
FCC Test Report

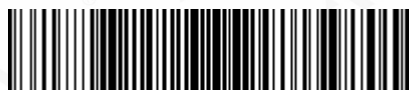
Report No.: AGC00210190903FE03

FCC ID : 2AFDGRP-PC014
APPLICATION PURPOSE : Original Equipment
PRODUCT DESIGNATION : FAST CHARGE WIRELESS CHARGING PAD
BRAND NAME : RAVPOWER
MODEL NAME : RP-PC014
APPLICANT : SUNVALLEYTEK INTERNATIONAL, INC.
DATE OF ISSUE : Sep. 19, 2019
STANDARD(S) : FCC Part 15 Rules
TEST PROCEDURE(S)
REPORT VERSION : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd

CAUTION:

This report shall not be reproduced except in full without the written permission of the test laboratory and shall not be quoted out of context.



Attestation of Global Compliance

Attestation of Global Compliance(Shenzhen)Co.,Ltd.

Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755 2523 4088

E-mail: agc@agc-cert.com

Service Hotline: 400 089 2118

REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Sep. 19, 2019	Valid	Initial Release



TABLE OF CONTENTS

1. VERIFICATION OF CONFORMITY	4
2. GENERAL INFORMATION.....	5
2.1. PRODUCT DESCRIPTION	5
3. MEASUREMENT UNCERTAINTY.....	6
4. DESCRIPTION OF TEST MODES.....	7
5. SYSTEM TEST CONFIGURATION	8
5.1. CONFIGURATION OF EUT SYSTEM	8
5.2. EQUIPMENT USED IN EUT SYSTEM.....	8
5.3. SUMMARY OF TEST RESULTS.....	8
6. TEST FACILITY	9
7. RADIATED EMISSION.....	10
7.1 TEST LIMIT	10
7.2. MEASUREMENT PROCEDURE.....	11
7.3. TEST SETUP.....	12
7.4. TEST RESULT.....	13
8. 20DB BANDWIDTH.....	16
8.1. MEASUREMENT PROCEDURE.....	16
8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION).....	16
8.3. MEASUREMENT RESULTS.....	17
9. FCC LINE CONDUCTED EMISSION TEST	18
9.1. LIMITS OF LINE CONDUCTED EMISSION TEST.....	18
9.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST	18
9.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST	19
9.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST	19
9.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST	20
APPENDIX A: PHOTOGRAPHS OF TEST SETUP	22
APPENDIX B: PHOTOGRAPHS OF EUT	24

1. VERIFICATION OF CONFORMITY

Applicant	SUNVALLEYTEK INTERNATIONAL, INC.
Address	46724 Lakeview Blvd, Fremont, CA 94538
Manufacturer	Shenzhen NearbyExpress Technology Development Company Limited
Address	333 Bulong Road, Jialianda Industrial Park, Building 1, Bantian, Longgang District, Shenzhen, China
Factory	Shenzhen NearbyExpress Technology Development Company Limited
Address	333 Bulong Road, Jialianda Industrial Park, Building 1, Bantian, Longgang District, Shenzhen, China
Product Designation	FAST CHARGE WIRELESS CHARGING PAD
Brand Name	RAVPOWER
Test Model	RP-PC014
Date of test	Sep. 09, 2019 to Sep. 16, 2019
Deviation	None
Condition of Test Sample	Normal
Test Result	Pass
Report Template	AGCRT-US-BR/RF

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with Section 15.207, 15.209, 15.203 of the FCC Part 15, Subpart C Rules.

The results of testing in this report apply to the product/system which was tested only.

Prepared By

Erik Yang

Erik Yang
(Project Engineer)

Sep. 16, 2019

Reviewed By

Max Zhang

Max Zhang
(Reviewer)

Sep. 19, 2019

Approved By

Forrest Lei

Forrest Lei
(Authorized Officer)

Sep. 19, 2019

2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

A major technical description of EUT is described as following

Operation Frequency	110-148 kHz
Test Frequency	123.4 kHz
Maximum field strength	55.48dBuV/m(PK)@3m
Modulation	FSK
Number of channels	1
Antenna Gain	0dBi
Antenna Designation	Integrated Antenna (Met 15.203 Antenna requirement)
Hardware Version	PC014_V01
Software Version	V1.0
Power Supply	DC 5V 2A or DC 9V 2A by adapter



3. MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the “Guide to the Expression of Uncertainty in measurement” (GUM) published by CISPR and ANSI.

- Uncertainty of Conducted Emission, $U_c = \pm 3.2$ dB
- Uncertainty of Radiated Emission below 1GHz, $U_c = \pm 3.9$ dB
- Uncertainty of Radiated Emission above 1GHz, $U_c = \pm 4.8$ dB



4. DESCRIPTION OF TEST MODES

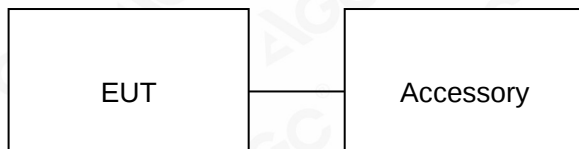
NO.	TEST MODE DESCRIPTION
1	Wireless charging Mode(Full load)
2	Wireless charging Mode(half load)
3	Wireless charging Mode(Null load)
Note: 1. The mode 1 was the worst case and only the data of the worst case record in this report. 2. Both adaptors are tested and reported the worst-case data.	



5. SYSTEM TEST CONFIGURATION

5.1. CONFIGURATION OF EUT SYSTEM

Configure :



5.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	FAST CHARGE WIRELESS CHARGING PAD	RP-PC014	2AFDGRP-PC014	EUT
2	Load	N/A	10W	Accessory
3	Adapter-1	CT131U-AQ18W	DC 5V 2A or DC 9V 2A	Accessory
4	Adapter-2	MDY-08-ES	DC 5V 2A or DC 9V 2A	Accessory
5	USB Cable	N/A	1.0m, Unshielded	Accessory

5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.209	Radiated Emission	Compliant
§15.215	20dB bandwidth	Compliant
§15.207	Conducted Emission	Compliant

6. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Designation Number	CN1259
FCC Test Firm Registration Number	975832
A2LA Cert. No.	5054.02
Description	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by A2LA

TEST EQUIPMENT OF CONDUCTED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	101206	Jun.12, 2019	Jun.11, 2020
LISN	R&S	ESH2-Z5	100086	Aug. 26, 2019	Aug. 25, 2020

TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	Jun.12, 2019	Jun.11, 2020
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec. 20, 2018	Dec. 19, 2019
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	Jun.12, 2019	Jun.11, 2020
ANTENNA	SCHWARZBECK	VULB9168	494	Jan. 09, 2019	Jan. 08, 2021

7. RADIATED EMISSION

7.1 TEST LIMIT

Standard FCC 15.209

Frequency (MHz)	Distance Meters	Field Strengths Limit	
		μ V/m	dB(μ V)/m
0.009 ~ 0.490	300	2400/F(kHz)	---
0.490 ~ 1.705	30	24000/F(kHz)	---
1.705 ~ 30	30	30	---
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	Other:74.0 dB(μ V)/m (Peak) 54.0 dB(μ V)/m (Average)	
Remark: (1) Emission level dB μ V = 20 log Emission level μ V/m (2) The smaller limit shall apply at the cross point between two frequency bands. (3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.			



Attestation of Global Compliance

Attestation of Global Compliance(Shenzhen)Co.,Ltd.

Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,
 Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755 2523 4088

E-mail: agc@agc-cert.com

Service Hotline: 400 089 2118

7.2. MEASUREMENT PROCEDURE

1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

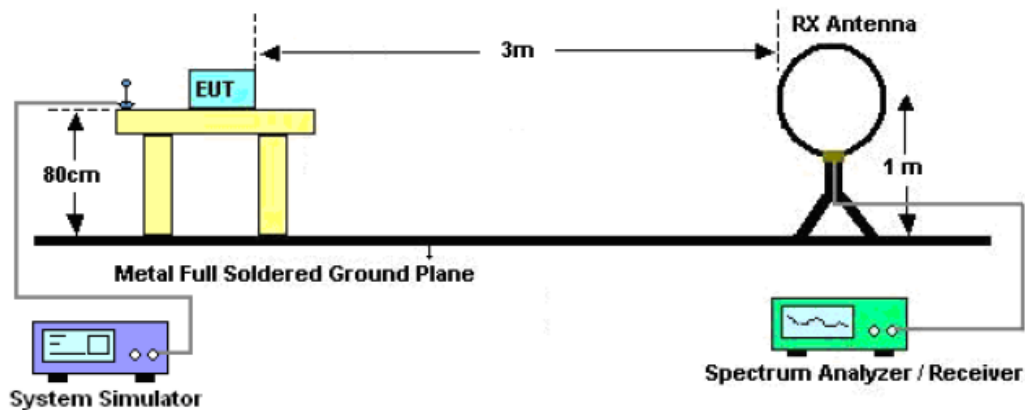
The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

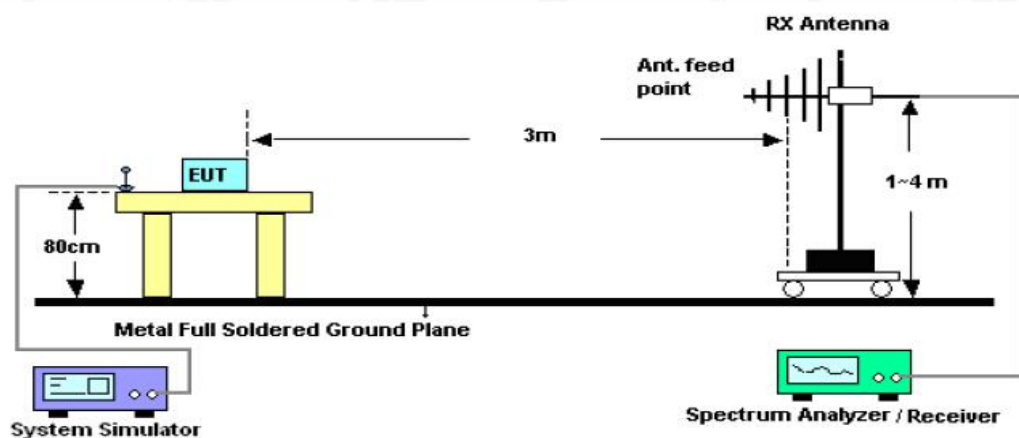
Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

7.3. TEST SETUP

Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



7.4. TEST RESULT

RADIATED EMISSION BELOW 30MHZ

Frequency MHz	Polarization	Reading dB(uV) PK	Factor dB (1/m)	Level dB(uV/m) PK	Limit dB(uV/m) PK	Margin dB	Pass/Fail
0.1234	Face	45.08	10.40	55.48	105.78	-50.30	Pass
0.1234	Side	34.97	10.40	45.37	105.78	-60.41	Pass

Note1: No other emissions found between lowest internal used/generated frequencies to 30MHz. The peak level of the emission is less than the average limit, so the average level shall be less than the limit without test.

Note 2: $\text{Level(dBuV/m)} = \text{Reading(dBuV)} + \text{Factor(dB/m)}$

$\text{Factor(dB/m)} = \text{Antenna Factor(dB/m)} + \text{Cable loss(dB)} + \text{Attenuation(dB) for Attenuator}$

$\text{Margin} = \text{Level} - \text{Limit}$

$\text{Limit(dBuV/m)} = 20\log(2400/F(\text{kHz})) + 40\log(300/3) = 105.78\text{dBuV/m.}$



Attestation of Global Compliance

Attestation of Global Compliance(Shenzhen)Co.,Ltd.

Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China

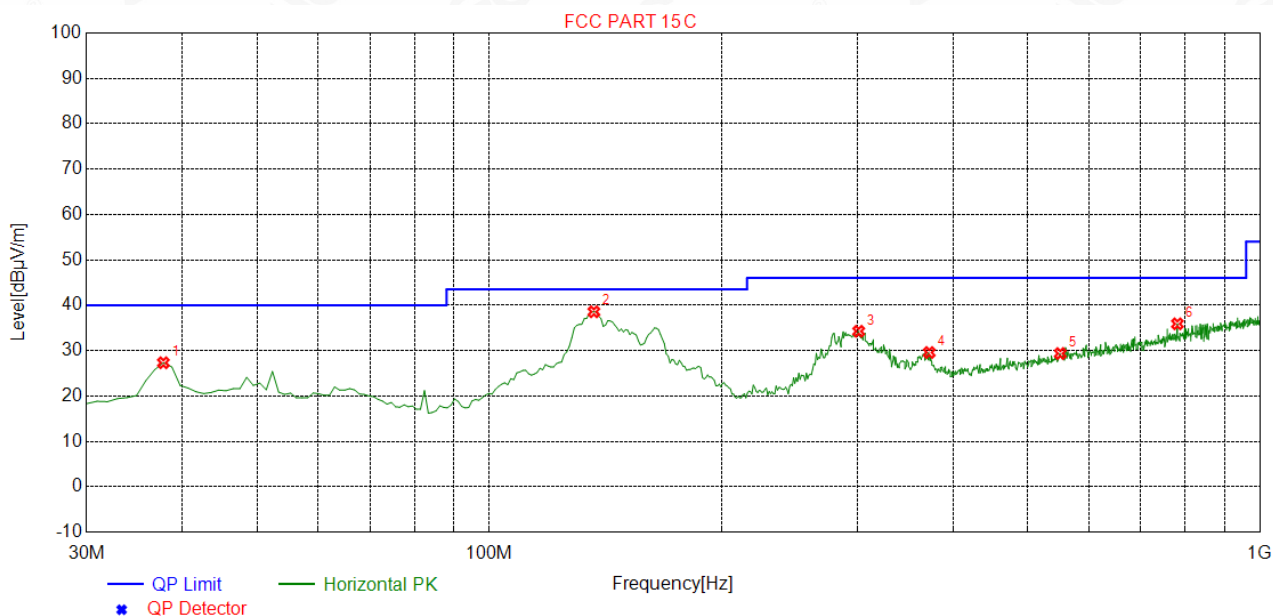
Tel: +86-755 2523 4088

E-mail: agc@agc-cert.com

Service Hotline: 400 089 2118

RADIATED EMISSION 30MHz- 1GHz

EUT :	FAST CHARGE WIRELESS CHARGING PAD	Model Name. :	RP-PC014
Temperature :	23℃	Relative Humidity:	58%
Pressure :	1010 hPa	Test Voltage :	DC 9V
Test Mode :	Mode 1	Polarization :	Horizontal



NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	37.7600	27.32	14.39	40.00	12.68	100	301	Horizontal
2	136.7000	38.55	14.64	43.50	4.95	200	3	Horizontal
3	301.6000	34.25	15.96	46.00	11.75	100	76	Horizontal
4	372.4100	29.58	18.70	46.00	16.42	100	91	Horizontal
5	550.8900	29.36	23.28	46.00	16.64	200	316	Horizontal
6	781.7500	35.90	27.99	46.00	10.10	200	357	Horizontal

RESULT: PASS



Attestation of Global Compliance

Attestation of Global Compliance(Shenzhen)Co.,Ltd.

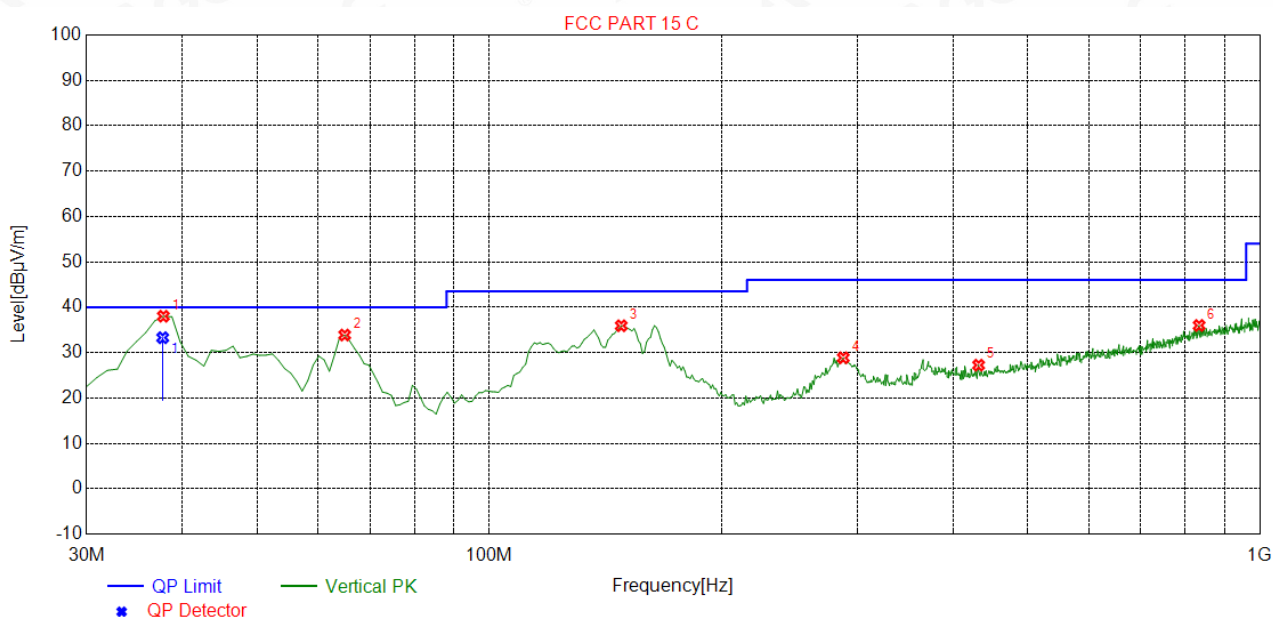
Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755 2523 4088

E-mail: agc@agc-cert.com

Service Hotline: 400 089 2118

EUT :	FAST CHARGE WIRELESS CHARGING PAD	Model Name. :	RP-PC014
Temperature :	23℃	Relative Humidity:	58%
Pressure :	1010 hPa	Test Voltage :	DC 9V
Test Mode :	Mode 1	Polarization :	Vertical



Peak list

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	37.7600	38.01	14.39	40.00	1.99	100	226	Vertical
2	64.9200	33.87	13.09	40.00	6.13	100	105	Vertical
3	148.3400	35.91	14.88	43.50	7.59	100	137	Vertical
4	288.0200	28.85	16.16	46.00	17.15	100	359	Vertical
5	431.5800	27.23	20.57	46.00	18.77	100	334	Vertical
6	834.1300	35.98	29.02	46.00	10.02	100	354	Vertical

QP list

NO.	Freq. [MHz]	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	37.6845	14.37	33.28	40.00	6.72	104.7	162.3	Vertical

RESULT: PASS

Note: Factor=Antenna Factor + Cable loss, Margin=Limit-Level.

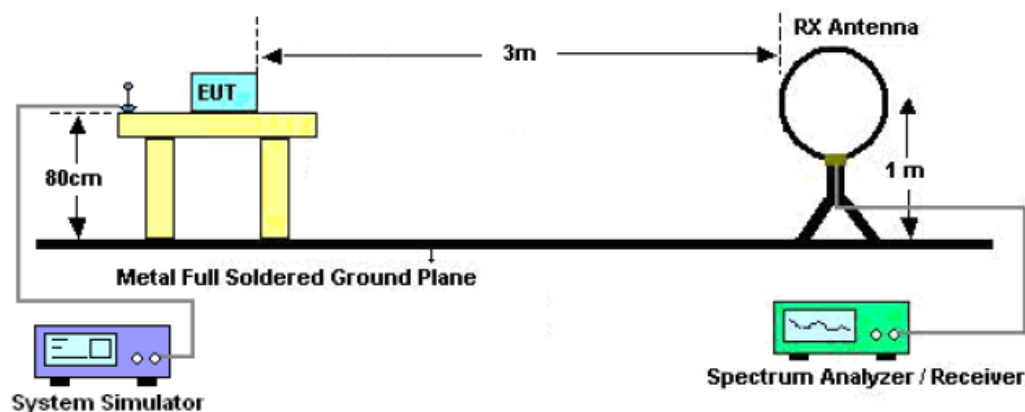
The “Factor” value can be calculated automatically by software of measurement system.

8. 20DB BANDWIDTH

8.1. MEASUREMENT PROCEDURE

1. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Set the EUT Work on operation frequency.
3. Set Span = approximately 2 to 5 times the 20 dB bandwidth, centered on a channel
The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW; Sweep = auto; Detector function = peak
4. Set SPA Trace 1 Max hold, then View.

8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

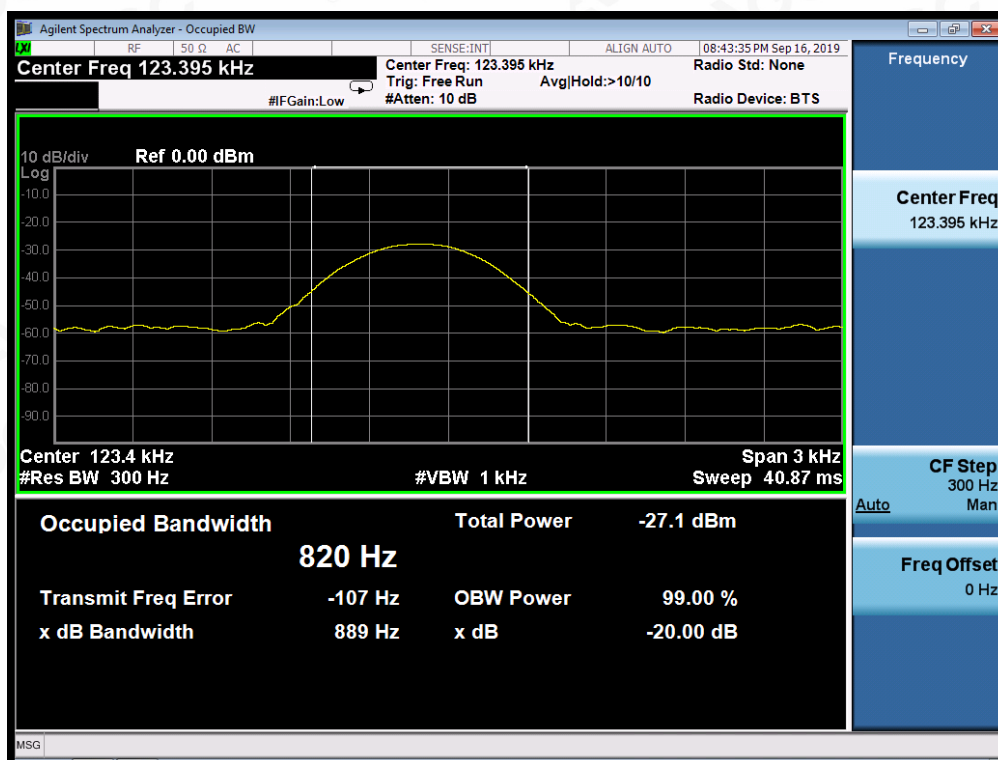


8.3. MEASUREMENT RESULTS

TEST ITEM	20DB BANDWIDTH
TEST MODULATION	FSK

Test Data (Hz)		Criteria
Operate Channel	889	PASS

TEST PLOT OF BANDWIDTH



9. FCC LINE CONDUCTED EMISSION TEST

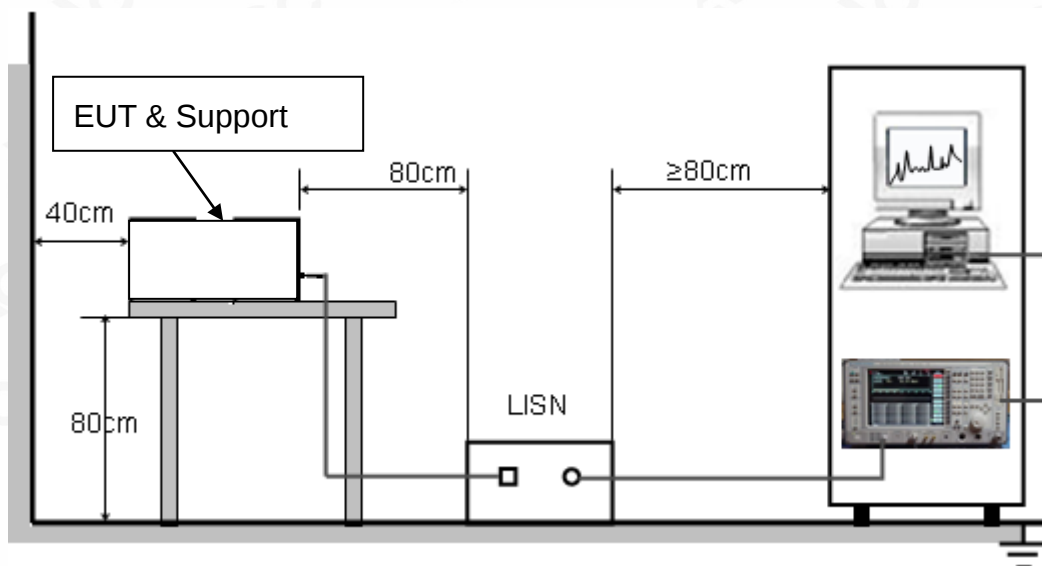
9.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P.(dBuV)	Average(dBuV)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50MHz.

9.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



9.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When 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 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
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. All support equipments received AC120V/60Hz power from a LISN, if any.
5. The EUT received charging voltage by adapter which received 120V/60Hz power by a LISN..
6. The 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.
8. During the above scans, the emissions were maximized by cable manipulation.
9. The test mode(s) were scanned during the preliminary test.

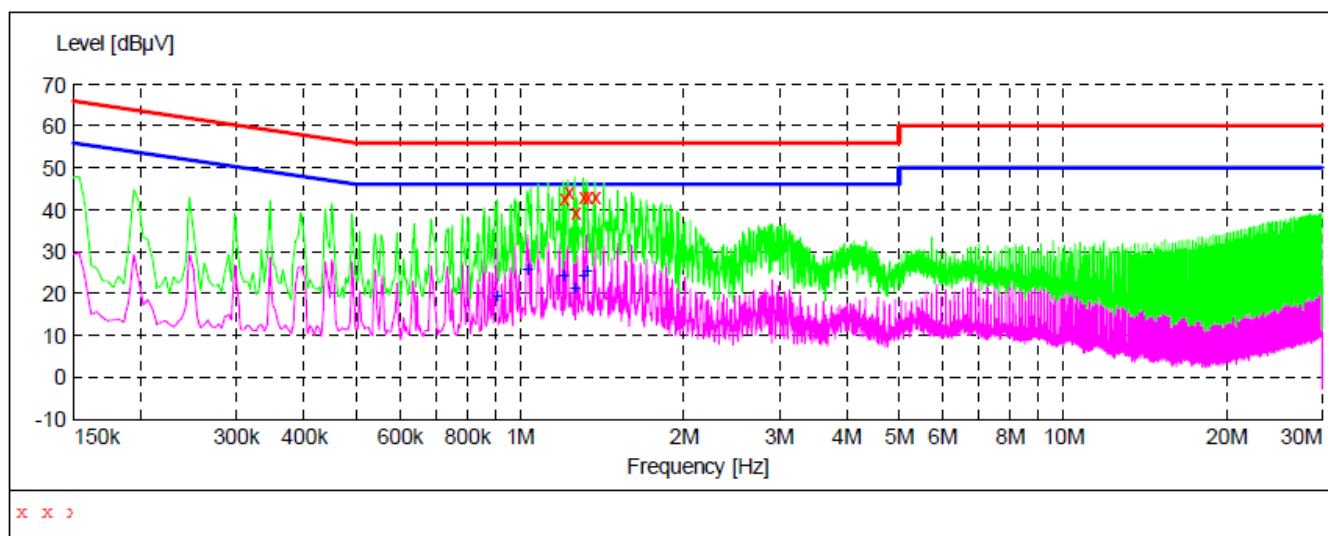
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

9.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case condition(s) was reported on the Summary Data page.

9.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

LINE CONDUCTED EMISSION TEST-L



MEASUREMENT RESULT

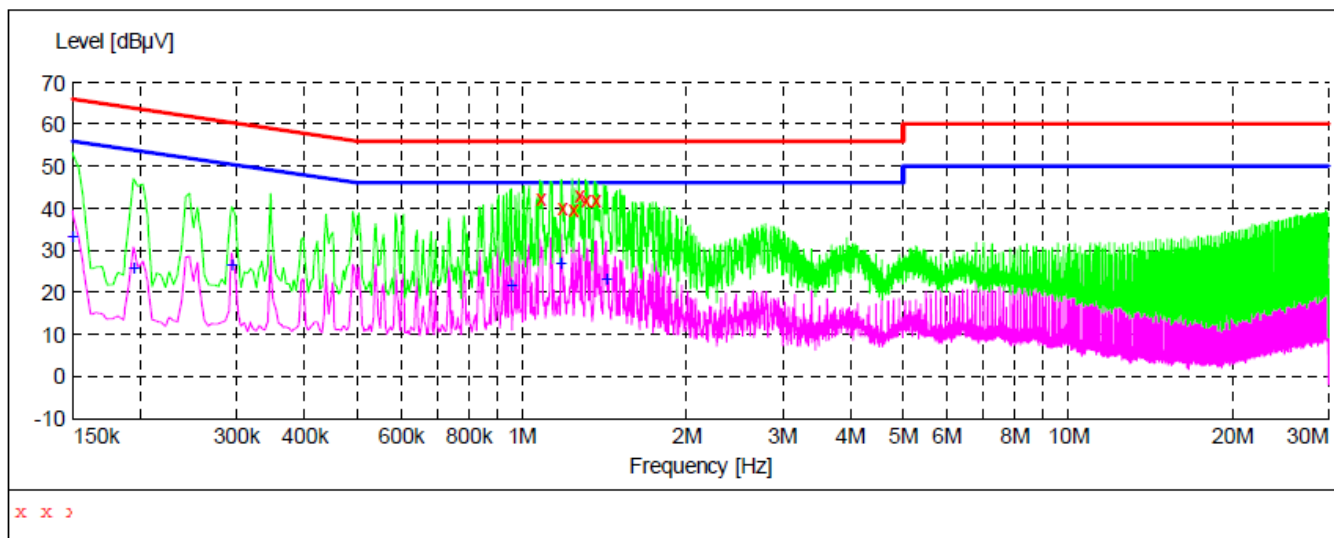
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
1.202000	42.80	11.5	56	13.2	QP	L1
1.226000	44.00	11.5	56	12.0	QP	L1
1.262000	39.40	11.5	56	16.6	QP	L1
1.306000	43.10	11.5	56	12.9	QP	L1
1.326000	43.00	11.5	56	13.0	QP	L1
1.374000	43.20	11.5	56	12.8	QP	L1

MEASUREMENT RESULT

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.906000	19.40	11.1	46	26.6	AV	L1
1.030000	25.80	11.4	46	20.2	AV	L1
1.202000	24.30	11.5	46	21.7	AV	L1
1.262000	21.50	11.5	46	24.5	AV	L1
1.306000	24.30	11.5	46	21.7	AV	L1
1.326000	25.60	11.5	46	20.4	AV	L1

RESULT: PASS

LINE CONDUCTED EMISSION TEST-N



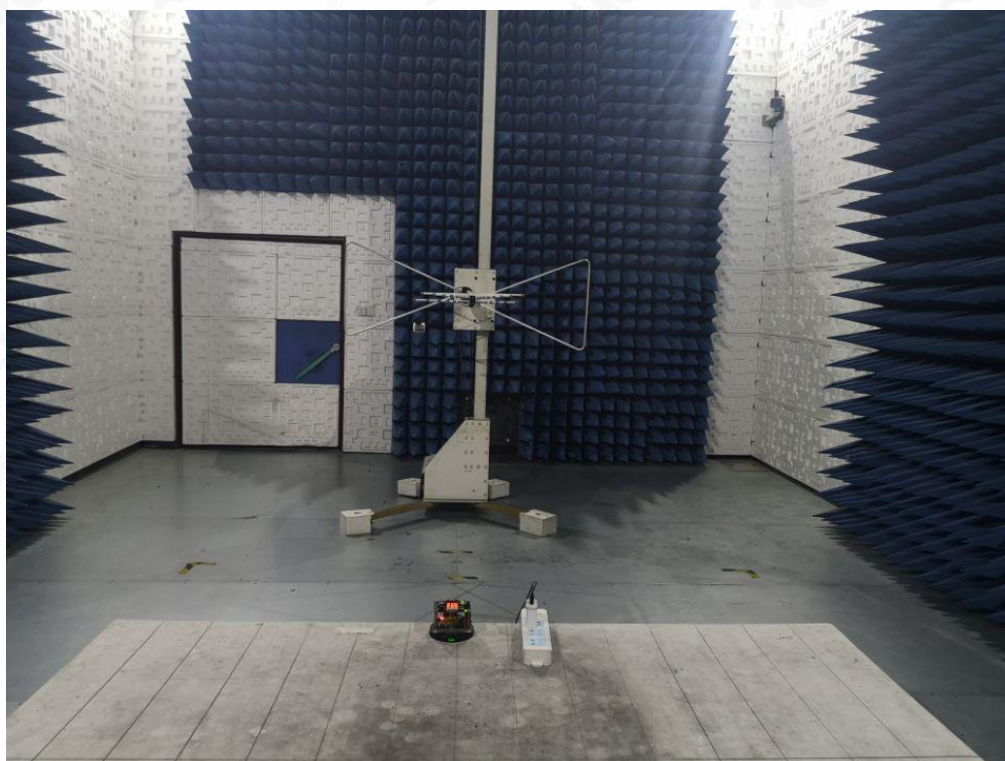
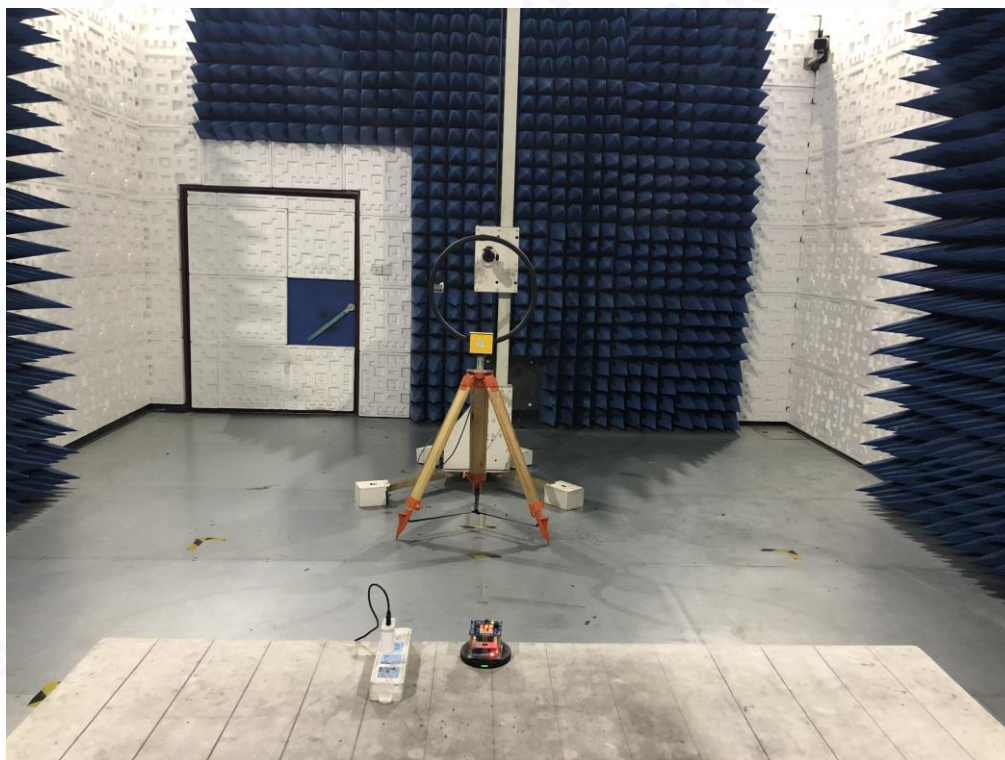
MEASUREMENT RESULT

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
1.078000	42.60	11.4	56	13.4	QP	N
1.182000	40.10	11.5	56	15.9	QP	N
1.234000	39.80	11.5	56	16.2	QP	N
1.270000	42.90	11.5	56	13.1	QP	N
1.306000	42.30	11.5	56	13.7	QP	N
1.358000	42.10	11.5	56	13.9	QP	N

MEASUREMENT RESULT

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.150000	33.40	10.8	56	22.6	AV	N
0.194000	25.90	10.9	54	28.0	AV	N
0.294000	26.60	10.9	50	23.8	AV	N
0.954000	21.70	11.3	46	24.3	AV	N
1.178000	26.90	11.5	46	19.1	AV	N
1.426000	23.40	11.5	46	22.6	AV	N

RESULT: PASS

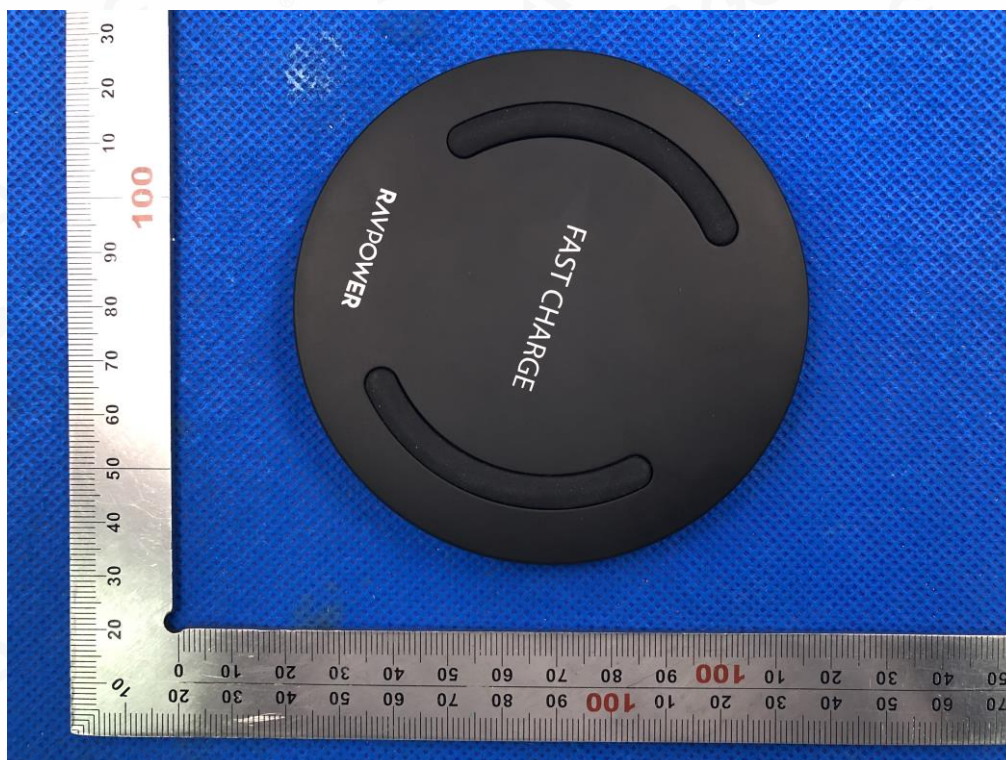
APPENDIX A: PHOTOGRAPHS OF TEST SETUP
FCC RADIATED EMISSION TEST SETUP BELOW 1GHZ

FCC LINE CONDUCTED EMISSION TEST SETUP



APPENDIX B: PHOTOGRAPHS OF EUT

TOP VIEW OF EUT



BOTTOM VIEW OF EUT



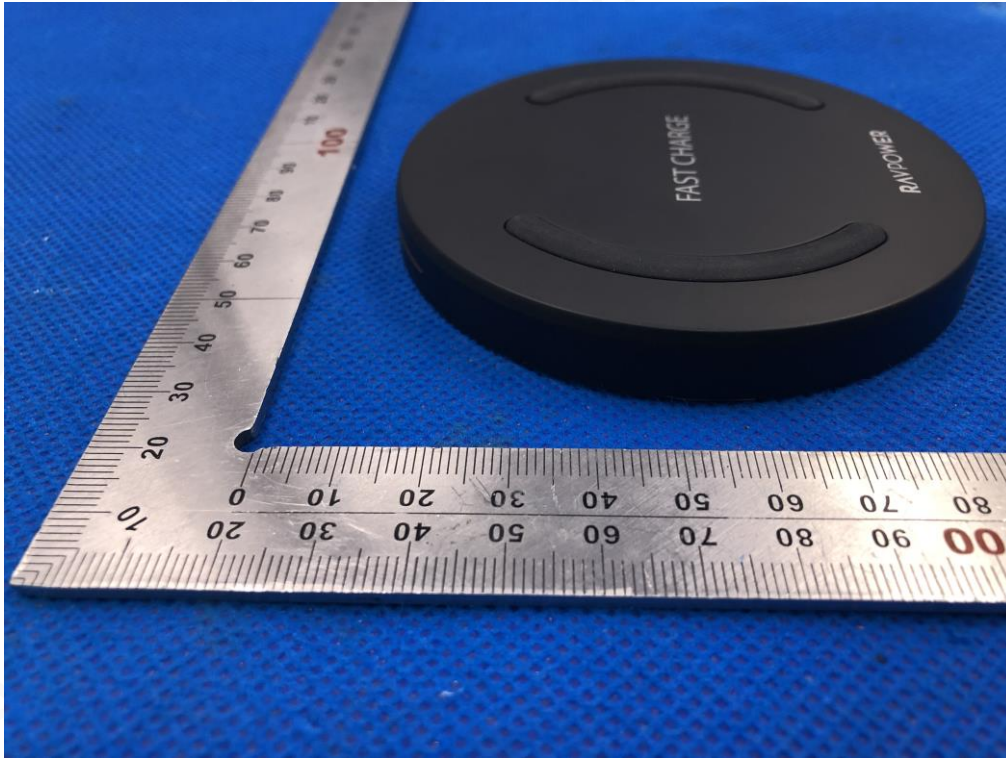
FRONT VIEW OF EUT



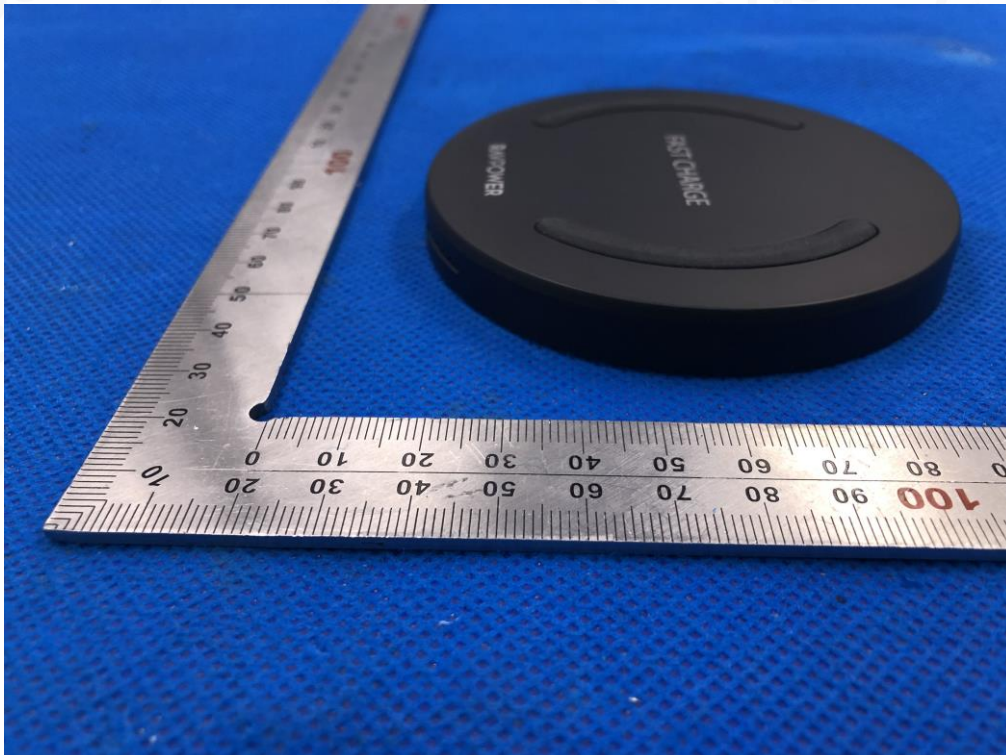
BACK VIEW OF EUT



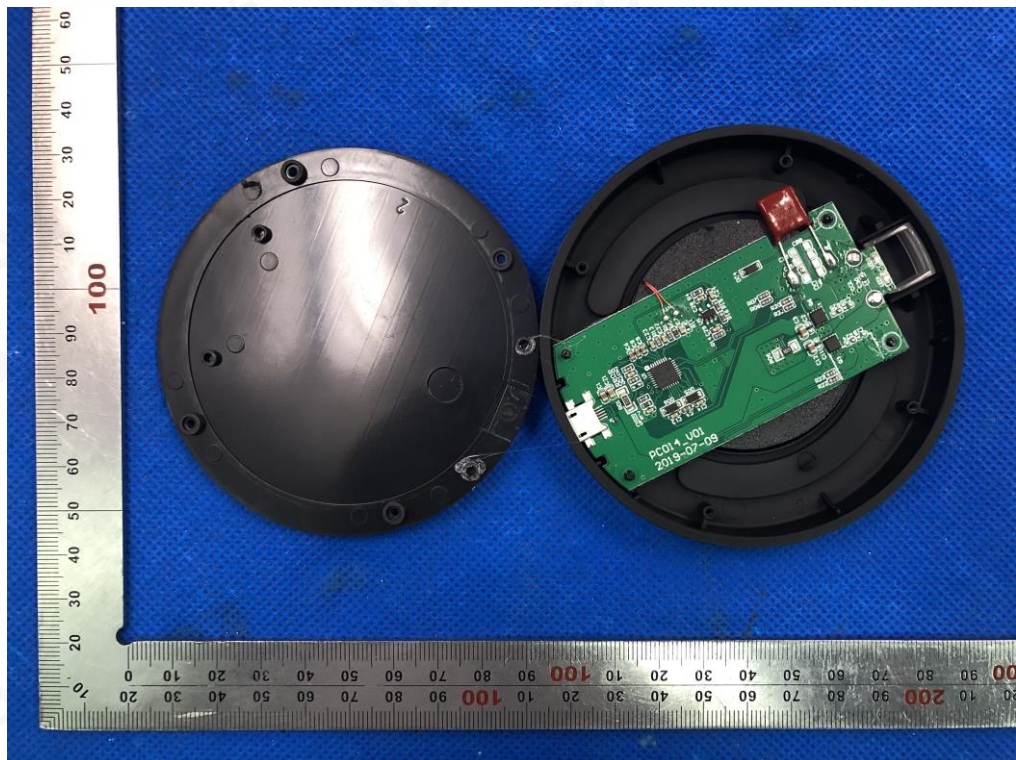
LEFT VIEW OF EUT



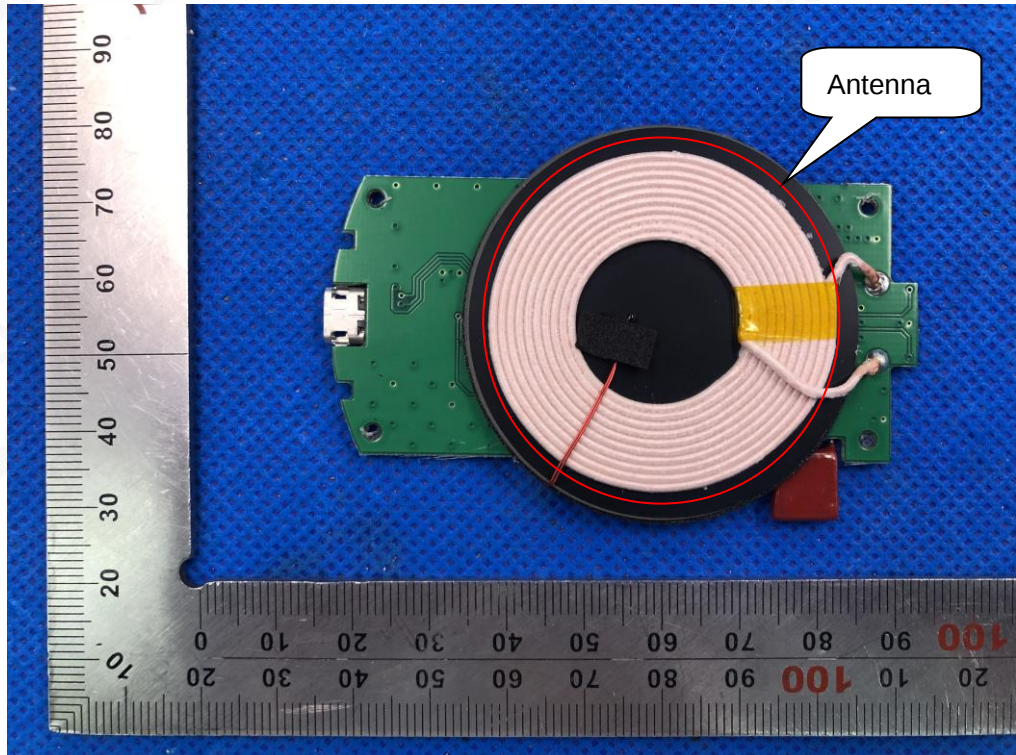
RIGHT VIEW OF EUT



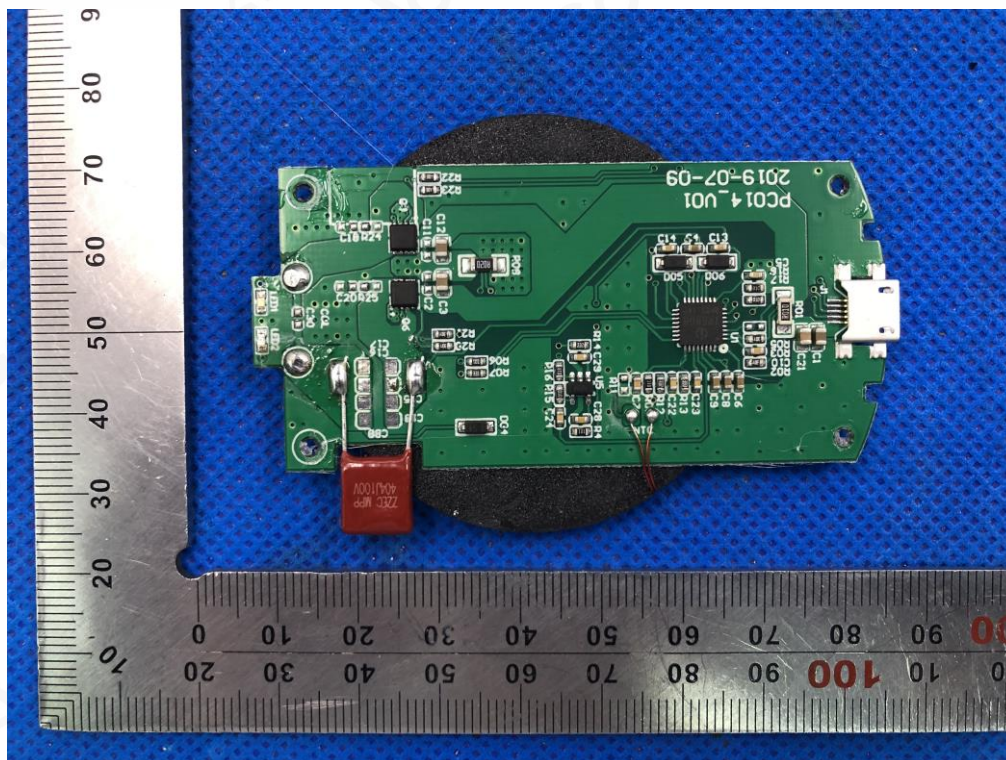
OPEN VIEW OF EUT



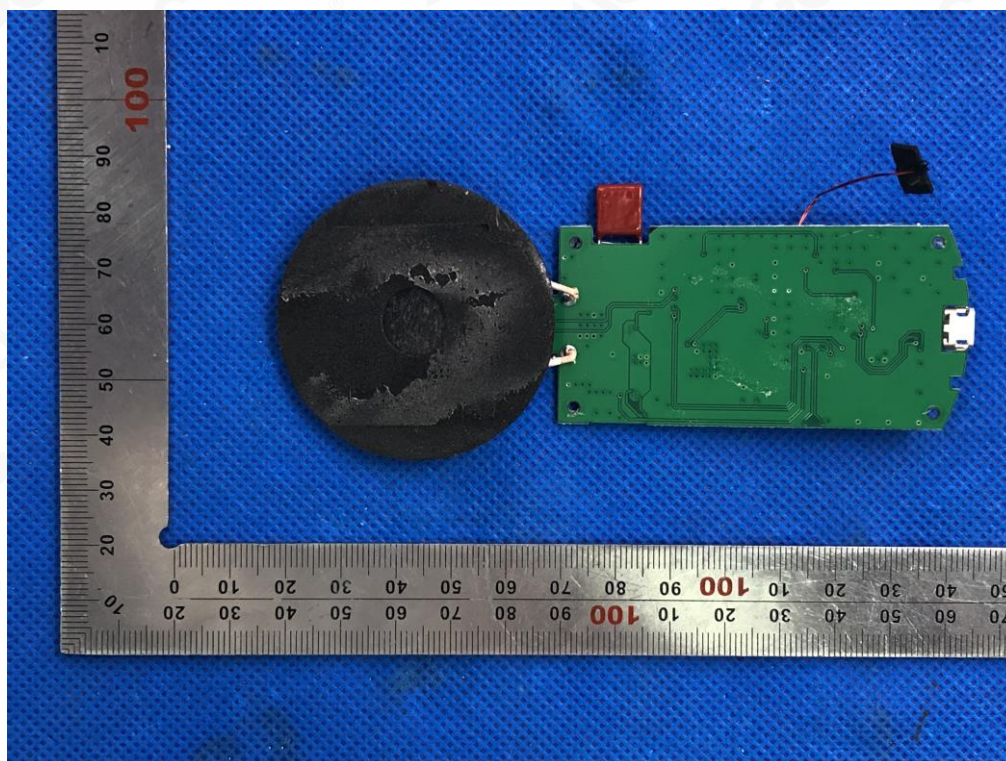
INTERNAL VIEW-1 OF EUT



INTERNAL VIEW-2 OF EUT



INTERNAL VIEW-3 OF EUT



----END OF REPORT----