TEST REPORT

Reference No.	:	WTS18S0199488-1E
FCC ID	:	2ACWB-BASE5
Applicant	:	mophie LLC
Address	:	6244 Technology Ave. Kalamazoo, MI 49009 U.S.A.
Manufacturer	:	The same as above
Address	:	The same as above
Product	:	mophie charge stream pad
Model(s)	:	WRLS-CHGBASE-5W
Standards	:	FCC Part 15 subpart C
Date of Receipt sample	:	2018-01-03
Date of Test	:	2018-01-04 to 2018-01-16
Date of Issue	:	2018-01-17
Test Result	:	**Pass**

Remarks:
The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

Prepared By:
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Philo Zhong / Manager

2 Laboratories Introduction

Waltek Services (Shenzhen) Co., Ltd is a professional third-party testing and certification laboratory with multi-year product testing and certification experience, established strictly in accordance with ISO/IEC 17025 requirements, and accredited by ILAC (International Laboratory Accreditation Cooperation) member. A2LA (American Association for Laboratory Accreditation) of USA, Meanwhile, Waltek has got recognition as registration and accreditation laboratory from EMSD (Electrical and Mechanical Services Department), and American Energy star, FCC(The Federal Communications Commission), CEC(California energy efficiency), IC(Industry Canada). It's the strategic partner and data recognition laboratory of international authoritative organizations, such as Intertek(ETL-SEMKO), TÜV Rheinland, TÜV SÜD, etc.

Waltek Services (Shenzhen) Co., Ltd is one of the largest and the most comprehensive third party testing laboratory in China. Our test capability covered four large fields: safety test. ElectroMagnetic Compatibility(EMC), and energy performance, wireless radio. As a professional, comprehensive, justice international test organization, we still keep the scientific and rigorous work attitude to help each client satisfy the international standards and assist their product enter into globe market smoothly.

2.1 Test Facility

A. Accreditations for Conformity Assessment (International)

Country/Region	Accreditation Body	Scope	Note
USA	**A2LA (Certificate No.: 4243.01)**	FCC ID \ DOC \ VOC	1
Canada		IC ID \ VOC	2
Japan		MIC-T \ MIC-R	-
Europe		EMCD \ RED	-
Taiwan		NCC	-
Hong Kong		OFCA	-
Australia		RCM	-
India	**International Services**	WPC	-
Thailand		NTC	-
Singapore		IDA	-

Note:

1. FCC Designation No.: CN1201. Test Firm Registration No.: 523476.
2. IC Canada Registration No.: 7760A

B.TCBs and Notify Bodies Recognized Testing Laboratory.

Recognized Testing Laboratory of …	Notify body number
TUV Rheinland	Optional.
Intertek	
TUV SUD	
SGS	
Phoenix Testlab GmbH	0700
Element Materials Technology Warwick Ltd	0891
Timco Engineering, Inc.	1177
Eurofins Product Service GmbH	0681

3 Test Summary

Test Items	Test Requirement	Result
Conducted Emissions	15.207	PASS
Radiated Spurious Emissions	15.209	PASS
Occupied Bandwidth	15.215	PASS
Antenna Requirement	15.203	PASS

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5 General Information

5.1 General Description of E.U.T

Product:	mophie charge stream pad
Model(s):	WRLS-CHGBASE-5W
Model Difference:	N/A
Type of Modulation:	ASK
Frequency Range:	0.112~0.205MHz
Antenna installation:	Coil Antenna
Antenna gain:	0dBi
Input:	5V/9V ⎓ 2A

5.2 Details of accessories

Ratings：	Adapter: Input: AC100-240V, 50/60Hz, 0.5A Output: 5V ⎓ 3A / 9V ⎓ 2A / 12V ⎓ 1.5A
Adapter：	Model： A138A-120150U-US2

6 Equipment Used during Test

6.1 Equipments List

Conducted Emissions Test Site 1#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1.	EMI Test Receiver	R&S	ESCI	100947	2017-09-12	2018-09-11
2.	LISN	R&S	ENV216	101215	2017-09-12	2018-09-11
3.	Cable	Top	TYPE16(3.5M)	-	2017-09-12	2018-09-11
3m Semi-anechoic Chamber for Radiation Emissions Test site 2#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No**	**Last Calibration Date**	**Calibration Due Date**
1	Test Receiver	R&S	ESCI	101296	2017-04-06	2018-04-05
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	2017-10-17	2017-10-16
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	2017-04-07	2018-04-06
4	Amplifier	ANRITSU	MH648A	M43381	2017-04-07	2018-04-06
5	Amplifier	Compliance pirection systems inc	PAP-0203	22024	2017-09-12	2018-09-11
6	Cable	HUBER+SUHNER	CBL2	525178	2017-04-07	2018-04-06
RF Conducted Testing						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1.	EMC Analyzer (9k~26.5GHz)	Agilent	E7405A	MY45114943	2017-09-15	2018-09-14
2.	Spectrum Analyzer (9k-6GHz)	R&S	FSL6	100959	2017-09-15	2018-09-14
3.	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY50520207	2017-09-15	2018-09-14
4.	Humidity Chamber	GF	GTH-225-40-1P	IAA061213	2017-09-15	2018-09-14

6.2 Description of Support Units

Equipment	Manufacturer	Model No.	Series No.
/	/	/	/

6.3 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty	Note
Conducted Emissions	150kHz~30MHz	±3.64dB	(1)
Radiated Spurious Emissions	26KHz~30MHz	±3.03dB	(1)
Radiated Spurious Emissions	30MHz~1000MHz	±5.03dB	(1)

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

6.4 Test Equipment Calibration

All the test equipments used are valid and calibrated by GUANG ZHOU GRG METROLOGY & TES T CO., LTD. address is No.163, Pingyun Rd. West of Huangpu Ave,Tianhe District, Guangzhou, Guangdong, China.

7 Conducted Emission

Test Requirement:	FCC CFR 47 Part 15 Section 15.207
Test Method:	ANSI C63.10:2013
Test Result:	PASS
Frequency Range:	150kHz to 30MHz
Class/Severity:	Class B
Limit:	66-56 dBμV between 0.15MHz & 0.5MHz
	56 dBμV between 0.5MHz & 5MHz
	60 dBμV between 5MHz & 30MHz
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth)

7.1 E.U.T. Operation

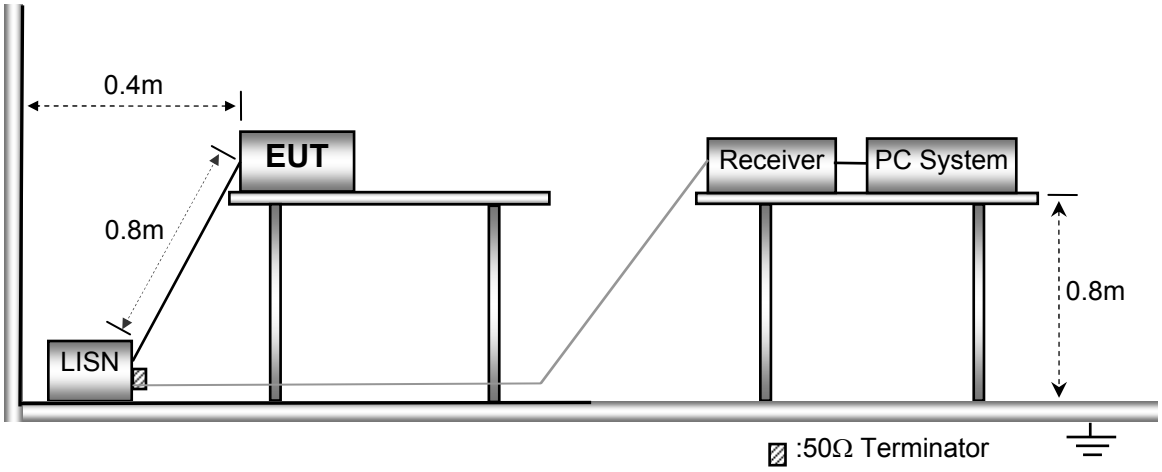
Operating Environment **:**

Temperature:	25.5 °C
Humidity:	51 % RH
Atmospheric Pressure:	101.2kPa
EUT Operation **:**	Transmitting mode

The test was performed in transmitting mode, the test data were shown in the report.

7.2 EUT Setup

The EUT was placed on the test table in shielding room.

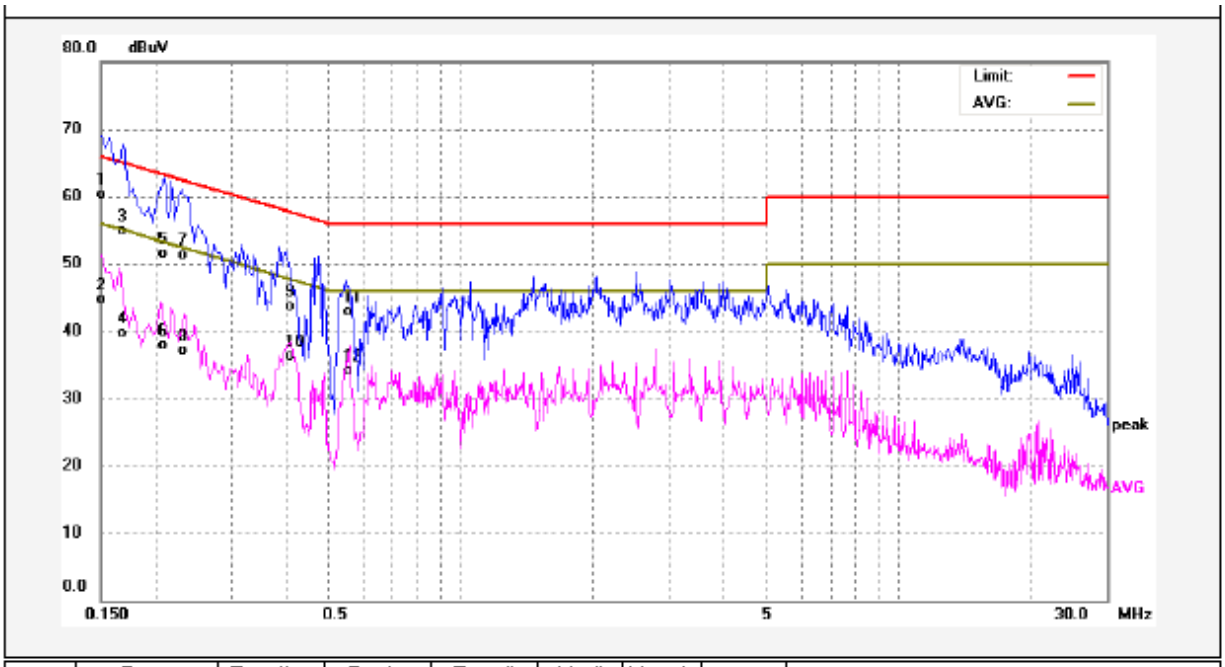


7.3 Measurement Description

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

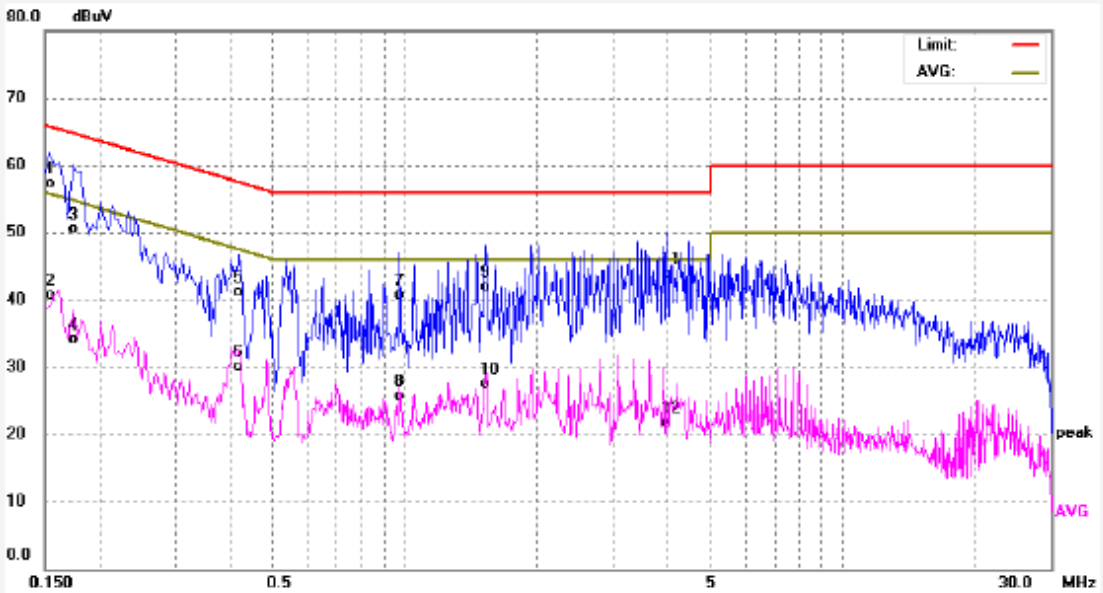
7.4 Conducted Emission Test Result

Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1500	50.34	10.06	60.40	65.99	-5.59	QP	
2	0.1500	34.56	10.06	44.62	55.99	-11.37	AVG	
3	0.1700	45.08	9.86	54.94	64.96	-10.02	QP	
4	0.1700	29.83	9.86	39.69	54.96	-15.27	AVG	
5	0.2100	41.63	9.93	51.56	63.20	-11.64	QP	
6	0.2100	27.93	9.93	37.86	53.20	-15.34	AVG	
7	0.2300	41.24	9.97	51.21	62.45	-11.24	QP	
8	0.2300	27.19	9.97	37.16	52.45	-15.29	AVG	
9	0.4100	33.75	10.03	43.78	57.65	-13.87	QP	
10	0.4100	26.35	10.03	36.38	47.65	-11.27	AVG	
11	0.5580	32.92	10.07	42.99	56.00	-13.01	QP	
12	0.5580	24.05	10.07	34.12	46.00	-11.88	AVG	

Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1539	47.25	10.02	57.27	65.78	-8.51	QP	
2	0.1539	30.66	10.02	40.68	55.78	-15.10	AVG	
3	0.1740	40.72	9.87	50.59	64.76	-14.17	QP	
4	0.1740	24.17	9.87	34.04	54.76	-20.72	AVG	
5	0.4180	31.05	10.04	41.09	57.49	-16.40	QP	
6	0.4180	20.08	10.04	30.12	47.49	-17.37	AVG	
7	0.9740	30.62	10.08	40.70	56.00	-15.30	QP	
8	0.9740	15.57	10.08	25.65	46.00	-20.35	AVG	
9	1.5339	31.71	10.15	41.86	56.00	-14.14	QP	
10	1.5339	17.39	10.15	27.54	46.00	-18.46	AVG	
11	3.9660	33.64	10.27	43.91	56.00	-12.09	QP	
12	3.9660	11.44	10.27	21.71	46.00	-24.29	AVG	

8 Radiated Spurious Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.209

Test Method: ANSI C63.10:2013

Test Result: PASS

Measurement Distance: 3m

Limit:

FCC Part15 Paragraph 15.209

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	$20\log^{(2400/F(kHz))} + 80$
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	$20\log^{(24000/F(kHz))} + 40$
1.705 ~ 30	30	30	100 * 30	$20\log^{(30)} + 40$
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

8.1 EUT Operation

Operating Environment :

Temperature: 23.5 °C

Humidity: 51.1 % RH

Atmospheric Pressure: 101.2kPa

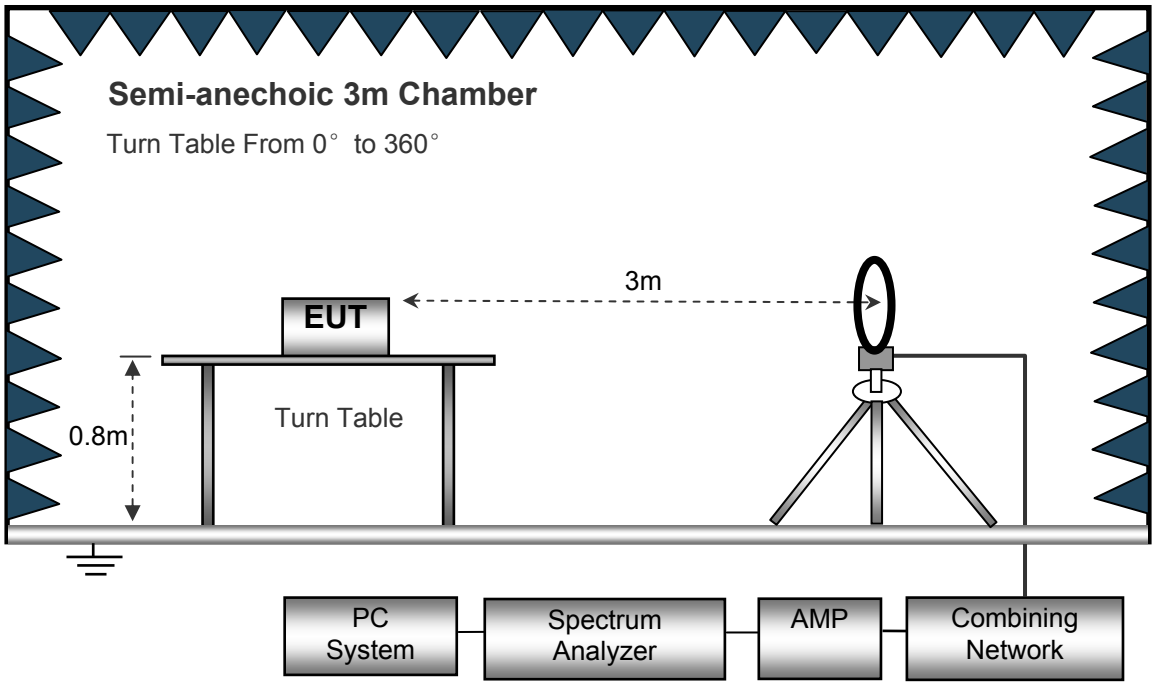
EUT Operation :

Only the worst case transmitting mode were record in the report.

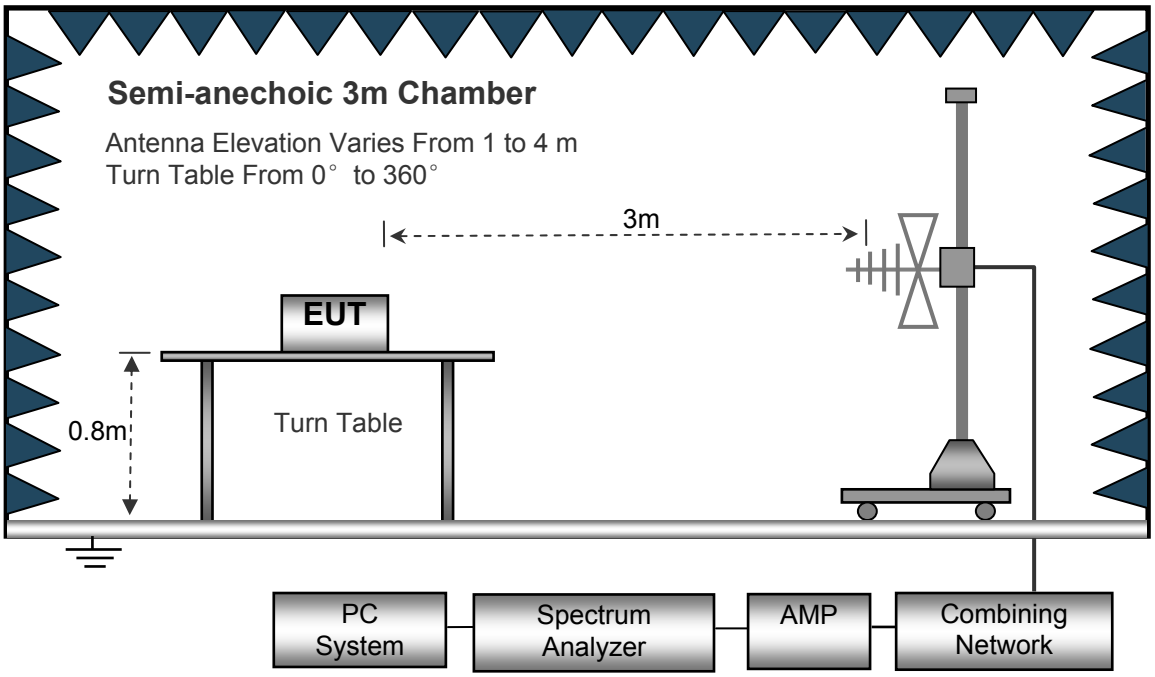
8.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.10: 2013.

The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



8.3 Spectrum Analyzer Setup

Below 30MHz

Sweep Speed ..... Auto
IF Bandwidth..... 10kHz
Video Bandwidth..... 10kHz

Resolution Bandwidth..... 10kHz

30MHz ~ 1GHz

Sweep Speed ..... Auto
Detector ..... PK
Resolution Bandwidth..... 100kHz
Video Bandwidth..... 300kHz

8.4 Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions. The spectrum was investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are tested under 3-axes(X, Y, Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand). After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.

8.5 Summary of Test Results

Test Frequency: 9KHz ~ 30MHz, Note: Correct factor = Cable loss + Antenna factor

Frequency (MHz)	**Measurement results**	**Detector**	**Correct factor**	**Measurement results (calculated)**	**Limits**	**Margin**
	dBμV @3m	**PK/QP**	**dB/m**	**dBμV/m @3m**	**dBμV/m @3m**	**dB**
0.139	33.20	QP	28.30	-18.50	25.33	-43.83
3.265	23.02	QP	23.60	6.62	29.54	-22.92

Test Frequency: 30MHz ~ 1GHz

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15. 209	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP /Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV /m)	(dB)
34.2	34.20	QP	329	1.5	H	-14.30	19.90	40.00	-20.10
34.2	35.29	QP	210	1.4	V	-14.30	20.99	40.00	-19.01
221.36	34.02	QP	56	2.2	H	-13.58	20.44	46.50	-26.06
223.36	40.89	QP	28	2.0	V	-13.58	27.31	46.50	-19.19
521.35	36.42	QP	24	2.1	H	-5.63	30.79	46.50	-15.71
521.35	37.48	QP	254	1.7	V	-5.63	31.85	46.50	-14.65

9 Bandwidth Measurement

Test Requirement: FCC CFR47 Part 15 Section 15.215

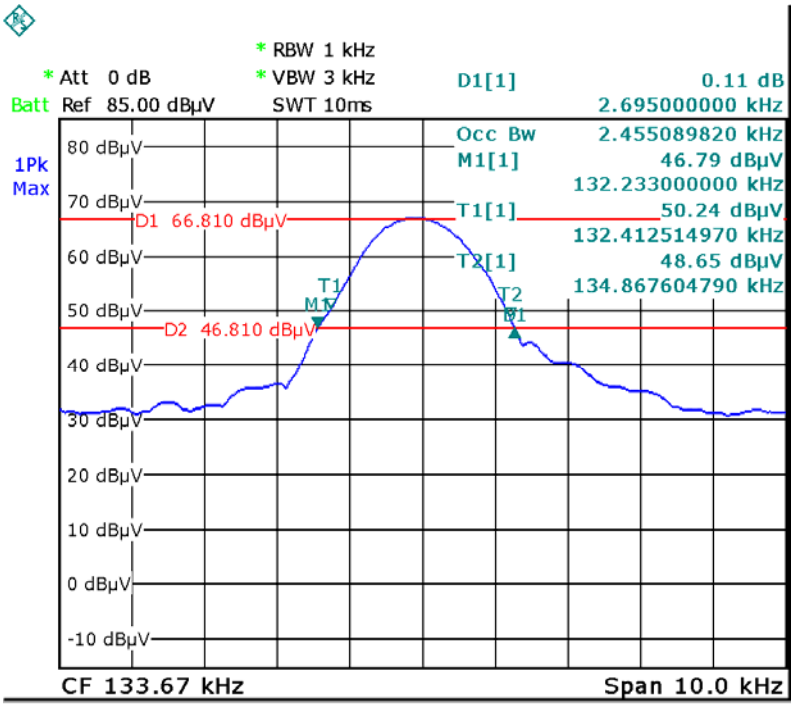
9.1 Test Procedure

1. The transmitter shall be operated at its maximum carrier power measured under normal test conditions;
2. The span of the analyzer shall be set to capture all products of the modulation process,including the emission skirts.
3. The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately 3x RBW.

9.2 Test Result Plot:

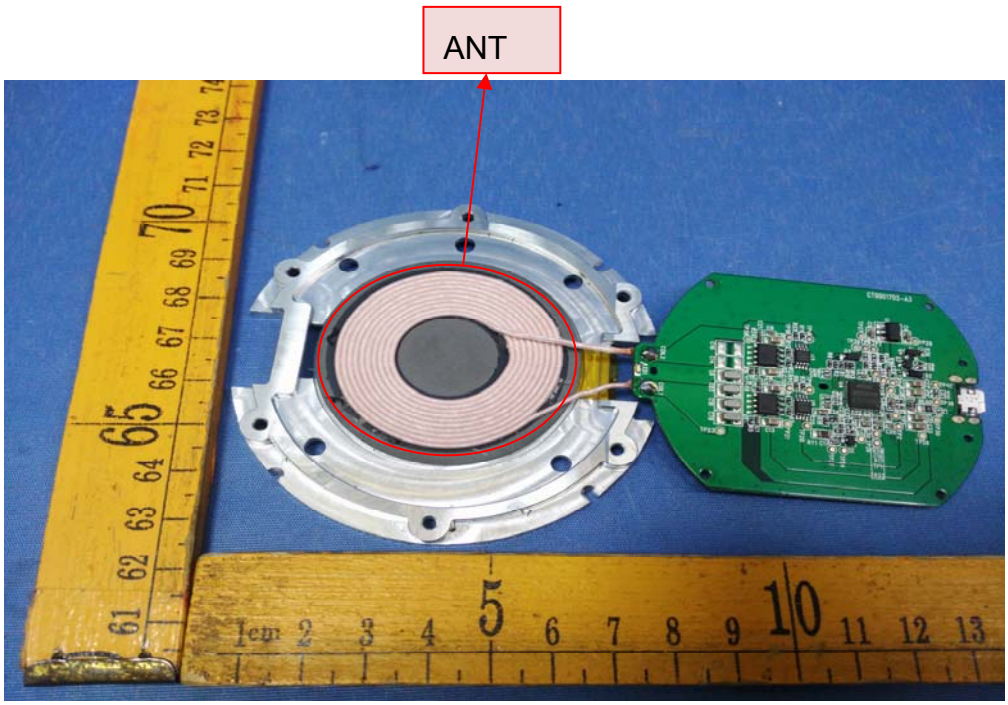
Test Channel(kHz)	99% Bandwidth(kHz)	20dB Bandwidth Emission(KHz)
133.67	2.455	2.695

Test result plot as follows:



10 Antenna Requirement

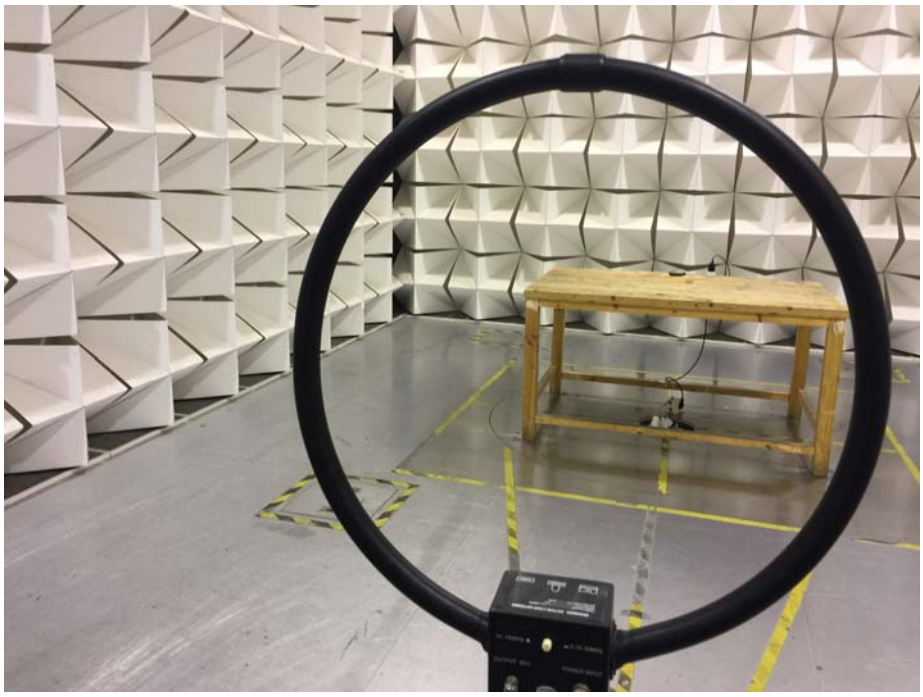
According to the FCC Part 15 Paragraph 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna to the intentional radiator shall be considered sufficient to comply with the provisions of this section. This product has a Coil antenna, fulfill the requirement of this section.



11 Photographs-Test Setup

11.1 Radiation Emission Test Setup

Below 30MHz



From 30MHz to 1GHz

11.2 Photograph – Conducted Emission Test Setup

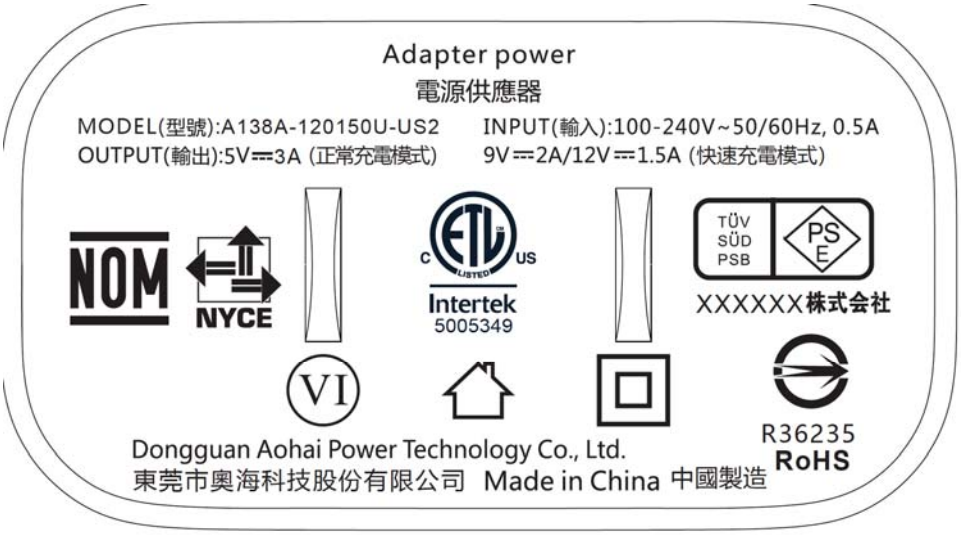
12 Photographs - Constructional Details

12.1 EUT – External View

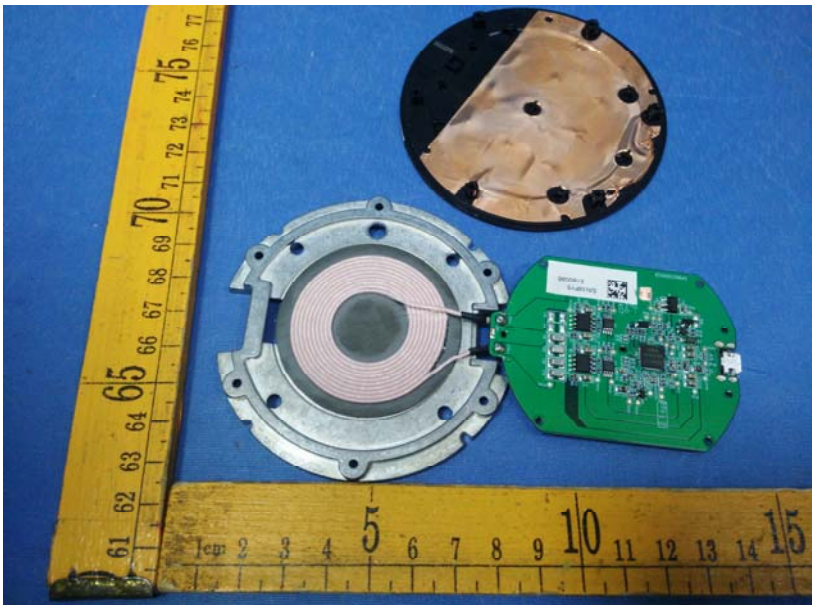
61 62 63 64 65 66 67 68 69 70
1cm 2 3 4 5 6 7 8

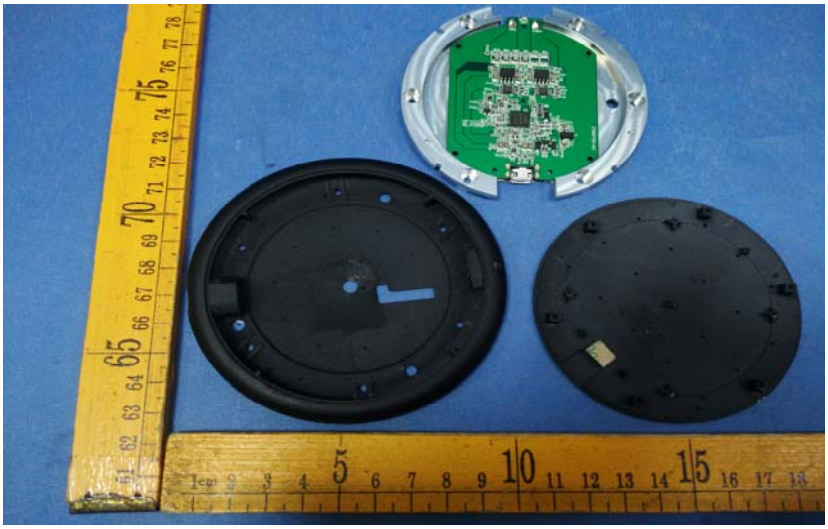
61 62 63 64 65 66 67 68 69 70
1cm 2 3 4 5 6 7 8

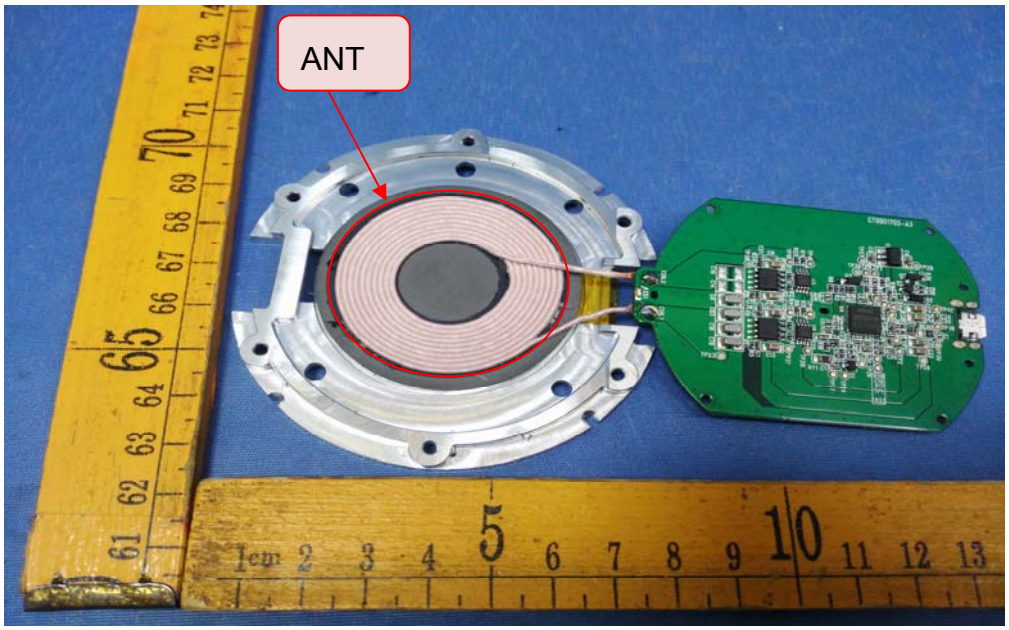
SN 123456780006-00


Adapter power
電源供應器
MODEL(型號):A138A-120150U-US2
INPUT(輸入):100-240V~50/60Hz, 0.5A
OUTPUT(輸出):5V⎓3A (正常充電模式)
9V⎓2A/12V⎓1.5A (快速充電模式)
NOM
NYCE
Intertek
5005349
TÜV SÜD PSB
PS E
XXXXXX株式会社
VI
R36235
RoHS
Dongguan Aohai Power Technology Co., Ltd.
東莞市奥海科技股份有限公司 Made in China 中國製造

12.2 EUT – Internal View



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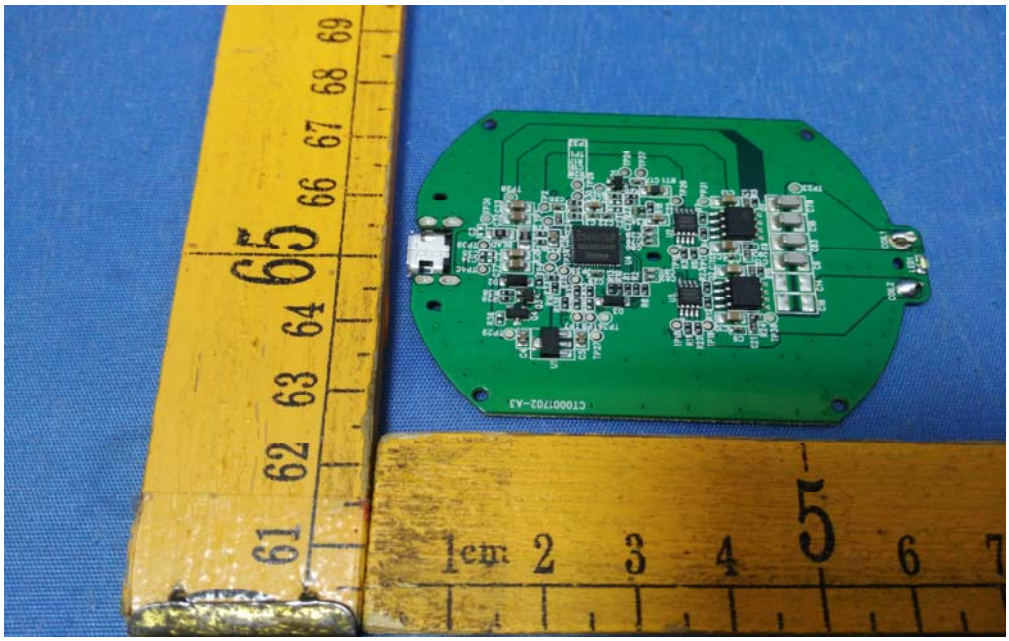

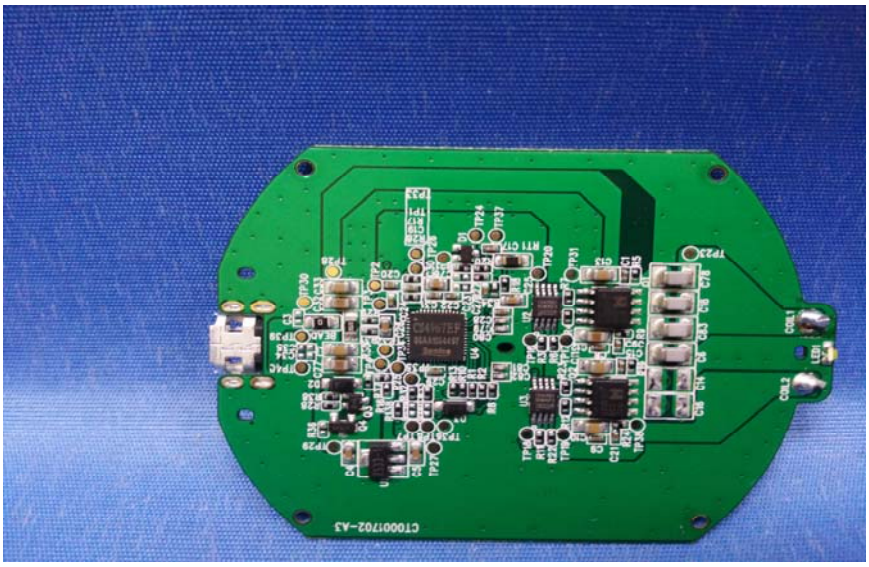

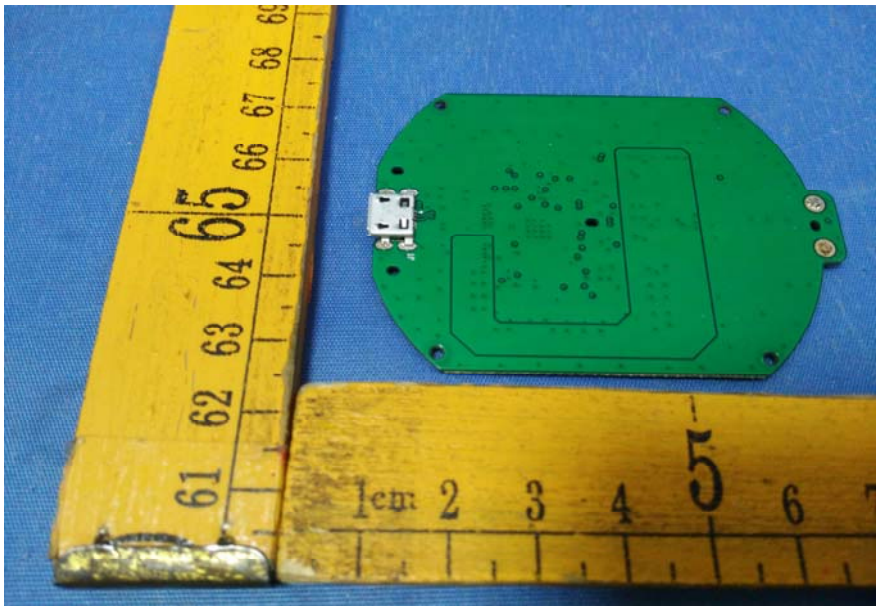

====== End of Report ======