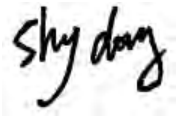
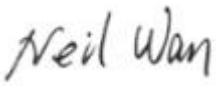
TEST REPORT

Report No. :	**KS2203S1247E**
FCC ID:	2A7K8-BLACKBEE-2000
Applicant :	**Alpha ESS Co., Ltd.**
Address :	Jiu Hua Road 888,High-Tech Industrial Development Zone,Nantong City,226300
Manufacturer.....:	Alpha ESS Co., Ltd.
Address.....:	Jiu Hua Road 888,High-Tech Industrial Development Zone,Nantong City,226300
Product Name :	**Portable Power Station**
Trade Mark :	AlphaESS
Model/Type reference :	BlackBee 2000
Listed Model(s) :	N/A
Standard :	**FCC Rules and Regulations Part 15 Subpart C (Section 15.209), ANSI C63.10: 2013**
Date of Receipt :	March 30, 2022
Date of Test Date :	March 30, 2022 ~ July 7, 2022
Date of issue :	July 7, 2022
Test result :	**Pass**

Prepared by: (Printed Name + Signature)	Sky Dong	
Approved by: (Printed Name + Signature)	Neil Wan	

Testing Laboratory Name :	**KSIGN(Guangdong) Testing Co., Ltd.**
Address :	West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China

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Contents

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1 TEST SUMMARY

1.1 Test Standards

The tests were performed according to following standards:

FCC Rules and Regulations Part 15 Subpart C (Section 15.207): Conducted limits.
FCC Rules and Regulations Part 15 Subpart C (Section 15.209): Radiated emission limits; general requirements.
ANSI C63.10: 2013: American National Standard for Testing Unlicensed Wireless Devices

1.2 Report Version

Revised No.	Date of issue	Description
01	July 7, 2022	Original

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2 SUMMARY

2.1 Product Description

Product Name:	Portable Power Station
Trade Mark:	AlphaESS
Model/Type reference:	BlackBee 2000
Listed Model(s):	N/A
Model Different:	N/A
Hardware version:	V1.0
Software version:	V1.0
Test samples ID:	KS2203S1247E-1# (Engineer sample), KS2203S1247E-2# (Normal sample)
Power supply((Adaptor)):	Input:AC 100-120V 60Hz
Power supply(Battery):	DC 43.2V
Wireless Charging(Output):	Wireless Charging 1: 10W(Max) Wireless Charging 2: 10W(Max)
Operation frequency:	115KHz - 205KHz
Modulation type:	ASK
Antenna type:	Coil Antenna
Antenna gain:	0 dBi

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2.2 Description of the test mode

Equipment under test was operated during the measurement under the following conditions:
☒ Charging and communication mode

Test Modes:		
Mode 1	Two Coil wireless simultaneous charging mode(Full load)	Recorded
Mode 2	Two Coil wireless simultaneous charging mode(Half load)	Recorded
Mode 3	Two Coil wireless simultaneous charging mode(Null load)	Recorded
Mode 4	Coil 1-Wireless charging mode(Full load)	Recorded
Mode 5	Coil 1-Wireless charging mode(Half load)	Recorded
Mode 6	Coil 1-Wireless charging mode(Null load)	Recorded
Mode 7	Coil 2-Wireless charging mode(Full load)	Recorded
Mode 8	Coil 2-Wireless charging mode(Half load)	Recorded
Mode 9	Coil 2-Wireless charging mode(Null load)	Recorded
Mode 10	Standby	Pre-tested
Note: All test modes were pre-tested, but we only recorded the worst case in this report.		

2.3 Special Accessories

Follow auxiliary equipment(s) test with EUT that provided by the manufacturer or laboratory is listed as follow:

Description	Manufacturer	Model	Technical Parameters	Certificate	Provided by
Adapter	/	SOY-2400625-094	Input: 100-120V, 60Hz	FCC	manufacturer
Wireless charging load	/	EESON	5W/7.5W/10W	FCC	laboratory

2.4 Modifications

No modifications were implemented to meet testing criteria.

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3 TEST ENVIRONMENT

3.1 Address of the test laboratory

KSIGN(Guangdong) Testing Co., Ltd.

West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China

3.2 Test Facility

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

CNAS-Lab Code: L13261
KSIGN(Guangdong) Testing Co., Ltd. has been assessed and proved to be in Compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2017 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No.: 5457.01
KSIGN(Guangdong) Testing Co.,Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

ISED#: 25693 CAB identifier.: CN0096
KSIGN(Guangdong) Testing Co., Ltd. has been listed by Innovation, Science and Economic Development Canada to perform electromagnetic emission measurement.

FCC-Registration No.: 294912 Designation Number: CN1328
KSIGN(Guangdong) Testing Co., Ltd. EMC Laboratory has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

3.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:
Radiated Emission:

Temperature:	24 ° C
Humidity:	45 %
Atmospheric pressure:	950-1050mbar

AC Power Conducted Emission:

Temperature:	25 ° C
Humidity:	46 %
Atmospheric pressure:	950-1050mbar

Conducted testing:

Temperature:	25 ° C
Humidity:	44 %
Atmospheric pressure:	950-1050mbar

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3.4 Summary of measurement results

Description of test	Result
Conducted emissions test	Compliant
Radiated emission test	Compliant
Antenna requirement	Compliant

3.5 Statement of the measurement uncertainty

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.06 dB	(1)
Radiated Emission	1~18GHz	5.14 dB	(1)
Radiated Emission	18-40GHz	5.38 dB	(1)
Conducted Disturbance	0.15~30MHz	2.14 dB	(1)
Radiated Emission	9~30MHz	2.20dB	(1)

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

3.6 Equipments Used during the Test

Tonscend JS0806-2 Test system					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
1	Spectrum Analyzer	R&S	FSV40-N	101798	03/04/2023
2	Vector Signal Generator	Agilent	N5182A	MY50142520	03/04/2023
3	Analog Signal Generator	HP	83752A	3344A00337	03/04/2023
4	Power Sensor	Agilent	E9304A	MY50390009	03/04/2023
5	Power Sensor	Agilent	E9300A	MY41498315	03/04/2023
6	Wideband Radio Communication Tester	R&S	CMW500	157282	03/04/2023
7	Climate Chamber	Angul	AGNH80L	1903042120	03/04/2023
8	Dual Output DC Power Supply	Agilent	E3646A	MY40009992	03/04/2023
9	RF Control Unit	Tonscend	JS0806-2	/	03/04/2023

Transmitter spurious emissions & Receiver spurious emissions					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
1	EMI Test Receiver	R&S	ESR	102525	03/04/2023
2	High Pass Filter	Chengdu E-Microwave	OHF-3-18-S	0E01901038	03/04/2023
3	High Pass Filter	Chengdu E-Microwave	OHF-6.5-18-S	0E01901039	03/04/2023
4	Spectrum Analyzer	HP	8593E	3831U02087	03/04/2023
5	Ultra-Broadband logarithmic period Antenna	Schwarzbeck	VULB 9163	01230	12/04/2023

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6	Loop Antenna	Beijin ZHINAN	ZN30900C	18050	03/04/2023
7	Spectrum Analyzer	R&S	FSV40-N	101798	03/04/2023
8	Horn Antenna	Schwarzbeck	BBHA 9120 D	2023	03/29/2023
9	Pre-Amplifier	Schwarzbeck	BBV 9745	9745#129	03/04/2023
10	Pre-Amplifier	EMCI	EMC051835SE	980662	03/04/2023

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
1	LISN	R&S	ENV432	1326.6105.02	03/04/2023
2	EMI Test Receiver	R&S	ESR	102524	03/04/2023
3	Manual RF Switch	JS TOYO	/	MSW-01/002	03/04/2023

Note: 1)The Cal.Interval was one year.
2)The cable loss has calculated in test result which connection between each test instruments.

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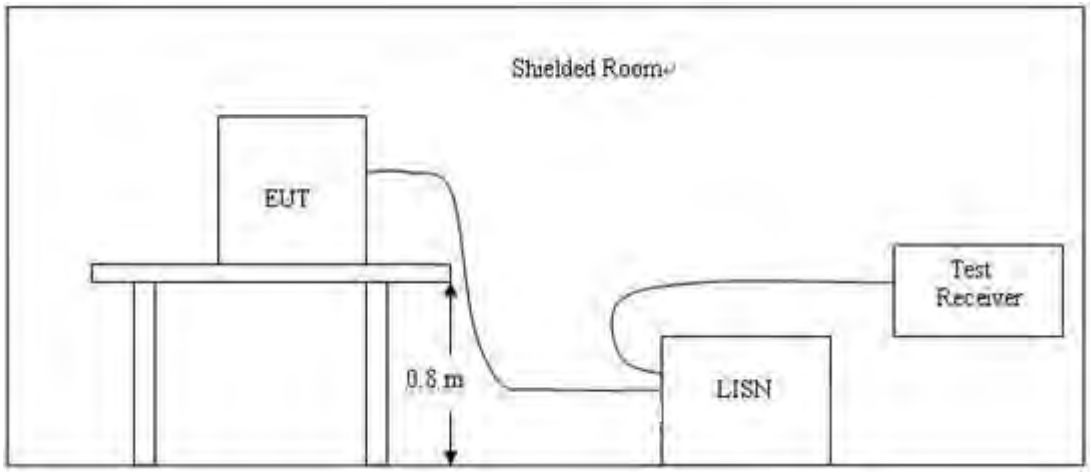
4. TEST CONDITIONS AND RESULTS

4.1 AC Power Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

1, The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10.
2, Support equipment, if needed, was placed as per ANSI C63.10.
3, All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4, If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5, All support equipments received AC power from a second LISN, if any.
6, The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7, Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.

AC Power Conducted Emission Limit

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following：

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.		

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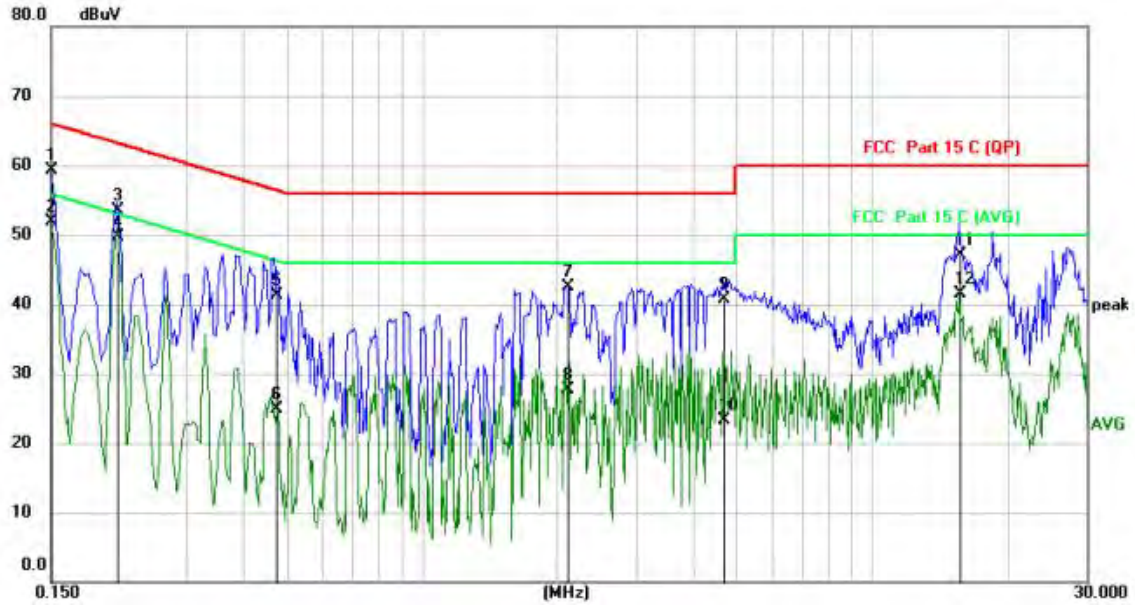
TEST RESULTS

1. Both 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz power supply have been tested, only the worst result of 120 VAC, 60 Hz was reported as below:

Power supply:	AC 120V/60Hz	Polarization	L



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1500	48.64	10.71	59.35	66.00	-6.65	QP
2		0.1500	41.19	10.71	51.90	56.00	-4.10	AVG
3		0.2100	42.77	10.75	53.52	63.21	-9.69	QP
4	*	0.2100	38.94	10.75	49.69	53.21	-3.52	AVG
5		0.4757	30.82	10.42	41.24	56.41	-15.17	QP
6		0.4757	14.48	10.42	24.90	46.41	-21.51	AVG
7		2.1026	31.97	10.58	42.55	56.00	-13.45	QP
8		2.1026	17.11	10.58	27.69	46.00	-18.31	AVG
9		4.6902	30.11	10.63	40.74	56.00	-15.26	QP
10		4.6902	12.58	10.63	23.21	46.00	-22.79	AVG
11		15.6717	36.41	10.75	47.16	60.00	-12.84	QP
12		15.6717	30.73	10.75	41.48	50.00	-8.52	AVG

Note: Note:1).QP Value (dBμV)= QP Reading (dBμV)+ Factor (dB)
2). Factor (dB)=insertion loss of LISN (dB) + Cable loss (dB)
3). QPMargin(dB) = QP Limit (dBμV) - QP Value (dBμV)
4). AVMargin(dB) = AV Limit (dBμV) - AV Value (dBμV)

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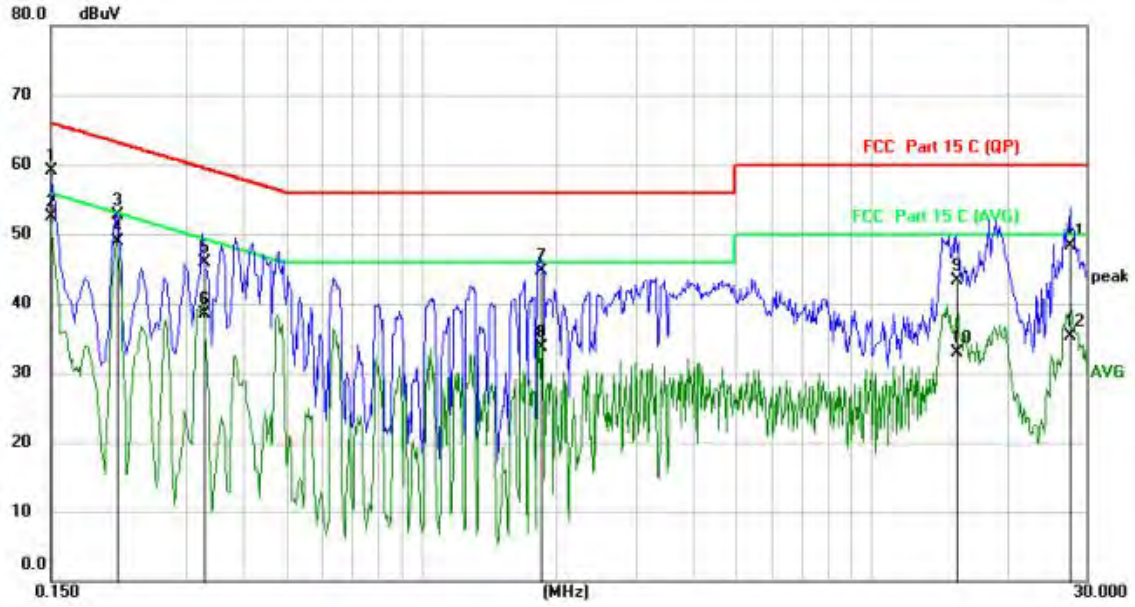
Power supply:	AC 120V/60Hz	Polarization	N



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1500	48.49	10.69	59.18	66.00	-6.82	QP
2	*	0.1500	41.83	10.69	52.52	56.00	-3.48	AVG
3		0.2098	41.93	10.74	52.67	63.21	-10.54	QP
4		0.2098	38.10	10.74	48.84	53.21	-4.37	AVG
5		0.3274	35.31	10.52	45.83	59.52	-13.69	QP
6		0.3274	28.06	10.52	38.58	49.52	-10.94	AVG
7		1.8428	34.16	10.54	44.70	56.00	-11.30	QP
8		1.8428	23.18	10.54	33.72	46.00	-12.28	AVG
9		15.4345	32.50	10.78	43.28	60.00	-16.72	QP
10		15.4345	22.07	10.78	32.85	50.00	-17.15	AVG
11		27.6117	37.44	10.96	48.40	60.00	-11.60	QP
12		27.6117	24.32	10.96	35.28	50.00	-14.72	AVG

Note: Note:1).QP Value (dBμV)= QP Reading (dBμV)+ Factor (dB)
2). Factor (dB)=insertion loss of LISN (dB) + Cable loss (dB)
3). QPMargin(dB) = QP Limit (dBμV) - QP Value (dBμV)
4). AVMargin(dB) = AV Limit (dBμV) - AV Value (dBμV)

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4.2 Radiated Emission

Limit

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission out of authorized band shall not exceed the following table at a 3 meters measurement distance.

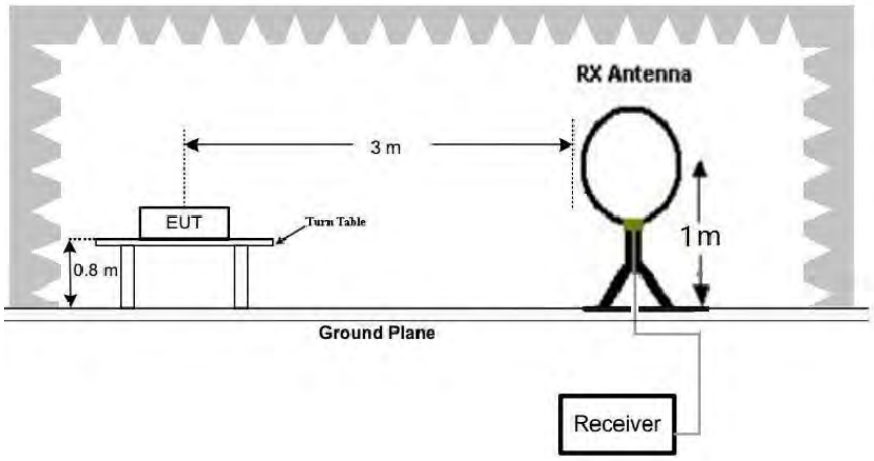
In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Radiated emission limits

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST CONFIGURATION

1. Radiated Emission Test Set-Up, Frequency Below 30MHz



2. Radiated Emission Test Set-Up, Frequency below 1000MHz

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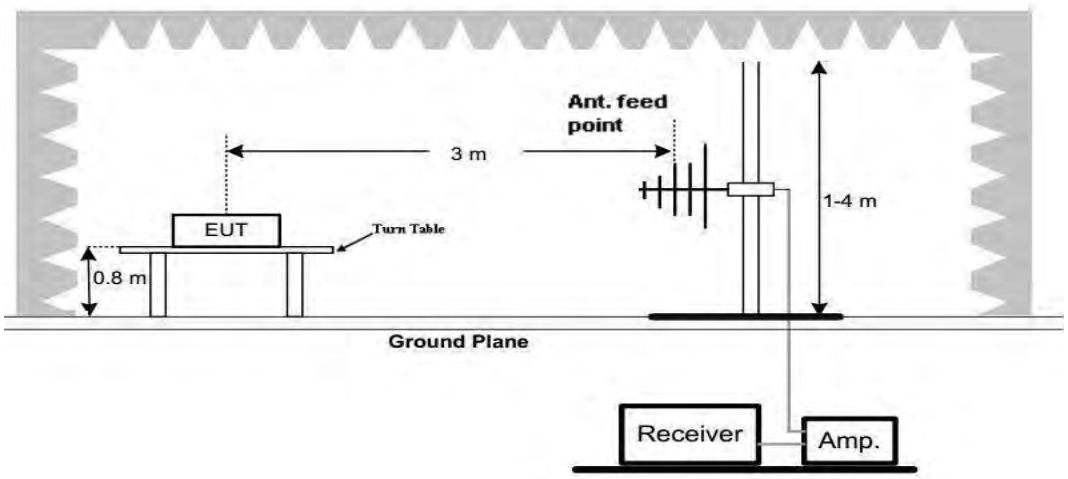

Test Procedure

1. Below 1GHz measurement the EUT is placed on a turntable which is 0.8m above ground plane.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0℃ to 360℃ to acquire the highest emissions from EUT
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. Radiated emission test frequency band from 9KHz to 1000MHz.
6. The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz-30MHz	Active Loop Antenna	3
30MHz-1GHz	Bilog Antenna	3

7. Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz,Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz,Sweep time=Auto	QP
30MHz-1GHz	RBW=120KHz/VBW=1000KHz,Sweep time=Auto	QP

TEST RESULTS

For 9 KHz-30MHz

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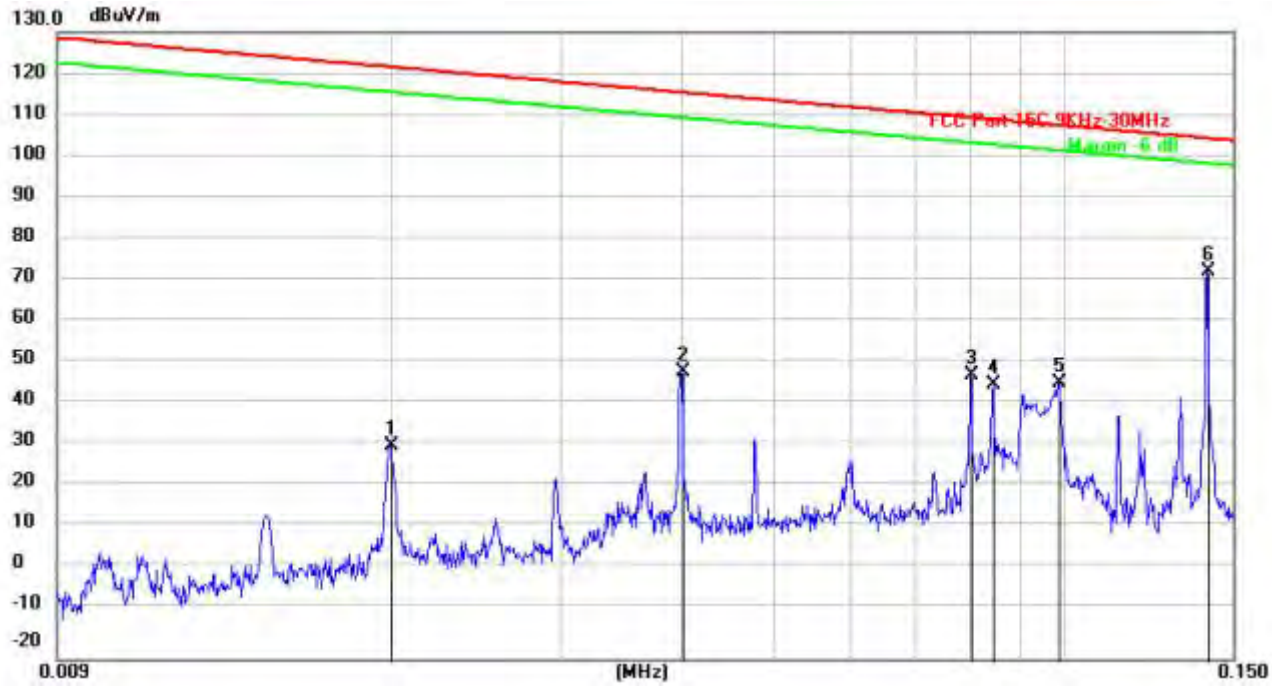
Face

9K-150K



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		0.0200	40.08	-9.05	31.03	121.58	-90.55	peak
2		0.0401	57.89	-8.90	48.99	115.54	-66.55	peak
3		0.0801	57.09	-9.15	47.94	109.53	-61.59	peak
4		0.0846	54.73	-9.03	45.70	109.06	-63.36	peak
5		0.0990	55.16	-8.90	46.26	107.69	-61.43	peak
6	*	0.1411	82.45	-9.50	72.95	104.61	-31.66	peak

Remark:

Correct Factor=Antenna Factor + Cable Loss -Preamplifier Factor

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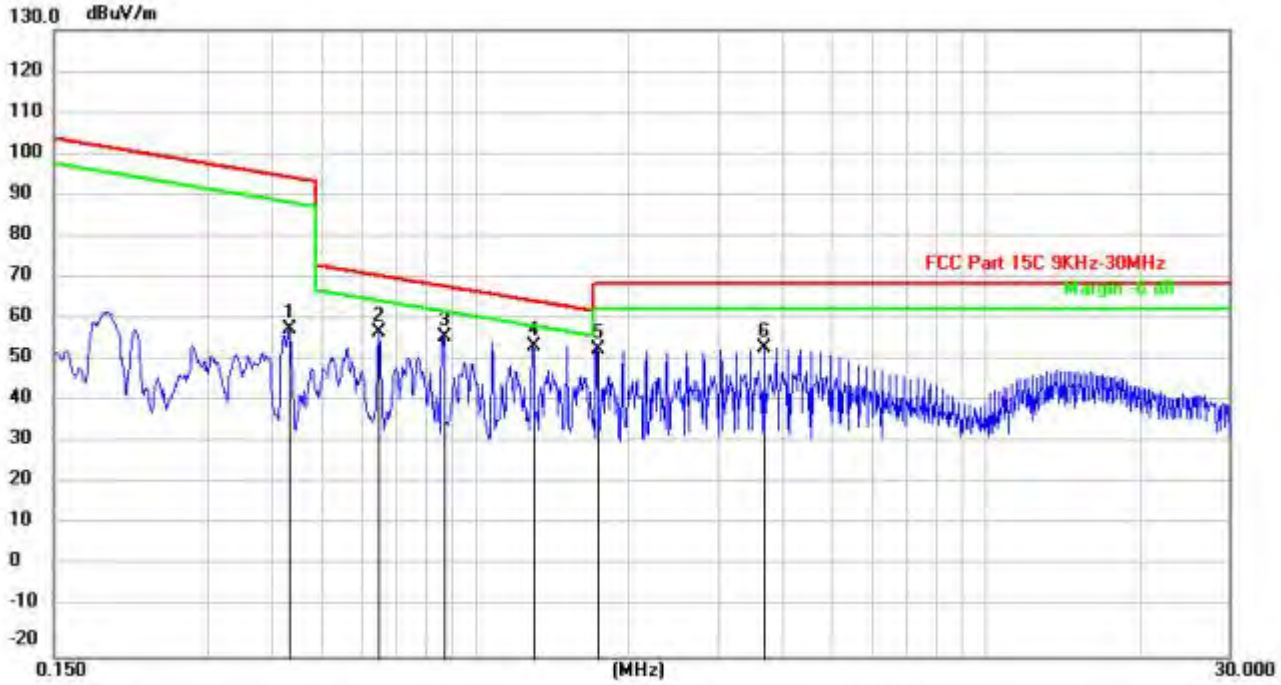
Face

150K-30M



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		0.4340	67.75	-9.25	58.50	94.85	-36.35	peak
2		0.6505	67.03	-9.19	57.84	71.34	-13.50	peak
3		0.8669	65.68	-9.14	56.54	68.84	-12.30	peak
4	*	1.3008	63.75	-9.15	54.60	65.32	-10.72	peak
5		1.7354	62.84	-9.21	53.63	69.54	-15.91	peak
6		3.6884	63.48	-9.43	54.05	69.54	-15.49	peak

Remark:

Correct Factor=Antenna Factor + Cable Loss -Preamplifier Factor

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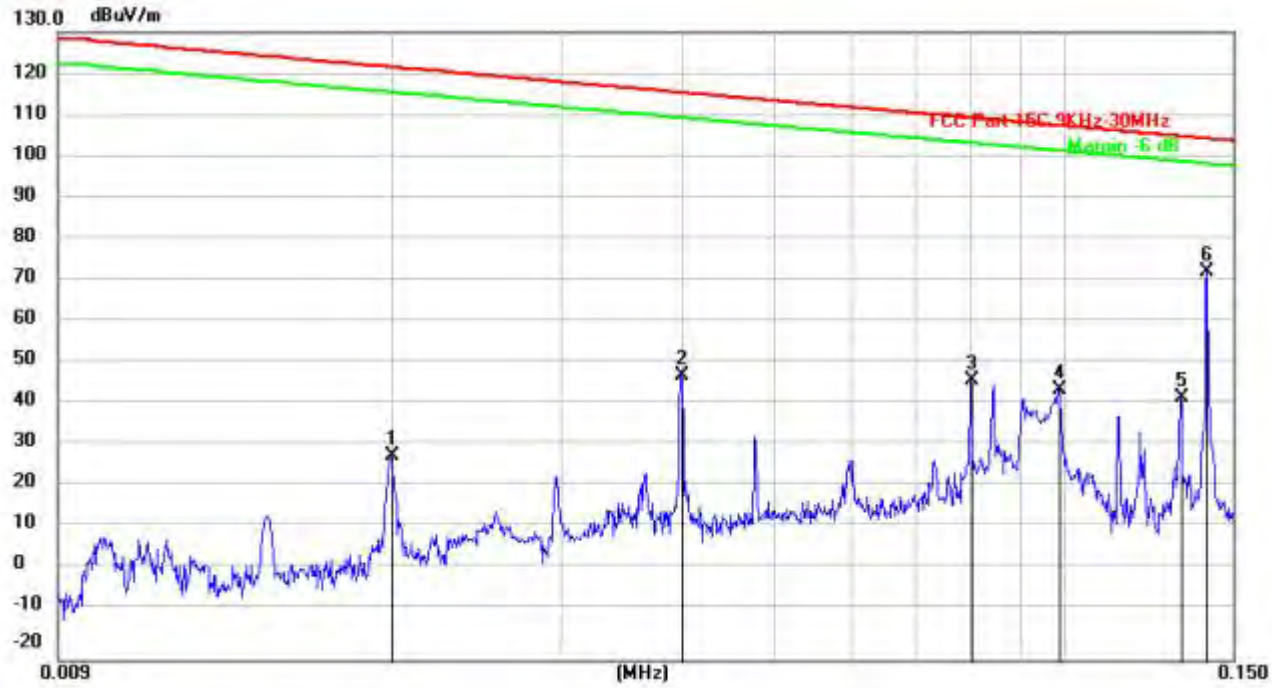
Side

9K-150K



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		0.0200	38.08	-9.05	29.03	121.58	-92.55	peak
2		0.0400	56.89	-8.90	47.99	115.56	-67.57	peak
3		0.0801	56.09	-9.15	46.94	109.53	-62.59	peak
4		0.0989	53.66	-8.90	44.76	107.70	-62.94	peak
5		0.1323	52.39	-9.67	42.72	105.17	-62.45	peak
6	*	0.1411	82.45	-9.50	72.95	104.63	-31.68	peak

Remark:

Correct Factor=Antenna Factor + Cable Loss -Preamplifier Factor

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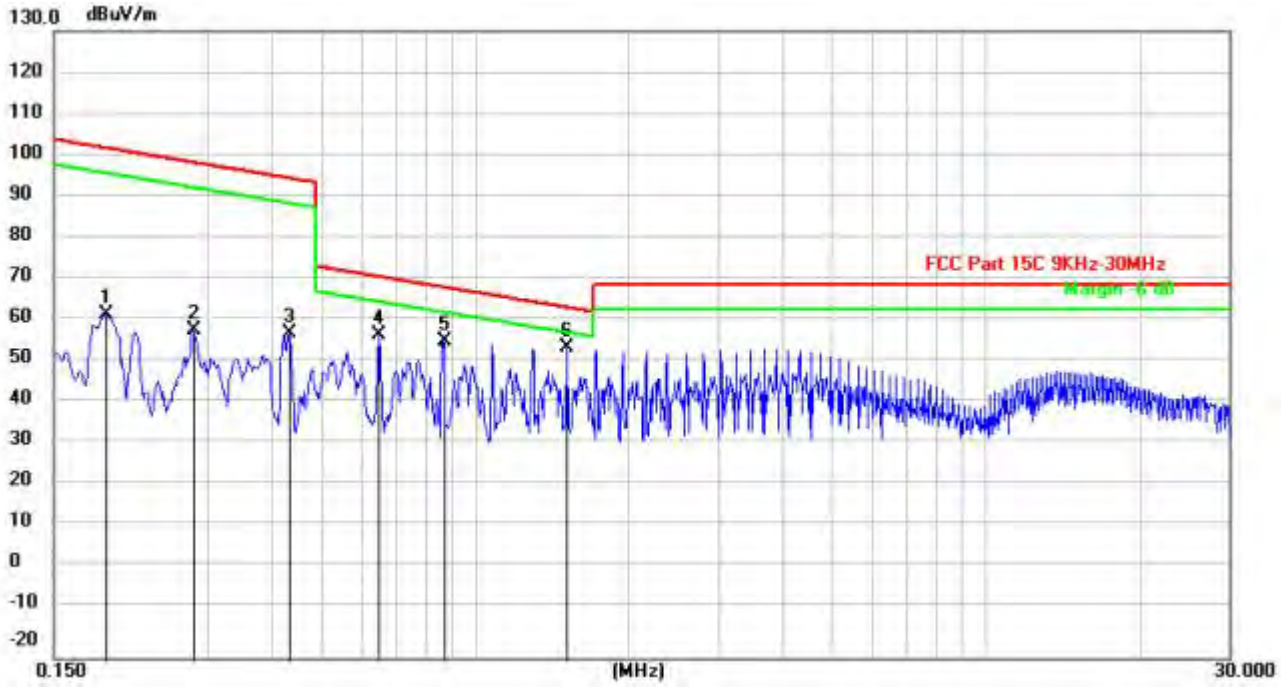
Side

150K-30M



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		0.1900	71.67	-9.32	62.35	102.03	-39.68	peak
2		0.2807	68.03	-9.29	58.74	98.64	-39.90	peak
3		0.4339	67.25	-9.25	58.00	94.86	-36.86	peak
4		0.6502	66.53	-9.19	57.34	71.34	-14.00	peak
5		0.8668	65.18	-9.14	56.04	68.85	-12.81	peak
6	*	1.5181	63.60	-9.18	54.42	63.98	-9.56	peak

Remark:

Correct Factor=Antenna Factor + Cable Loss -Preamplifier Factor

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For 30MHz-1GHz

Horizontal

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		103.9509	42.33	-17.94	24.39	43.50	-19.11	QP
2		147.0422	51.20	-21.37	29.83	43.50	-13.67	QP
3		178.8838	47.46	-19.23	28.23	43.50	-15.27	QP
4		282.5885	44.86	-15.08	29.78	46.00	-16.22	QP
5	*	334.6240	46.96	-13.19	33.77	46.00	-12.23	QP
6		466.7436	39.60	-10.19	29.41	46.00	-16.59	QP

Note:1).Level (dBμV/m)= Reading (dBμV)+ Factor (dB/m)

2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)

3). Margin(dB) = Limit (dBμV/m) - Level (dBμV/m)

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Vertical

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		51.8792	43.74	-16.02	27.72	40.00	-12.28	QP
2		89.3703	52.64	-19.95	32.69	43.50	-10.81	QP
3	*	147.7136	57.87	-21.37	36.50	43.50	-7.00	QP
4		176.5158	48.59	-19.62	28.97	43.50	-14.53	QP
5		334.6240	44.03	-13.19	30.84	46.00	-15.16	QP
6		429.3722	46.58	-10.57	36.01	46.00	-9.99	QP

Note:1).Level (dBμV/m)= Reading (dBμV)+ Factor (dB/m)

2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)

3). Margin(dB) = Limit (dBμV/m) - Level (dBμV/m)

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4.3 Antenna Requirement

Standard Applicable

Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, 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.

Antenna Information

The antenna used in this product is a Coil Antenna, The directional gains of antenna used for transmitting is 0dBi.

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5. Test Setup Photos of the EUT

Radiated Measurement (Below 30MHz)

Radiated Measurement (Above 30MHz)

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Conducted Emission

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6. PHOTOS OF THE EUT

External Photographs

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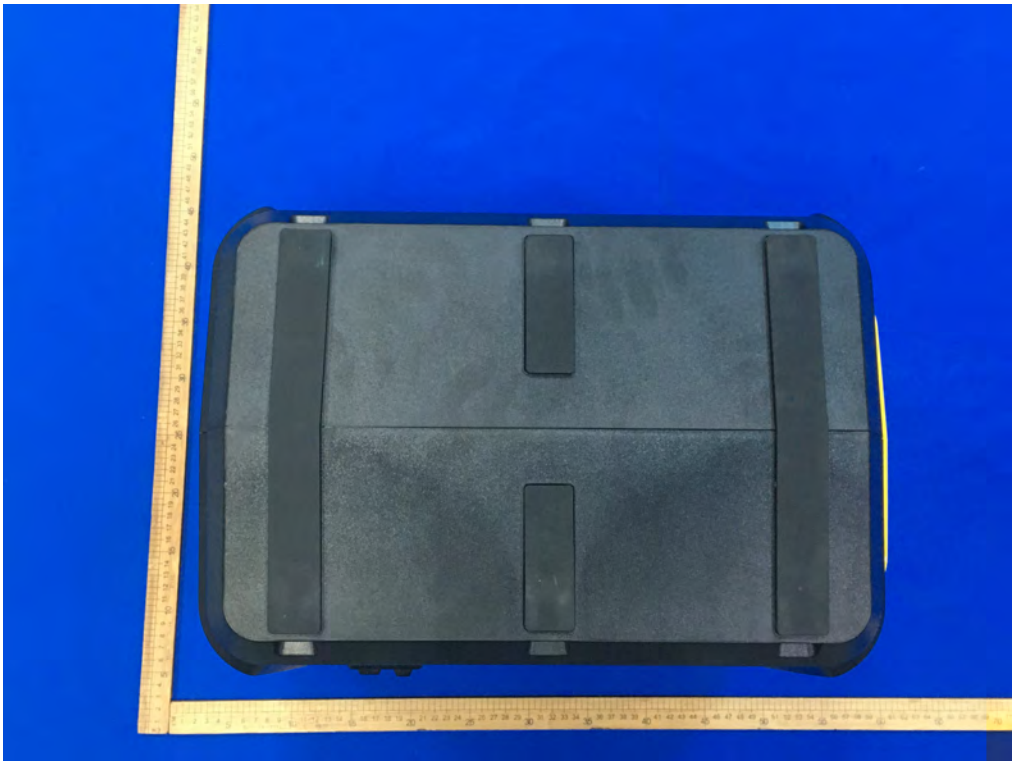

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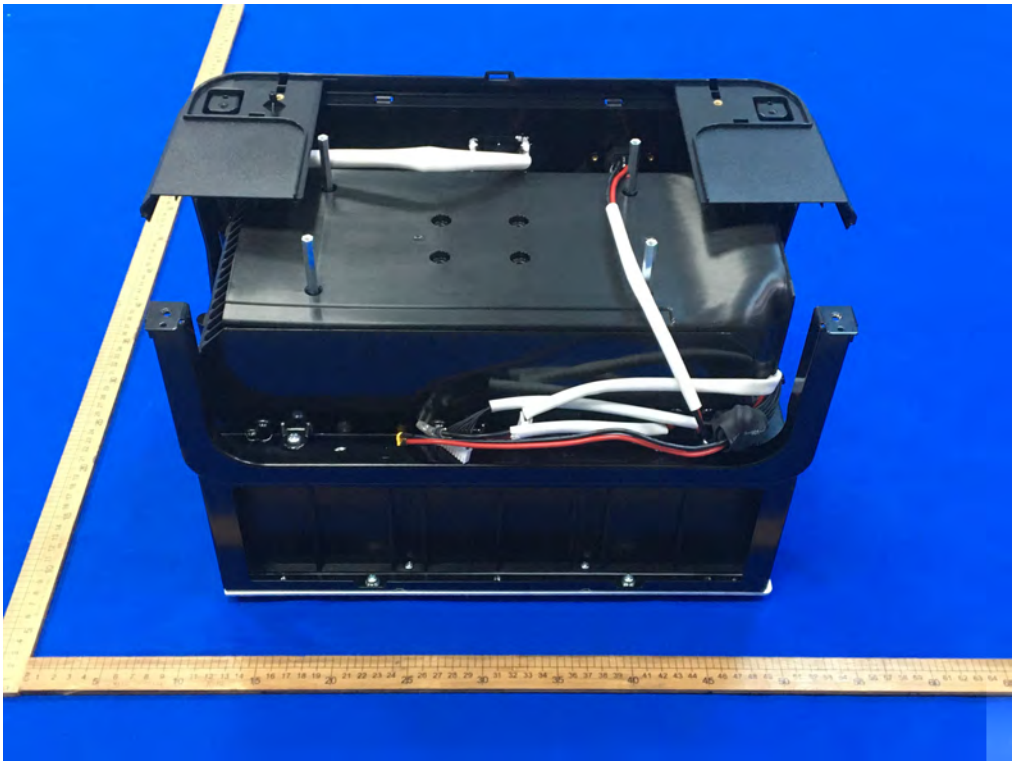
Internal Photographs



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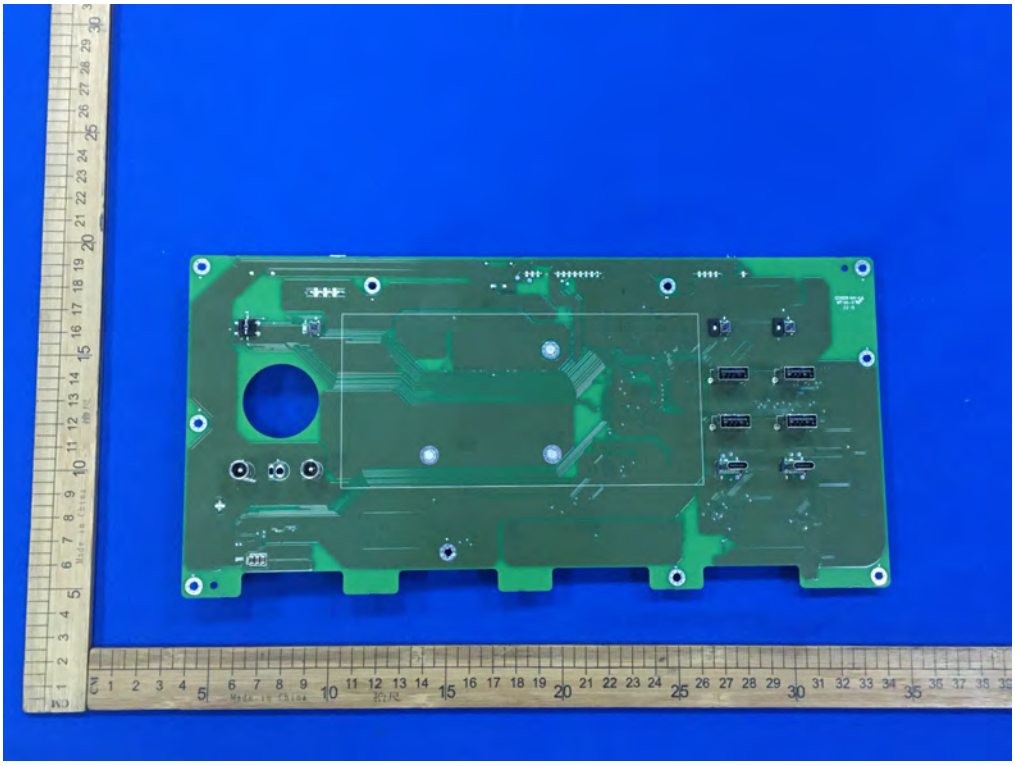

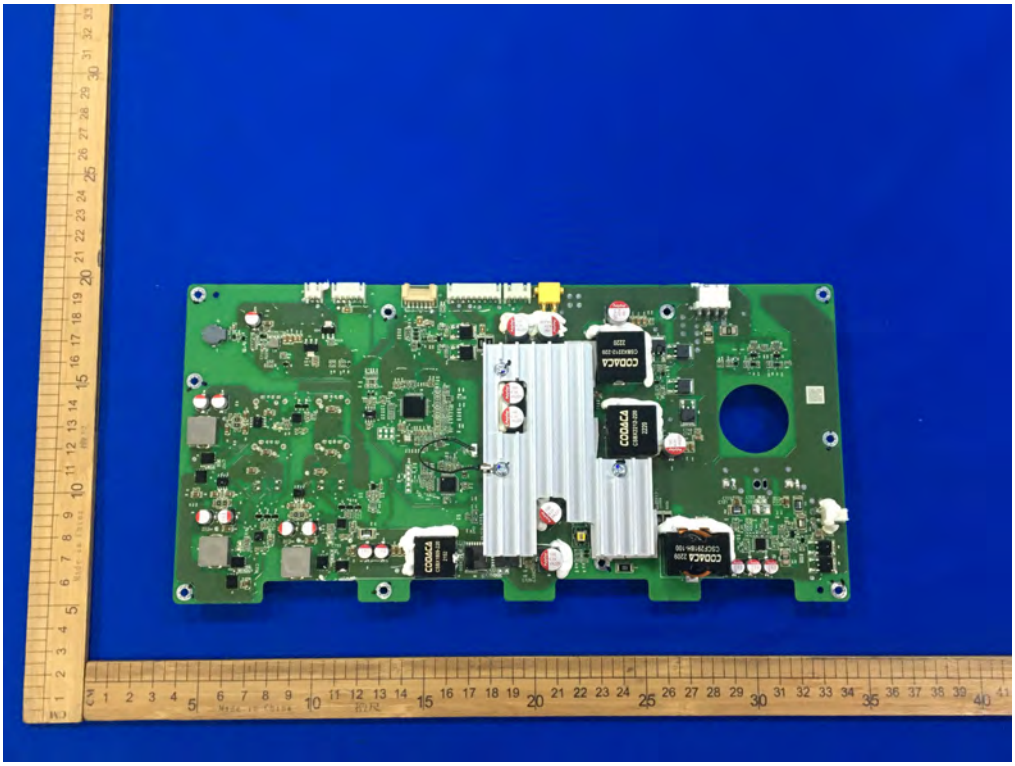

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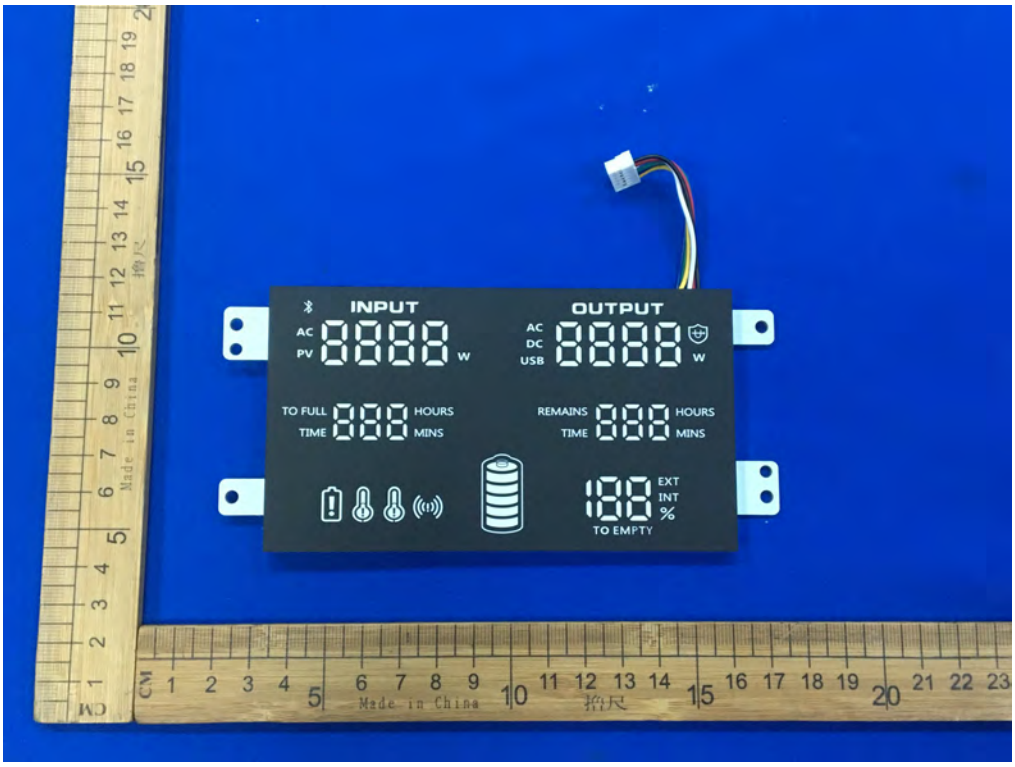

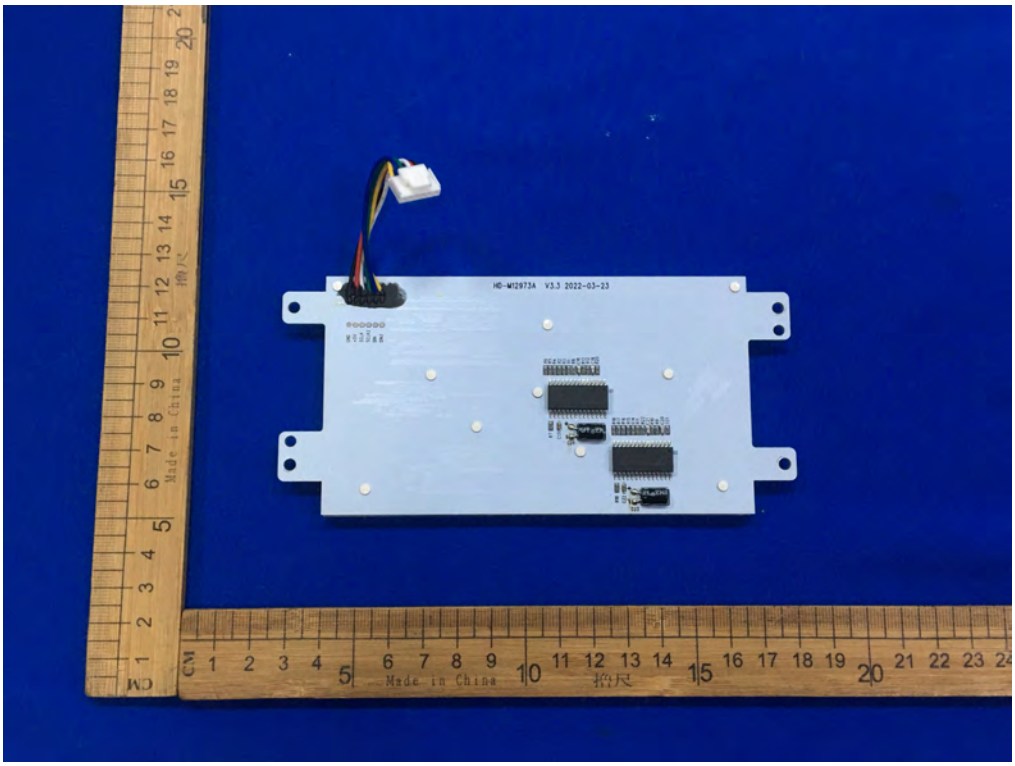

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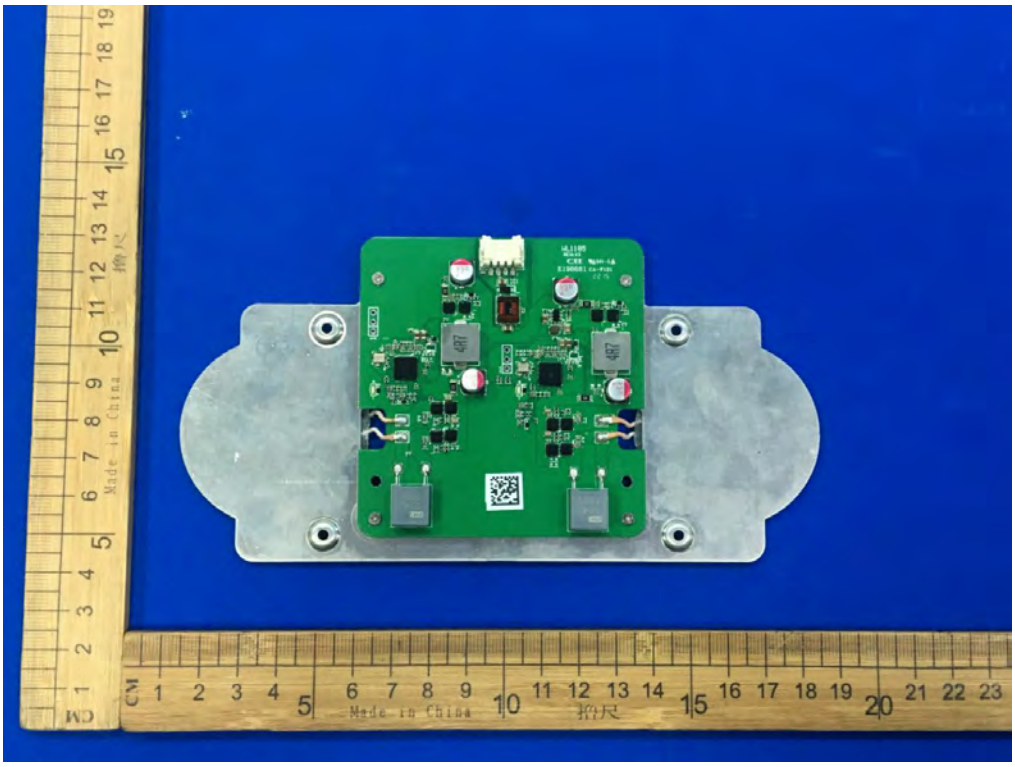

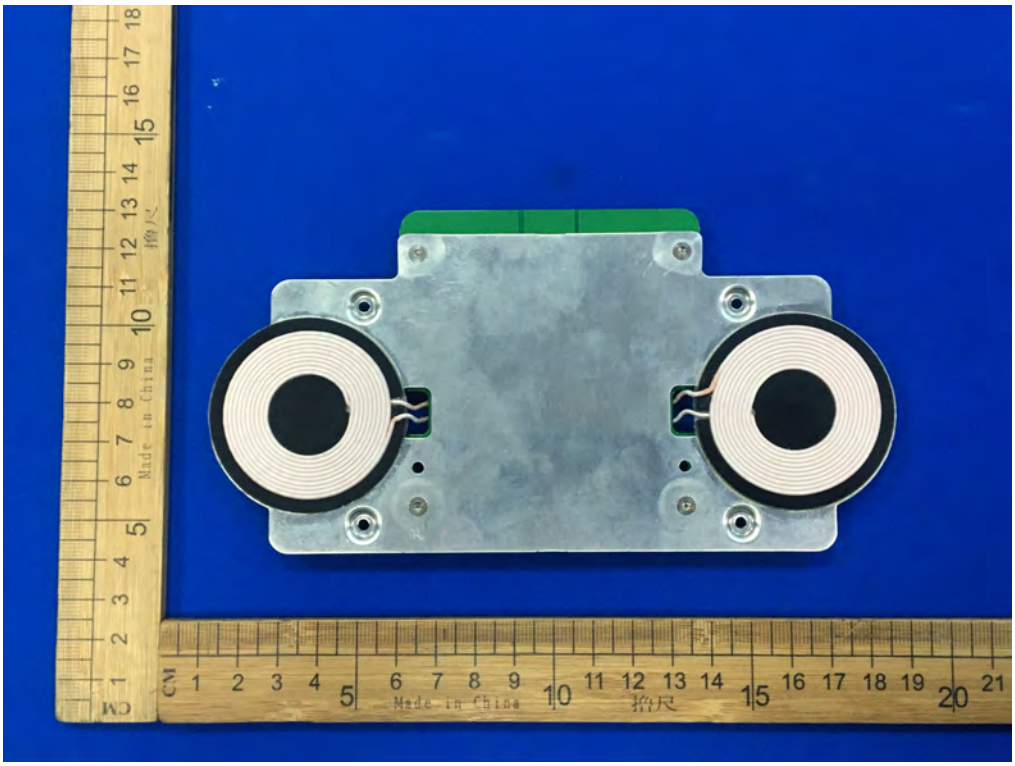

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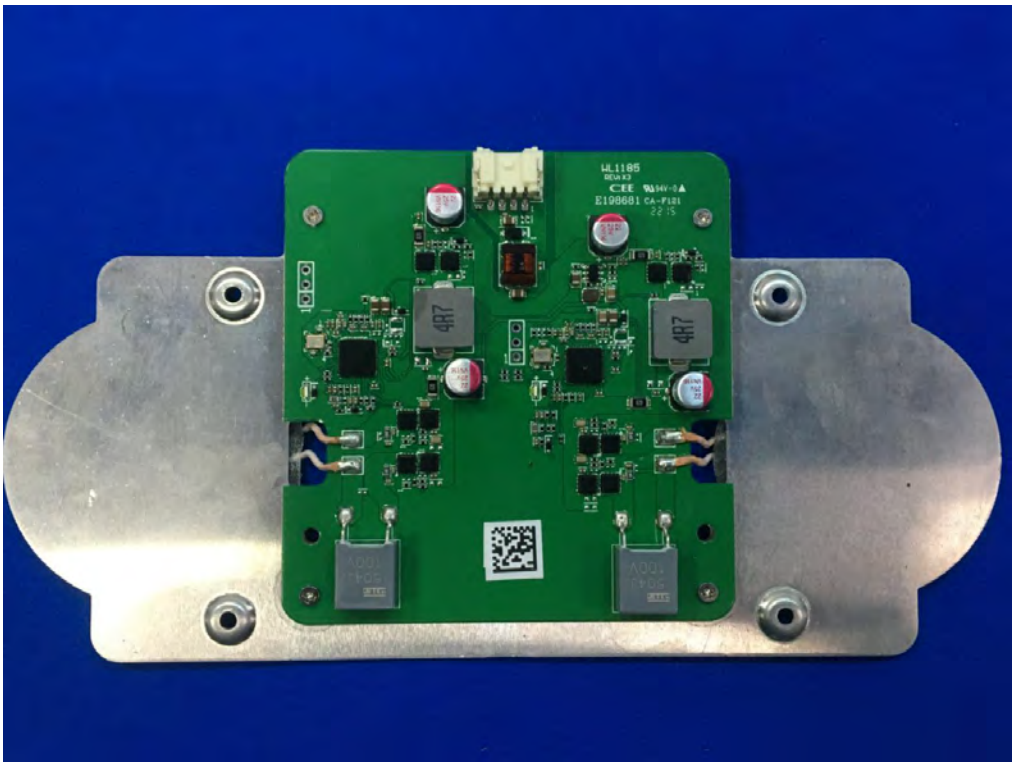

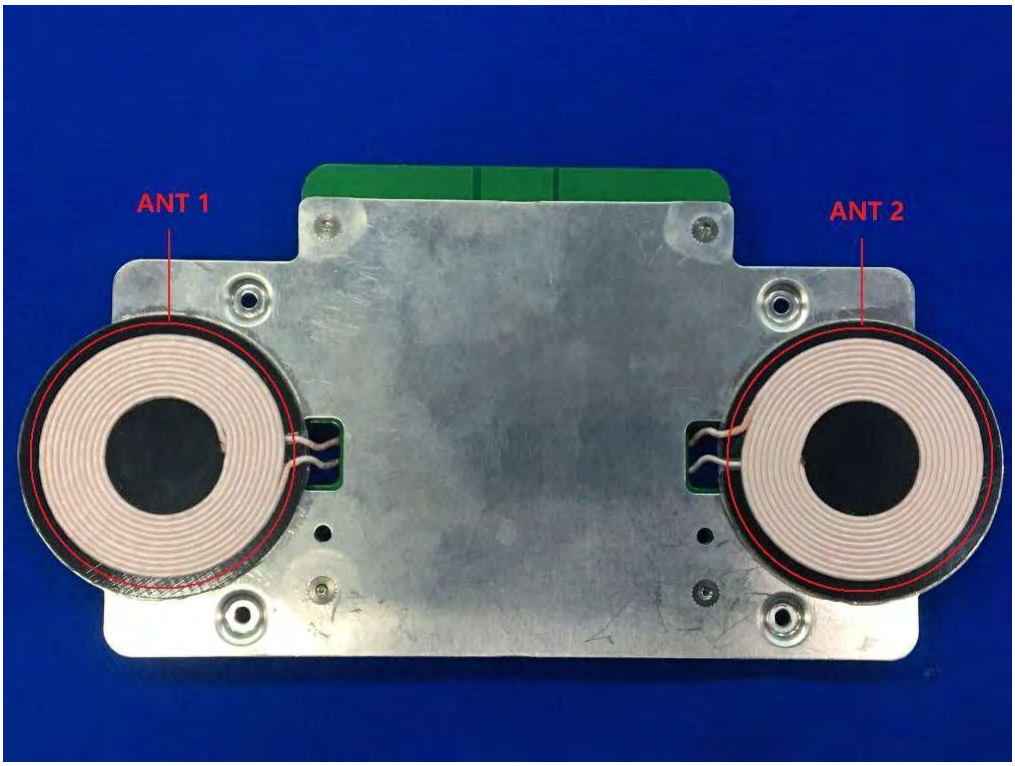

********** End of Report **********

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