TCT 通测检测 TESTING CENTRE TECHNOLOGY

TEST REPORT

FCC ID. ..... :	2AYT3-AC200MAX	
Test Report No..... :	TCT210915E058	
Date of issue..... :	Sep. 30, 2021	
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..... :	SHENZHEN POWEROAK NEWENER CO., LTD	
Address..... :	Room 701-3, Building B, CADRE Building, Tongsha Road, Nanshan District, Shenzhen City, Guangdong Province, P.R. China	
Manufacturer's name ... :	SHENZHEN POWEROAK NEWENER CO., LTD	
Address..... :	Room 701-3, Building B, CADRE Building, Tongsha Road, Nanshan District, Shenzhen City, Guangdong Province, P.R. China	
Standard(s) ..... :	FCC CFR Title 47 Part 15 Subpart C	
Test item description ..... :	PORTABLE POWER STATION	
Trade Mark ..... :	N/A	
Model/Type reference..... :	AC200MAX	
Rating(s)..... :	Refer to EUT description of page 3	
Date of receipt of test item ..... :	Sep. 15, 2021	
Date (s) of performance of test..... :	Sep. 15, 2021 ~ Sep. 30, 2021	
Tested by (+signature) ... :	Aaron Mo	
Check by (+signature).... :	Beryl Zhao	
Approved by (+signature):	Tomsin	

General disclaimer:

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Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

1. General Product Information

1.1. EUT description

Test item description .....:	PORTABLE POWER STATION
Model/Type reference.....:	AC200MAX
Sample Number.....:	TCT210915E058-0101
Operation Frequency.....:	110.99kHz - 145.97kHz
Modulation Technology .....:	Load modulation
Antenna Type.....:	Inductive loop coil Antenna
Rating(s).....:	DC port Input: DC 10-145 V, 15 A Adapter Input: DC 58.8 V, 8.0 A Capacity: DC 51.2 V, 2048 Wh, 40 Ah Output AC *5: AC 100-110 V, 50/ 60 Hz, 2000 W Total; AC 110-120 V, 50/ 60 Hz, 2200 W Total Aviation Sockets *1: DC 12 V, 30 A USB-A *2: DC 5-12 V, 3 A*2, 18 W *2 USB-A *2: DC 5 V,3 A, 15 W Total USB-C *1: DC 5-15 V, 3 A; DC 20 V, 5 A, 100 W Cigarette Lighter*1: DC 12 V, 10 A DC 5521 *2: DC 12 V, 10 A Total (DC 5521 and Cigarette Lighter, 10 A Total) Wireless Charging *2: 5/ 7.5/ 10 /15 W *2 POWER SUPPLY model: T500-588A800-00 POWER SUPPLY input: AC 100-240 V, 50/60 Hz, 7.5 A POWER SUPPLY output: DC 58.8 V, 8.0 A

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

None.

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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	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. General Information

3.1. Test environment and mode

Operating Environment:		
Condition	Conducted Emission	Radiated Emission
Temperature:	25.0 °C	25.0 °C
Humidity:	55 % RH	55 % RH
Atmospheric Pressure:	1010 mbar	1010 mbar
Test Mode:		
Engineering mode:	Charging+ Wireless charging	
The sample was placed 0.8m & 1.5m for the measurement below & 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(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
Mobile Phone	MQ972LL/A	C39V67SHJCM0	/	Apple
Mobile Phone	SM-G9350	R28HA2ER3GT	/	SAMSUNG

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.

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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

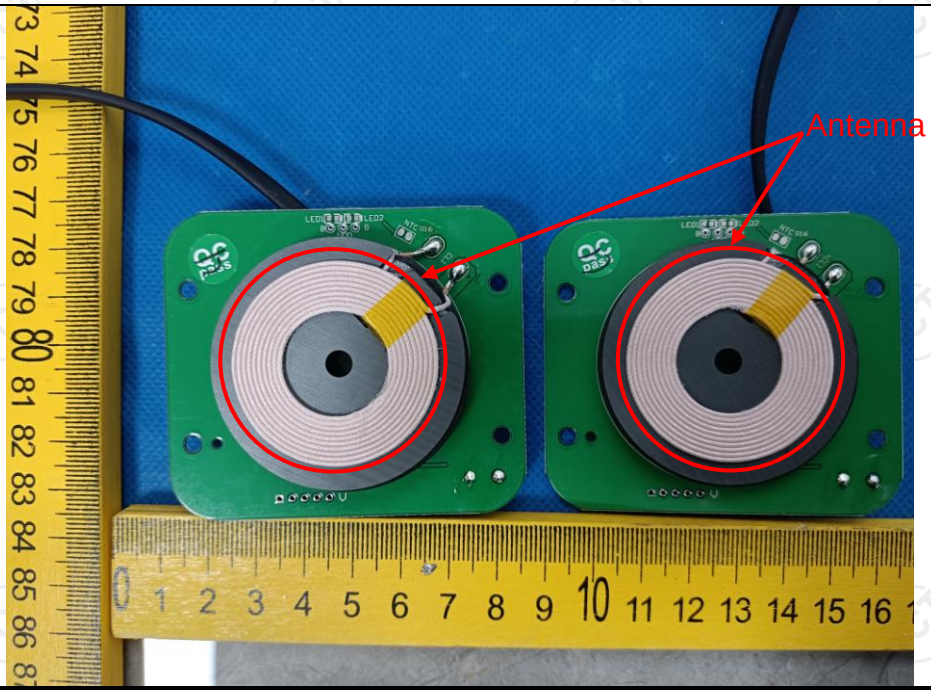
The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

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

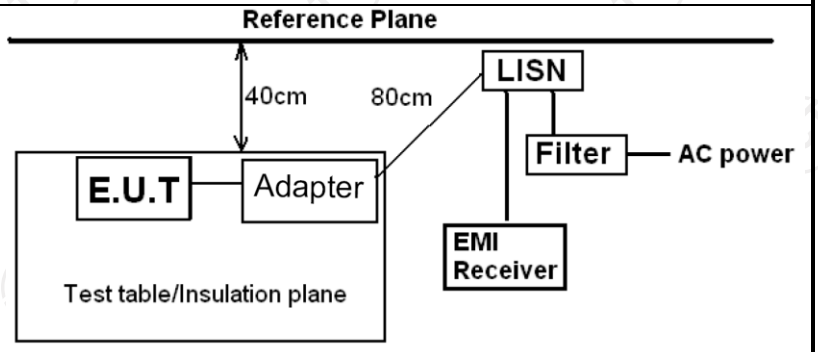
5.1. Antenna requirement

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>Refer to section 3.1 for details</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>PASS</td></tr>
</table>

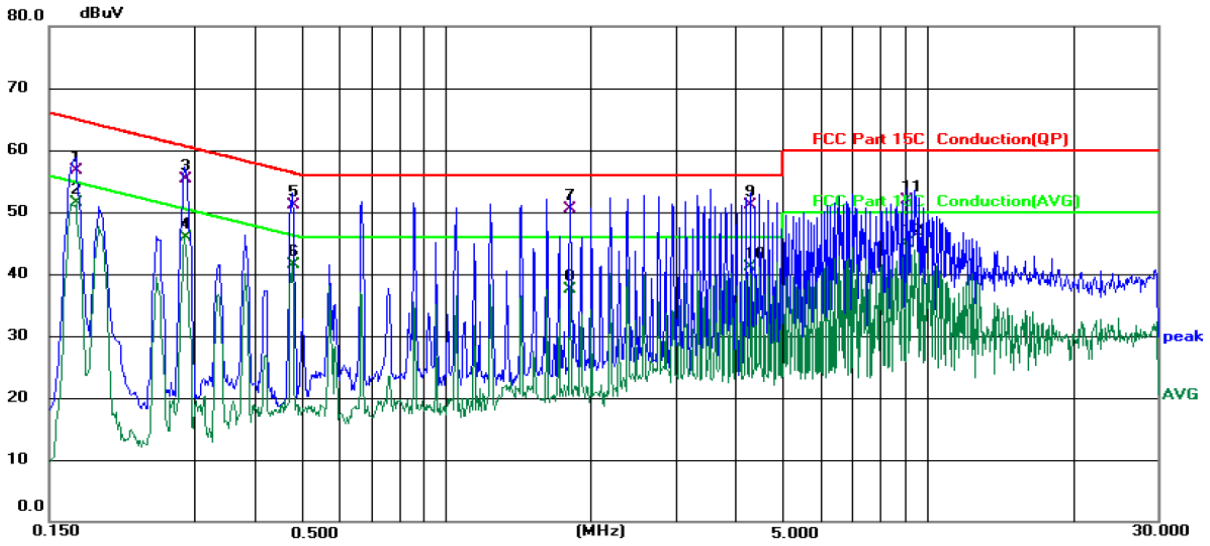
5.2.2. Test Instruments

Conducted Emission Shielding Room Test Site (843)				
Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
EMI Test Receiver	R&S	ESCI3	100898	Jul. 07, 2022
Line Impedance Stabilisation Newtork(LISN)	Schwarzbeck	NSLK 8126	8126453	Mar. 11, 2022
Line-5	TCT	CE-05	N/A	Jul. 07, 2022
EMI Test Software	Shurple Technology	EZ-EMC	N/A	N/A

5.2.3. Test data

Please refer to following diagram for individual

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



Site 844 Shielding Room | Phase: *L1* | Temperature: 23.1 (℃) | Humidity: 52 %

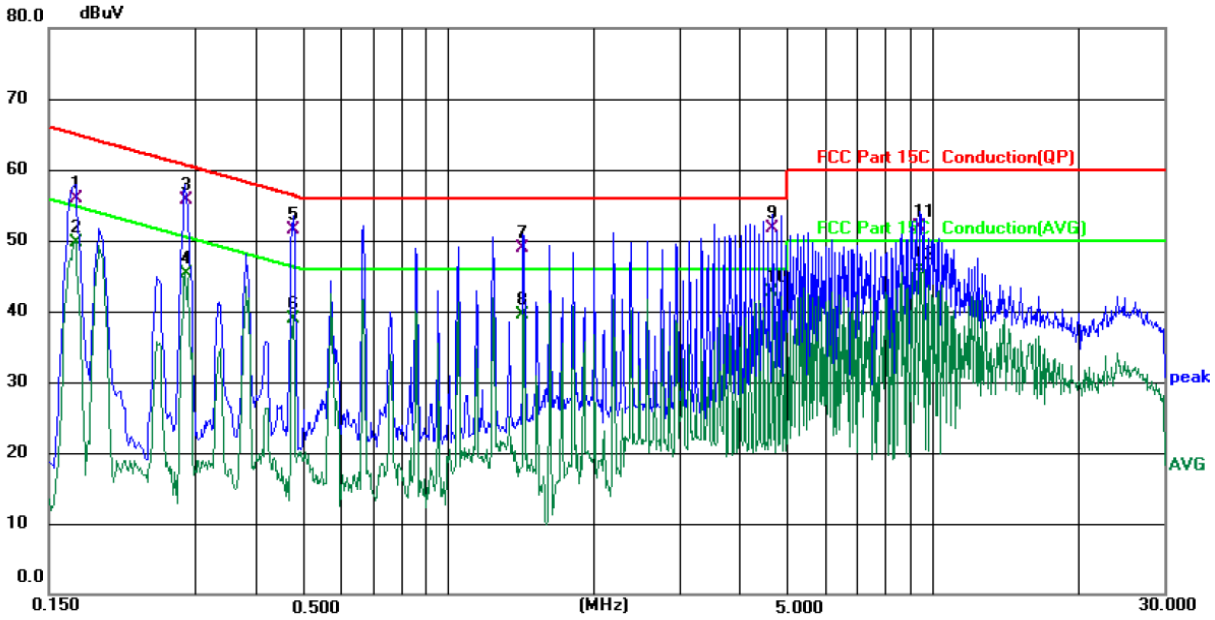
Limit: FCC Part 15C Conduction(QP) | Power: AC 120 V/60 Hz

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1700	47.21	9.59	56.80	64.96	-8.16	QP	
2	*	0.1700	41.95	9.59	51.54	54.96	-3.42	AVG	
3		0.2859	45.97	9.33	55.30	60.64	-5.34	QP	
4		0.2859	36.51	9.33	45.84	50.64	-4.80	AVG	
5		0.4779	41.89	9.21	51.10	56.38	-5.28	QP	
6		0.4779	32.28	9.21	41.49	46.38	-4.89	AVG	
7		1.8140	41.09	9.41	50.50	56.00	-5.50	QP	
8		1.8140	28.19	9.41	37.60	46.00	-8.40	AVG	
9		4.2980	41.54	9.56	51.10	56.00	-4.90	QP	
10		4.2980	31.56	9.56	41.12	46.00	-4.88	AVG	
11		9.0700	42.31	9.59	51.90	60.00	-8.10	QP	
12		9.0700	35.31	9.59	44.90	50.00	-5.10	AVG	

Note:

Freq. = Emission frequency in MHz
Reading level (dBμV) = Receiver reading
Corr. Factor (dB) = LISN factor + Cable loss
Measurement (dBμV) = Reading level (dBμV) + Corr. Factor (dB)
Limit (dBμV) = Limit stated in standard
Margin (dB) = Measurement (dBμV) – Limits (dBμV)
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 844 Shielding Room | Phase: N | Temperature: 23.1 (℃) | Humidity: 52 %

Limit: FCC Part 15C Conduction(QP) | Power: AC 120 V/60 Hz

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1700	46.31	9.59	55.90	64.96	-9.06	QP	
2		0.1700	40.07	9.59	49.66	54.96	-5.30	AVG	
3		0.2858	46.47	9.33	55.80	60.65	-4.85	QP	
4		0.2858	36.06	9.33	45.39	50.65	-5.26	AVG	
5		0.4778	42.29	9.21	51.50	56.38	-4.88	QP	
6		0.4778	29.74	9.21	38.95	46.38	-7.43	AVG	
7		1.4299	39.53	9.37	48.90	56.00	-7.10	QP	
8		1.4299	30.09	9.37	39.46	46.00	-6.54	AVG	
9		4.6779	42.14	9.56	51.70	56.00	-4.30	QP	
10	*	4.6779	33.05	9.56	42.61	46.00	-3.39	AVG	
11		9.4500	42.40	9.60	52.00	60.00	-8.00	QP	
12		9.4500	36.39	9.60	45.99	50.00	-4.01	AVG	

Note:

Freq. = Emission frequency in MHz

Reading level (dBμV) = Receiver reading

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

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

Limit (dBμV) = Limit stated in standard

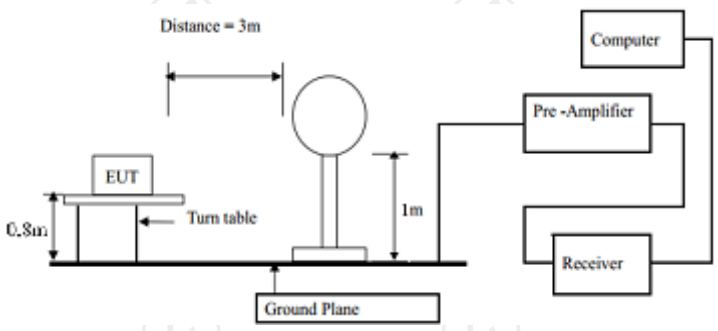
Margin (dB) = Measurement (dBμV) – Limits (dBμV)

Q.P. =Quasi-Peak AVG =average

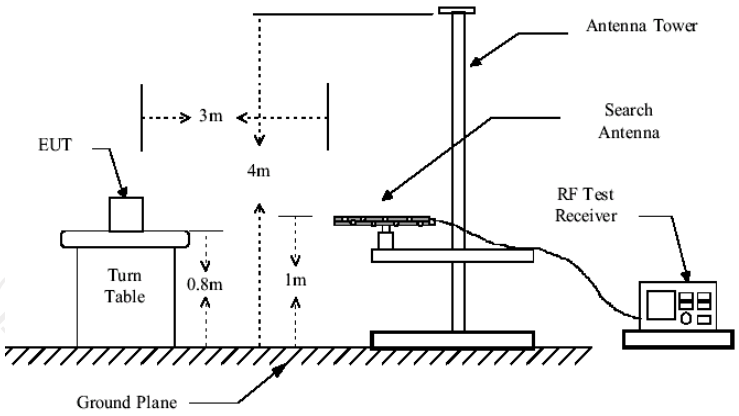
** is meaning the worst frequency has been tested in the frequency range 150 kHz to 30MHz.*

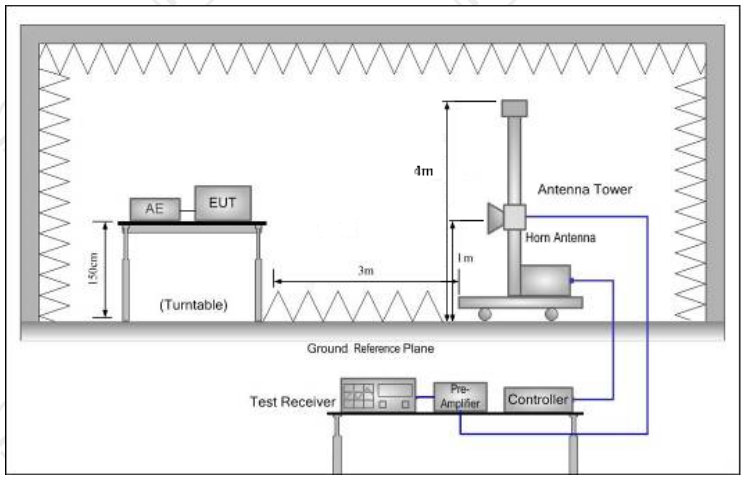
5.3. Radiated Spurious Emission Measurement

5.3.1. Test Specification

<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>Frequency Range:</td><td>9 kHz to 25 GHz</td></tr>
<tr><td>Measurement Distance:</td><td>3 m</td></tr>
<tr><td>Antenna Polarization:</td><td>Horizontal & Vertical</td></tr>
<tr><td>Operation mode:</td><td>Refer to item 3.1</td></tr>
<tr><td>Receiver Setup:</td><td>
<table>
<tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr>
<tr><td>9kHz- 150kHz</td><td>Quasi-peak</td><td>200Hz</td><td>1kHz</td><td>Quasi-peak Value</td></tr>
<tr><td>150kHz-30MHz</td><td>Quasi-peak</td><td>9kHz</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>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td>Peak</td><td>1MHz</td><td>10Hz</td><td>Average Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><td>Frequency</td><td>Field Strength (microvolts/meter)</td><td>Measurement Distance (meters)</td></tr>
<tr><td>0.009-0.490</td><td>2400/F(KHz)</td><td>300</td></tr>
<tr><td>0.490-1.705</td><td>24000/F(KHz)</td><td>30</td></tr>
<tr><td>1.705-30</td><td>30</td><td>30</td></tr>
<tr><td>30-88</td><td>100</td><td>3</td></tr>
<tr><td>88-216</td><td>150</td><td>3</td></tr>
<tr><td>216-960</td><td>200</td><td>3</td></tr>
<tr><td>Above 960</td><td>500</td><td>3</td></tr>
</table>
<table>
<tr><td>Frequency</td><td>Field Strength (microvolts/meter)</td><td>Measurement Distance (meters)</td><td>Detector</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>500</td><td>3</td><td>Average</td></tr>
<tr><td>5000</td><td>3</td><td>Peak</td></tr>
</table>
</td></tr>
<tr><td>Test setup:</td><td>For radiated emissions below 30MHz
 

30MHz to 1GHz</td></tr>
</table>

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


Above 1GHz


</td>
</tr>
<tr>
<td>Test Procedure:</td>
<td>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</td>
</tr>
</table>

	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

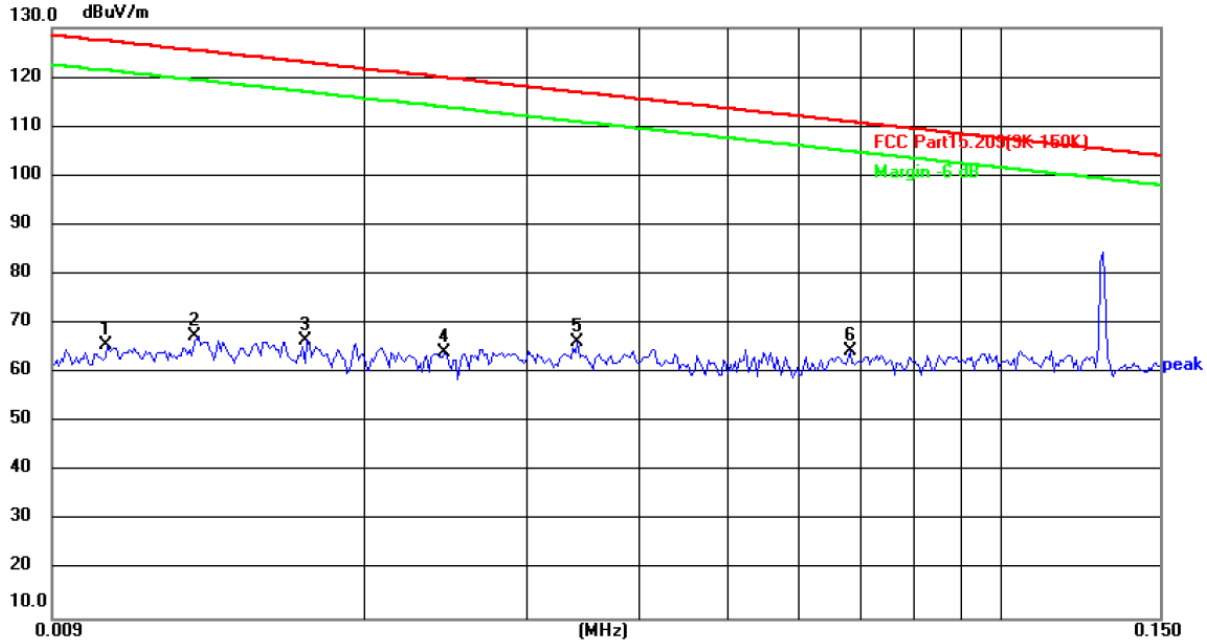
Radiated Emission Test Site (966)				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
EMI Test Receiver	R&S	ESIB7	100197	Jul. 07, 2022
Spectrum Analyzer	R&S	FSQ40	200061	Jul. 07, 2022
Pre-amplifier	SKET	LNPA_0118G-45	SK2021012102	Mar. 11, 2022
Pre-amplifier	SKET	LNPA_1840G-50	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

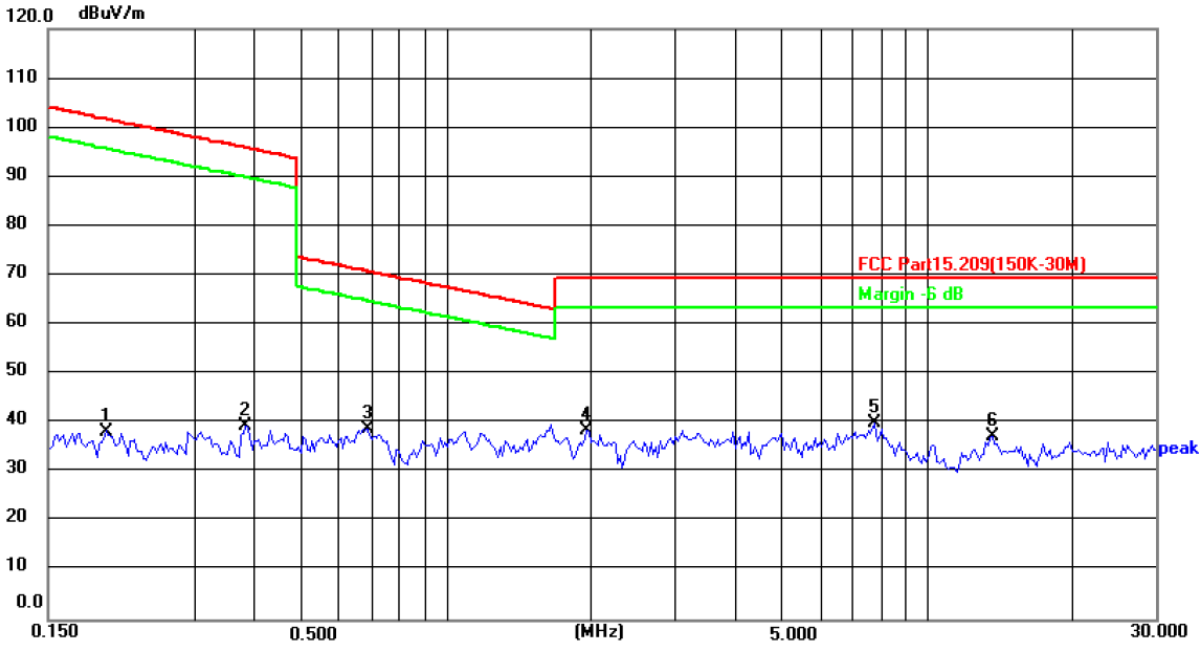
9KHz-150KHz:



Site
Limit: FCC Part15.209(9K-150K)
Polarization:
Power: DC 5 V
Temperature: 25(℃)
Humidity: 55 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	0.0103	42.10	23.57	65.67	127.34	-61.67	peak
2	0.0129	45.16	22.19	67.35	125.39	-58.04	peak
3	0.0171	46.66	19.99	66.65	122.94	-56.29	peak
4	0.0244	45.57	18.70	64.27	119.86	-55.59	peak
5	0.0342	46.77	19.36	66.13	116.93	-50.80	peak
6 *	0.0680	42.69	21.63	64.32	110.97	-46.65	peak

150KHz-30MHz:

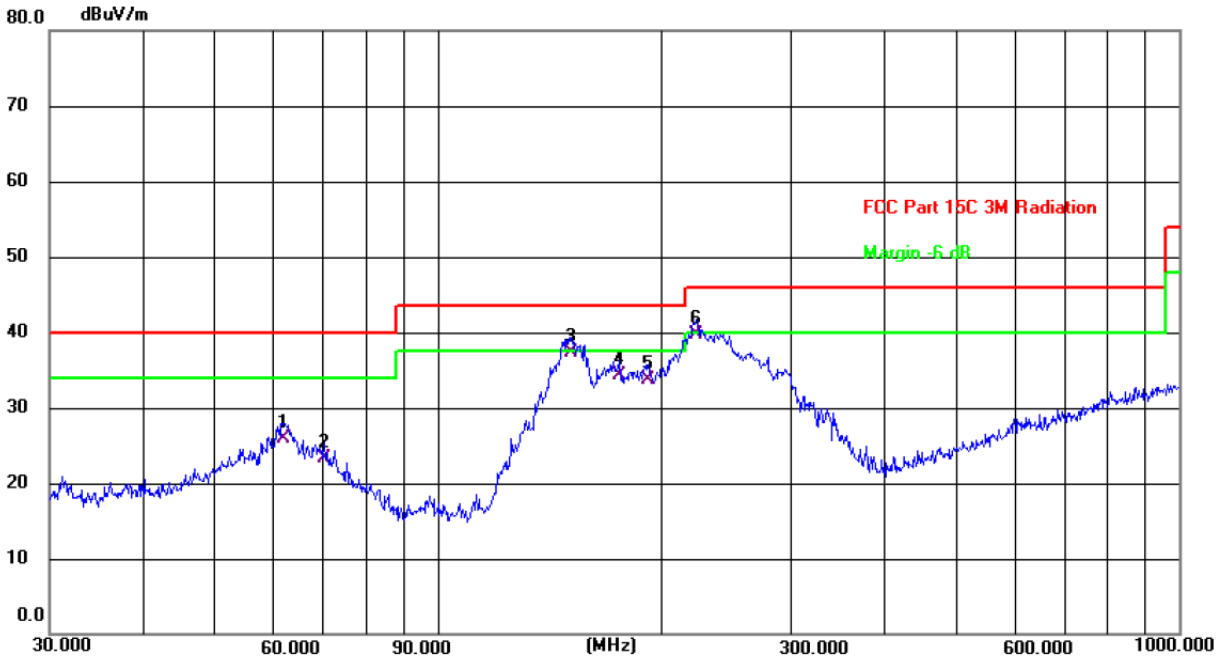


Site
Polarization:
Temperature: 25(℃)
Limit: FCC Part15.209(150K-30M)
Power: DC 5 V
Humidity: 55 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	0.1975	12.16	26.24	38.40	101.71	-63.31	peak
2	0.3850	13.21	26.24	39.45	95.90	-56.45	peak
3	0.6895	13.82	25.16	38.98	70.84	-31.86	peak
4	1.9697	13.69	24.77	38.46	69.50	-31.04	peak
5 *	7.8102	14.53	25.57	40.10	69.50	-29.40	peak
6	13.6951	12.19	25.16	37.35	69.50	-32.15	peak

30MHz-1GHz

Horizontal:



Site

Limit: FCC Part 15C 3M Radiation

Polarization: ***Horizontal***

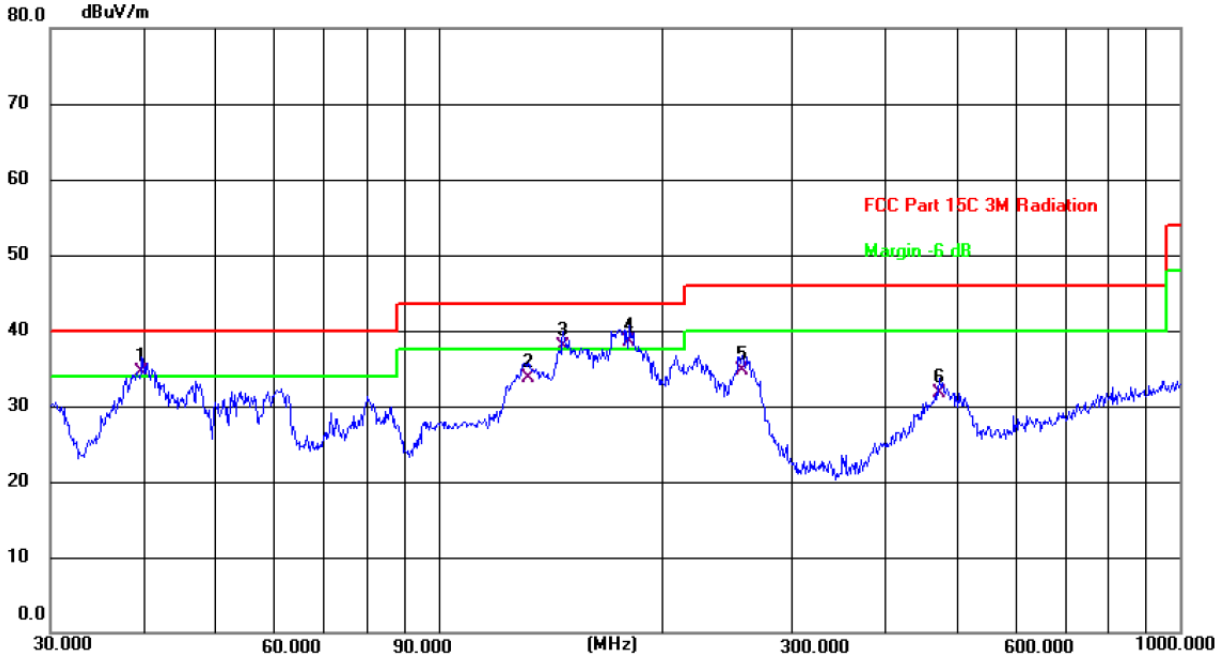
Power: DC 5V

Temperature: 26.9(C)

Humidity: 54 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	61.9949	13.72	12.28	26.00	40.00	-14.00	QP	P	
2	70.3365	12.11	11.23	23.34	40.00	-16.66	QP	P	
3 *	151.5971	23.77	13.59	37.36	43.50	-6.14	QP	P	
4	176.2684	22.08	12.29	34.37	43.50	-9.13	QP	P	
5	192.4182	22.63	11.14	33.77	43.50	-9.73	QP	P	
6	223.7333	28.00	11.63	39.63	46.00	-6.37	QP	P	

Vertical:



Site
Polarization: *Vertical*
Temperature: 26.9(C)
Limit: FCC Part 15C 3M Radiation
Power: DC 5V
Humidity: 54 %

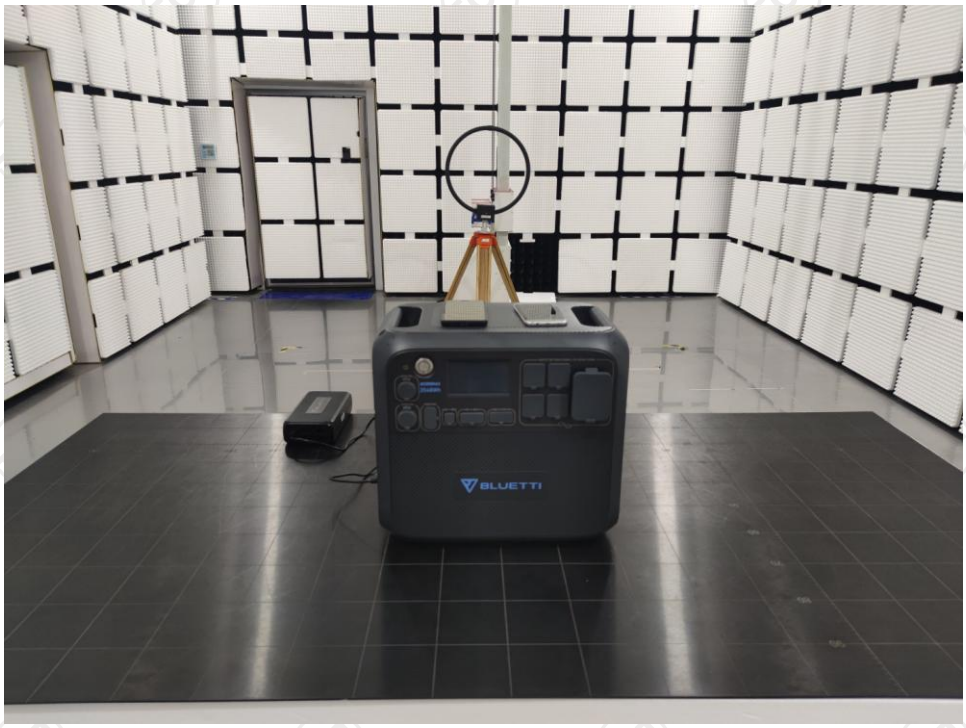
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1 !	39.8541	20.52	13.98	34.50	40.00	-5.50	QP	P	
2	132.2204	20.91	12.76	33.67	43.50	-9.83	QP	P	
3 !	147.4036	24.55	13.43	37.98	43.50	-5.52	QP	P	
4 *	180.6484	26.71	11.89	38.60	43.50	-4.90	QP	P	
5	256.5210	21.92	12.83	34.75	46.00	-11.25	QP	P	
6	473.8346	13.23	18.39	31.62	46.00	-14.38	QP	P	

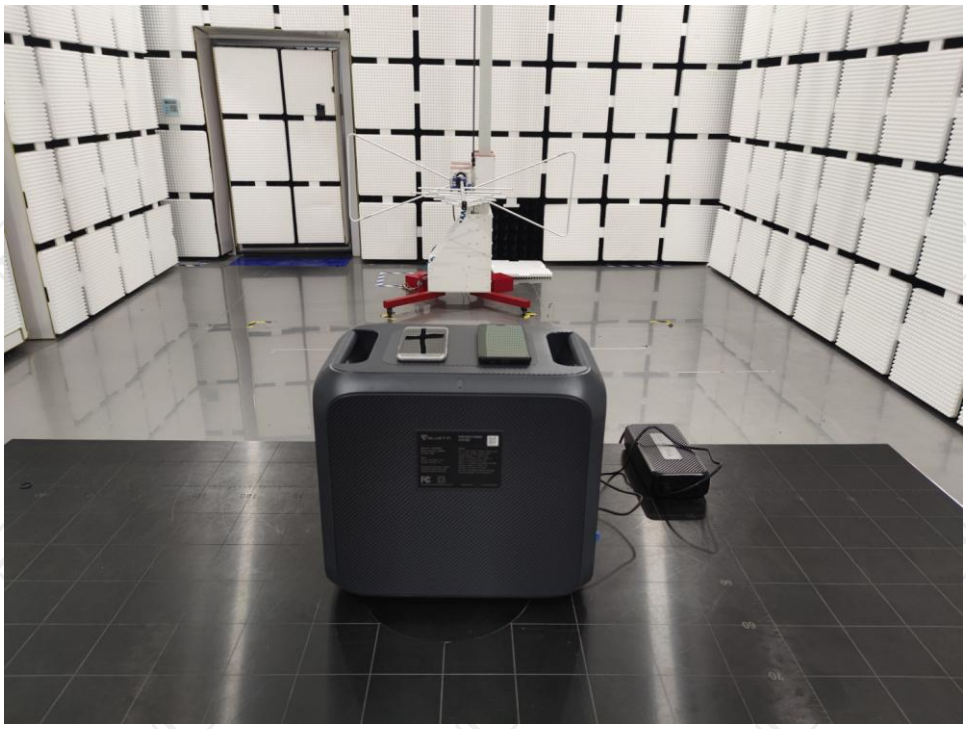
Note:

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

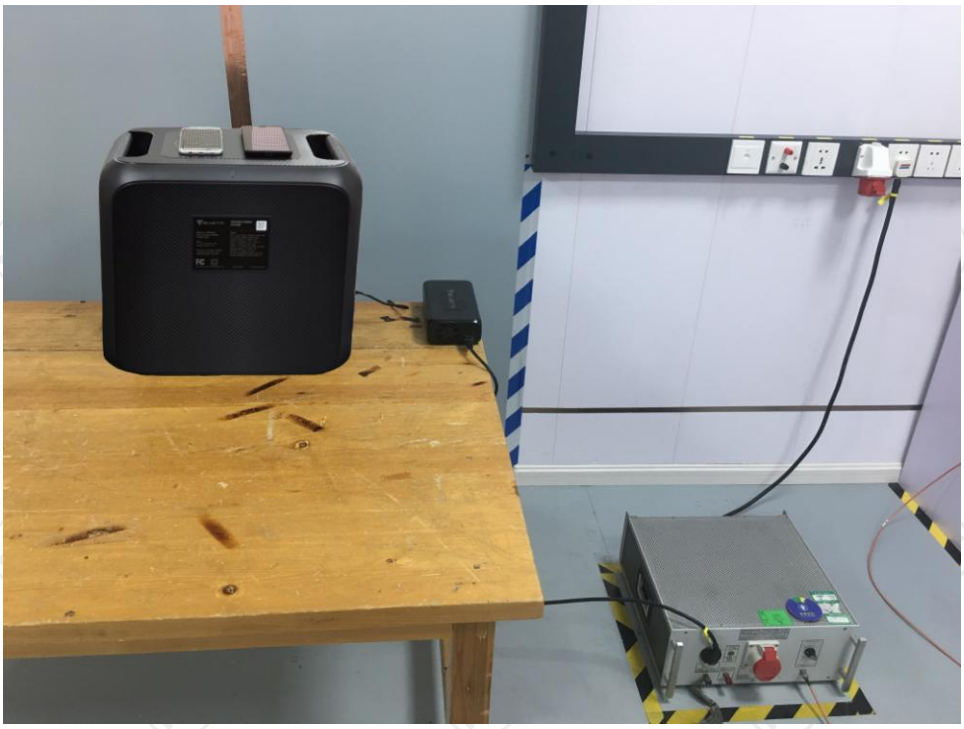
Appendix A: Photographs of Test Setup

Product: PORTABLE POWER STATION
Model: AC200MAX
Radiated Emission





Conducted Emission



Appendix B: Photographs of EUT
Product: PORTABLE POWER STATION
Model: AC200MAX
External Photos

Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com


POWER SUPPLY
CAUTION/PRECAUCIONES/MISE EN GARDE
STATUS DISPLAY:
WORKING
FINISH


AC200MAX
2048Wh
BLUETTI


BLUETTI
PORTABLE POWER STATION


INPUT

Product: PORTABLE POWER STATION
Model: AC200MAX
Internal Photos