

TEST REPORT

FCC ID: 2AQT6-38568

Product: CHARGING PAD

Model No.: 38568

Additional Model: N/A

Trade Mark: N/A

Report No.: TCT180928E008

Issued Date: Oct. 11, 2018

Issued for:

Gartner Studios LLC

220 East Myrtle Street, Stillwater, MN 55082, United States

Issued By:

Shenzhen Tongce Testing Lab.

**1B/F., Building 1, Yibaolai Industrial Park, Qiaotou, Fuyong, Baoan District,
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1. Test Certification

Product:	CHARGING PAD
Model No.:	38568
Additional Model No.:	N/A
Trade Mark:	N/A
Applicant:	Gartner Studios LLC
Address:	220 East Myrtle Street, Stillwater, MN 55082, United States
Manufacturer:	Gartner Studios LLC
Address:	220 East Myrtle Street, Stillwater, MN 55082, United States
Date of Test:	Sep. 29, 2018 - Oct. 10, 2018
Applicable Standards:	FCC CFR Title 47 Part 15 Subpart C

The above equipment has been tested by Shenzhen Tongce Testing Lab. and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Tested By:



Brews Xu

Date:

Oct. 10, 2018

Reviewed By:



Beryl Zhao

Date:

Oct. 11, 2018

Approved By:



Tomsin

Date:

Oct. 11, 2018

2. 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

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.

3. EUT Description

Product:	CHARGING PAD
Model No.:	38568
Additional Model No.:	N/A
Trade Mark:	N/A
Operation Frequency:	125.2-168.4KHz
Modulation Technology:	Load modulation
Antenna Type:	Coil antenna
Power Supply:	DC 5V, 2A / 9V, 1.7A via adapter

4. General Information

4.1. Test environment and mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	56 % RH
Atmospheric Pressure:	1010 mbar
Test Mode:	
Engineering mode:	Keep the EUT in continuous transmitting by select channel and modulations(The value of duty cycle is 98.46%) with Fully-charged battery.
The sample was placed (0.1m below 1GHz, 1.5m above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.	

4.2. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Equipment	Model No.	Serial No.	FCC ID	Trade Name
Mobile Phone	SM-G9350	R28HA2ER3GT	/	SAMSUNG
Mobile Phone	MQ6M2CH/A	C7DV86Y3JC6F	GCG-E3159A	Apple

Note:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.
3. For conducted measurements (Output Power, 6dB Emission Bandwidth, Power Spectral Density, Spurious Emissions), the antenna of EUT is connected to the test equipment via temporary antenna connector, the antenna connector is soldered on the antenna port of EUT, and the temporary antenna connector is listed in the Test Instruments.

5. Facilities and Accreditations

5.1. Facilities

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

- FCC - Registration No.: 645098

Shenzhen Tongce Testing Lab

The 3m Semi-anechoic chamber has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

- IC - Registration No.: 10668A-1

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

5.2. Location

Shenzhen Tongce Testing Lab

Address: 1B/F., Building 1, Yibaolai Industrial Park, Qiaotou, Fuyong, Baoan District, Shenzhen, Guangdong, China

TEL: +86-755-27673339

5.3. Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	MU
1	Conducted Emission	$\pm 2.56\text{dB}$
2	RF power, conducted	$\pm 0.12\text{dB}$
3	Spurious emissions, conducted	$\pm 0.11\text{dB}$
4	All emissions, radiated(<1G)	$\pm 3.92\text{dB}$
5	All emissions, radiated(>1G)	$\pm 4.28\text{dB}$
6	Temperature	$\pm 0.1^{\circ}\text{C}$
7	Humidity	$\pm 1.0\%$

6. Test Results and Measurement Data

6.1. Antenna requirement

Standard requirement:

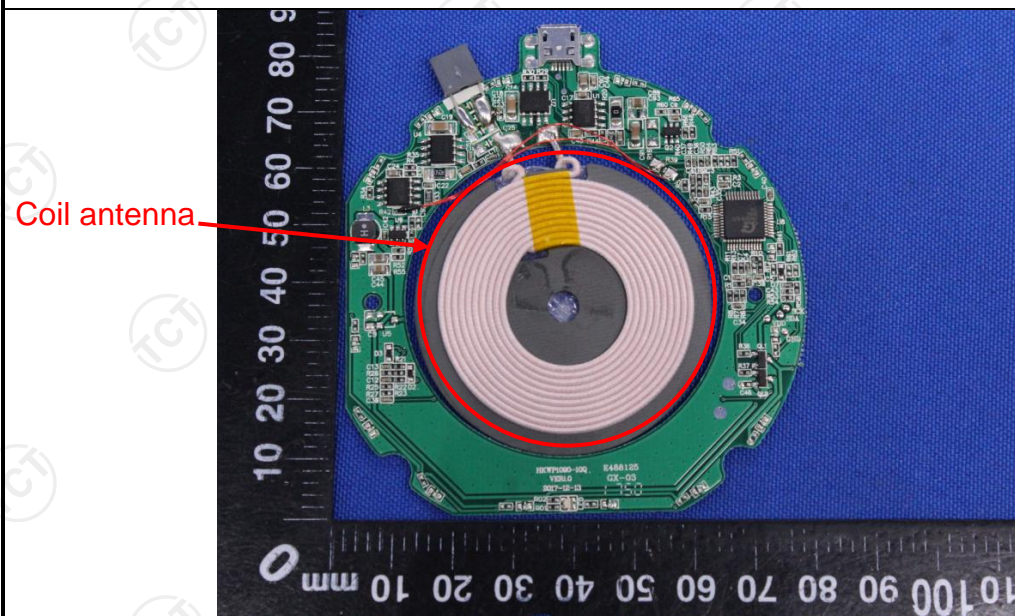
FCC Part15 C Section 15.203

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.

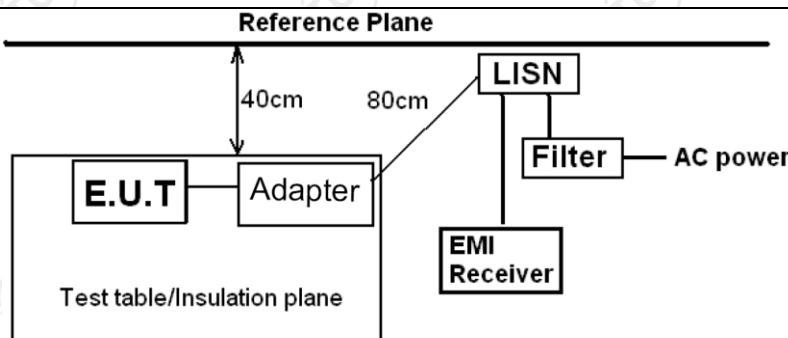
E.U.T Antenna:

The antenna is coil antenna which permanently attached.



6.2. Conducted Emission

6.2.1. 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><tr><th rowspan="2">Frequency range (MHz)</th><th colspan="2">Limit (dBuV)</th></tr><tr><th>Quasi-peak</th><th>Average</th></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>	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:	<div><p style="text-align: center;">Reference Plane</p><p>Remark: E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p></div>														
Test Mode:	Charging + Transmitting Mode														
Test Procedure:	<div><div>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.</div><div>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).</div><div>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.</div></div>														
Test Result:	PASS														

6.2.2. Test Instruments

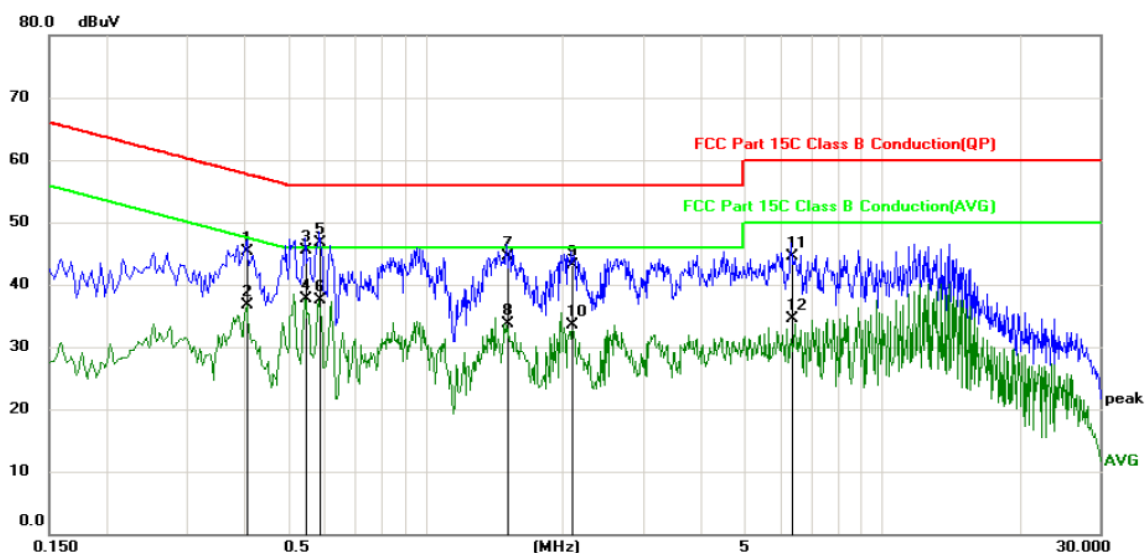
Conducted Emission Shielding Room Test Site (843)				
Equipment	Manufacturer	Model	Serial Number	Calibration Due
Test Receiver	R&S	ESPI	101401	Aug. 27, 2019
LISN	Schwarzbeck	NSLK 8126	8126453	Aug. 27, 2019
Coax cable (9KHz-30MHz)	TCT	CE-05	N/A	Aug. 27, 2019
EMI Test Software	Shurple Technology	EZ-EMC	N/A	N/A

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

6.2.3. Test data

Please refer to following diagram for individual

Conducted Emission on Line Terminal of the power line (150 kHz to 30MHz)



Site: Limit: FCC Part 15C Class B Conduction(QP) Phase: L1 Power: Temperature: 25 Humidity: 55 %

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.4063	35.00	10.22	45.22	57.72	-12.50	QP	
2		0.4063	26.48	10.22	36.70	47.72	-11.02	AVG	
3		0.5459	35.20	10.22	45.42	56.00	-10.58	QP	
4	*	0.5459	27.57	10.22	37.79	46.00	-8.21	AVG	
5		0.5864	36.41	10.23	46.64	56.00	-9.36	QP	
6		0.5864	27.33	10.23	37.56	46.00	-8.44	AVG	
7		1.5088	34.00	10.41	44.41	56.00	-11.59	QP	
8		1.5088	23.22	10.41	33.63	46.00	-12.37	AVG	
9		2.0939	32.70	10.45	43.15	56.00	-12.85	QP	
10		2.0939	22.96	10.45	33.41	46.00	-12.59	AVG	
11		6.3330	34.10	10.50	44.60	60.00	-15.40	QP	
12		6.3330	23.96	10.50	34.46	50.00	-15.54	AVG	

Note:

Freq. = Emission frequency in MHz

Reading level (dBuV) = Receiver reading

Corr. Factor (dB) = Antenna factor + Cable loss

Measurement (dBuV) = Reading level (dBuV) + Corr. Factor (dB)

Limit (dBuV) = Limit stated in standard

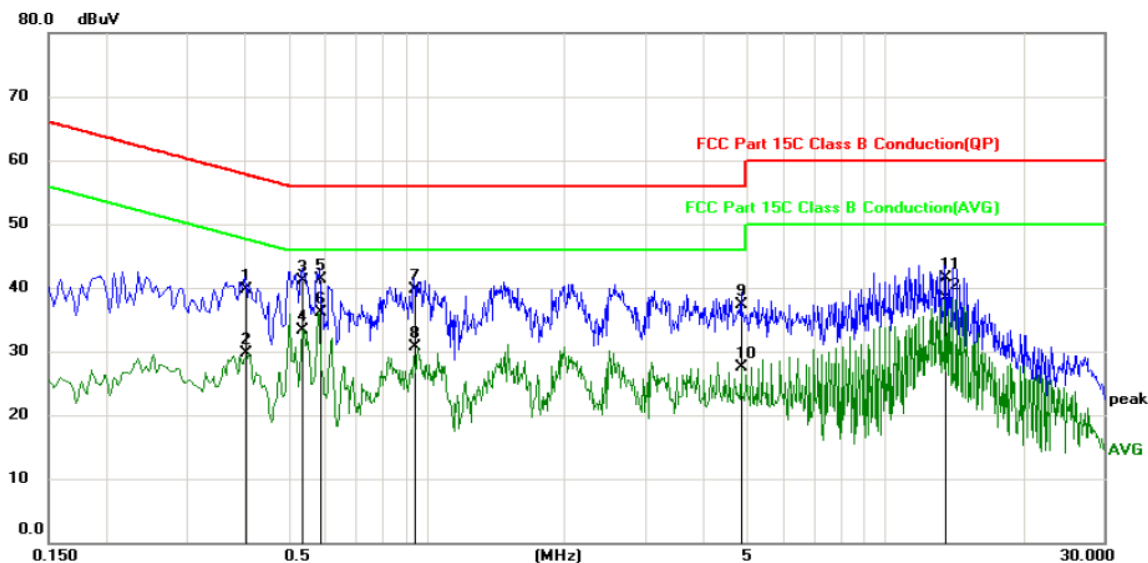
Margin (dB) = Measurement (dBuV) – Limits (dBuV)

Q.P. =Quasi-Peak

AVG =average

* is meaning the worst frequency has been tested in the frequency range 150 kHz to 30MHz

Conducted Emission on Neutral Terminal of the power line (150 kHz to 30MHz)



Site: Phase: **N** Temperature: 25
Limit: FCC Part 15C Class B Conduction(QP) Power: Humidity: 55 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.4020	29.50	10.22	39.72	57.81	-18.09	QP	
2		0.4020	19.41	10.22	29.63	47.81	-18.18	AVG	
3		0.5370	30.93	10.22	41.15	56.00	-14.85	QP	
4		0.5370	23.10	10.22	33.32	46.00	-12.68	AVG	
5		0.5865	31.10	10.23	41.33	56.00	-14.67	QP	
6	*	0.5865	25.80	10.23	36.03	46.00	-9.97	AVG	
7		0.9420	29.30	10.33	39.63	56.00	-16.37	QP	
8		0.9420	20.29	10.33	30.62	46.00	-15.38	AVG	
9		4.8525	26.80	10.48	37.28	56.00	-18.72	QP	
10		4.8525	17.06	10.48	27.54	46.00	-18.46	AVG	
11		13.5105	30.90	10.69	41.59	60.00	-18.41	QP	
12		13.5105	27.62	10.69	38.31	50.00	-11.69	AVG	

Note1:

Freq. = Emission frequency in MHz

Reading level (dBuV) = Receiver reading

Corr. Factor (dB) = Antenna factor + Cable loss

Measurement (dBuV) = Reading level (dBuV) + Corr. Factor (dB)

Limit (dBuV) = Limit stated in standard

Margin (dB) = Measurement (dBuV) – Limits (dBuV)

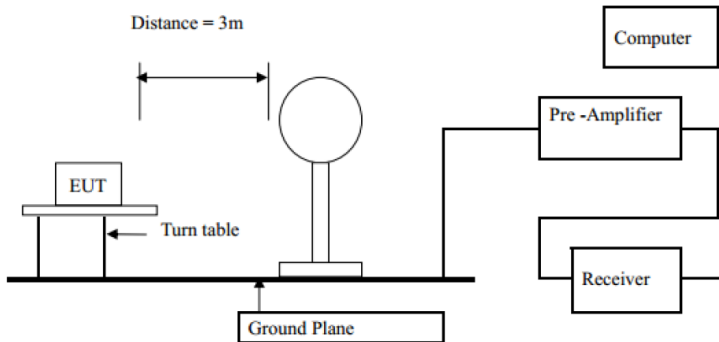
Q.P. =Quasi-Peak AVG =average

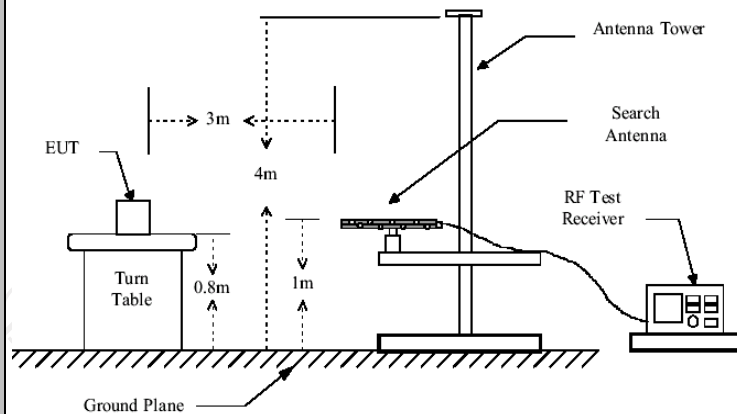
* is meaning the worst frequency has been tested in the frequency range 150 kHz to 30MHz.

Note2: Both 5V/2A&9V/1.7A input modes are tested, and the test data of worse mode 9V/1.7A be listed

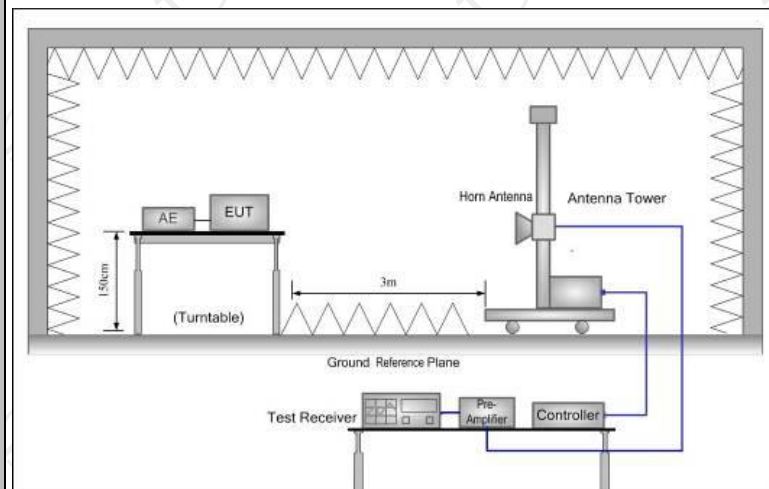
6.3. Radiated Spurious Emission Measurement

6.3.1. 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
	9kHz- 150kHz	Quasi-peak	200Hz	1kHz
	150kHz- 30MHz	Quasi-peak	9kHz	30kHz
	30MHz-1GHz	Quasi-peak	100KHz	300KHz
	Above 1GHz	Peak	1MHz	3MHz
Limit:	Remark			
	Quasi-peak Value			
	Quasi-peak Value			
	Quasi-peak Value			
	Peak Value			
Test setup:	Average Value			
	Frequency	Field Strength (microvolts/meter)	Measurement Distance (meters)	Detector
	0.009-0.490	2400/F(KHz)	300	
	0.490-1.705	24000/F(KHz)	30	
	1.705-30	30	30	
Test setup:	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
Test setup:	Above 1GHz	500	3	Average
		5000	3	Peak
	For radiated emissions below 30MHz			
				
	30MHz to 1GHz			



Above 1GHz



Test Procedure:

- 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

	<p>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.</p> <p>2. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level</p> <p>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.</p> <p>4. Use the following spectrum analyzer settings:</p> <p>(1) Span shall wide enough to fully capture the emission being measured;</p> <p>(2) Set RBW=100 kHz for $f < 1$ GHz; VBW \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold;</p> <p>(3) Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement.</p> <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

6.3.2. Test Instruments

Radiated Emission Test Site (966)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Test Receiver	ROHDE&SCHW ARZ	ESVD	100008	Aug. 27, 2019
Spectrum Analyzer	ROHDE&SCHW ARZ	FSQ	200061	Aug. 27, 2019
Pre-amplifier	EM Electronics Corporation CO.,LTD	EM30265	07032613	Aug. 27, 2019
Pre-amplifier	HP	8447D	2727A05017	Aug. 27, 2019
Loop antenna	ZHINAN	ZN30900A	12024	Aug. 27, 2019
Broadband Antenna	Schwarzbeck	VULB9163	340	Aug. 27, 2019
Horn Antenna	Schwarzbeck	BBHA 9120D	631	Aug. 27, 2019
Horn Antenna	Schwarzbeck	BBH 9170	582	Aug. 27, 2019
Antenna Mast	Keleto	CC-A-4M	N/A	N/A
Coax cable (9KHz-1GHz)	TCT	RE-low-01	N/A	Aug. 27, 2019
Coax cable (9KHz-40GHz)	TCT	RE-high-02	N/A	Aug. 27, 2019
Coax cable (9KHz-1GHz)	TCT	RE-low-03	N/A	Aug. 27, 2019
Coax cable (9KHz-40GHz)	TCT	RE-high-04	N/A	Aug. 27, 2019
EMI Test Software	Shurple Technology	EZ-EMC	N/A	N/A

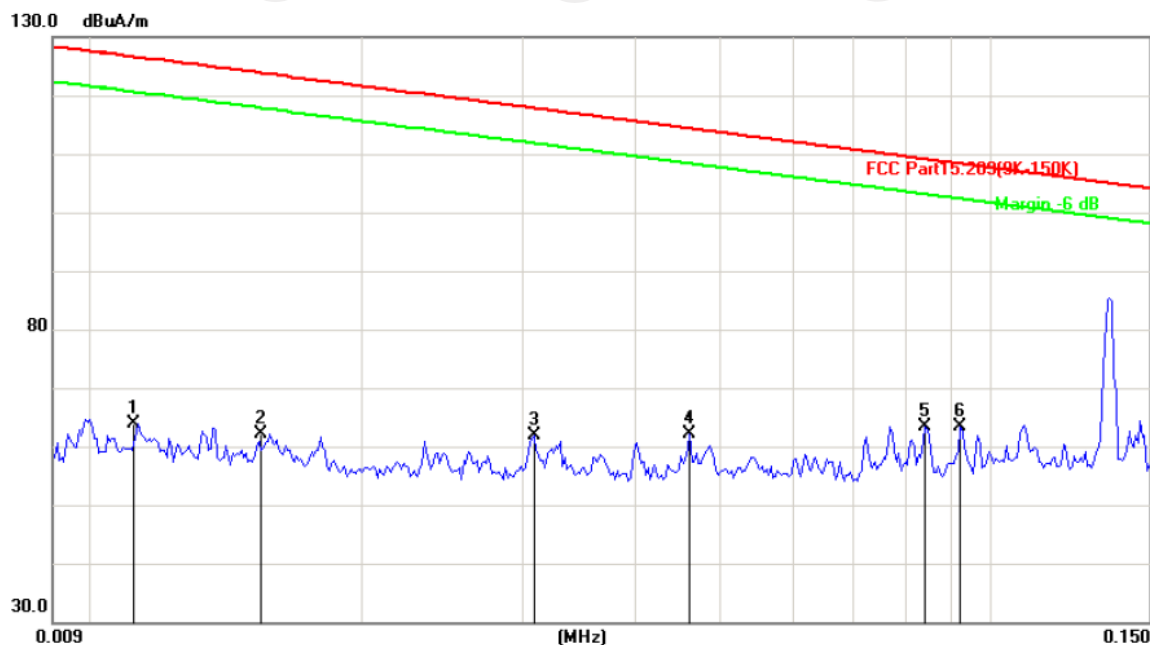
Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

6.3.3. Test Data

Please refer to following diagram for individual

9KHz-30MHz

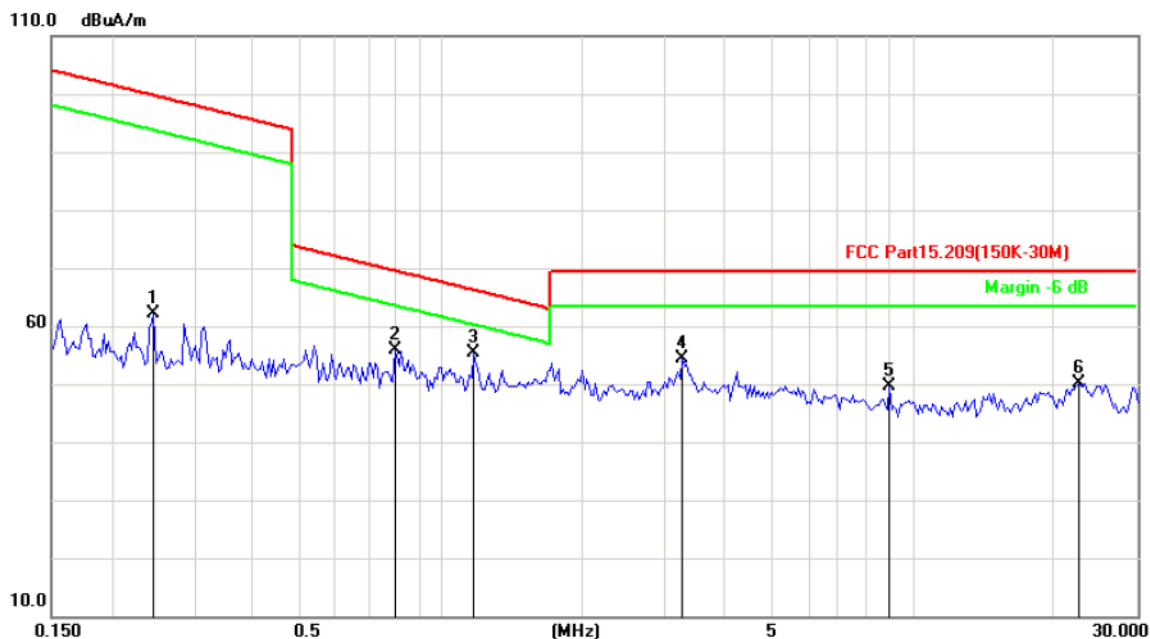
9KHz-150KHz:



Site: Polarization: **Vertical** Temperature: 25
 Limit: FCC Part15.209(9K-150K) Power: AC 120V/60Hz Humidity: 55 %

No.	Mk.	Freq. MHz	Reading Level dBuA	Correct Factor dB	Measure- ment dBuA/m	Limit dB/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1		0.0111	40.61	23.26	63.87	126.6	-62.82	peak		
2		0.0154	41.05	20.98	62.03	123.8	-61.82	peak		
3		0.0309	42.54	19.27	61.81	117.8	-56.00	peak		
4		0.0461	41.73	20.29	62.02	114.3	-52.32	peak		
5		0.0844	40.58	22.90	63.48	109.0	-45.61	peak		
6	*	0.0922	39.98	23.43	63.41	108.3	-44.91	peak		

150KHz-30MHz:

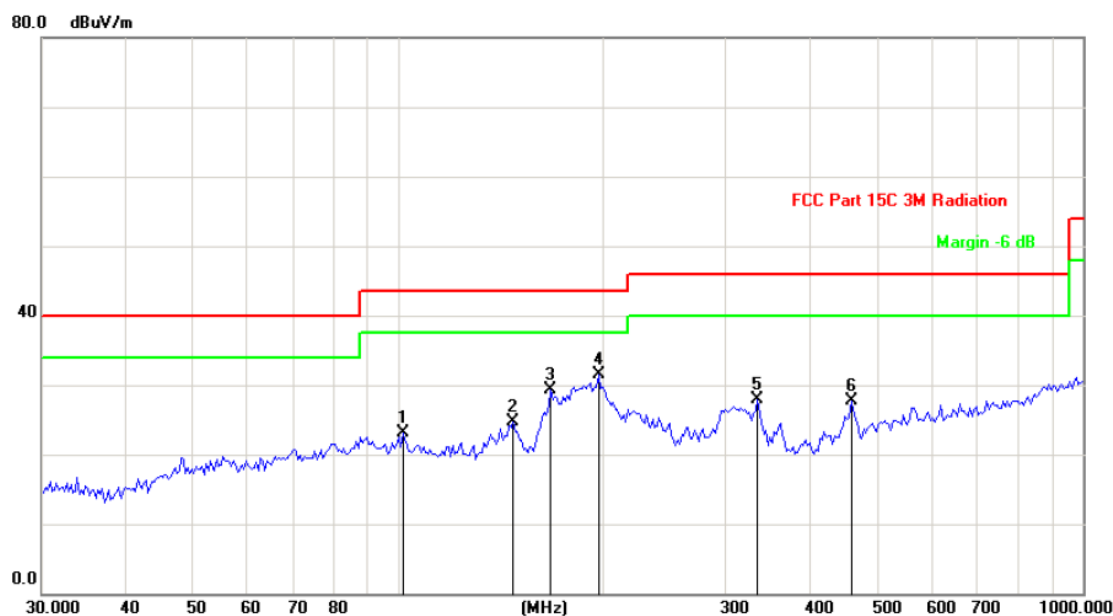


Site: Limit: FCC Part15.209(150K-30M) Polarization: **Vertical** Temperature: 25 Power: AC 120V/60Hz Humidity: 55 %

No.	Mk.	Freq. MHz	Reading Level dBuA	Correct Factor dB	Measure- ment dBuA/m	Limit dB/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1		0.2469	36.26	25.90	62.16	99.76	-37.60	peak		
2		0.8024	30.41	25.45	55.86	69.53	-13.67	peak		
3	*	1.1767	30.00	25.39	55.39	66.21	-10.82	peak		
4		3.2610	29.37	25.08	54.45	69.50	-15.05	peak		
5		8.9420	23.47	26.26	49.73	69.50	-19.77	peak		
6		22.5224	24.70	25.52	50.22	69.50	-19.28	peak		

30MHz-1GHz

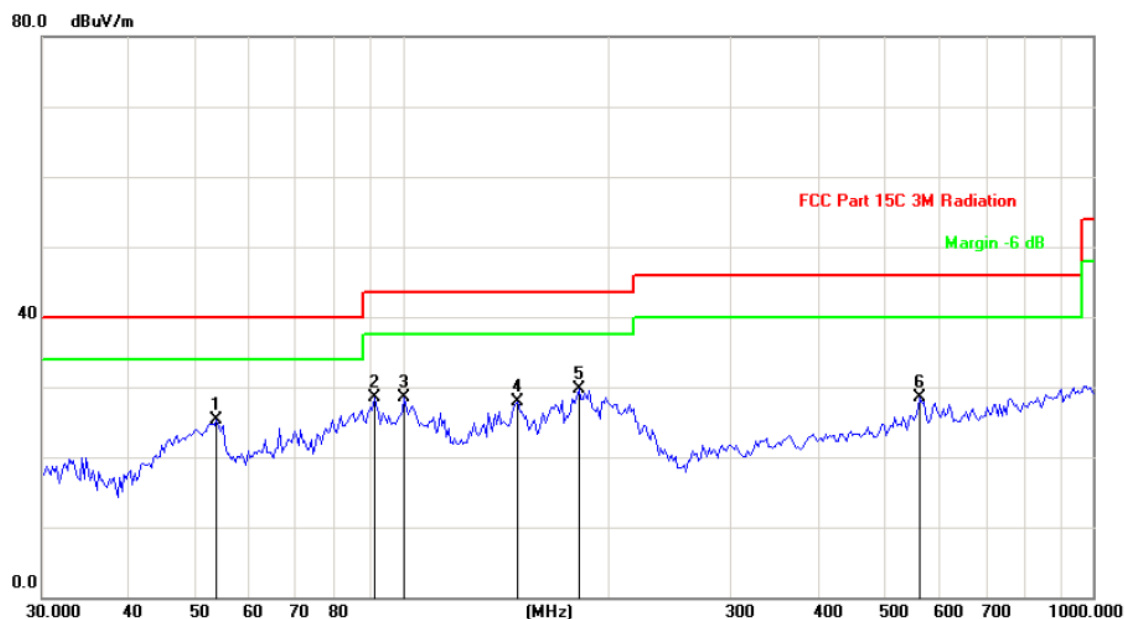
Horizontal:



Site: Polarization: **Horizontal** Temperature: 25
 Limit: FCC Part 15C 3M Radiation Power: AC 120V/60Hz Humidity: 55 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	cm	degree	Comment
1		101.1797	31.14	-8.10	23.04	43.50	-20.46	peak		
2		146.8392	40.62	-15.97	24.65	43.50	-18.85	peak		
3		166.6385	44.51	-15.17	29.34	43.50	-14.16	peak		
4	*	195.8701	45.12	-13.71	31.41	43.50	-12.09	peak		
5		334.1255	36.95	-8.96	27.99	46.00	-18.01	peak		
6		458.3987	34.24	-6.63	27.61	46.00	-18.39	peak		

Vertical:



Site Polarization: **Vertical** Temperature: 25
Limit: FCC Part 15C 3M Radiation Power: AC 120V/60Hz Humidity: 55 %

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Antenna Height cm	Table Degree	Comment
1		53.7559	36.18	-10.90	25.28	40.00	-14.72	peak		
2		91.0574	38.62	-10.15	28.47	43.50	-15.03	peak		
3		100.4712	36.49	-8.04	28.45	43.50	-15.05	peak		
4		146.8392	43.81	-15.97	27.84	43.50	-15.66	peak		
5	*	180.0304	44.23	-14.51	29.72	43.50	-13.78	peak		
6		562.0143	33.36	-4.79	28.57	46.00	-17.43	peak		

Note1:

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

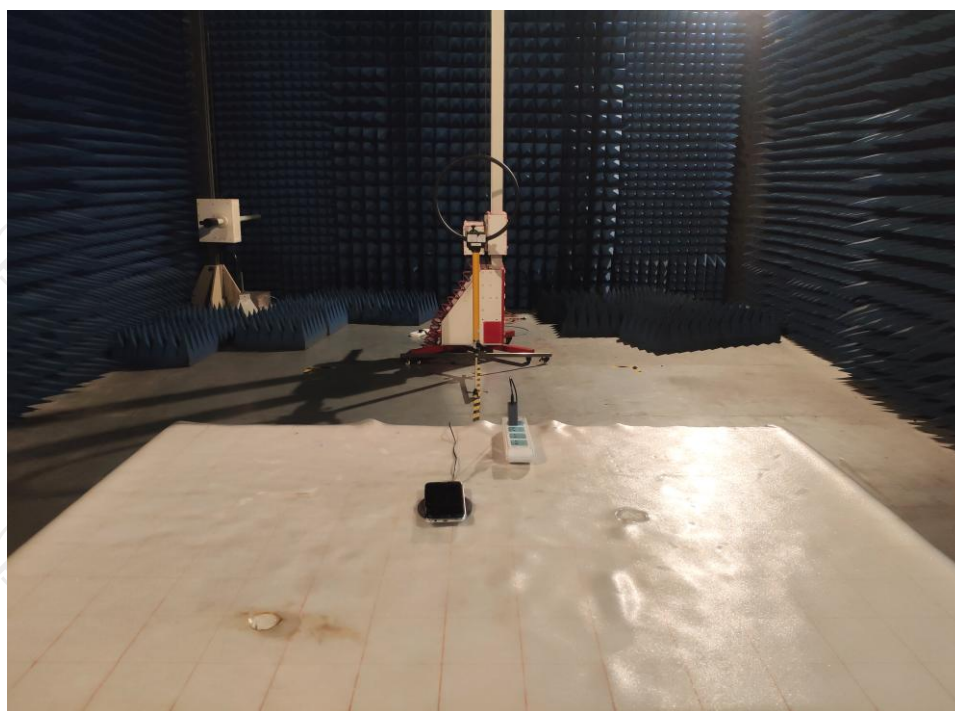
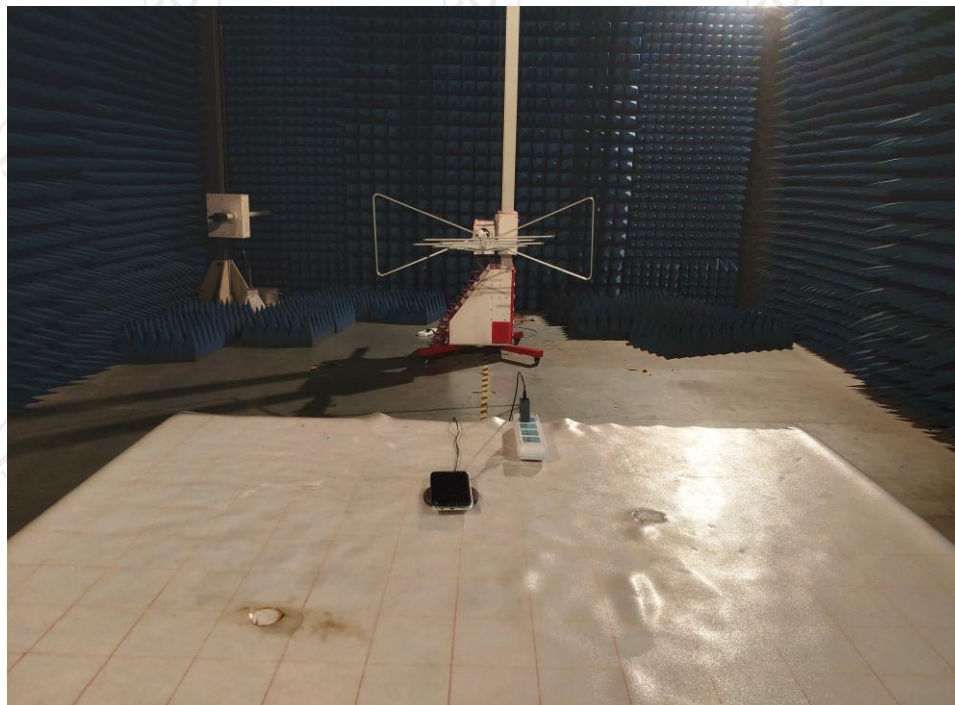
Note2: Both 5V/2A&9V/1.7A input modes are tested, and the test data of worse mode 9V/1.7A be listed

Appendix A: Photographs of Test Setup

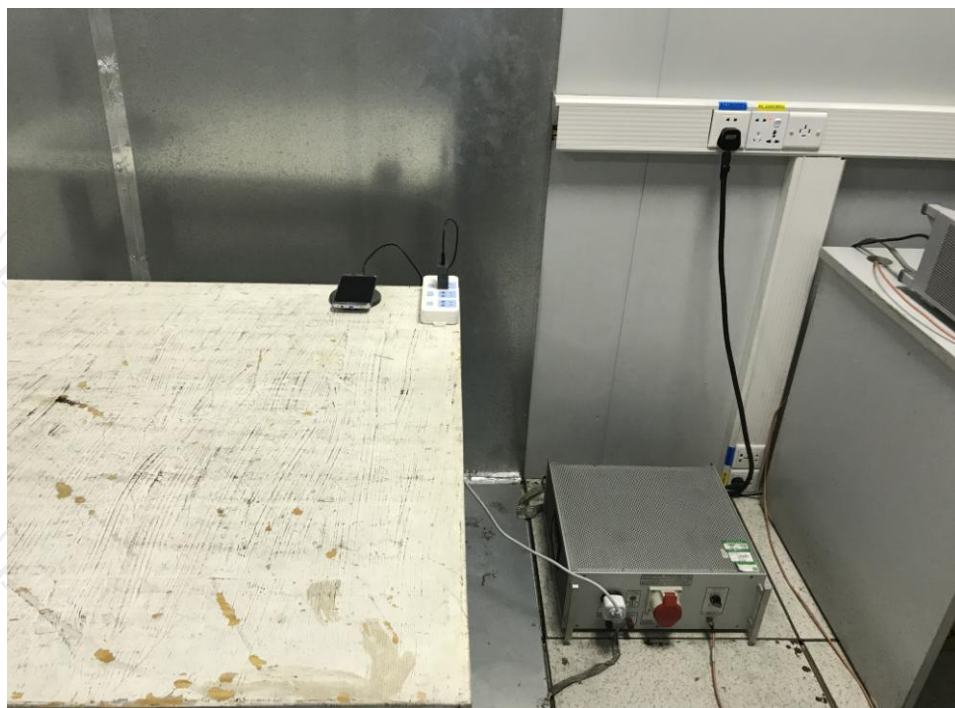
Product: CHARGING PAD

Model: 38568

Radiated Emission



Conducted Emission

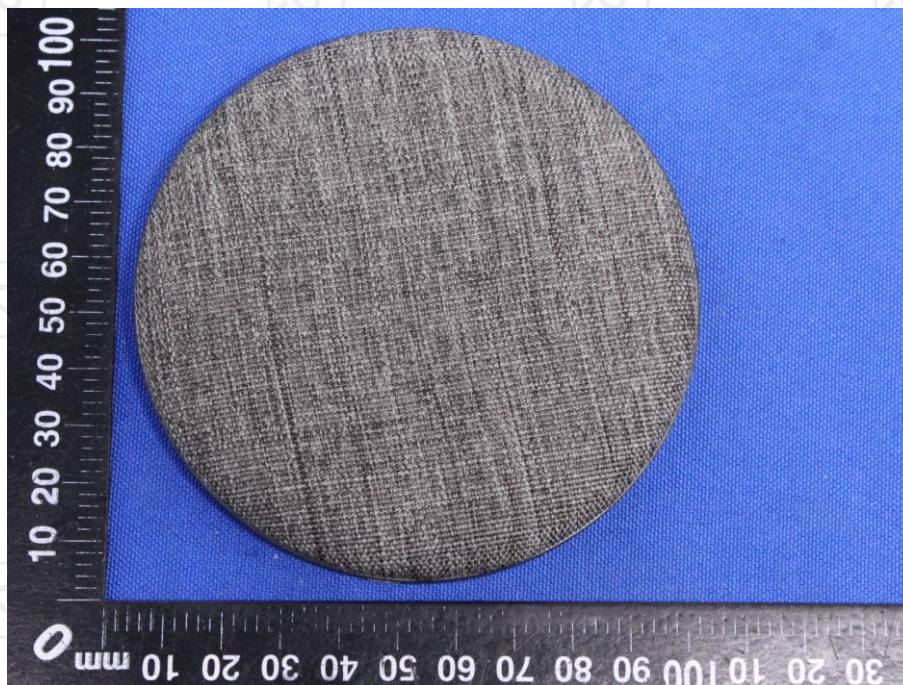
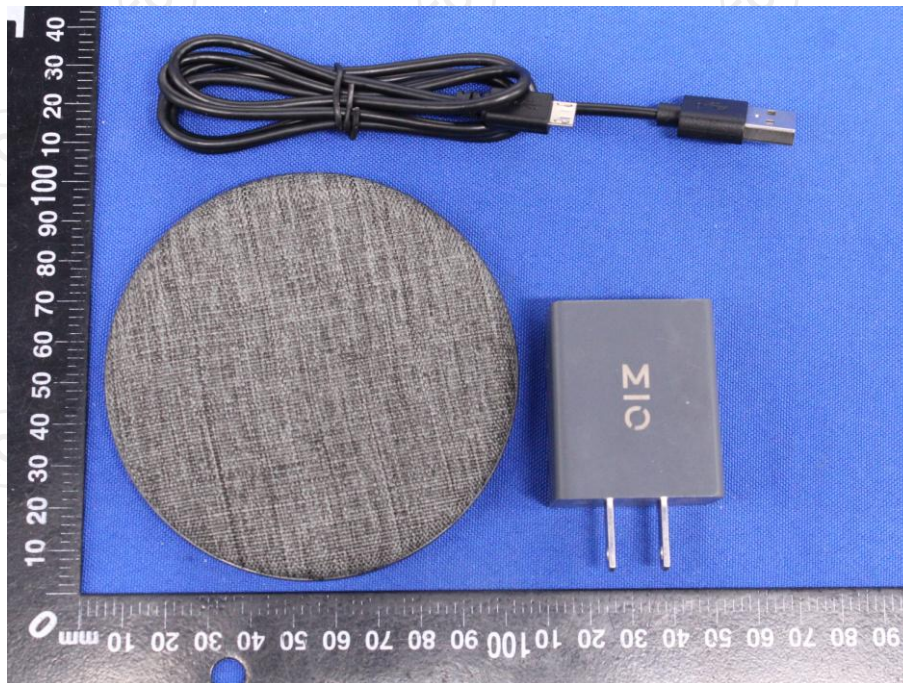


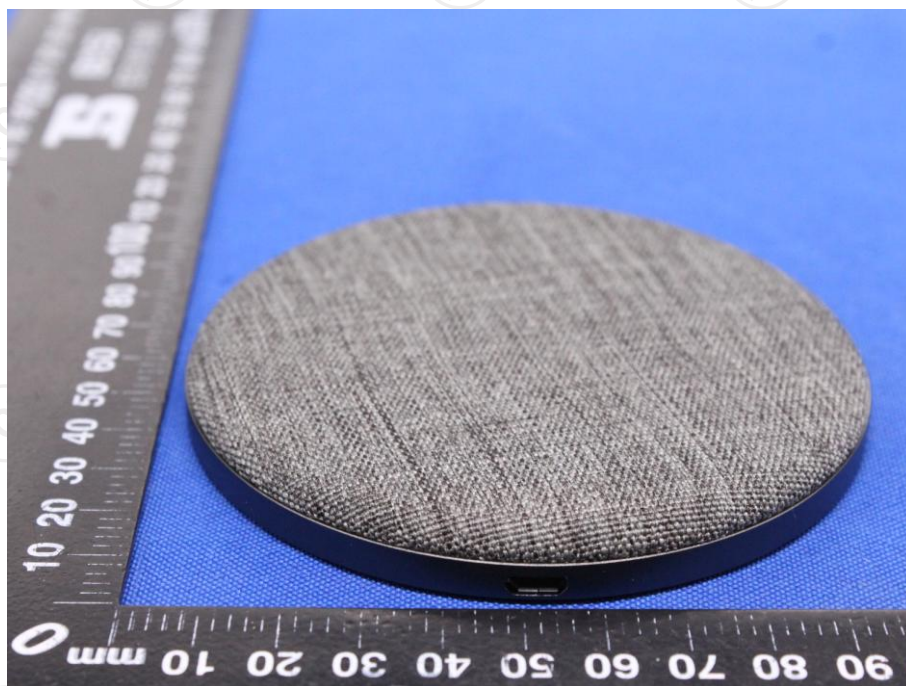
Appendix B: Photographs of EUT

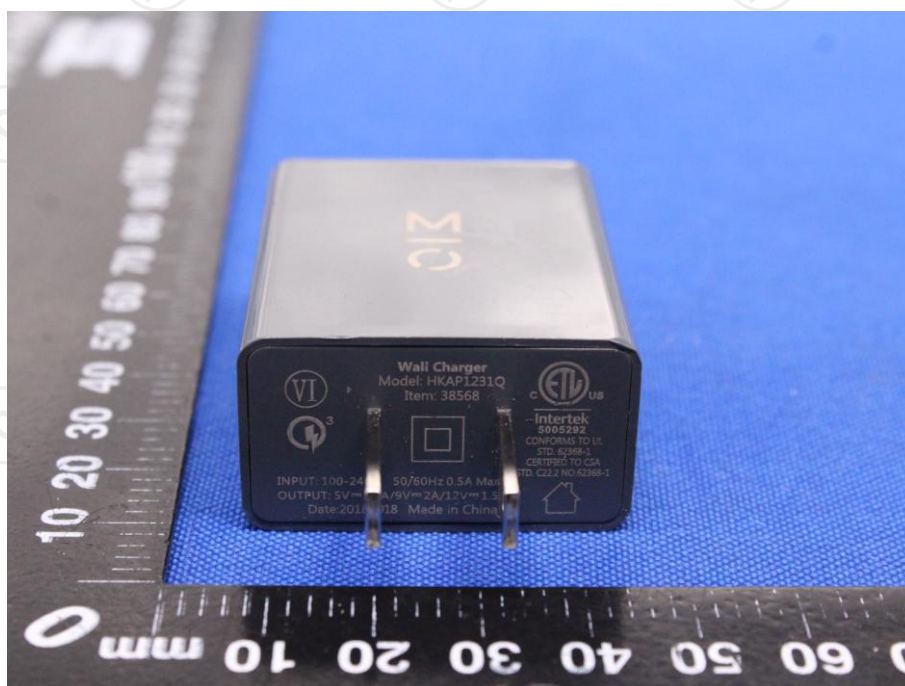
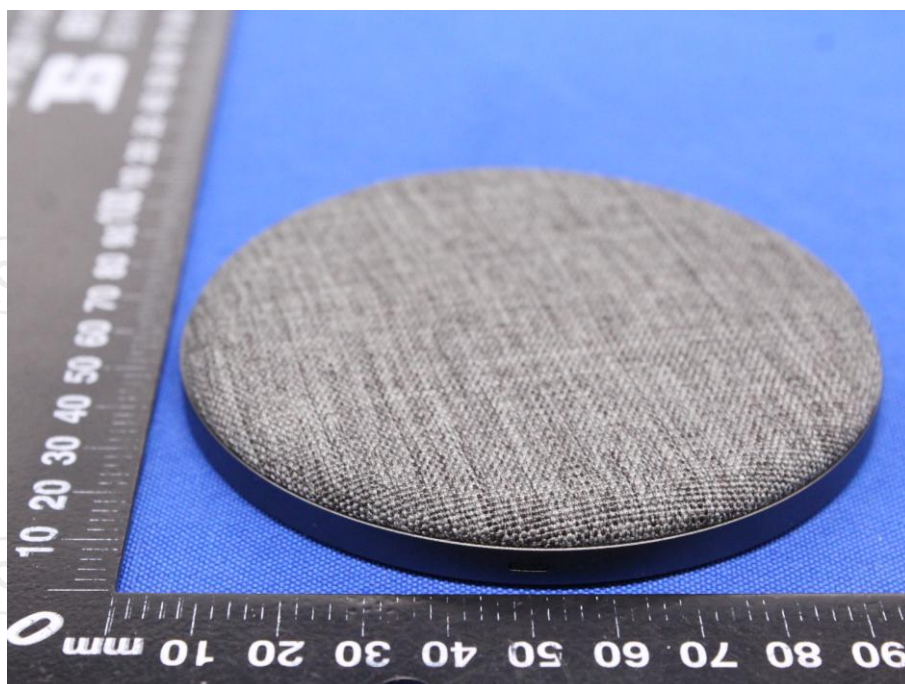
Product: CHARGING PAD

Model: 38568

External Photos

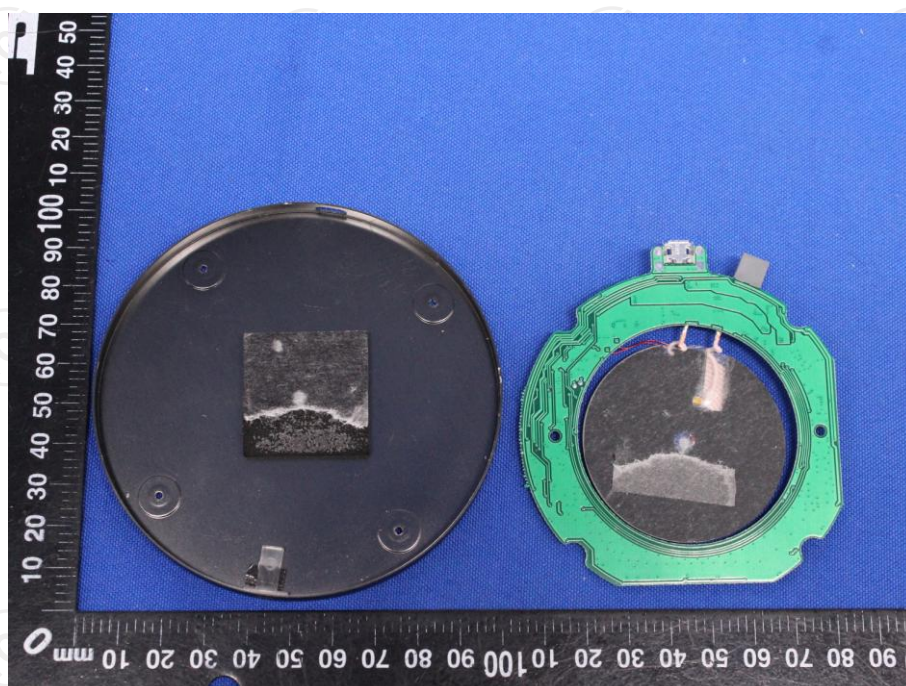
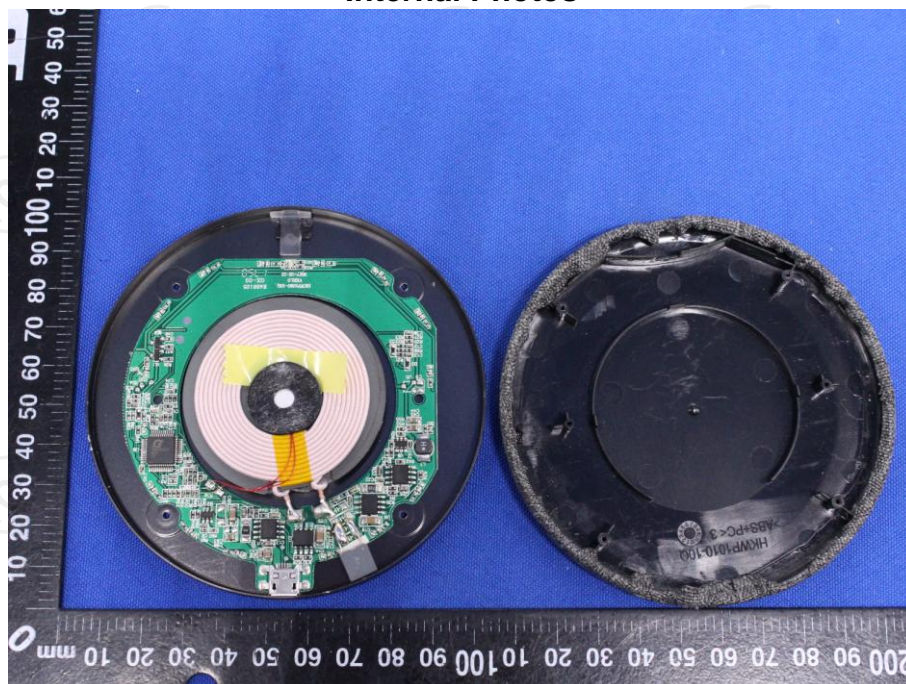


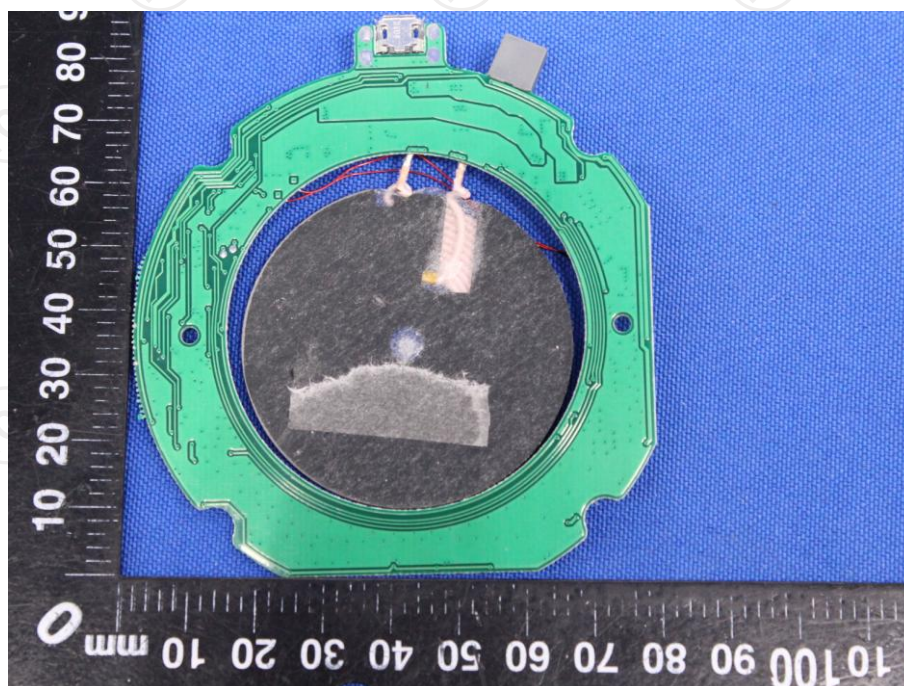
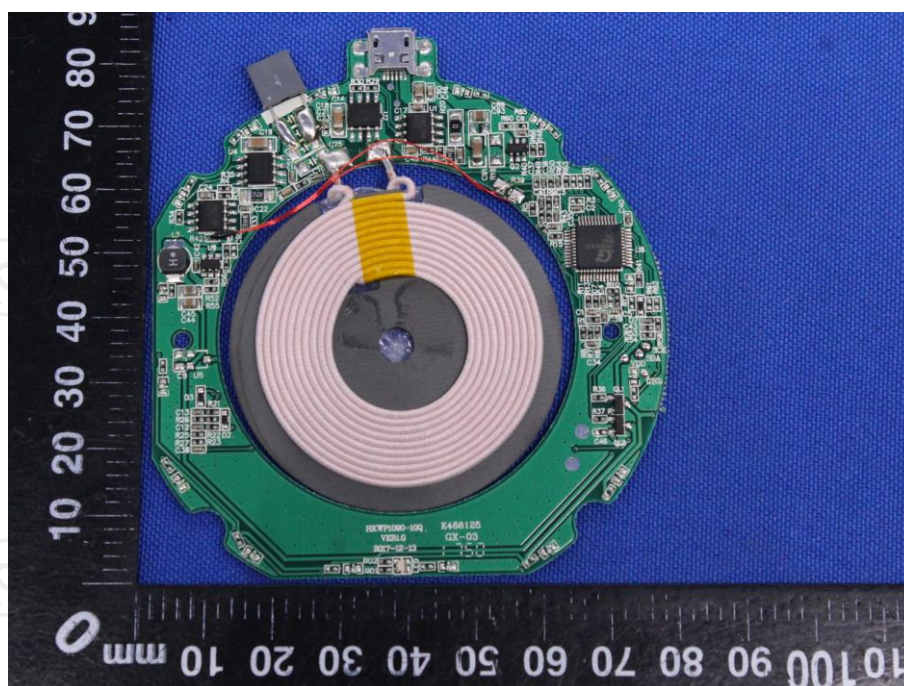






Product: CHARGING PAD
Model: 38568
Internal Photos





*******END OF REPORT*******