FCC REPORT

Applicant:	Gigastone Corporation
Address of Applicant:	12F., No.480, Rueiguang Rd., Neihu Dist., Taipei City 114, Taiwan (R.O.C.)
Manufacturer/Factory:	Shenzhen Nuohao Technology Co., Ltd.
Address of Manufacturer/Factory:	3F AB building, Pinchuangyuan Technology Park, N0.42 Industrial Road, Longhua Town, Shenzhen, China

Equipment Under Test (EUT)

Product Name:	2 in 1 Wireless Charger
Model No.:	WP-7310W, WP-7310
FCC ID:	2AR89-WP-7310W
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C
Date of sample receipt:	February 15, 2019
Date of Test:	February 18-22, 2019
Date of report issued:	February 22, 2019
Test Result :	PASS *

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

Authorized Signature:

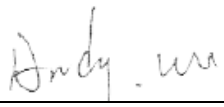
Robinson Lo
Laboratory Manager

2 Version

Version No.	Date	Description
00	*February 22, 2019*	*Original*

Prepared By:  ***Date:*** February 22, 2019

Project Engineer

Check By:  ***Date:*** February 22, 2019

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

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:	2 in 1 Wireless Charger
Model No.:	WP-7310W
Serial No.:	WP-7310
Test sample(s) ID:	GTS201808000126-1
Sample(s) Status	Engineer sample
Hardware:	HV1.0
Software:	SV1.0
Operation Frequency:	115kHz ~ 205KHz
Number of Frequency:	19 Channels
Modulation type:	Backscatter
Antenna Type:	Inductive loop coil Antenna
Antenna gain:	0dBi
Power supply:	Input : DC5.0V, 2A / DC9.0V, 2A Output Power : DC5V 1A,DC9V 1.1A(Max 10Watt) Output Power(Apple Watch): DC5V 0.4A

Operation Frequency each of channel

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	0.115	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		

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	FCC ID
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.

● 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.

● NVLAP (LAB CODE:600179-0)

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0

● CNAS (No. CNAS L5775)

CNAS has accredited Global United Technology Services Co., Ltd., to ISO/IEC 17025:2017 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.

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	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 27 2018	June. 26 2019
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 27 2018	June. 26 2019
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June. 27 2018	June. 26 2019
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 27 2018	June. 26 2019
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 27 2018	June. 26 2019
9	Coaxial Cable	GTS	N/A	GTS211	June. 27 2018	June. 26 2019
10	Coaxial cable	GTS	N/A	GTS210	June. 27 2018	June. 26 2019
11	Coaxial Cable	GTS	N/A	GTS212	June. 27 2018	June. 26 2019
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 27 2018	June. 26 2019
13	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	June. 27 2018	June. 26 2019
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 27 2018	June. 26 2019
15	Band filter	Amindeon	82346	GTS219	June. 27 2018	June. 26 2019
16	Power Meter	Anritsu	ML2495A	GTS540	June. 27 2018	June. 26 2019
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 27 2018	June. 26 2019
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS588	June. 27 2018	June. 26 2019
19	Splitter	Agilent	11636B	GTS237	June. 27 2018	June. 26 2019
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 27 2018	June. 26 2019

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. 27 2018	June. 26 2019
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 27 2018	June. 26 2019
4	Artificial Mains Network	SCHWARZBECK MESS	NSLK8127	GTS226	June. 27 2018	June. 26 2019
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. 27 2018	June. 26 2019
8	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	June. 27 2018	June. 26 2019

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 27 2018	June 26 2019
2	Thermo meter	KTJ	TA328	GTS233	June 27 2018	June 26 2019

7 Test results and Measurement Data

7.1 Antenna requirement:

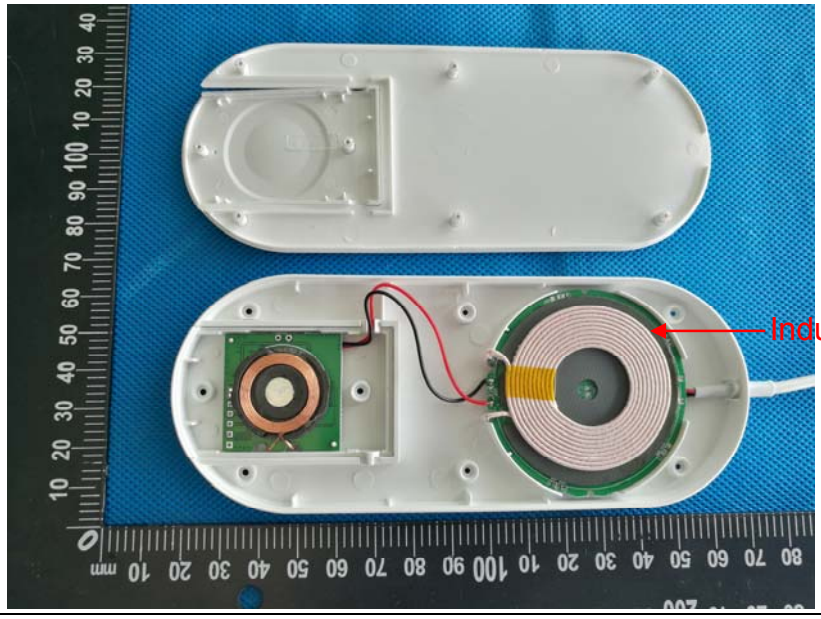
Standard requirement:	FCC Part15 C Section 15.203

15.203 requirement:

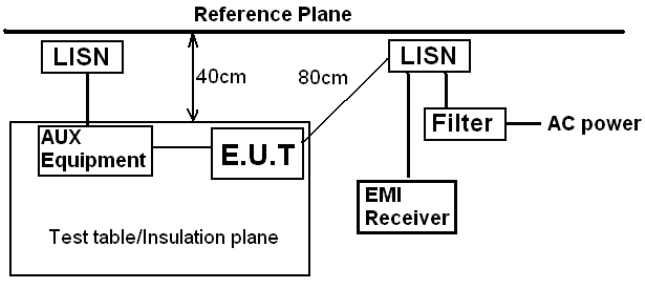
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit 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.

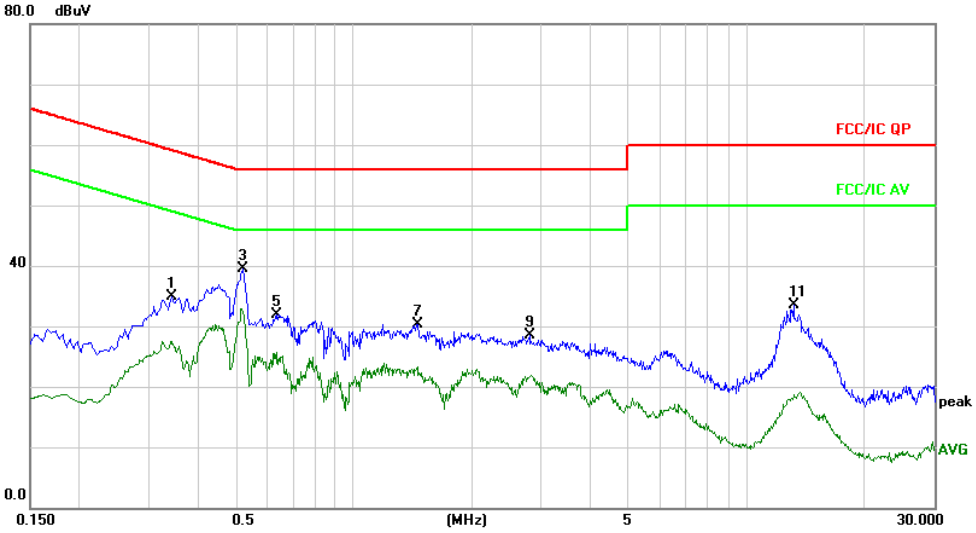


7.2 Conducted Emissions

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

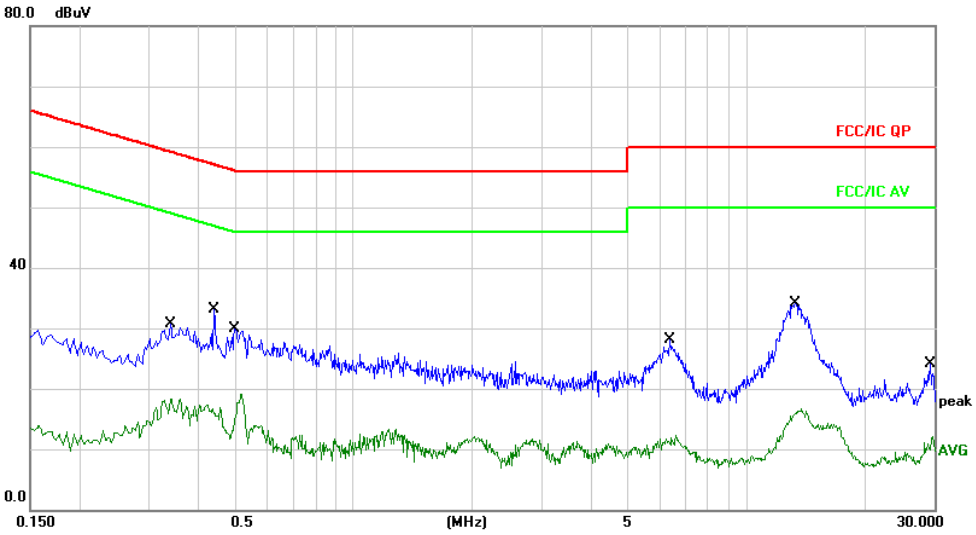
Measurement data:

Temperature：	26℃	Relative Humidity：	54%
Pressure：	1010hPa	Phase：	Line
Test Voltage ：	AC120V/60Hz	Test Mode：	Normal Link



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.3460	25.15	9.66	34.81	59.06	-24.25	QP	
2		0.3460	17.85	9.66	27.51	49.06	-21.55	AVG	
3		0.5220	29.80	9.68	39.48	56.00	-16.52	QP	
4	*	0.5220	23.16	9.68	32.84	46.00	-13.16	AVG	
5		0.6340	22.29	9.68	31.97	56.00	-24.03	QP	
6		0.6340	16.01	9.68	25.69	46.00	-20.31	AVG	
7		1.4580	20.67	9.70	30.37	56.00	-25.63	QP	
8		1.4580	13.62	9.70	23.32	46.00	-22.68	AVG	
9		2.8060	18.86	9.72	28.58	56.00	-27.42	QP	
10		2.8060	12.10	9.72	21.82	46.00	-24.18	AVG	
11		13.1420	23.71	9.84	33.55	60.00	-26.45	QP	
12		13.1420	9.17	9.84	19.01	50.00	-30.99	AVG	

Temperature：	26℃	Relative Humidity：	54%
Pressure：	1010hPa	Phase：	Neutral
Test Voltage ：	AC120V/60Hz	Test Mode：	Normal Link



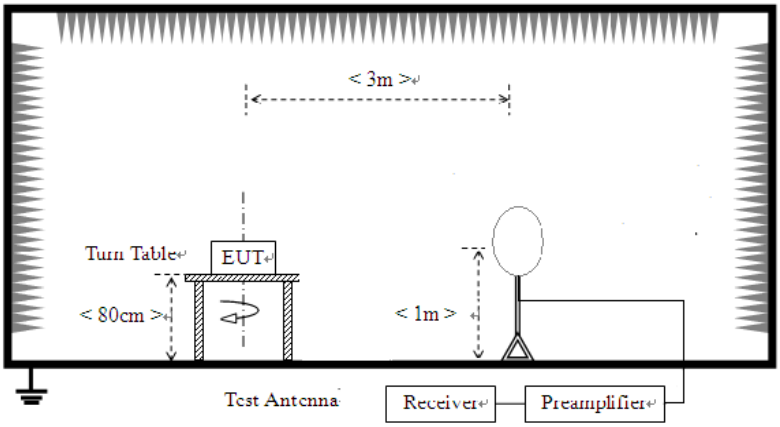
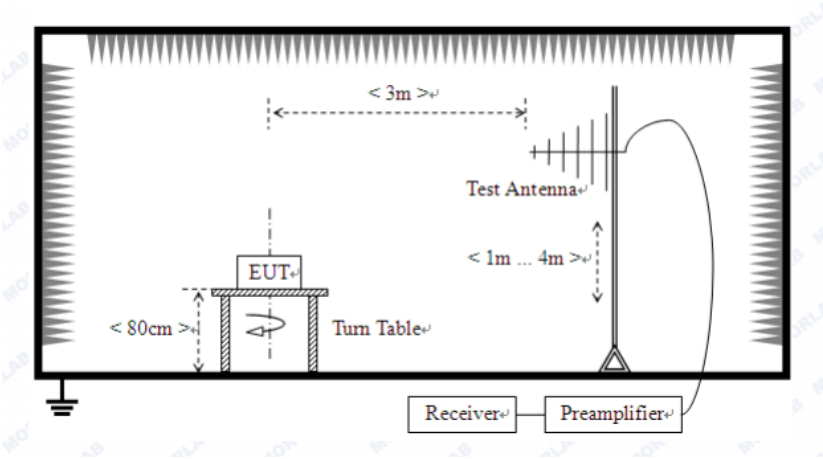
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.3420	21.07	9.65	30.72	59.15	-28.43	QP	
2		0.3420	8.74	9.65	18.39	49.15	-30.76	AVG	
3	*	0.4420	23.39	9.67	33.06	57.02	-23.96	QP	
4		0.4420	8.71	9.67	18.38	47.02	-28.64	AVG	
5		0.4980	20.27	9.68	29.95	56.03	-26.08	QP	
6		0.4980	9.40	9.68	19.08	46.03	-26.95	AVG	
7		6.3700	18.41	9.78	28.19	60.00	-31.81	QP	
8		6.3700	2.54	9.78	12.32	50.00	-37.68	AVG	
9		13.3140	24.26	9.89	34.15	60.00	-25.85	QP	
10		13.3140	6.80	9.89	16.69	50.00	-33.31	AVG	
11		29.2940	13.93	10.08	24.01	60.00	-35.99	QP	
12		29.2940	2.11	10.08	12.19	50.00	-37.81	AVG	

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>
</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>
</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. 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 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.
</td></tr>
</table>

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

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(kHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
115.0000	63.42	20.36	83.78	126.39	-42.61	PK
115.0000	54.87	20.36	75.23	106.39	-31.16	AV
160.0000	66.67	20.41	87.08	123.52	-36.44	PK
160.0000	55.38	20.41	75.79	103.52	-27.73	AV
205.0000	64.36	20.46	84.82	121.37	-36.55	PK
205.0000	56.59	20.46	77.05	101.37	-24.32	AV

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(kHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
35.5000	34.85	20.15	55.00	136.60	-81.60	PK
35.5000	32.04	20.15	52.19	116.60	-64.41	AV
58.7000	45.17	20.33	65.50	132.23	-66.73	PK
58.7000	43.02	20.33	63.35	112.23	-48.88	AV
101.2000	48.20	20.55	68.75	107.50	-38.75	QP
188.0000	56.19	21.23	77.42	122.12	-44.70	PK
188.0000	34.35	21.23	55.58	102.12	-46.54	AV
1524.0000	14.75	22.29	37.04	63.94	-26.90	QP

Note:

Pre-scan in the all of mode, the worst case in of was recorded.

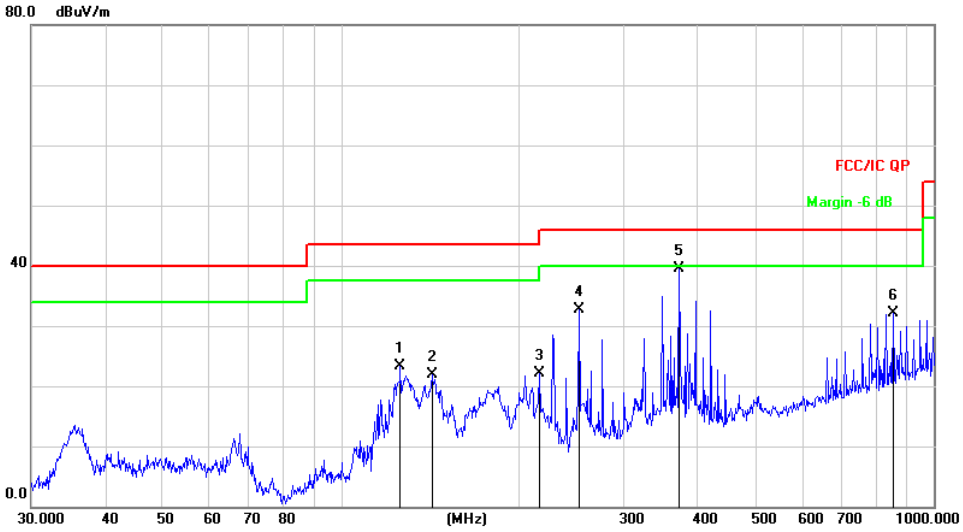
Factor = antenna factor + cable loss – pre-amplifier.

Margin = Emission Level- Limit.

All the measurements are performed under C63.10-2013 section 6.4.6 and 6.4.7, the measurement antenna was aligned along the site axis, orthogonal to the axis, and then with the measurement antenna horizontal, only the worst-case results recorded

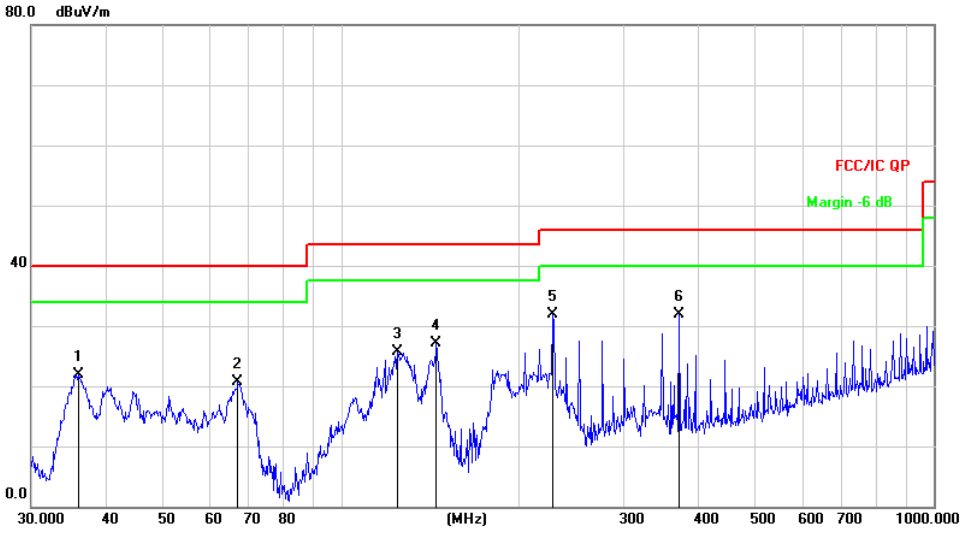
30MHz~1GHz

Temperature：	26℃	Relative Humidity：	54%
Pressure：	1010 hPa	Polarization：	Horizontal
Test Voltage ：	AC120V/60Hz		
Test Mode ：	Normal Link		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		125.8864	42.57	-19.22	23.35	43.50	-20.15	QP
2		142.3244	41.70	-19.89	21.81	43.50	-21.69	QP
3		216.0240	37.78	-15.61	22.17	46.00	-23.83	QP
4		252.0627	46.31	-13.69	32.62	46.00	-13.38	QP
5	*	372.0045	49.77	-10.30	39.47	46.00	-6.53	QP
6		854.0247	32.39	-0.20	32.19	46.00	-13.81	QP

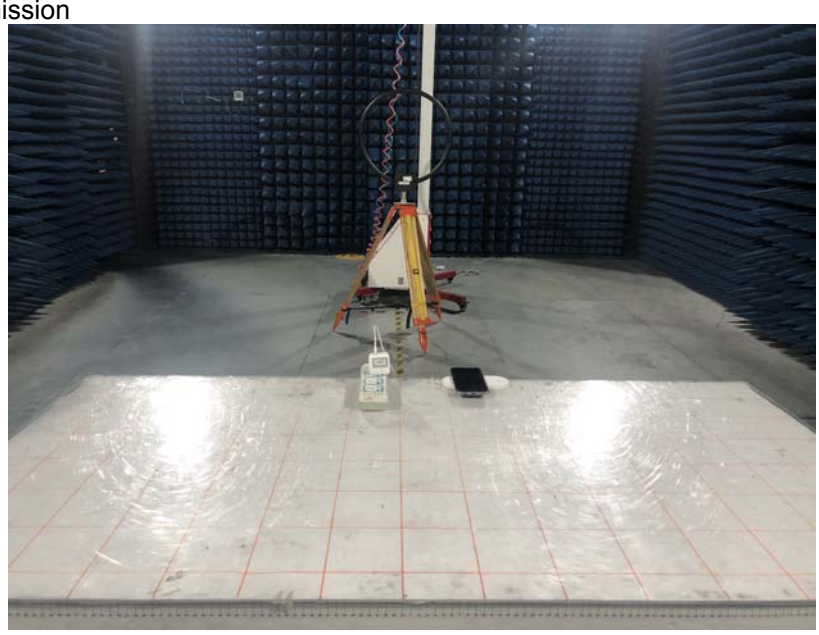
Temperature：	26℃	Relative Humidity：	54%
Pressure：	1010 hPa	Polarization：	Vertical
Test Voltage ：	AC120V/60Hz		
Test Mode ：	Normal Link		

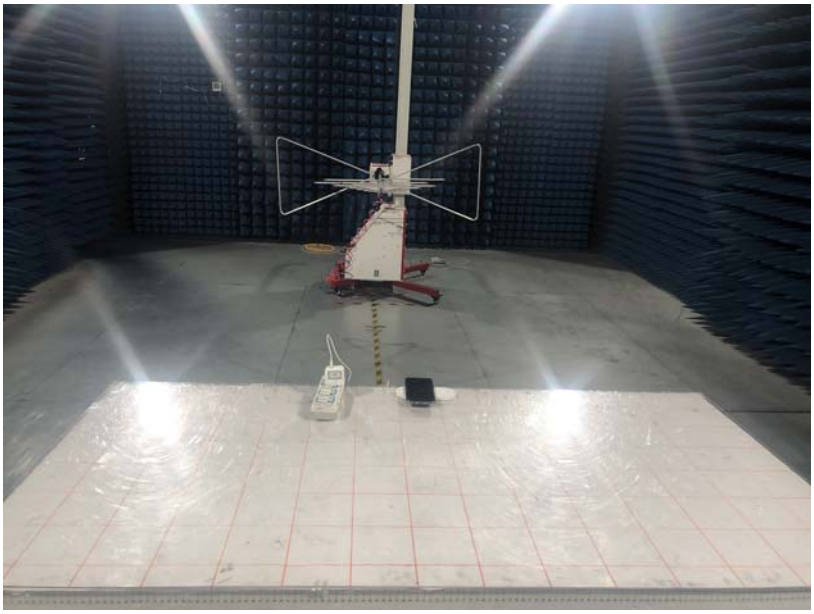


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		36.0007	38.93	-17.10	21.83	40.00	-18.17	QP
2		66.9669	38.27	-17.55	20.72	40.00	-19.28	QP
3		124.5690	44.75	-19.06	25.69	43.50	-17.81	QP
4		144.8418	46.94	-19.89	27.05	43.50	-16.45	QP
5	*	227.6906	46.72	-14.75	31.97	46.00	-14.03	QP
6		372.0045	42.23	-10.30	31.93	46.00	-14.07	QP

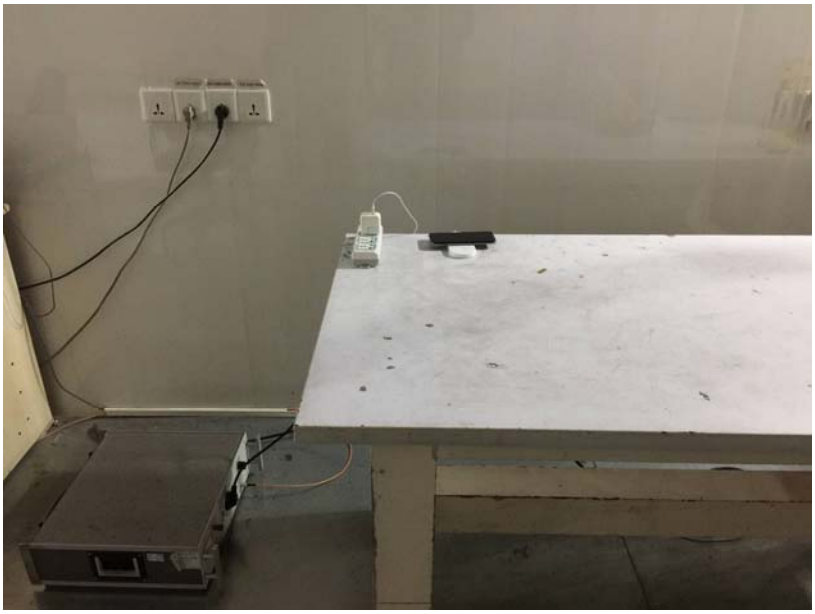
8 Test Setup Photo

Radiated Emission

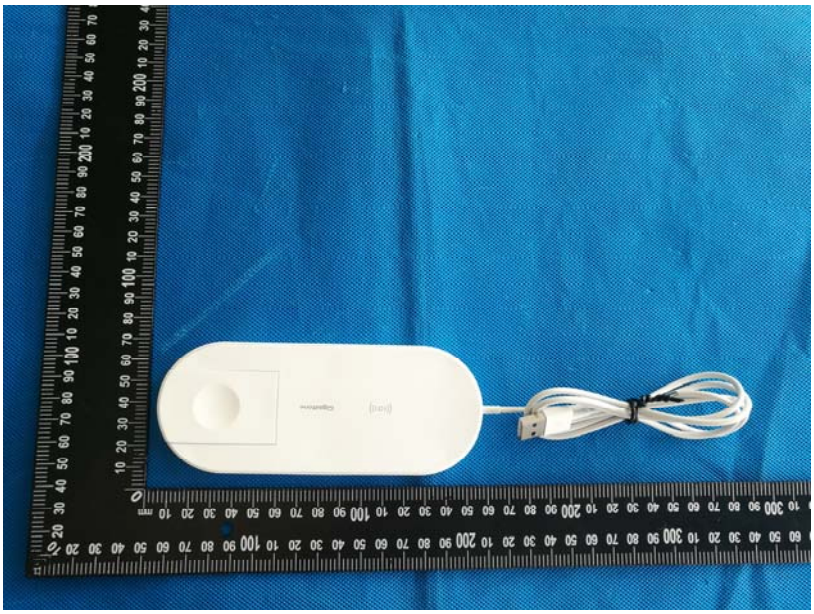


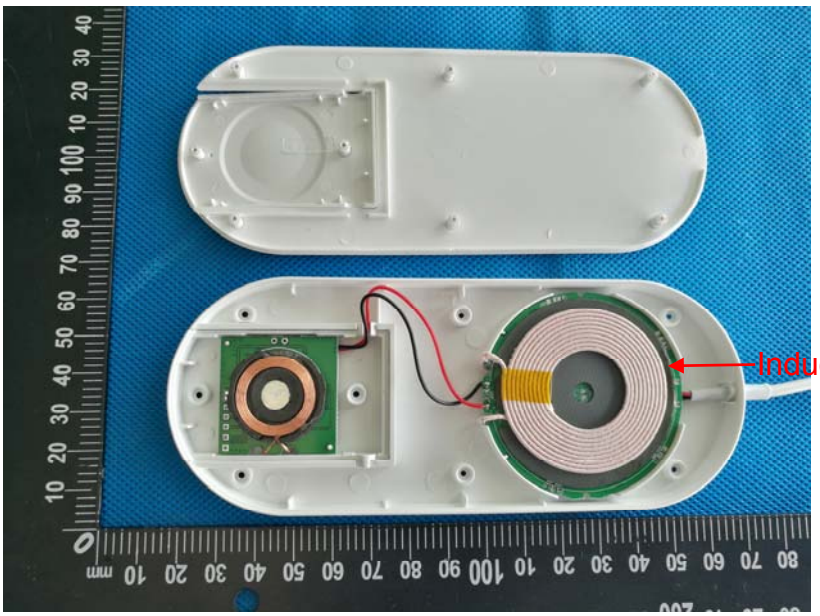


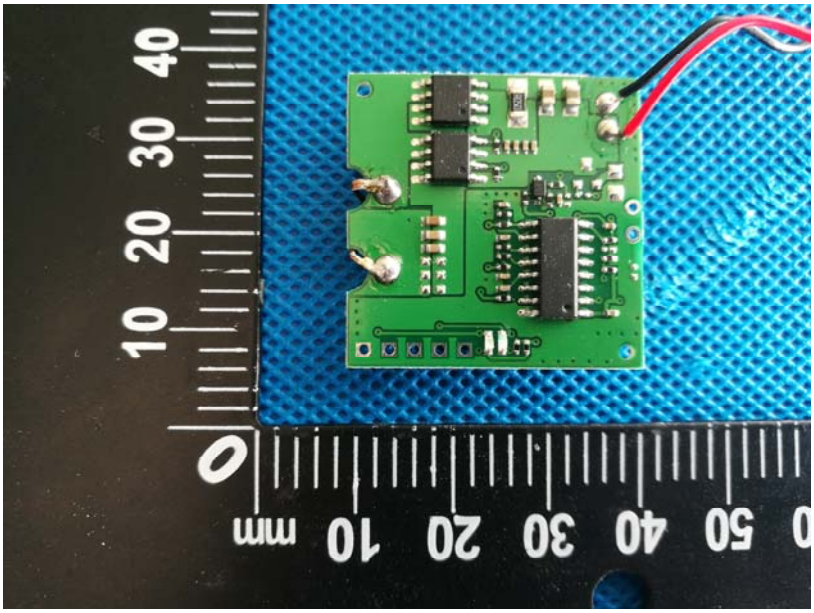
Conducted Emission

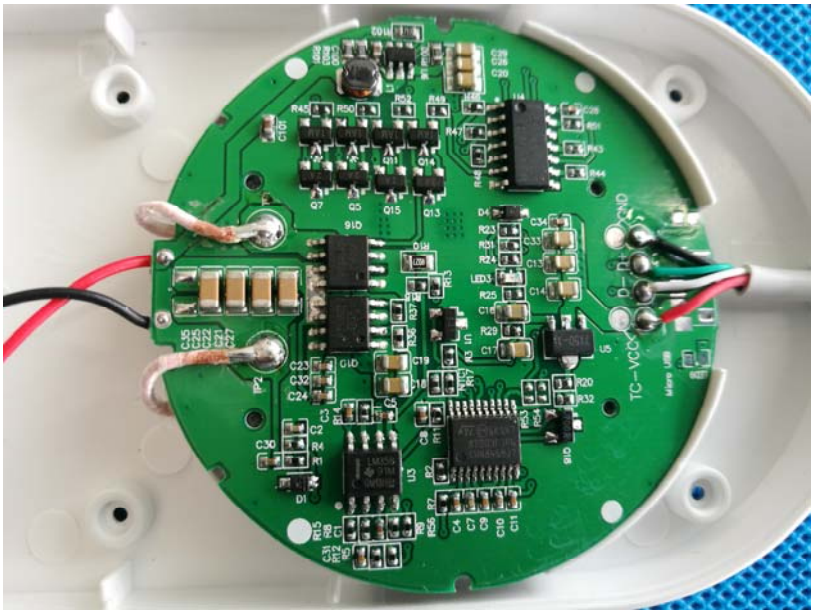


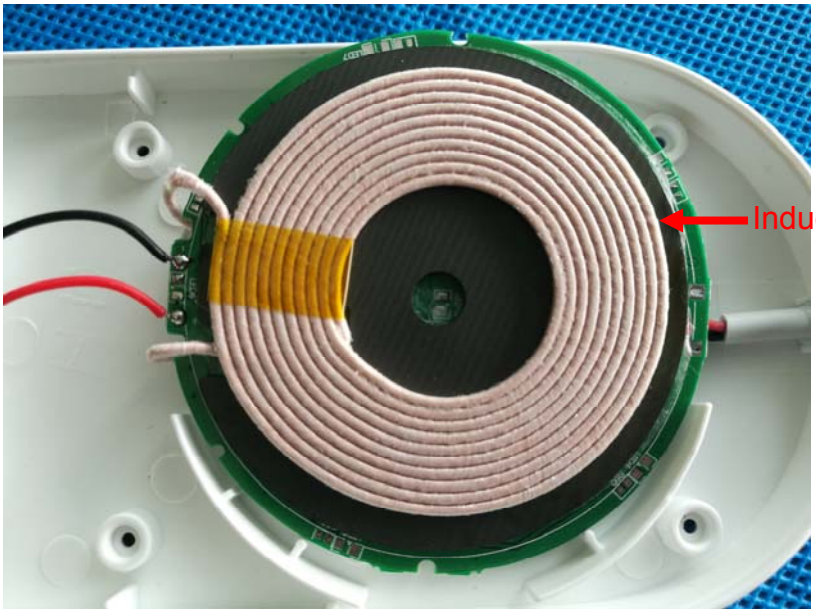
9 EUT Constructional Details

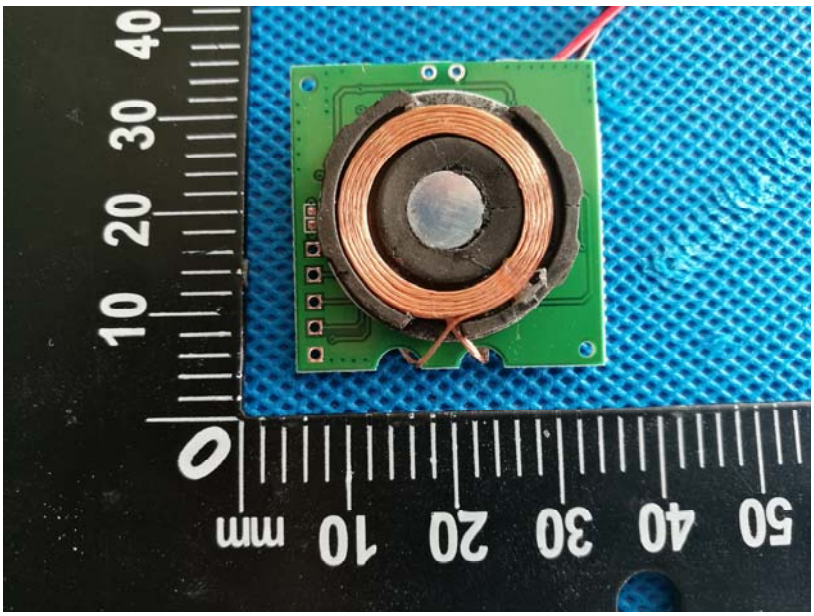



Inductive loop coil Antenna






Inductive loop coil Antenna



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