TCT 通测检测
TESTING CENTRE TECHNOLOGY

TEST REPORT

FCC ID. ..... :	2A5HQ-C1944
Test Report No..... :	TCT220303E007
Date of issue..... :	Mar. 25, 2022
Testing laboratory ..... :	SHENZHEN TONGCE TESTING LAB
Testing location/ address:	TCT Testing Industrial Park Fuqiao 5th Industrial Zone, Fuhai Street, Bao'an District Shenzhen, Guangdong, 518103, People's Republic of China
Applicant's name..... :	Ciro Corporation
Address..... :	1310 Gateway Circle, Hudson, WISCONSIN 54016
Manufacturer's name ... :	Ciro Corporation
Address..... :	1310 Gateway Circle, Hudson, WISCONSIN 54016
Standard(s) ..... :	FCC CFR Title 47 Part 15 Subpart C
Product Name..... :	CYBERCHARGER
Trade Mark ..... :	Ciro
Model/Type reference..... :	52310, 52311, 50002, 58002
Rating(s) ..... :	DC 12V
Date of receipt of test item ..... :	Mar. 03, 2022
Date (s) of performance of test..... :	Mar. 03, 2022 - Mar. 25, 2022
Tested by (+signature) ... :	Rleo LIU
Check by (+signature).... :	Beryl ZHAO
Approved by (+signature):	Tomsin

General disclaimer:

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1. General Product Information

1.1. EUT description

Product Name.....:	CYBERCHARGER
Model/Type reference.....:	52310
Sample Number.....:	TCT220303E007-0101
Operation Frequency .....:	127.20kHz-147.90kHz
Modulation Technology .....:	Load modulation
Antenna Type.....:	Inductive loop coil Antenna
Rating(s) .....:	DC 12V

Note: The antenna gain listed in this report is provided by applicant, and the test laboratory is not responsible for this parameter.

1.2. Model(s) list

No.	Model No.	Tested with
1	52310	☒
Other models	52311, 50002, 58002	☐

Note: 52310 is tested model, other models are derivative models. The models are identical in circuit and PCB layout, only different on the model names. So the test data of 52310 can represent the remaining models.

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2. Test Result Summary

Requirement	CFR 47 Section	Result
Antenna requirement	§15.203	PASS
AC Power Line Conducted Emission	§15.207	N/A
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. General Information

3.1. Test environment and mode

Operating Environment:	
Condition	Radiated Emission
Temperature:	25.0 °C
Humidity:	55 % RH
Atmospheric Pressure:	1010 mbar
Test Mode:	
Engineering mode:	Keep the EUT in continuous transmitting (15W Max).
The sample was placed 0.8m for the measurement below above the ground plane of 3m chamber. Measurements in vertical polarity was 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(Z axis) are shown in Test Results of the following pages.	

3.2. 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
15W coil Load	/	/	/	/

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.

4. Facilities and Accreditations

4.1. Facilities

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

- FCC - Registration No.: 645098
  SHENZHEN TONGCE TESTING LAB
  Designation Number: CN1205
  The testing lab 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
  SHENZHEN TONGCE TESTING LAB
  CAB identifier: CN0031
  The testing lab has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing.

4.2. Location

SHENZHEN TONGCE TESTING LAB
Address: TCT Testing Industrial Park Fuqiao 5th Industrial Zone, Fuhai Street, Bao'an District Shenzhen, Guangdong, 518103, People's Republic of China
TEL: +86-755-27673339

4.3. Measurement Uncertainty

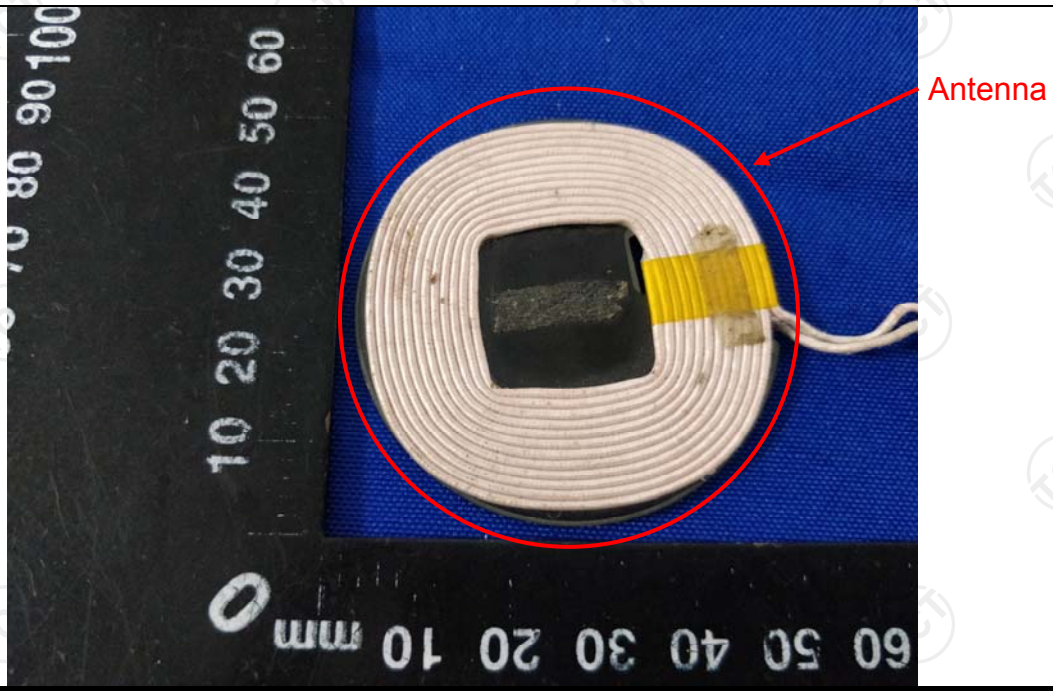
The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

No.	Item	MU
1	Conducted Emission	± 3.10 dB
2	RF power, conducted	± 0.12 dB
3	Spurious emissions, conducted	± 0.11 dB
4	All emissions, radiated(<1 GHz)	± 4.56 dB
5	All emissions, radiated(1 GHz - 18 GHz)	± 4.22 dB
6	All emissions, radiated(18 GHz- 40 GHz)	± 4.36 dB

5. Test Results and Measurement Data

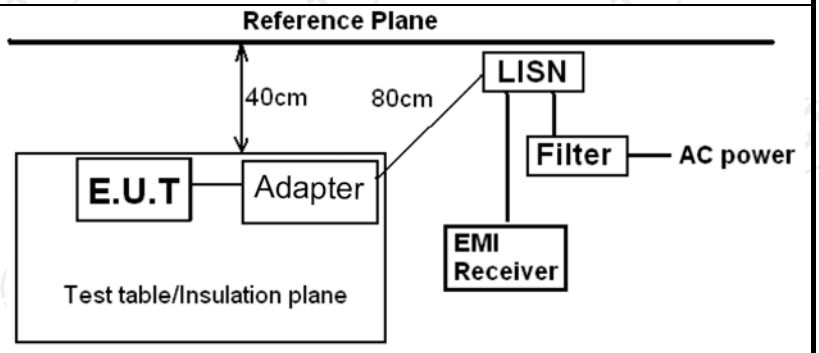
5.1. Antenna requirement

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 inductive loop coil antenna which permanently attached.	



5.2. Conducted Emission

5.2.1. Test Specification

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.207</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2013</td></tr>
<tr><td>Frequency Range:</td><td>150 kHz to 30 MHz</td></tr>
<tr><td>Receiver setup:</td><td>RBW=9 kHz, VBW=30 kHz, Sweep time=auto</td></tr>
<tr><td>Limits:</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>
</td></tr>
<tr><td>Test Setup:</td><td>


Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m
</td></tr>
<tr><td>Test Mode:</td><td>Transmitting Mode</td></tr>
<tr><td>Test Procedure:</td><td>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.</td></tr>
<tr><td>Test Result:</td><td>N/A</td></tr>
</table>

5.3. Radiated Spurious Emission Measurement

5.3.1. 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 3.1

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	120KHz	300KHz	Quasi-peak Value
Above 1GHz	Peak	1MHz	3MHz	Peak Value
	Peak	1MHz	10Hz	Average Value

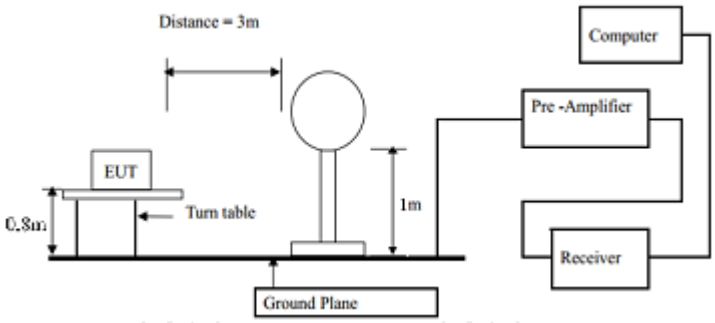
Limit:

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

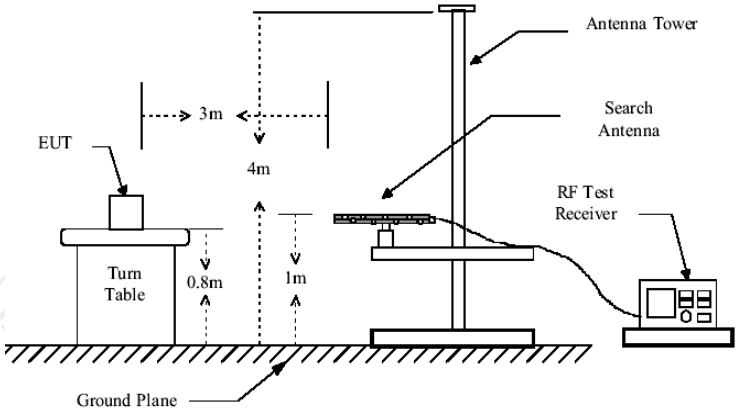
Frequency	Field Strength (microvolts/meter)	Measurement Distance (meters)	Detector
Above 1GHz	500	3	Average
	5000	3	Peak

Test setup:

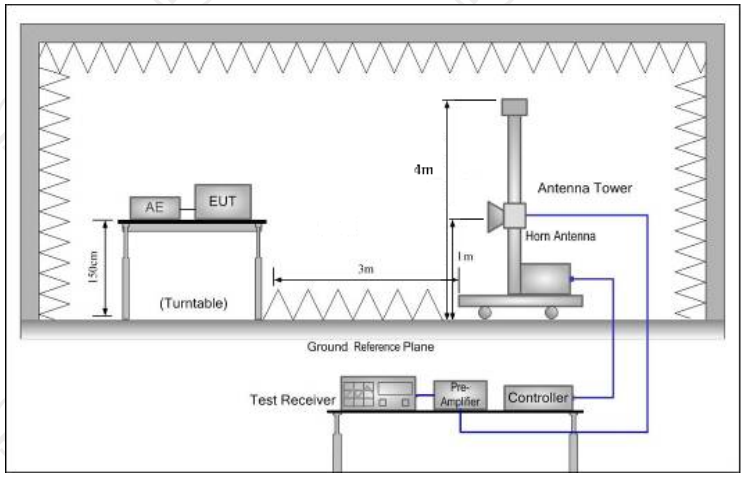
For radiated emissions below 30MHz



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 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. 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: (1) Span shall wide enough to fully capture the emission being measured; (2) Set RBW=120 kHz for f < 1 GHz; VBW ≥RBW; Sweep = auto; Detector function = peak; Trace = max hold; (3) Set RBW = 1 MHz, VBW= 3MHz for f 1 GHz for peak measurement. For average measurement: VBW = 10 Hz, when duty cycle is no less than 98 percent. VBW ≥ 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.
Test mode:	Refer to section 3.1 for details
Test results:	PASS

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5.3.2. Test Instruments

Radiated Emission Test Site (966)				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
EMI Test Receiver	R&S	ESIB7	100197	Jul. 07, 2022
Spectrum Analyzer	R&S	FSQ40	200061	Jul. 07, 2022
Pre-amplifier	SKET	LNPA_0118G-45	SK2021012102	Feb. 24, 2023
Pre-amplifier	SKET	LNPA_1840G-50	SK202109203500	Apr. 08, 2022
Pre-amplifier	HP	8447D	2727A05017	Jul. 07, 2022
Loop antenna	ZHINAN	ZN30900A	12024	Sep. 05, 2022
Broadband Antenna	Schwarzbeck	VULB9163	340	Sep. 04, 2022
Horn Antenna	Schwarzbeck	BBHA 9120D	631	Sep. 04, 2022
Horn Antenna	Schwarzbeck	BBHA 9170	00956	Apr. 10, 2023
Antenna Mast	Keleto	RE-AM	N/A	N/A
Coaxial cable	SKET	RC_DC18G-N	N/A	Apr. 08, 2022
Coaxial cable	SKET	RC-DC18G-N	N/A	Apr. 08, 2022
Coaxial cable	SKET	RC-DC40G-N	N/A	Jul. 07, 2022
EMI Test Software	Shurple Technology	EZ-EMC	N/A	N/A

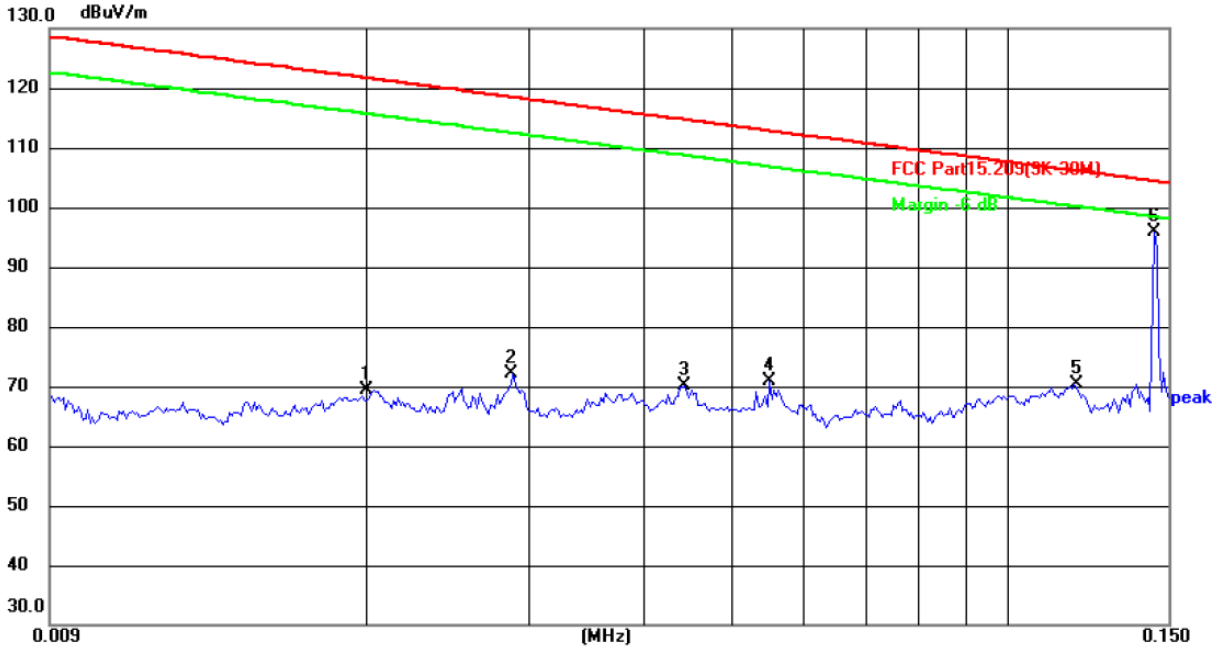
5.3.3. Test Data

Please refer to following diagram for individual

9KHz-30MHz

9KHz-150KHz:

Coaxial



Site		Polarization:	*Coaxial*	Temperature:	24(℃)
Limit: FCC Part15.209(9K-30M)		Power:	DC 12 V	Humidity:	52 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	0.0200	48.57	20.75	69.32	121.58	-52.26	peak	P	
2	0.0286	51.43	20.68	72.11	118.48	-46.37	peak	P	
3	0.0444	49.41	20.76	70.17	114.66	-44.49	peak	P	
4	0.0550	50.05	20.81	70.86	112.80	-41.94	peak	P	
5	0.1180	49.98	20.46	70.44	106.17	-35.73	peak	P	
6 *	0.1449	75.34	20.42	95.76	104.38	-8.62	peak	P	

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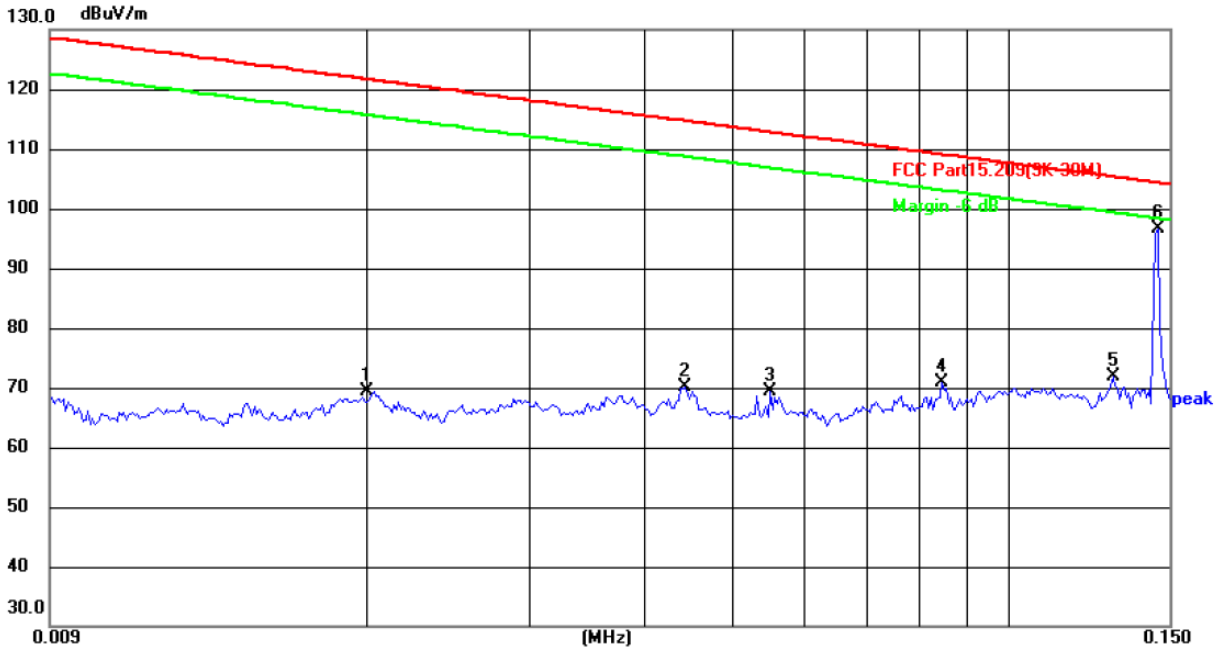
Coplanar

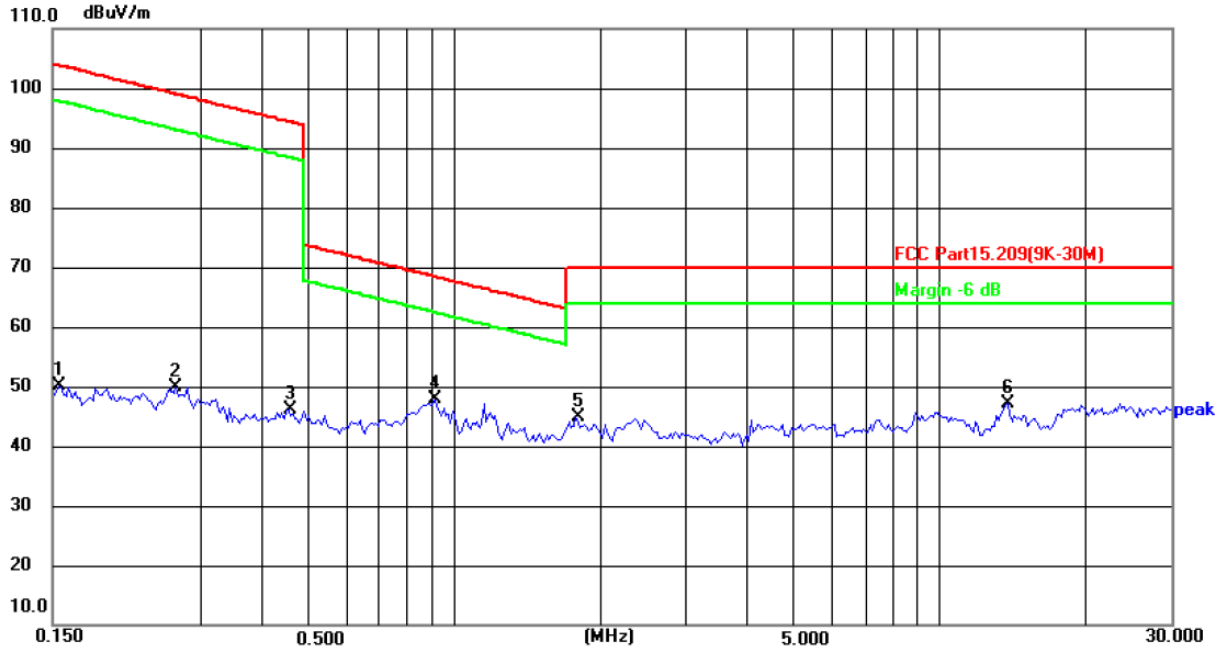


Site	Polarization: *Coplanar*	Temperature:	24(℃)
Limit: FCC Part15.209(9K-30M)	Power: DC 12 V	Humidity:	52 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	0.0200	48.57	20.75	69.32	121.58	-52.26	peak	P	
2	0.0444	49.41	20.76	70.17	114.66	-44.49	peak	P	
3	0.0550	48.55	20.81	69.36	112.80	-43.44	peak	P	
4	0.0844	49.92	20.93	70.85	109.08	-38.23	peak	P	
5	0.1302	51.70	20.18	71.88	105.31	-33.43	peak	P	
6 *	0.1457	76.15	20.46	96.61	104.34	-7.73	peak	P	

150KHz-30MHz:

Coaxial



Site

Polarization: *Coaxial*

Temperature: 24(℃)

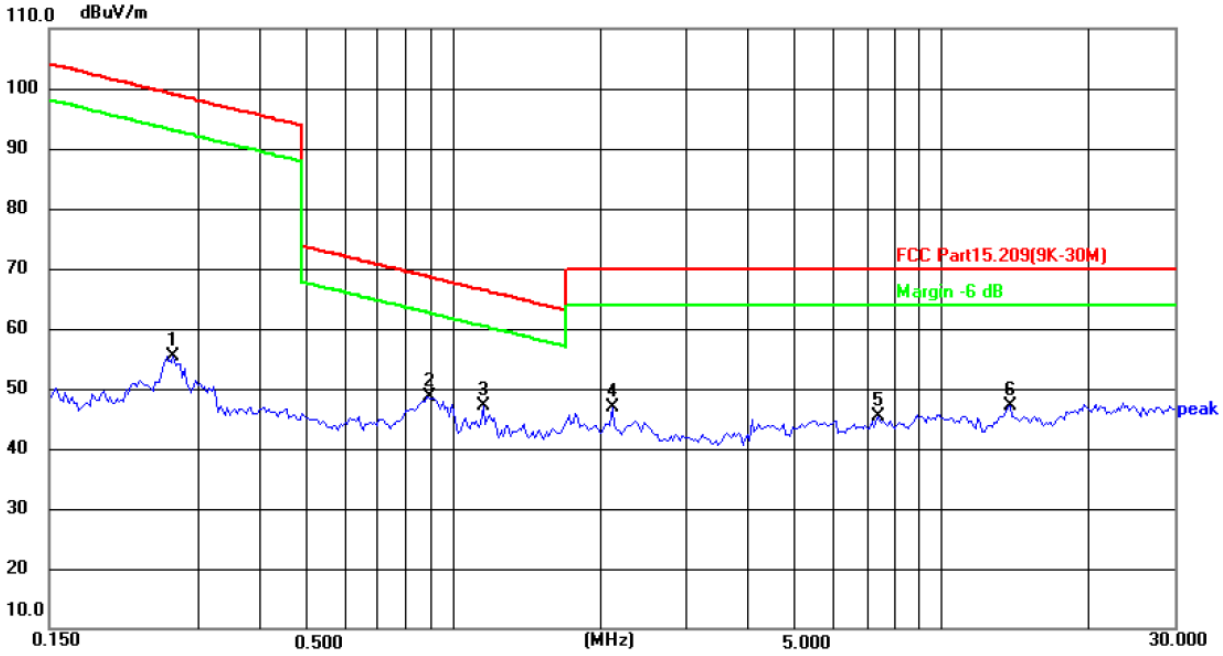
Limit: FCC Part15.209(9K-30M)

Power: DC 12 V

Humidity: 52 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	0.1547	29.70	20.53	50.23	103.81	-53.58	peak	P	
2	0.2691	29.00	20.91	49.91	99.01	-49.10	peak	P	
3	0.4582	24.60	21.51	46.11	94.38	-48.27	peak	P	
4 *	0.9153	25.49	22.42	47.91	68.39	-20.48	peak	P	
5	1.7890	20.69	24.15	44.84	70.00	-25.16	peak	P	
6	13.7980	27.46	19.59	47.05	70.00	-22.95	peak	P	

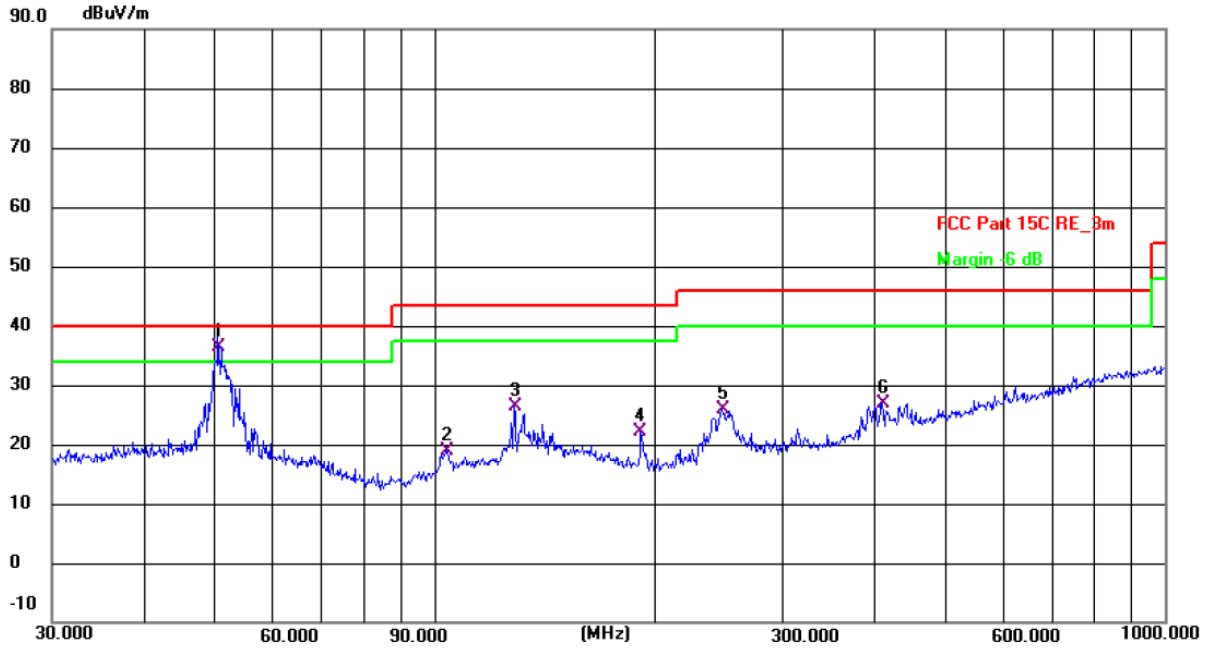
Coplanar



Site				Polarization:	*Coplanar*		Temperature:	24(℃)	
Limit: FCC Part15.209(9K-30M)				Power:	DC 12 V		Humidity:	52 %	
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	0.2691	34.50	20.91	55.41	99.01	-43.60	peak	P	
2	0.8861	26.38	22.36	48.74	68.67	-19.93	peak	P	
3 *	1.1567	24.21	22.88	47.09	66.36	-19.27	peak	P	
4	2.1213	22.13	24.82	46.95	70.00	-23.05	peak	P	
5	7.4443	9.90	35.36	45.26	70.00	-24.74	peak	P	
6	13.7980	27.46	19.59	47.05	70.00	-22.95	peak	P	

30MHz-1GHz

Horizontal:

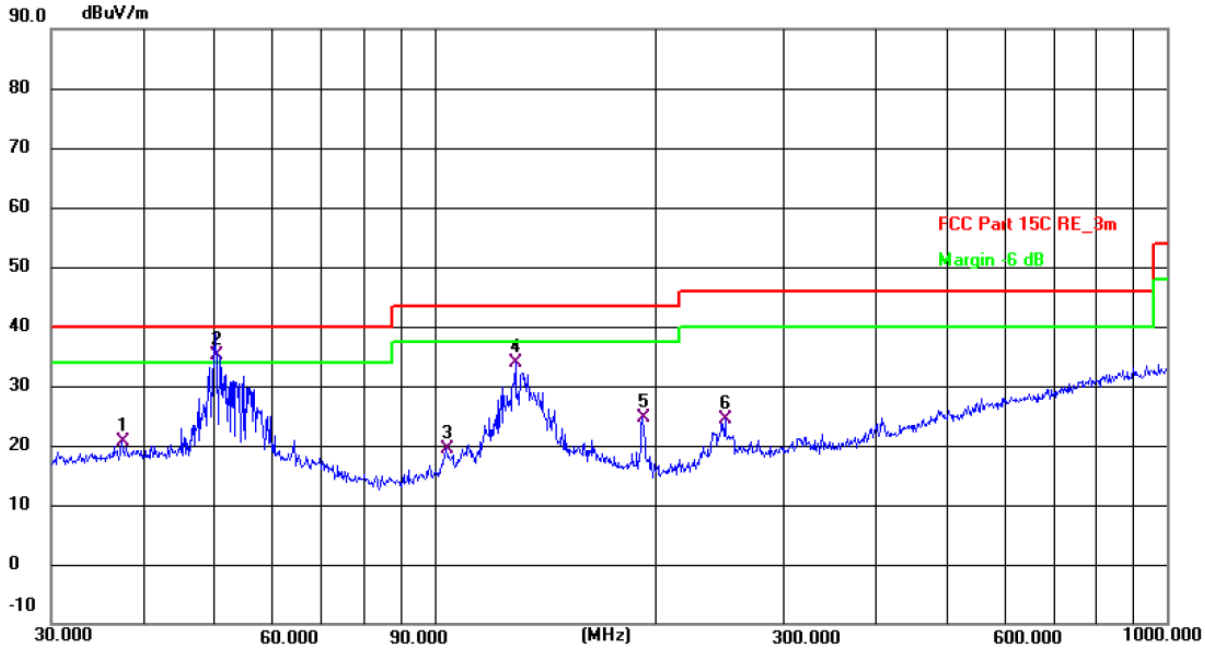


Site #1 3m Anechoic Chamber Polarization: ***Horizontal*** Temperature: 25.3(C) Humidity: 54 %

Limit: FCC Part 15C RE_3m Power: DC 12 V

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1 *	50.5860	22.71	13.69	36.40	40.00	-3.60	QP	P	
2	103.8055	8.08	10.73	18.81	43.50	-24.69	QP	P	
3	128.5630	13.87	12.57	26.44	43.50	-17.06	QP	P	
4	191.7450	11.00	11.18	22.18	43.50	-21.32	QP	P	
5	247.6819	13.07	12.77	25.84	46.00	-20.16	QP	P	
6	410.3825	10.05	16.83	26.88	46.00	-19.12	QP	P	

Vertical:



Site #1 3m Anechoic Chamber Polarization: ***Vertical*** Temperature: 25.3(C) Humidity: 54 %

Limit: FCC Part 15C RE_3m Power: DC 12 V

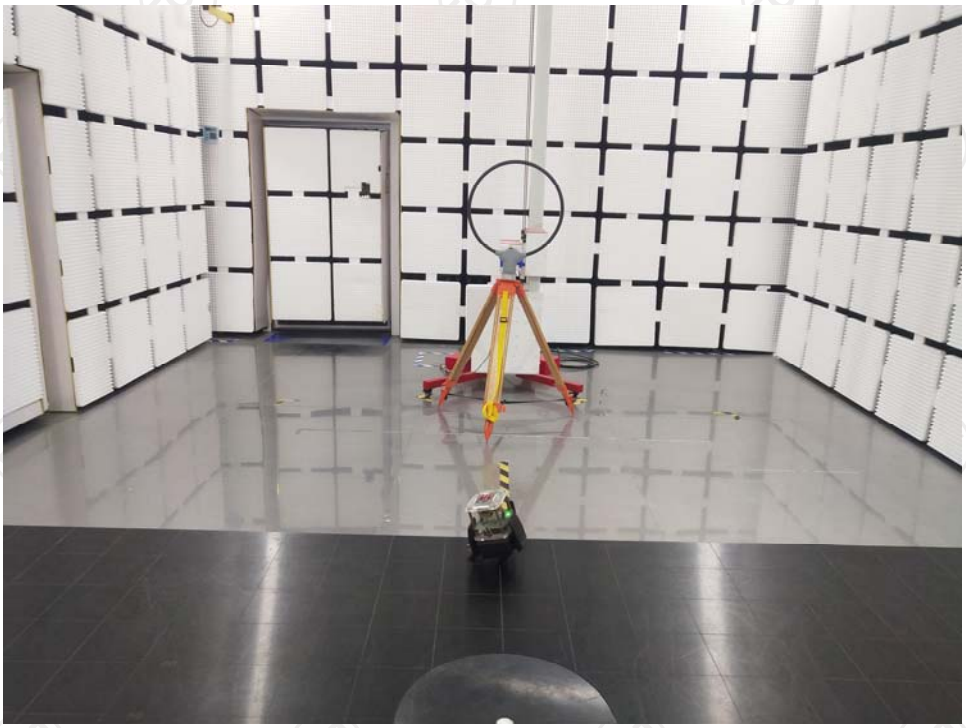
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	37.4165	6.82	13.72	20.54	40.00	-19.46	QP	P	
2 *	50.2324	21.47	13.73	35.20	40.00	-4.80	QP	P	
3	103.8055	8.75	10.73	19.48	43.50	-24.02	QP	P	
4	129.0146	21.16	12.60	33.76	43.50	-9.74	QP	P	
5	192.4186	13.45	11.14	24.59	43.50	-18.91	QP	P	
6	249.4250	11.51	12.79	24.30	46.00	-21.70	QP	P	

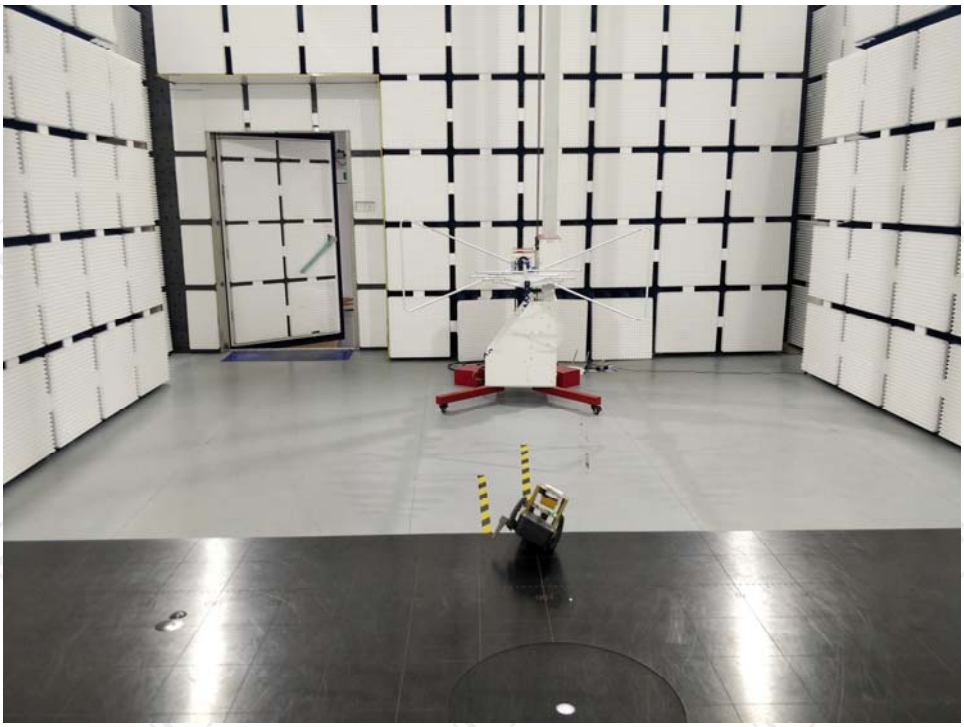
Note:

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

Appendix A: Photographs of Test Setup

Product: CYBERCHARGER
Model: 52310
Radiated Emission





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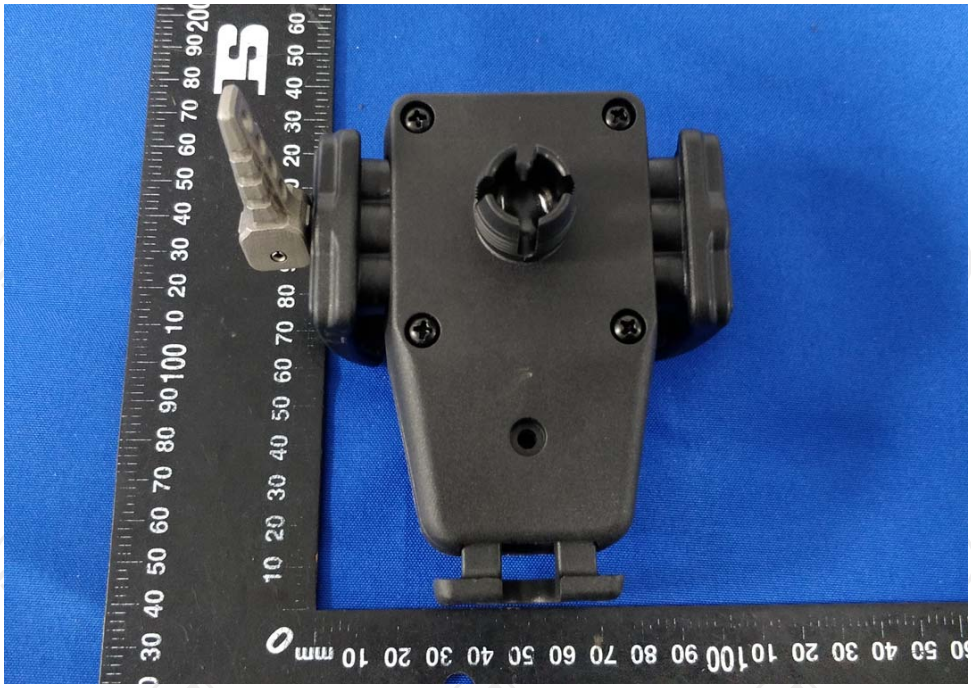
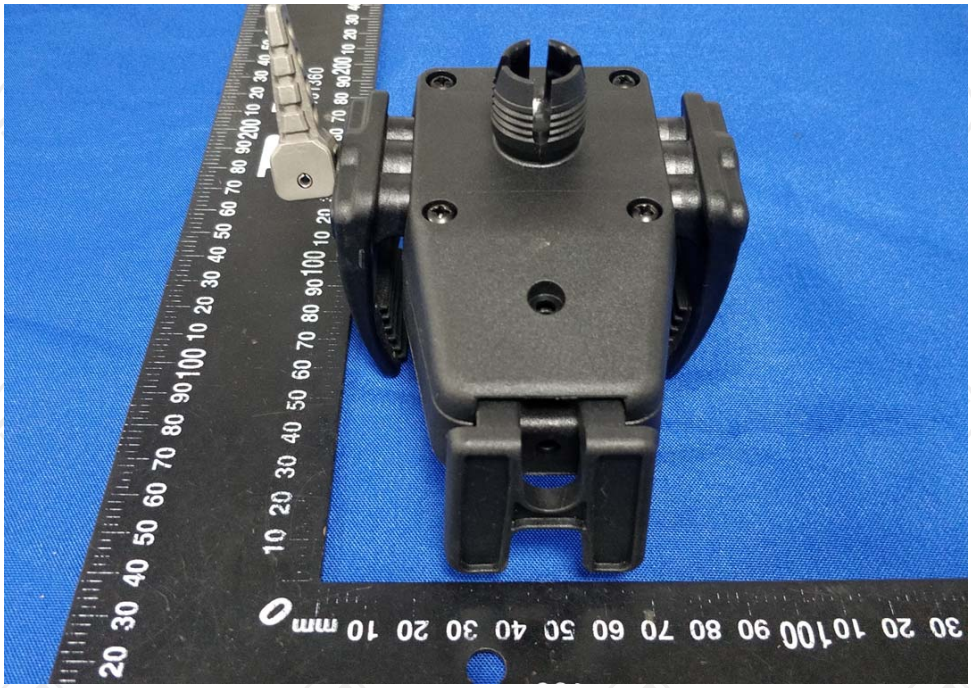
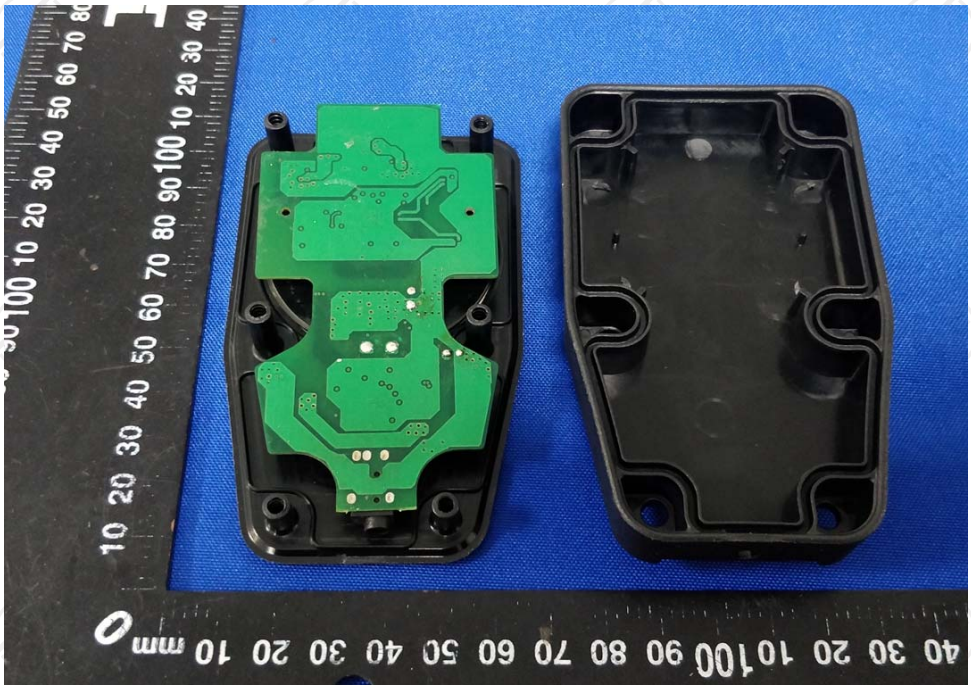
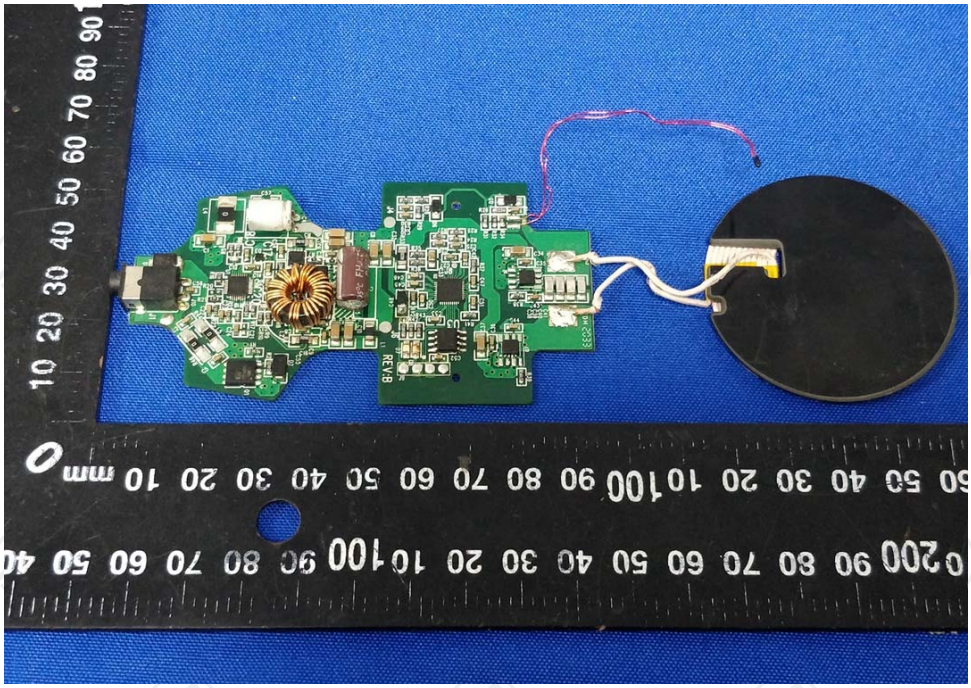
Appendix B: Photographs of EUT
Product: CYBERCHARGER
Model: 52310
External Photos

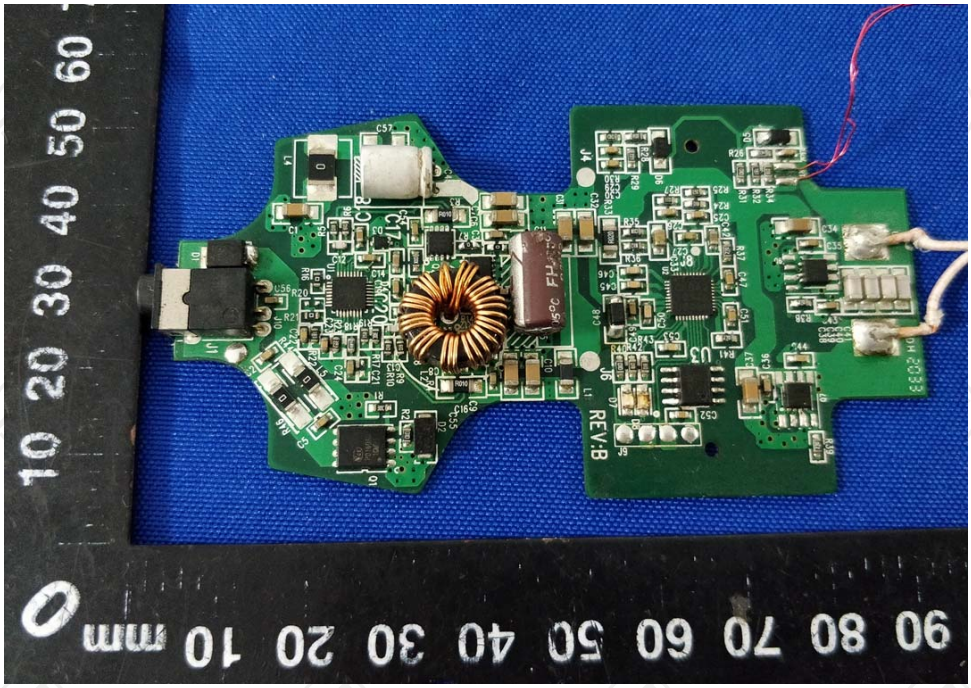


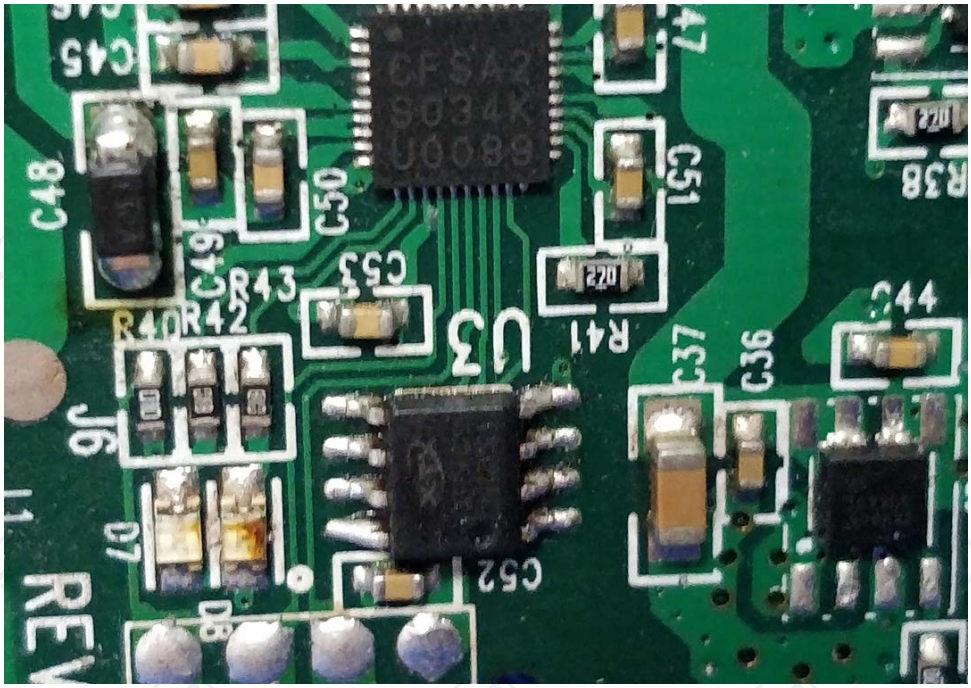


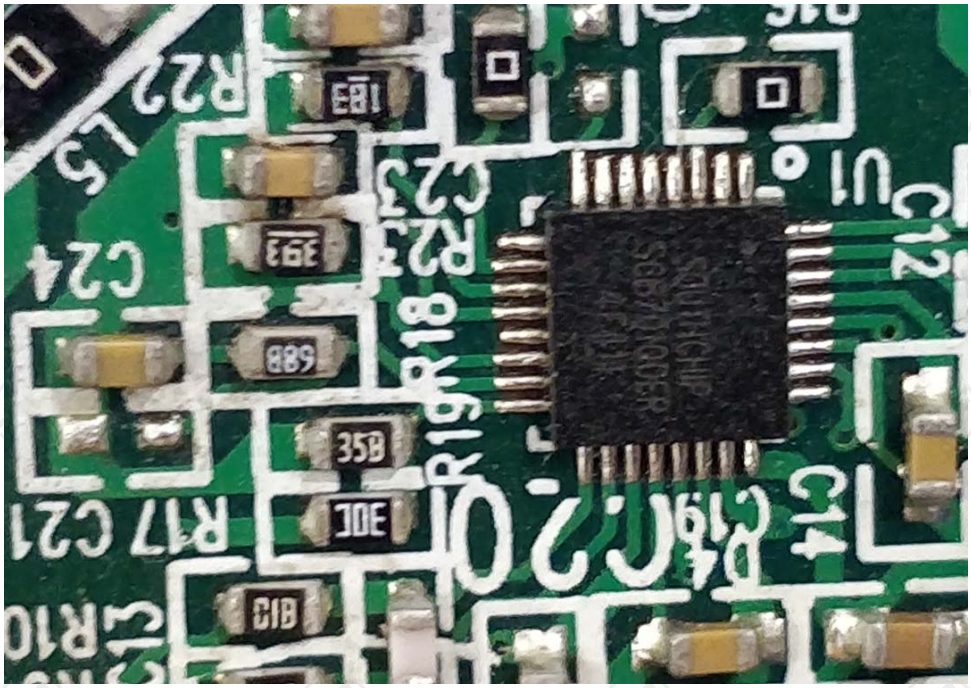
Product: CYBERCHARGER
Model: 52310
Internal Photos











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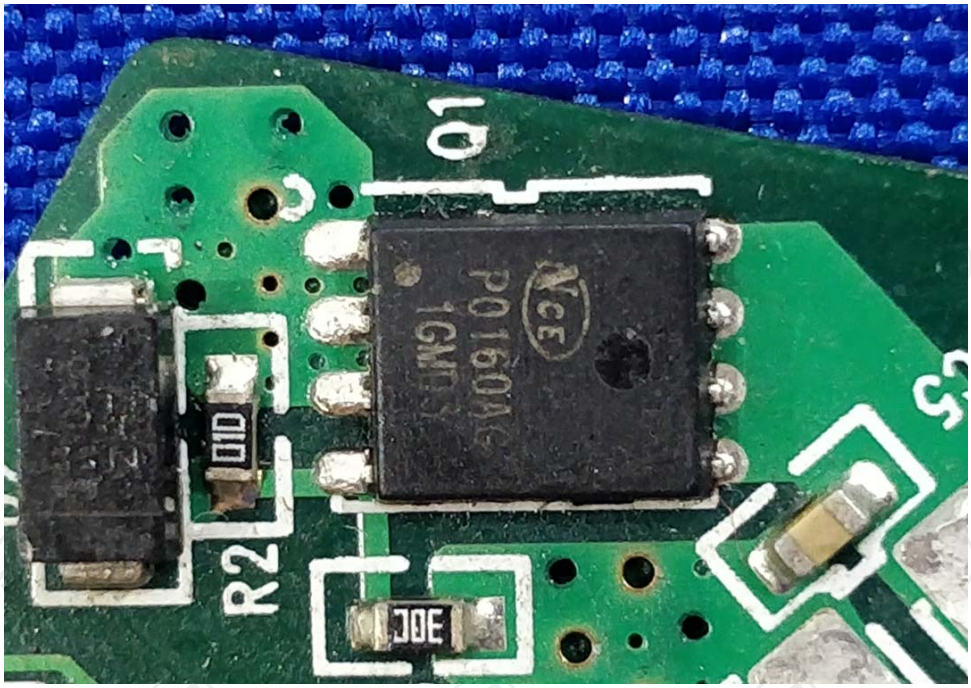

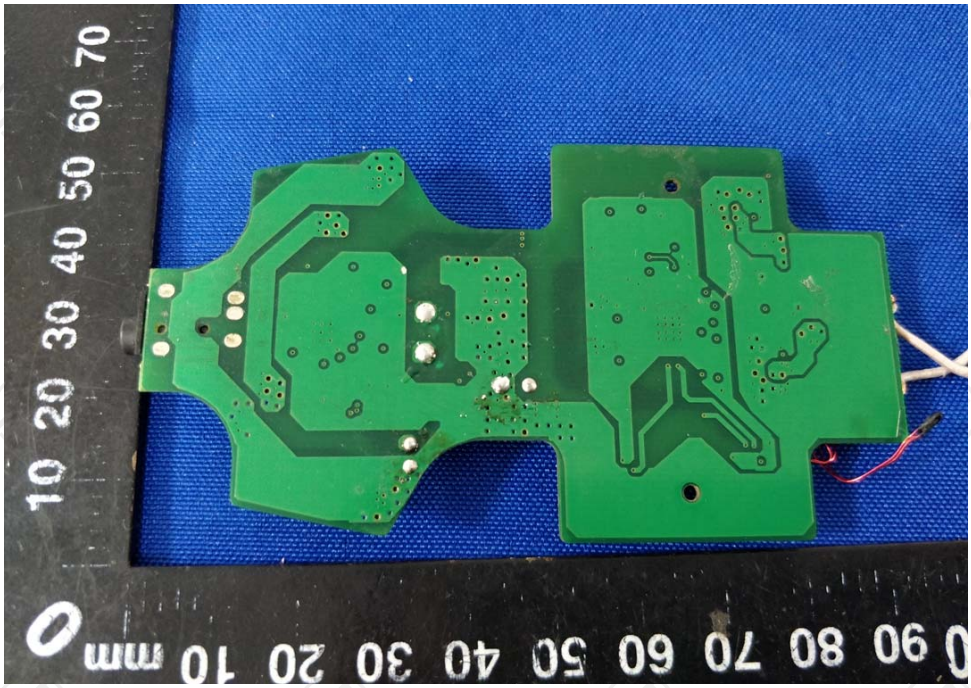

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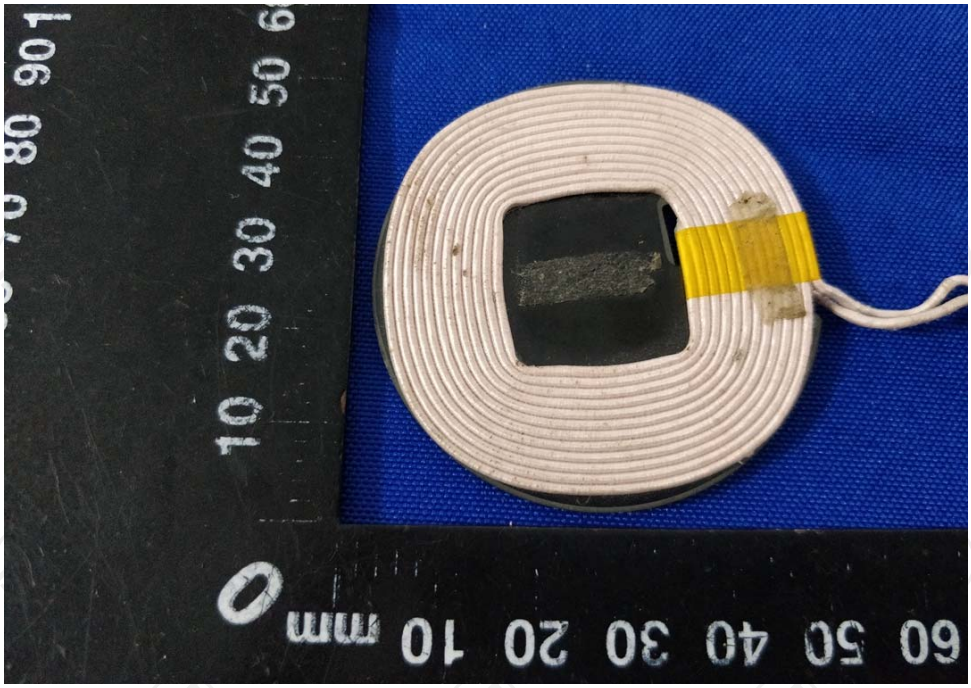

********END OF REPORT********