

TEST REPORT

Reference No...... : WTS16S0755741E
FCC ID : 2ACWB-PSWRLS
Applicant..... : mophie LLC
Address..... : 6244 Technology Ave. Kalamazoo, Michigan United States
Manufacturer : mophie LLC
Address..... : 6244 Technology Ave. Kalamazoo, Michigan United States
Product Name..... : mophie charge force powerstation
Model No..... : PWRSTION-WRLS
Standards..... : FCC Part 15 subpart C
Date of Receipt sample : Jul. 14, 2016
Date of Test : Nov. 15 – 23, 2016
Date of Issue..... : Jan. 04, 2017
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:

Waltek Services (Shenzhen) Co., Ltd.

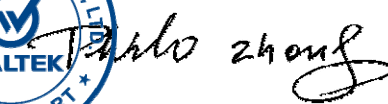
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Approved by:



Philo Zhong / Manager

2 Test Summary

Test Items	Test Requirement	Result
Conducted Emissions	15.207	PASS
Radiated Spurious Emissions	15.209	PASS
Occupied Bandwidth	15.205	PASS
Antenna Requirement	15.203	PASS

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4 General Information

4.1 General Description of E.U.T.

Product Name:	mophie charge force powerstation
Model No.:	PWRSTION-WRLS
Model Difference:	N/A
Type of Modulation:	ASK
Frequency Range:	0.112~0.205MHz
The Lowest Oscillator:	/
Antenna installation:	Coil Antenna

4.2 Details of E.U.T.

Technical Data:	: Input:5V \equiv 1.5A Output (USB-A): 5V \equiv 2.1A; Wireless Output: 5W; Battery: 3.8V, 10000mAh, 38Wh
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4.3 Test Facility

The test facility has a test site registered with the following organizations:

- **IC – Registration No.: 7760A-1**

Waltek Services (Shenzhen) Co., Ltd. has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration 7760A-1, October 15, 2015.

- **FCC Test Site 1#– Registration No.: 880581**

Waltek Services(Shenzhen) Co., Ltd. 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 our files. Registration 880581, April 29, 2014.

- **FCC Test Site 2#– Registration No.: 328995**

Waltek Services(Shenzhen) Co., Ltd. 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 our files. Registration 328995, December 3, 2014.

5 Equipment Used during Test

5.1 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	Sep.12, 2016	Sep.11, 2017
2.	LISN	R&S	ENV216	101215	Sep.12, 2016	Sep.11, 2017
3.	Cable	Top	TYPE16(3.5M)	-	Sep.12, 2016	Sep.11, 2017
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	Apr.13, 2016	Apr.12, 2017
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	Oct.17, 2016	Oct.16, 2017
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	Apr.09, 2016	Apr.08, 2017
4	Amplifier	ANRITSU	MH648A	M43381	Apr.13, 2016	Apr.12, 2017
5	Amplifier	Compliance pirection systems inc	PAP-0203	22024	Sep.12, 2016	Sep.11, 2017
6	Cable	HUBER+SUHNER	CBL2	525178	Apr.13, 2016	Apr.12, 2017
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	Sep.15,2016	Sep.14,2017
2.	Spectrum Analyzer (9k-6GHz)	R&S	FSL6	100959	Sep.15,2016	Sep.14,2017
3.	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY50520207	Sep.15,2016	Sep.14,2017
4.	Humidity Chamber	GF	GTH-225-40-1P	IAA061213	Sep.15,2016	Sep.14,2017

5.2 Description of Support Units

Equipment	Manufacturer	Model No.	Series No.
SWITCH ADAPTER	SHENZHEN HONOR ELECTRONIC CO., LTD.	ADS-25FSG-06 05015EPUC	-
Mobile Phone	SAMSUNG	GALAXY S6 Edge	-

5.3 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty	Note
Conducted Emissions	150kHz~30MHz	$\pm 3.64\text{dB}$	(1)
Radiated Spurious Emissions	30MHz~1000MHz	$\pm 5.03\text{dB}$	(1)

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

5.4 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

6 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 dB μ V between 0.15MHz & 0.5MHz 56 dB μ V between 0.5MHz & 5MHz 60 dB μ V between 5MHz & 30MHz
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth)

6.1 E.U.T. Operation

Operating Environment :

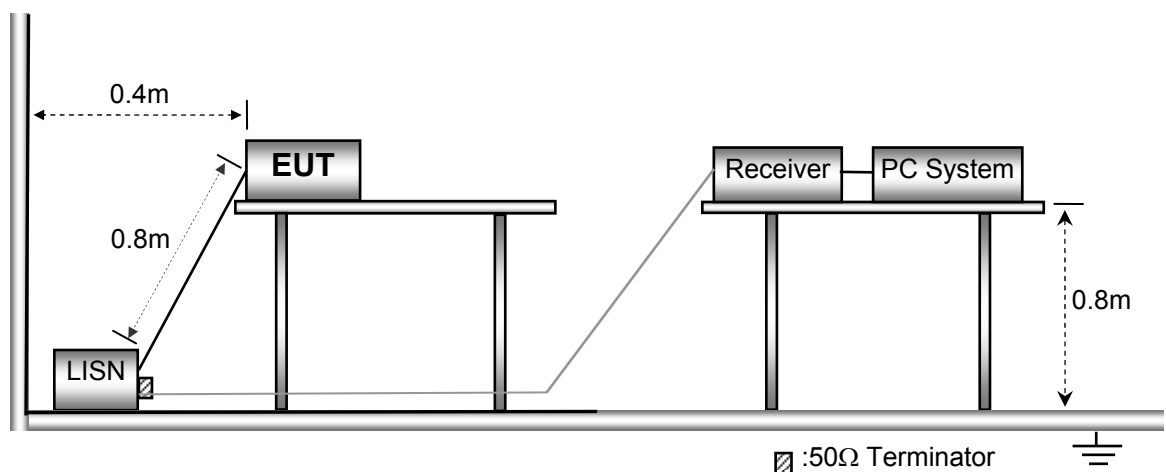
Temperature:	25.5 °C
Humidity:	51 % RH
Atmospheric Pressure:	101.2kPa

EUT Operation :

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

6.2 EUT Setup

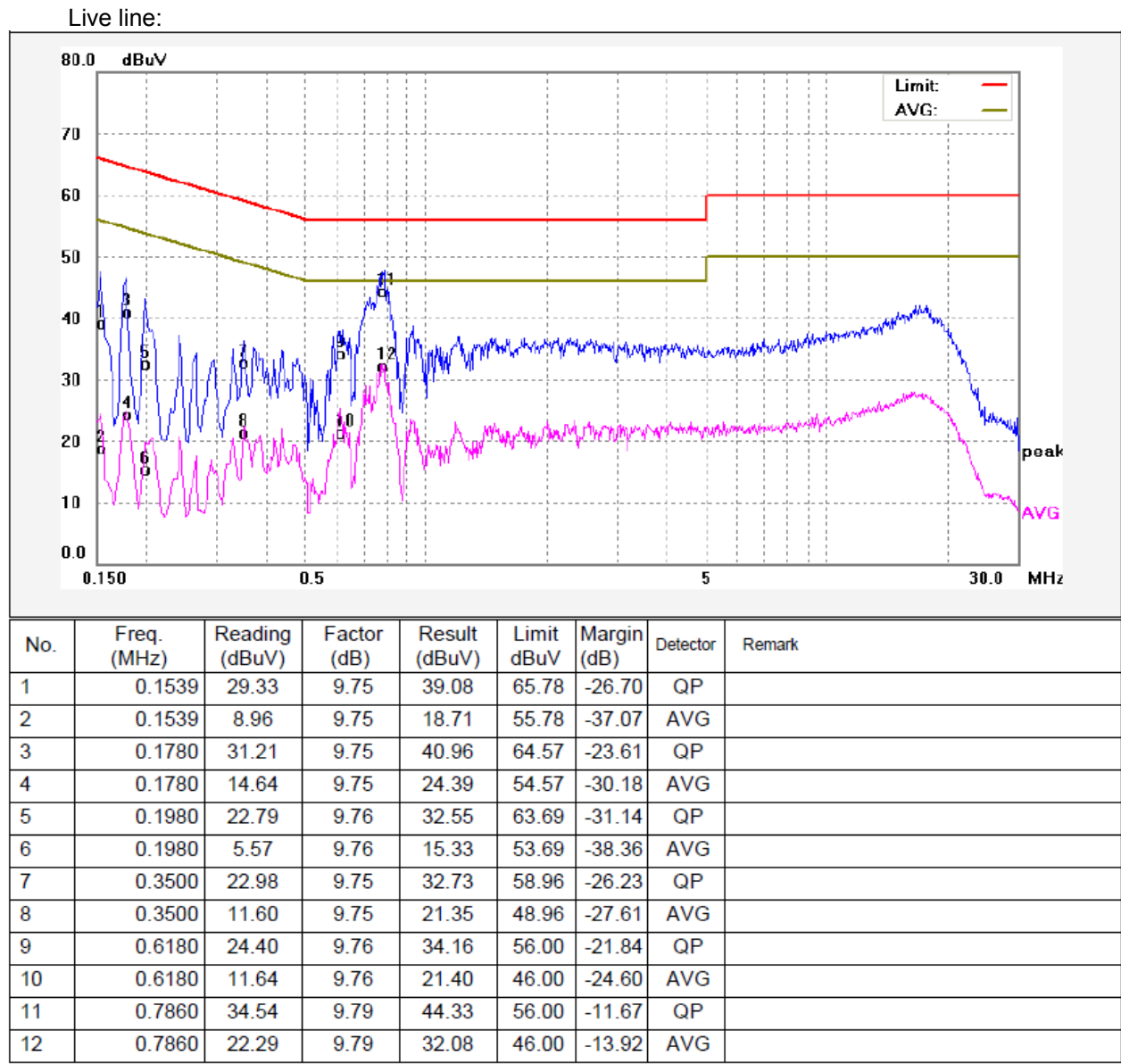
The EUT was placed on the test table in shielding room.



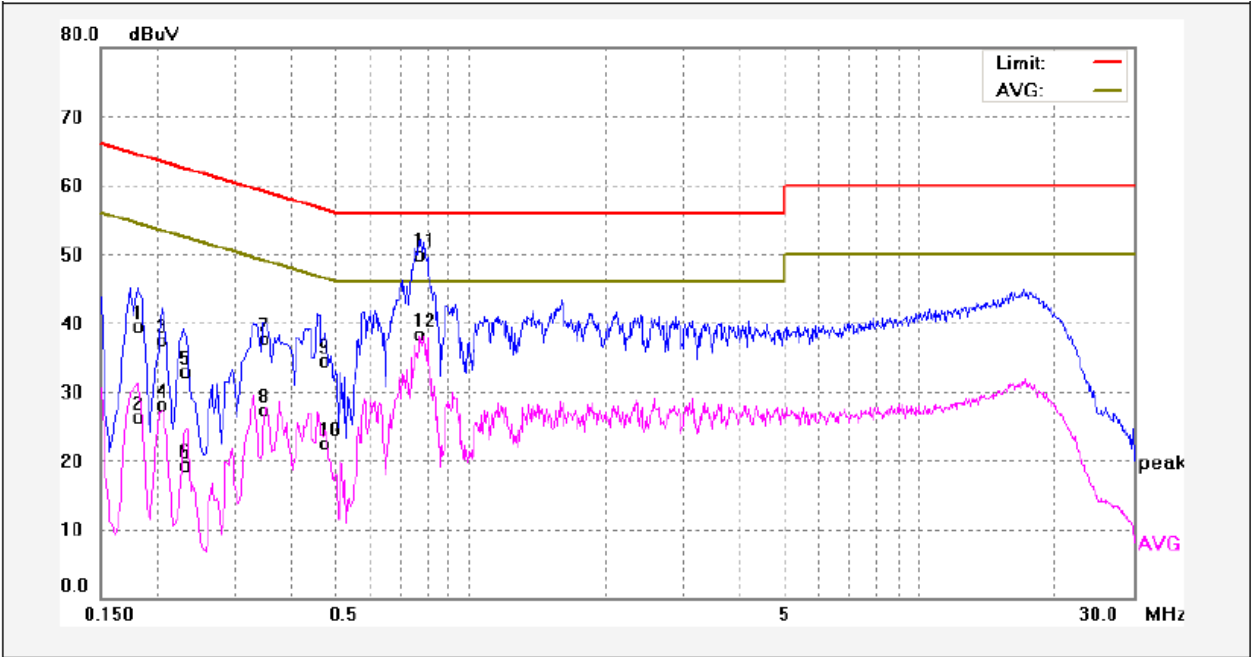
6.3 Measurement Description

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.

6.4 Conducted Emission Test Result



Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1819	29.77	9.75	39.52	64.39	-24.87	QP	
2	0.1819	16.64	9.75	26.39	54.39	-28.00	AVG	
3	0.2060	27.81	9.76	37.57	63.36	-25.79	QP	
4	0.2060	18.42	9.76	28.18	53.36	-25.18	AVG	
5	0.2300	23.18	9.75	32.93	62.45	-29.52	QP	
6	0.2300	9.56	9.75	19.31	52.45	-33.14	AVG	
7	0.3460	27.88	9.75	37.63	59.06	-21.43	QP	
8	0.3460	17.49	9.75	27.24	49.06	-21.82	AVG	
9	0.4740	24.84	9.76	34.60	56.44	-21.84	QP	
10	0.4740	12.83	9.76	22.59	46.44	-23.85	AVG	
11	0.7780	40.02	9.79	49.81	56.00	-6.19	QP	
12	0.7780	28.45	9.79	38.24	46.00	-7.76	AVG	

7 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	$20\log^{(500)}$

7.1 EUT Operation

Operating Environment :

Temperature: 23.5 °C

Humidity: 51.1 % RH

Atmospheric Pressure: 101.2kPa

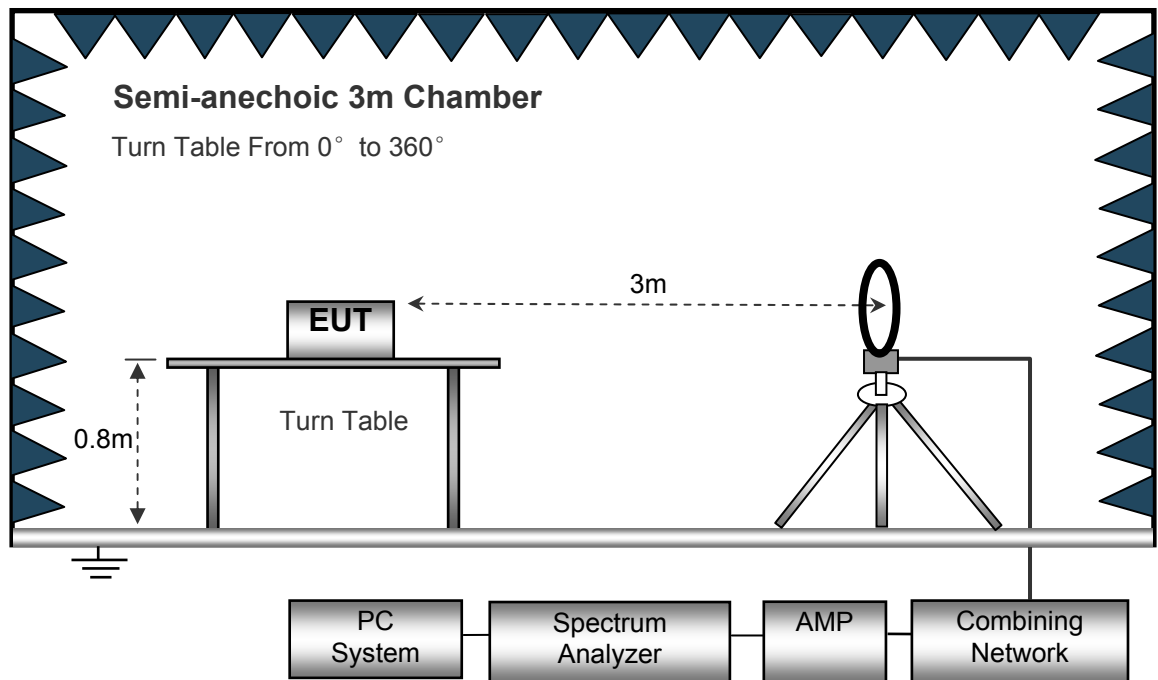
EUT Operation :

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

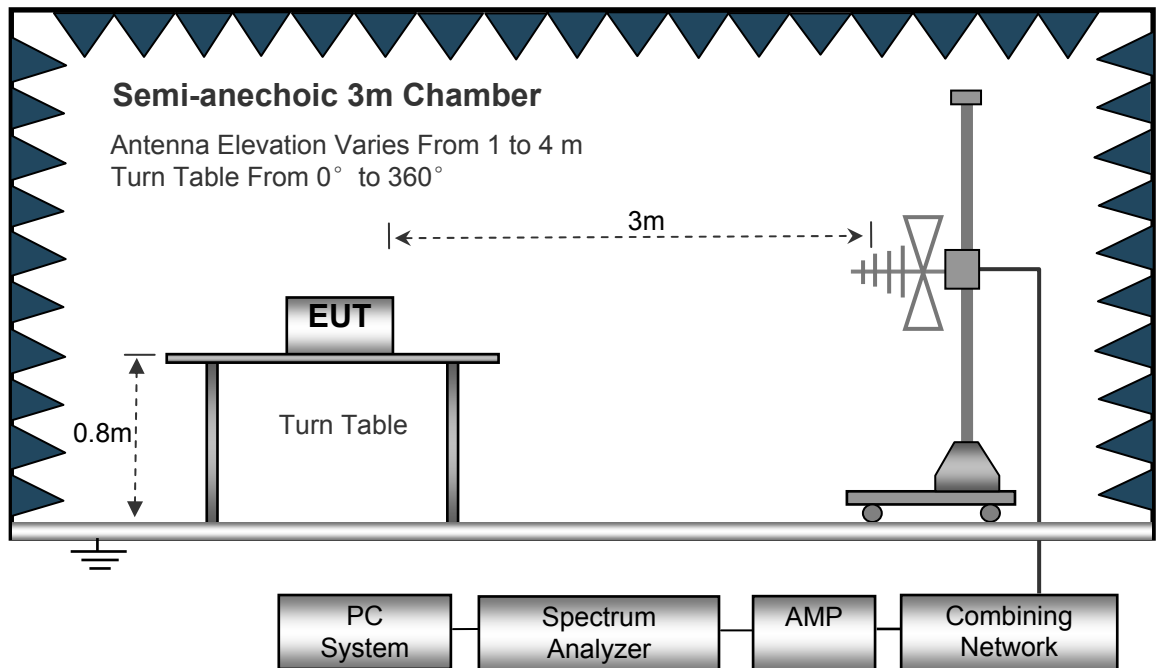
7.2 Test Setup

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.



7.3 Spectrum Analyzer Setup

Below 30MHz

Sweep SpeedAuto
IF Bandwidth..... 10kHz
Video Bandwidth..... 10kHz
Resolution Bandwidth..... 10kHz

30MHz ~ 1GHz

Sweep SpeedAuto
DetectorPK
Resolution Bandwidth..... 100kHz
Video Bandwidth..... 300kHz

7.4 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.

7.5 Summary of Test Results

Test Frequency: 9KHz ~ 30MHz

Frequency (MHz)	Measurement results	Detector	Correct factor	Extrapolation factor	Measurement results (calculated)	Limits	Margin
	dB μ V @3m	PK/QP	dB/m	dB	dB μ V/m @300m	dB μ V/m @300m	dB
0.134	70.81	QP	20.74	80.00	11.55	25.33	-13.78
0.268	21.98	QP	20.20	40.00	2.18	29.54	-27.36

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)	(dB μ V)	(PK/QP /Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V /m)	(dB)
34.22	32.51	QP	17	2.0	H	-14.30	18.21	40.00	-21.79
34.22	34.47	QP	241	1.3	V	-14.30	20.17	40.00	-19.83
220.34	37.16	QP	186	1.2	H	-13.58	23.58	46.50	-22.92
220.34	42.21	QP	187	1.6	V	-13.58	28.63	46.50	-17.87
519.67	37.73	QP	75	1.9	H	-5.63	32.10	46.50	-14.40
519.67	43.58	QP	212	1.5	V	-5.63	37.95	46.50	-8.55

8 Bandwidth Measurement

Test Requirement: FCC CFR47 Part 15 Section 15.205

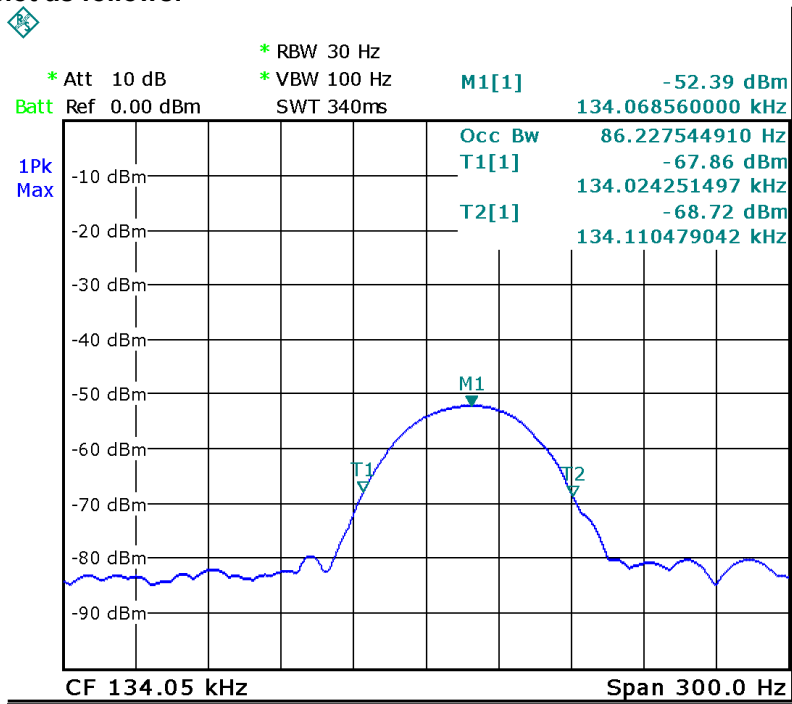
8.1 Test Procedure

- 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.

8.2 Test Result/Plot:

Test Channel(kHz)	99% Bandwidth(Hz)
134.07	86.228

Test result plot as follows:



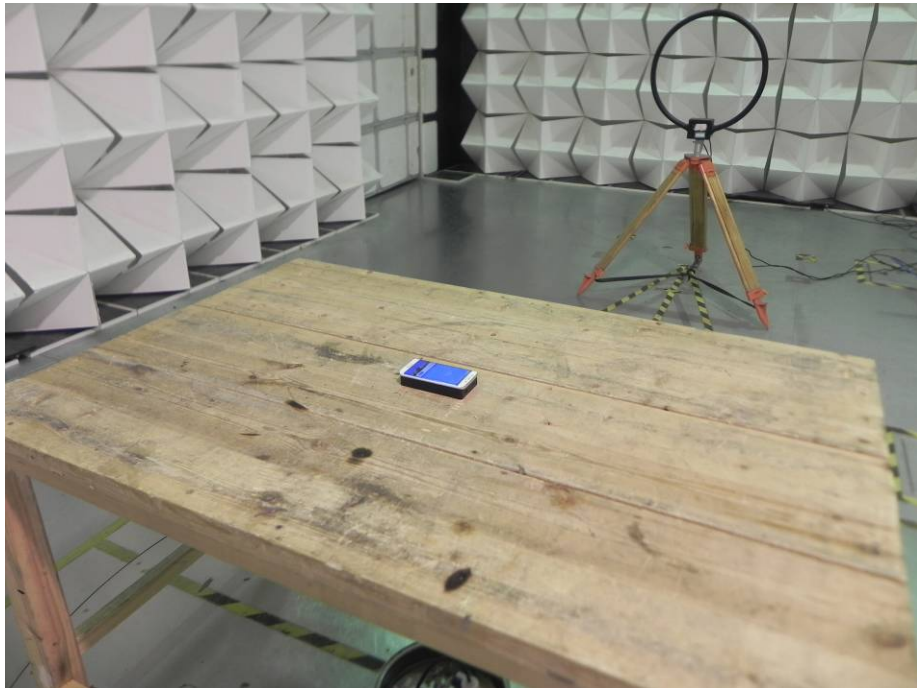
9 Antenna Requirement

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 permanent Coil antenna, fulfill the requirement of this section

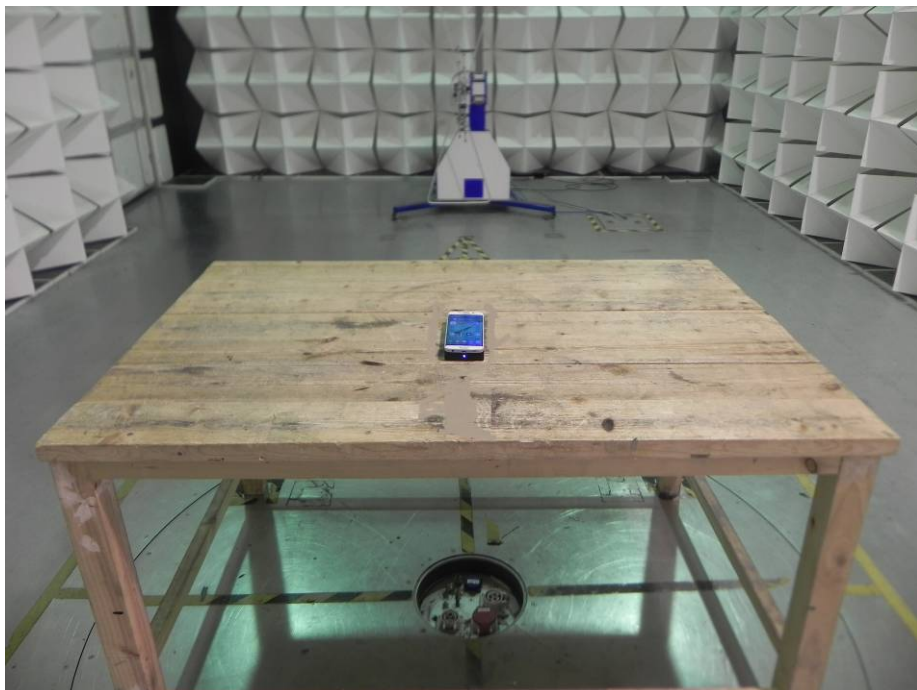
10 Photographs- PWRSTION-WRLS Test Setup

10.1 Radiation Emission Test Setup

Below 30MHz at Test Site 2#



From 30MHz to 1GHz at Test Site 2#



10.2 Photograph – Conducted Emission Test Setup

Conducted Emissions Test Site 1#

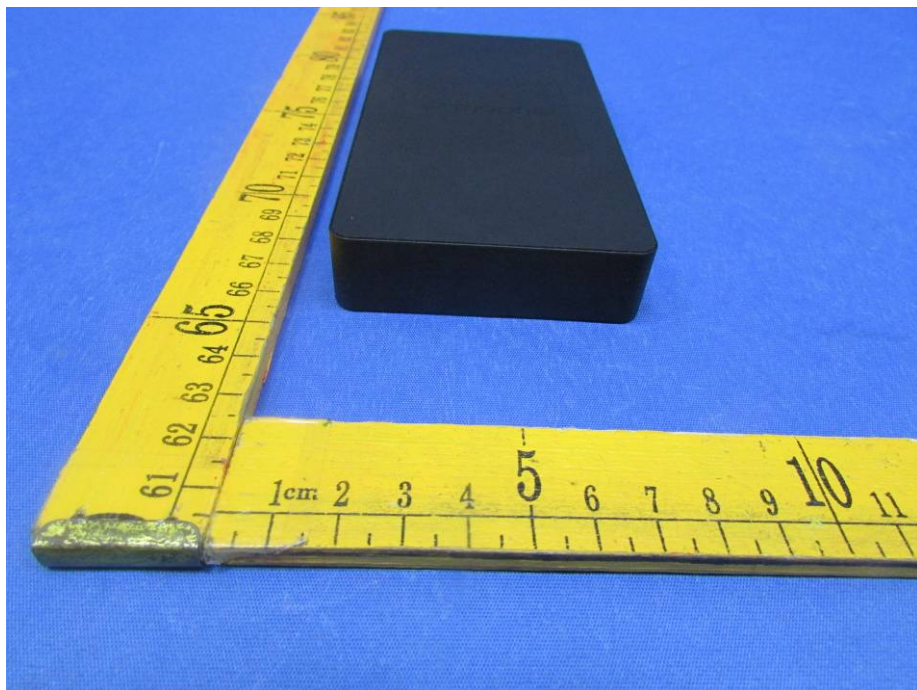


11 Photographs - Constructional Details

11.1 PWRSTION-WRLS - Appearance View

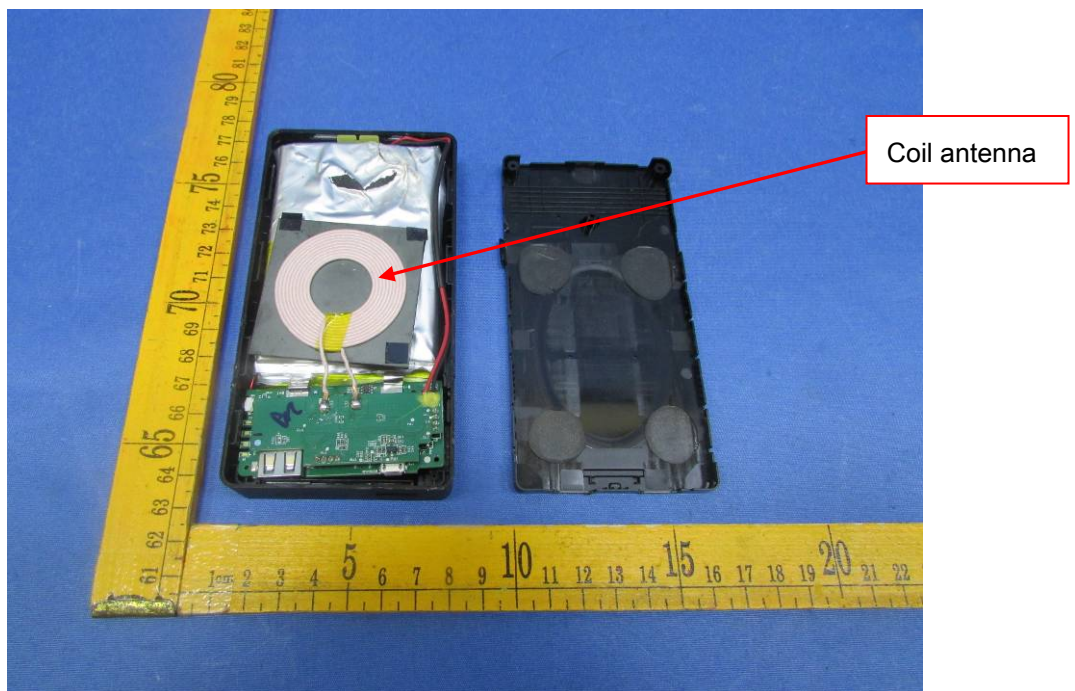


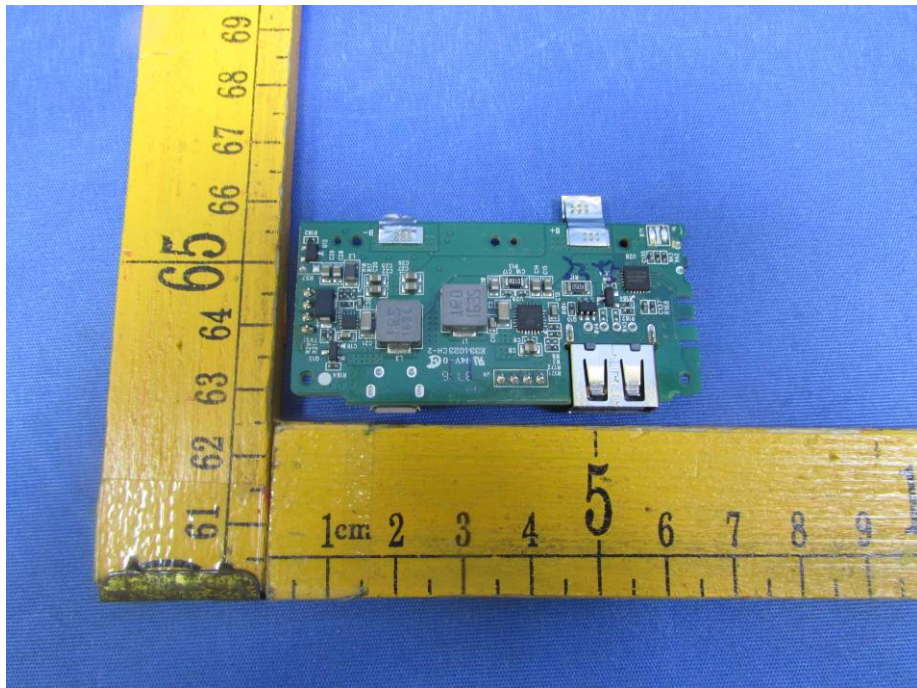
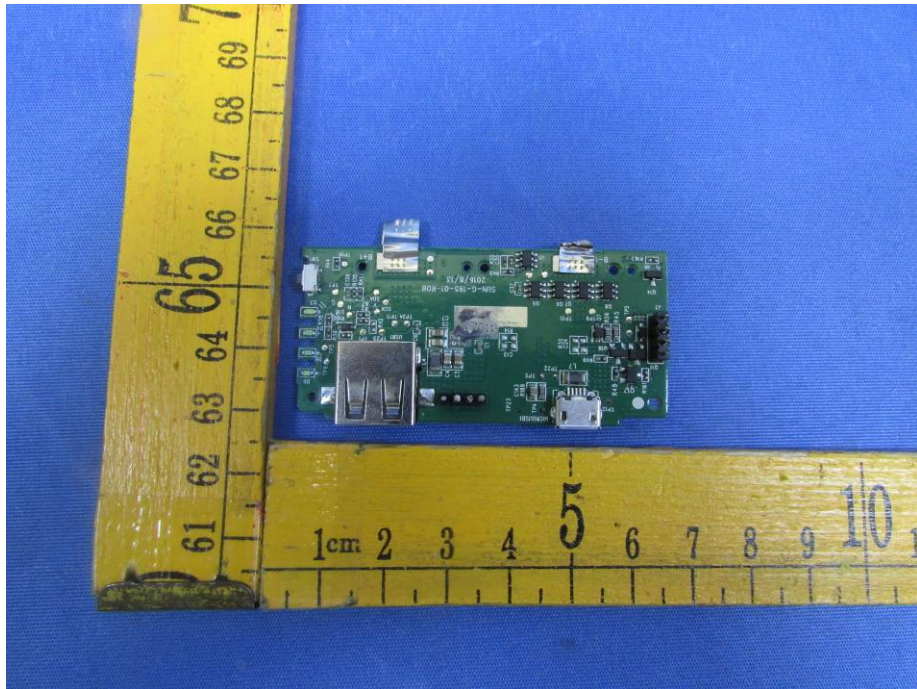


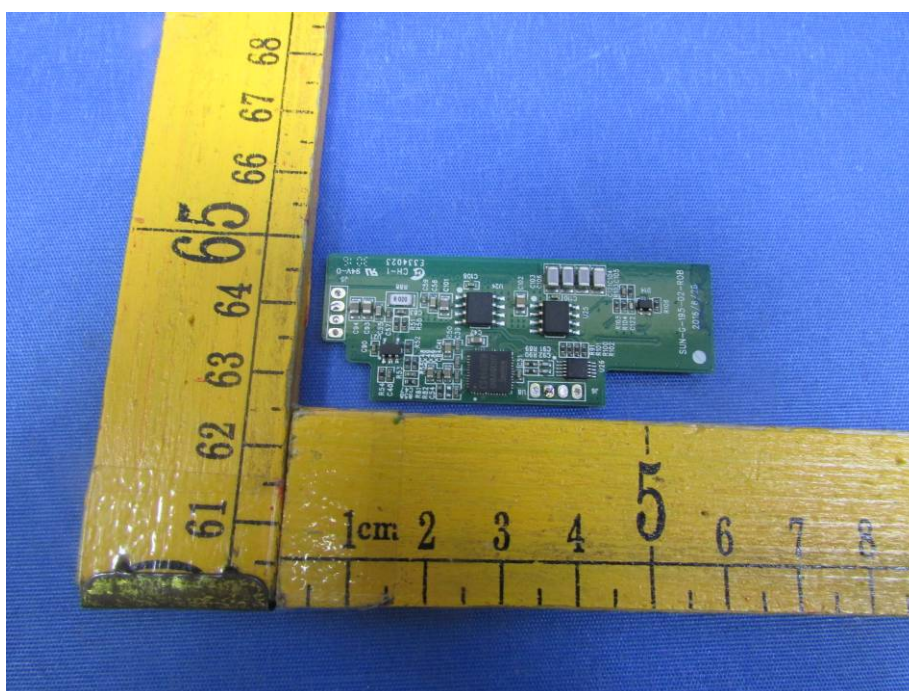
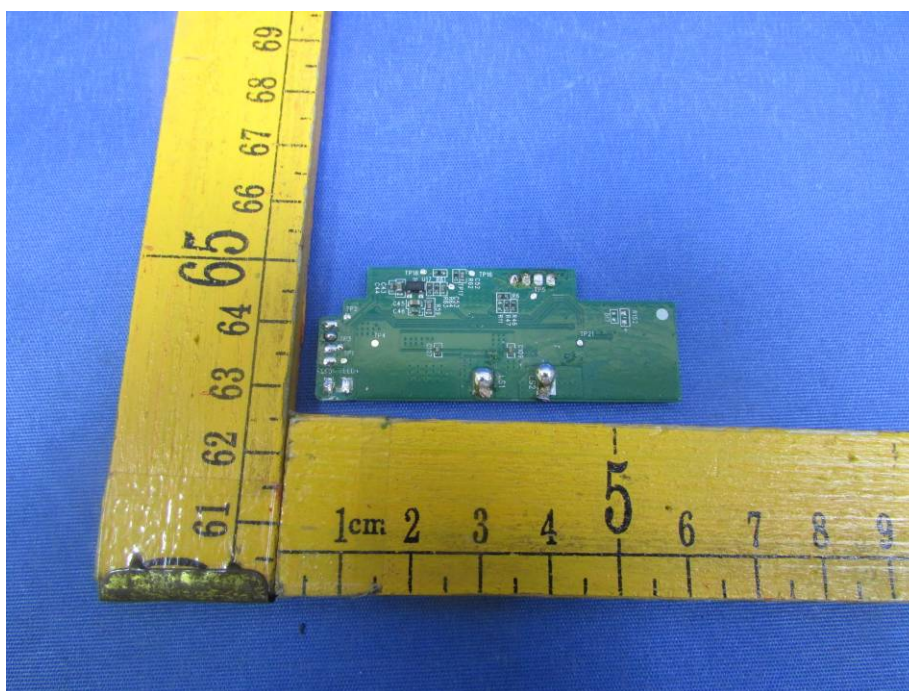


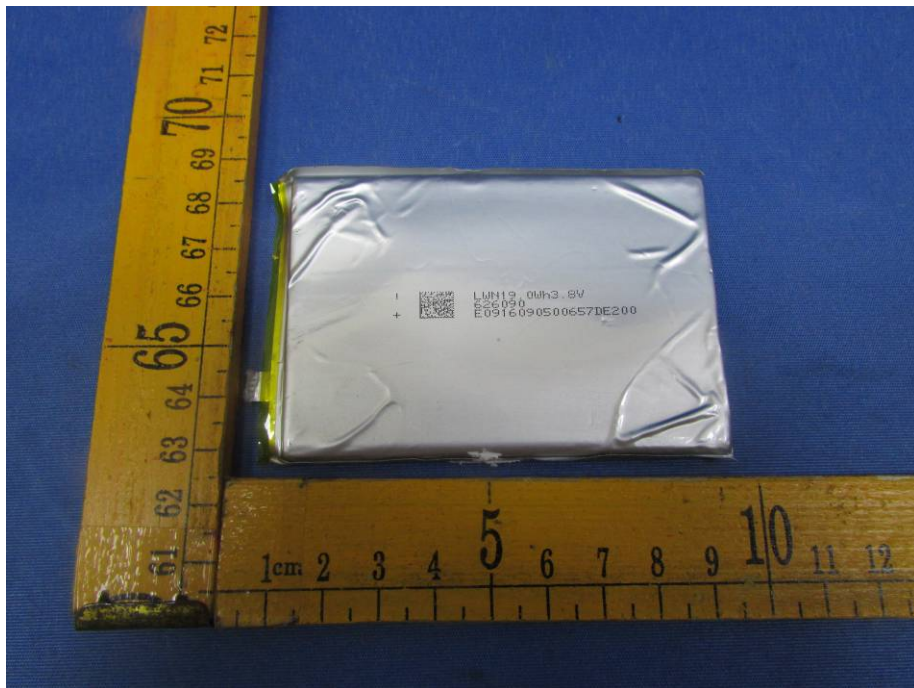


11.2 PWRSTION-WRLS - Internal View









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