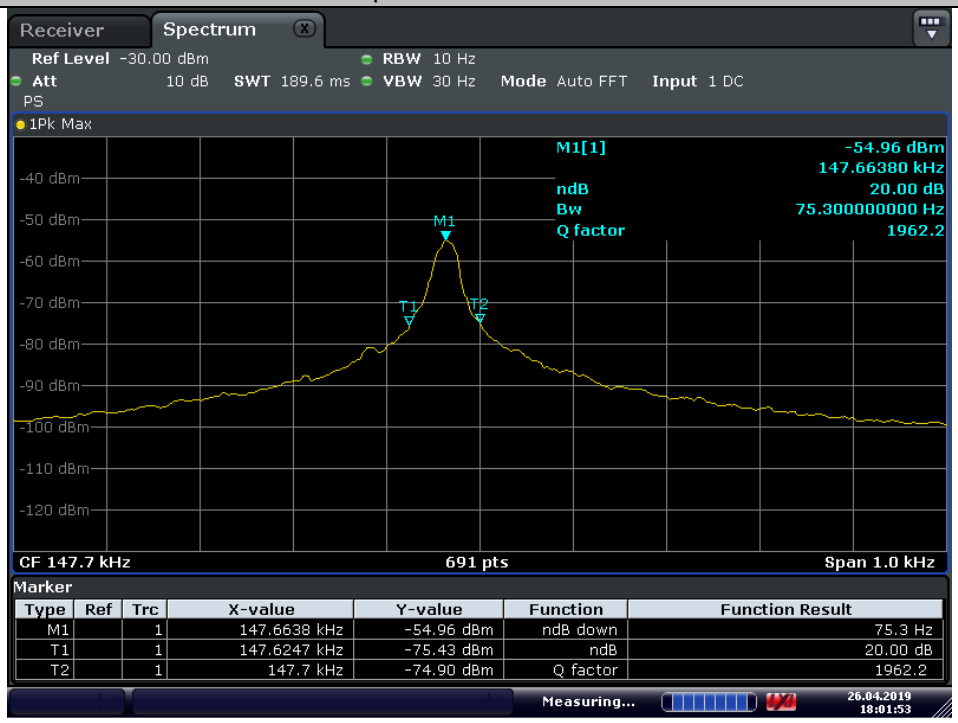
5.3 20dB Occupy Bandwidth

Test Requirement:	47 CFR Part 15C Section 15.215
Test Method:	ANSI C63.10 2013
Test Setup:	 *Remark: Offset=Cable loss+ attenuation factor.*
Test Results:	Pass

Measurement Data

Mode a		
Test Frequency (KHz)	20dB Occupy Bandwidth (kHz)	Result
147.7	0.075	Pass

Test plot as follows:

Graphs	
110K	

5.4 Radiated Spurious Emission & Restricted bands

5.4.1 Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205
Test Method:	ANSI C63.10 2013
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak
0.009MHz-0.090MHz	Average	10kHz	30kHz	Average
0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak
0.110MHz-0.490MHz	Average	10kHz	30kHz	Average
0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
30MHz-1GHz	Quasi-peak	100 kHz	300kHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

Limit:

Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
1.705MHz-30MHz	30	-	-	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3

Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

Test Setup:	

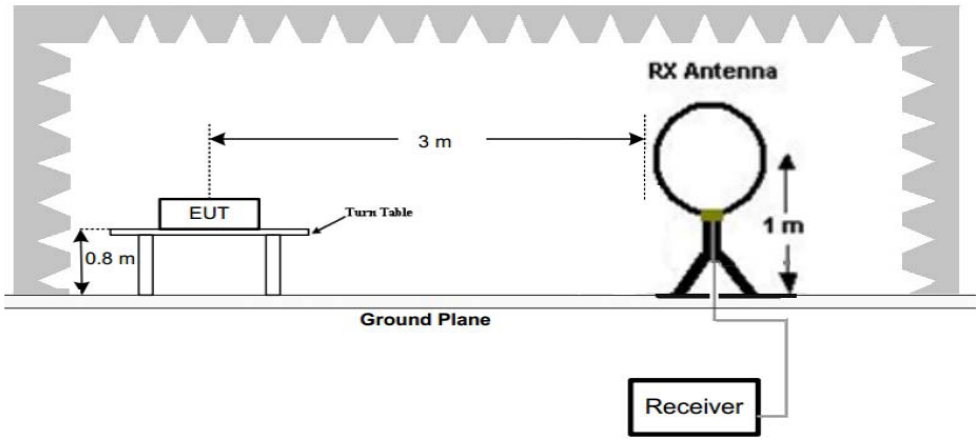


Figure 1. Below 30MHz

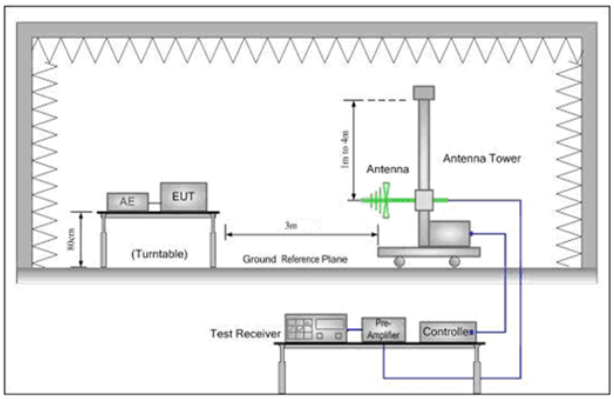


Figure 2. 30MHz to 1GHz

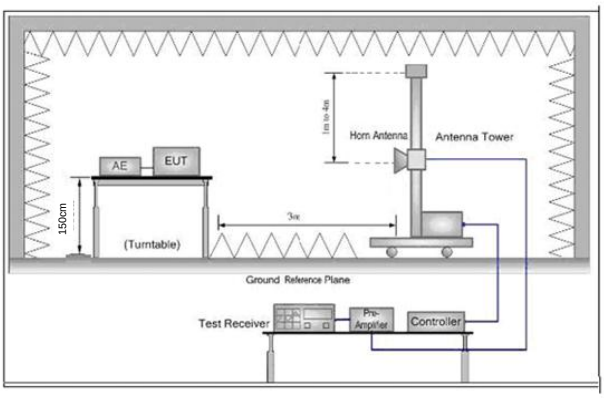


Figure 3. Above 1 GHz

Test Procedure:	a. 1) Below 1G: The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2) Above 1G: The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. Note: For the radiated emission test above 1GHz: Place the measurement antenna 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 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. b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. c. 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

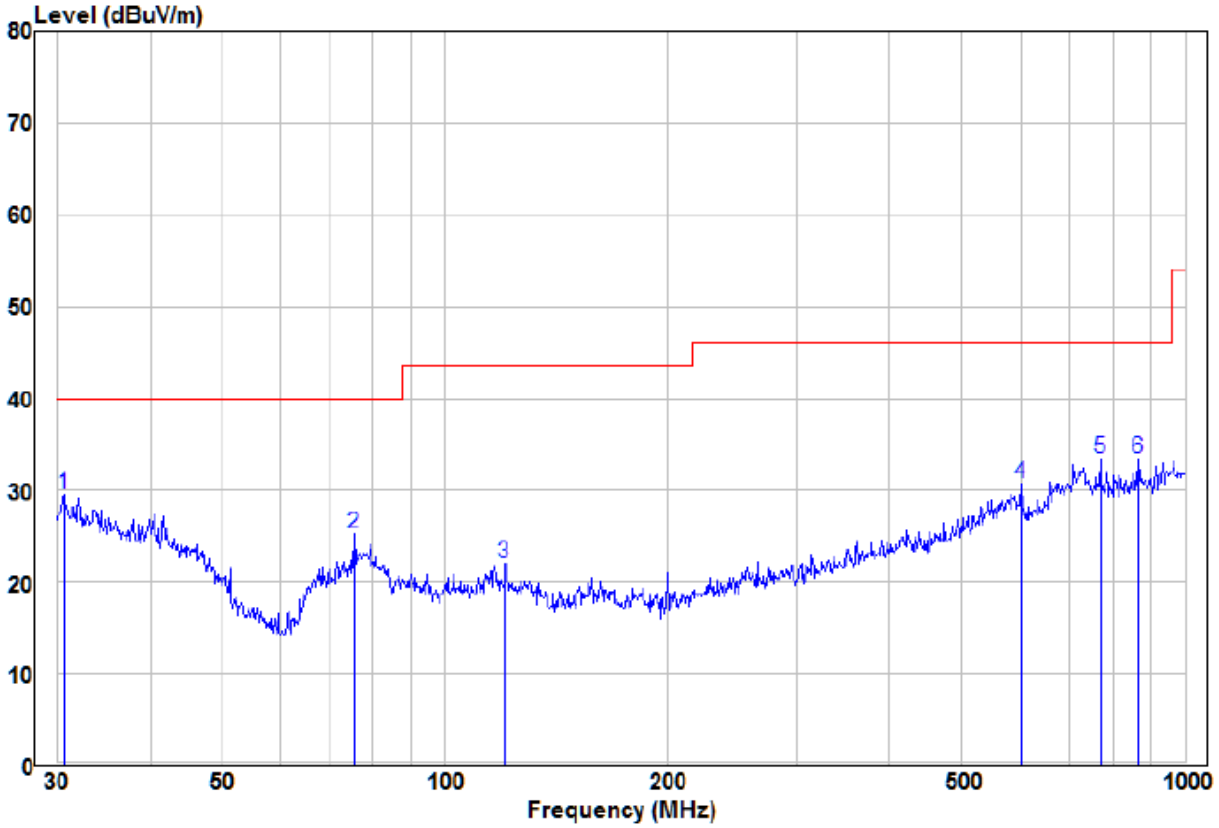
	measurement. d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. f. If the emission level of the EUT in peak mode was 10dB lower than the 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. g. Repeat above procedures until all frequencies measured was complete.
Test Results:	Pass

Radiated Emission below 9K~30MHz	
the worst case	
Test mode:	Mode a

Frequency MHz	Polarization	Reading dB(uV)	Factor dB (1/m)	Level dB(uV/m) Peak	Limit dB(uV/m) Average	Margin dB	Pass/Fail
0.1477	Face	48.32	19.54	67.86	104.28	36.42	Pass
0.1477	Side	47.65	19.54	67.19	104.28	37.09	Pass

Note: No other emissions found between lowest internal used/generated frequencies to 30MHz. The peak level of the emission is less than the average limit, so the average level shall be less than the limit without test.

Radiated Emission		
30MHz~1GHz, the worst case		
Test mode:	Mode a	Vertical



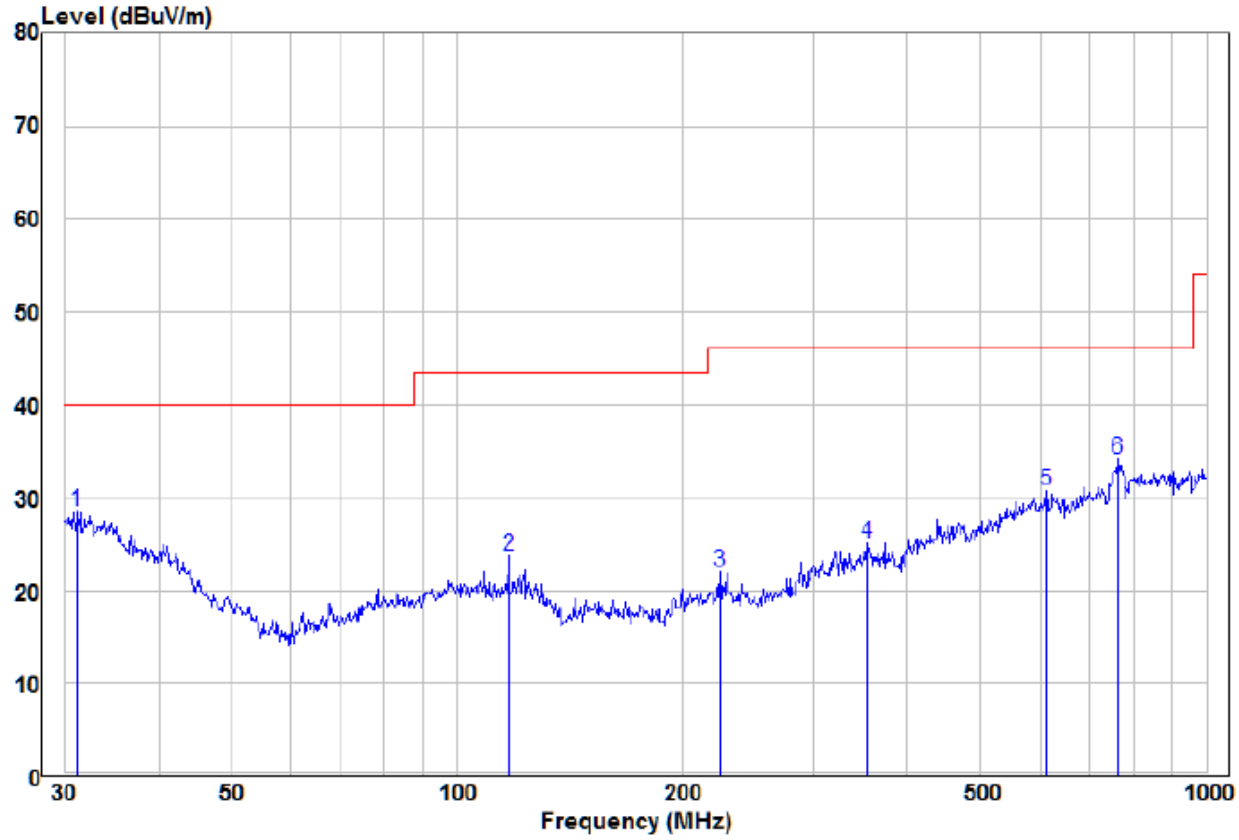
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1 pp	30.64	1.45	28.08	29.53	40.00	-10.47	Peak	VERTICAL
2	75.45	6.34	18.94	25.28	40.00	-14.72	Peak	VERTICAL
3	120.70	1.49	20.57	22.06	43.50	-21.44	Peak	VERTICAL
4	601.43	2.51	28.26	30.77	46.00	-15.23	Peak	VERTICAL
5	768.75	3.00	30.51	33.51	46.00	-12.49	Peak	VERTICAL
6	866.09	3.09	30.40	33.49	46.00	-12.51	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:

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

30MHz~1GHz, the worst case		
Test mode:	Mode a	Horizontal



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1 pp	31.18	0.53	27.89	28.42	40.00	-11.58	Peak	HORIZONTAL
2	117.36	3.19	20.46	23.65	43.50	-19.85	Peak	HORIZONTAL
3	224.52	2.77	19.17	21.94	46.00	-24.06	Peak	HORIZONTAL
4	352.94	2.06	22.94	25.00	46.00	-21.00	Peak	HORIZONTAL
5	612.06	2.21	28.46	30.67	46.00	-15.33	Peak	HORIZONTAL
6	763.38	3.68	30.47	34.15	46.00	-11.85	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:

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

6 Photographs - EUT Test Setup

6.1 Radiated Emission

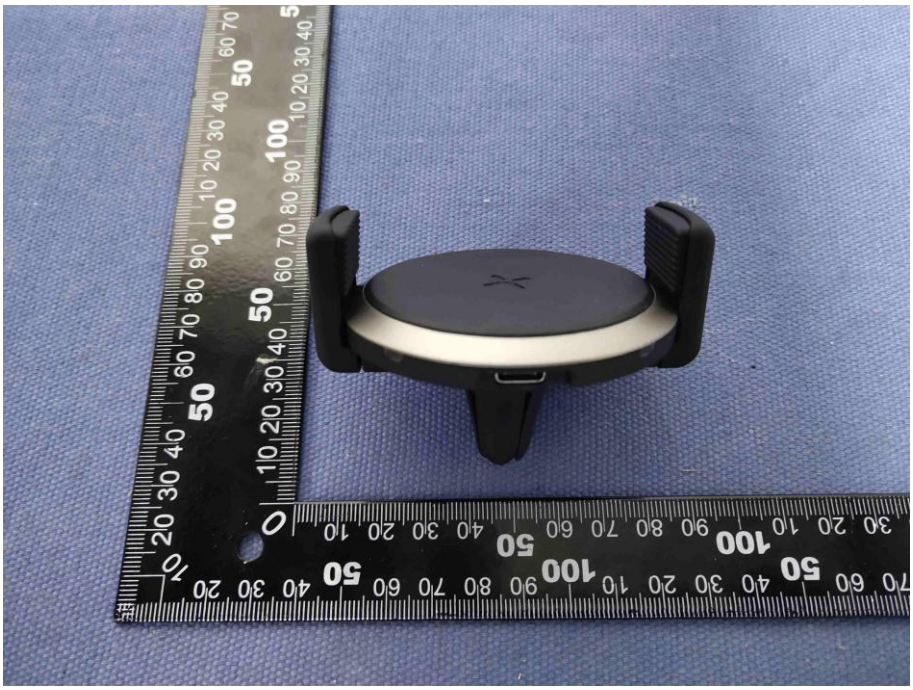
9KHz~30MHz:

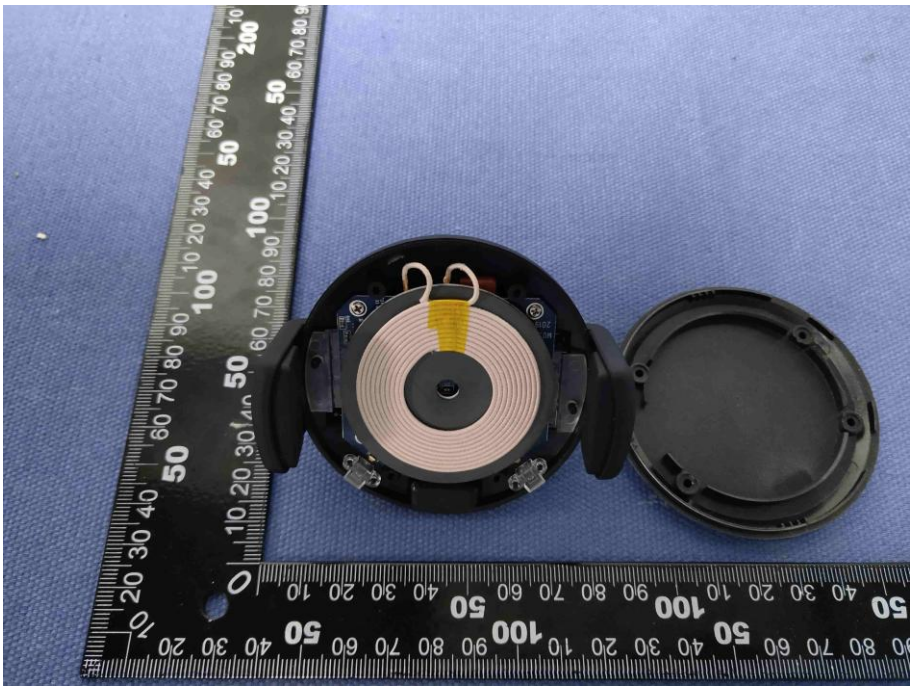
30MHz~1GHz:

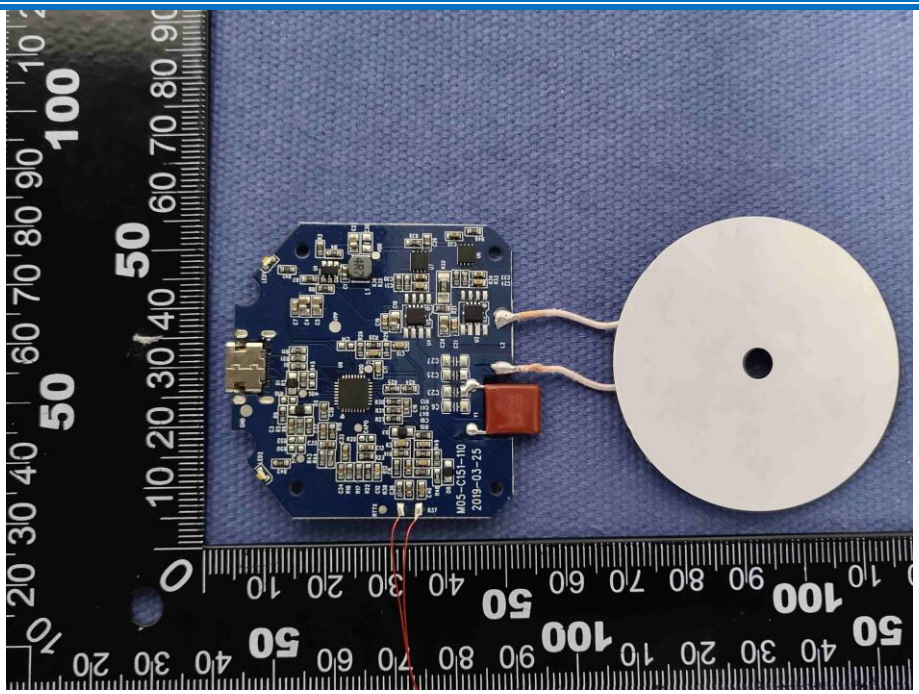
6.2 Conducted Emission

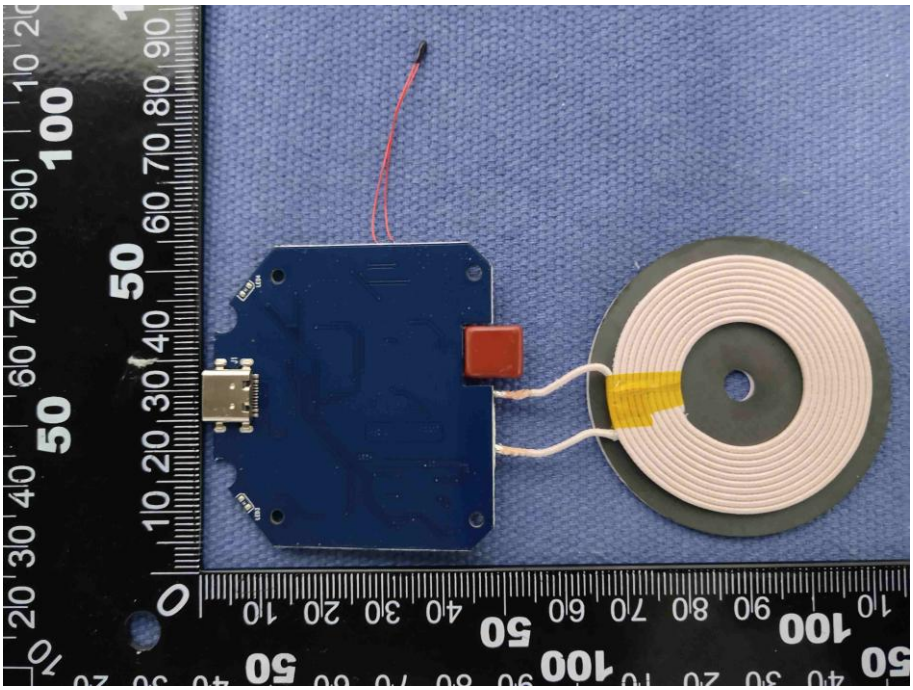
7 Photographs - EUT Constructional Details

Test Model No.: QIVENTBK3-T









.The End