

# FCC Test Report

Report No.: AGC03767190901FE05

**FCC ID** : Z52NAS-WR02ZU  
**APPLICATION PURPOSE** : Original Equipment  
**PRODUCT DESIGNATION** : Smart Plug  
**BRAND NAME** : NEO  
**MODEL NAME** : NAS-WR02ZU  
**APPLICANT** : SHENZHEN NEO ELECTRONICS CO.,LTD  
**DATE OF ISSUE** : Oct. 10, 2019  
**STANDARD(S)** : FCC Part 15.249  
**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	/	Oct. 10, 2019	Valid	Initial Release



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

## TABLE OF CONTENTS

<b>1. VERIFICATION OF CONFORMITY.....</b>	<b>4</b>
<b>2. GENERAL INFORMATION.....</b>	<b>5</b>
2.1. PRODUCT DESCRIPTION.....	5
2.2. RELATED SUBMITTAL(S) / GRANT (S) .....	5
2.3. TEST METHODOLOGY.....	5
2.4. SPECIAL ACCESSORIES.....	5
2.5. EQUIPMENT MODIFICATIONS.....	5
<b>3. MEASUREMENT UNCERTAINTY .....</b>	<b>6</b>
<b>4. DESCRIPTION OF TEST MODES .....</b>	<b>7</b>
<b>5. SYSTEM TEST CONFIGURATION.....</b>	<b>8</b>
5.1. CONFIGURATION OF EUT SYSTEM.....	8
5.2. EQUIPMENT USED IN EUT SYSTEM.....	8
5.3. SUMMARY OF TEST RESULTS.....	8
<b>6. TEST FACILITY.....</b>	<b>9</b>
<b>7. RADIATED EMISSION.....</b>	<b>10</b>
7.1. MEASUREMENT PROCEDURE .....	10
7.2. TEST SETUP .....	11
7.3. LIMITS AND MEASUREMENT RESULT .....	12
7.4. TEST RESULT .....	12
<b>9. BANDWIDTH.....</b>	<b>19</b>
9.1. MEASUREMENT PROCEDURE .....	19
9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION).....	19
9.3. MEASUREMENT RESULTS.....	20
<b>10. FCC LINE CONDUCTED EMISSION TEST .....</b>	<b>22</b>
10.1 LIMITS OF LINE CONDUCTED EMISSION TEST .....	22
10.2 BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST .....	22
10.3 PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST .....	23
10.4 FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST .....	23
10.5 TEST RESULT OF LINE CONDUCTED EMISSION TEST .....	24
<b>APPENDIX A: PHOTOGRAPHS OF TEST SETUP .....</b>	<b>28</b>
<b>APPENDIX B: PHOTOGRAPHS OF EUT .....</b>	<b>30</b>

**1. VERIFICATION OF CONFORMITY**

<b>Applicant</b>	SHENZHEN NEO ELECTRONICS CO.,LTD
<b>Address</b>	East 6/F, Building 2 LaoBing Industry, No.44 TieZai Road, Baoan District, Shenzhen
<b>Manufacturer</b>	SHENZHEN NEO ELECTRONICS CO.,LTD
<b>Address</b>	East 6/F, Building 2 LaoBing Industry, No.44 TieZai Road, Baoan District, Shenzhen
<b>Factory Name</b>	SHENZHEN NEO ELECTRONICS CO.,LTD
<b>Address</b>	East 6/F, Building 2 LaoBing Industry, No.44 TieZai Road, Baoan District, Shenzhen
<b>Product Designation</b>	Smart Plug
<b>Brand Name</b>	NEO
<b>Test Model</b>	NAS-WR02ZU
<b>Date of test</b>	Sep. 20, 2019 to Oct. 09, 2019
<b>Deviation</b>	None
<b>Condition of Test Sample</b>	Normal
<b>Test Result</b>	Pass
<b>Report Template</b>	AGCRT-US-BGN/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 radiated emission limits of FCC part 15.249.

Prepared By

*Jeast Zhan*Jeast Zhan  
(Project Engineer)

Oct. 09, 2019

Reviewed By

*Max Zhang*Max Zhang  
(Reviewer)

Oct. 10, 2019

Approved By

*Forrest Lei*Forrest Lei  
(Authorized Officer)

Oct. 10, 2019



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

## 2. GENERAL INFORMATION

### 2.1. PRODUCT DESCRIPTION

The EUT is designed as "Smart Plug". It is designed by way of utilizing the FSK and GFSK technology to achieve the system operation.

A major technical description of EUT is described as following

<b>Operation Frequency</b>	908.4MHz, 916.0MHz
<b>Output Power</b>	76.68dBuV/m @ 3m(Average)
<b>Modulation</b>	908.4MHz: FSK; 916.0MHz: GFSK
<b>Number of channels</b>	2
<b>Hardware Version</b>	MGCZ-T-V13 20170313
<b>Software Version</b>	S2
<b>Antenna Designation</b>	PCB Antenna (Met 15.203 Antenna requirement)
<b>Antenna Gain</b>	0dBi
<b>Power Supply</b>	AC 85–240V, 50/60Hz, 13A

### 2.2. RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: Z52NAS-WR02ZU** filing to comply with the FCC PART 15.249 requirements.

### 2.3. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 (2013). Radiated testing was performed at an antenna to EUT distance 3 meters.

### 2.4. SPECIAL ACCESSORIES

Refer to section 5.2.

### 2.5. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.



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

### 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,  $U_c = \pm 3.2 \text{ dB}$
- Uncertainty of Radiated Emission below 1GHz,  $U_c = \pm 3.9 \text{ dB}$
- Uncertainty of Radiated Emission above 1GHz,  $U_c = \pm 4.8 \text{ dB}$



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

#### 4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Transmitting at 908.4MHz
2	Transmitting at 916.0MHz

**Note:**

1. The EUT has been set to operate continuously on the lowest, middle and highest operation frequency individually, and the EUT is operating at its maximum duty cycle>or equal 98%
2. All modes under which configure applicable have been tested and the worst mode test data recording in the test report, if no other mode data.
3. For Radiated Emission, 3axis were chosen for testing for each applicable mode.



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

## 5. SYSTEM TEST CONFIGURATION

### 5.1. CONFIGURATION OF EUT SYSTEM

Radiated Emission Configure:



Conducted Emission Configure:



### 5.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	Smart Plug	NAS-WR02ZU	Z52NAS-WR02ZU	EUT

### 5.3. SUMMARY OF TEST RESULTS

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



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

## 6. TEST FACILITY

<b>Test Site</b>	Attestation of Global Compliance (Shenzhen) Co., Ltd
<b>Location</b>	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
<b>Designation Number</b>	CN1259
<b>FCC Test Firm Registration Number</b>	975832
<b>A2LA Cert. No.</b>	5054.02
<b>Description</b>	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
Attenuator	Weinachel Corp	58-30-33	N/A	Jun. 12, 2019	Jun. 11, 2020
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	Jun. 12, 2019	Jun. 11, 2020
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May. 26, 2018	May. 25, 2020
Broadband Preamplifier	ETS LINDGREN	3117PA	00225134	Oct. 25, 2018	Oct. 24, 2019
ANTENNA	SCHWARZBECK	VULB9168	494	Jan. 09, 2019	Jan. 08, 2021

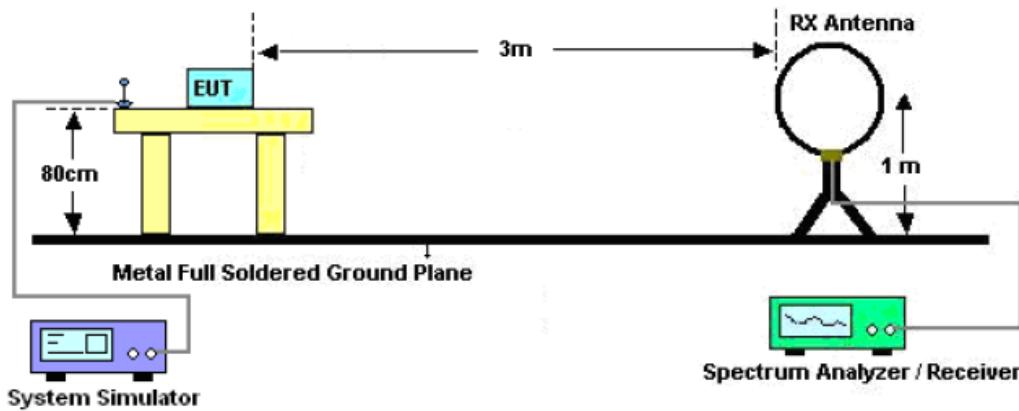
## 7. RADIATED EMISSION

### 7.1. MEASUREMENT PROCEDURE

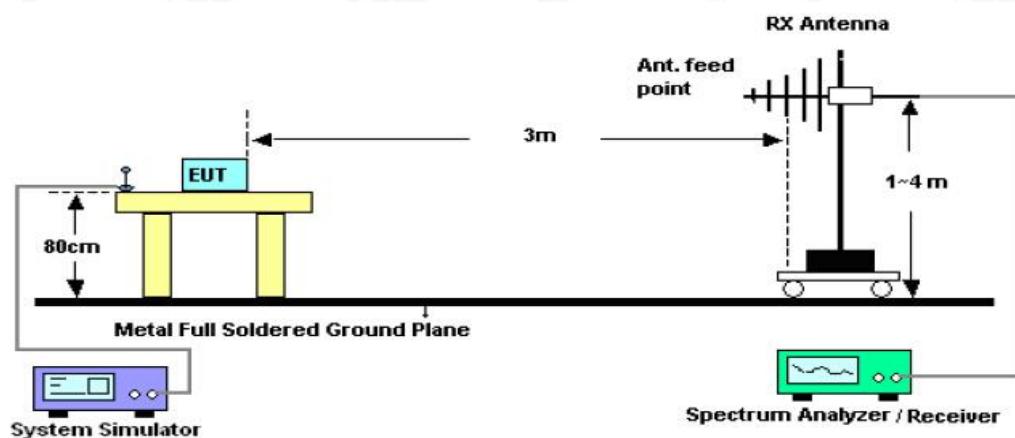
1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated 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. For emissions above 1GHz, use 1MHz VBW and 3MHz RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer. Place the measurement antenna 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 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.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. 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.

## 7.2. TEST SETUP

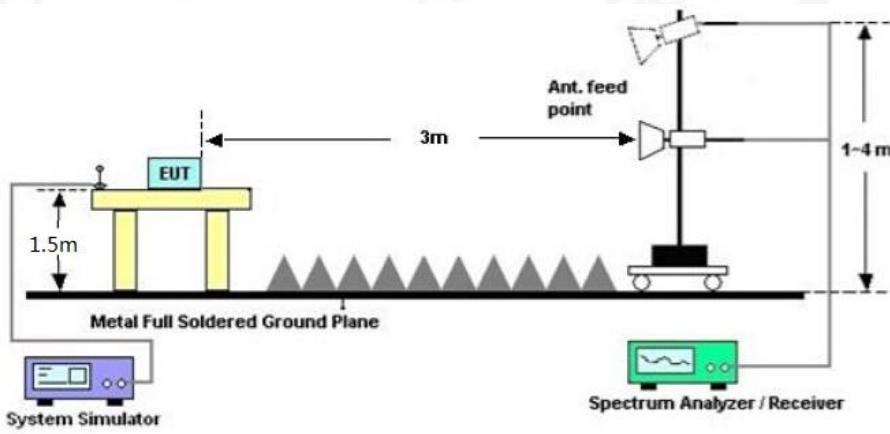
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



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

### 7.3. LIMITS AND MEASUREMENT RESULT

FCC part 15.209 Limit in the below table has to be followed

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Note: All modes were tested For restricted band radiated emission,  
the test records reported below are the worst result compared to other modes.

### 7.4. TEST RESULT

#### RADIATED EMISSION BELOW 30MHZ

No emission found between lowest internal used/generated frequencies to 30MHz.

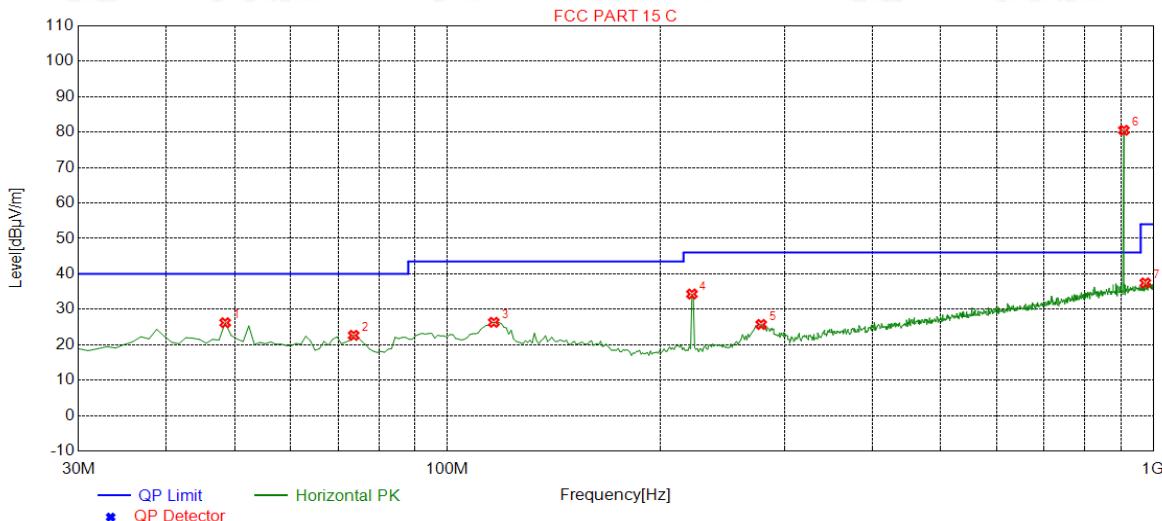


Attestation of Global Compliance

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

**Emissions radiated outside of the specified frequency bands, except for harmonic emissions**

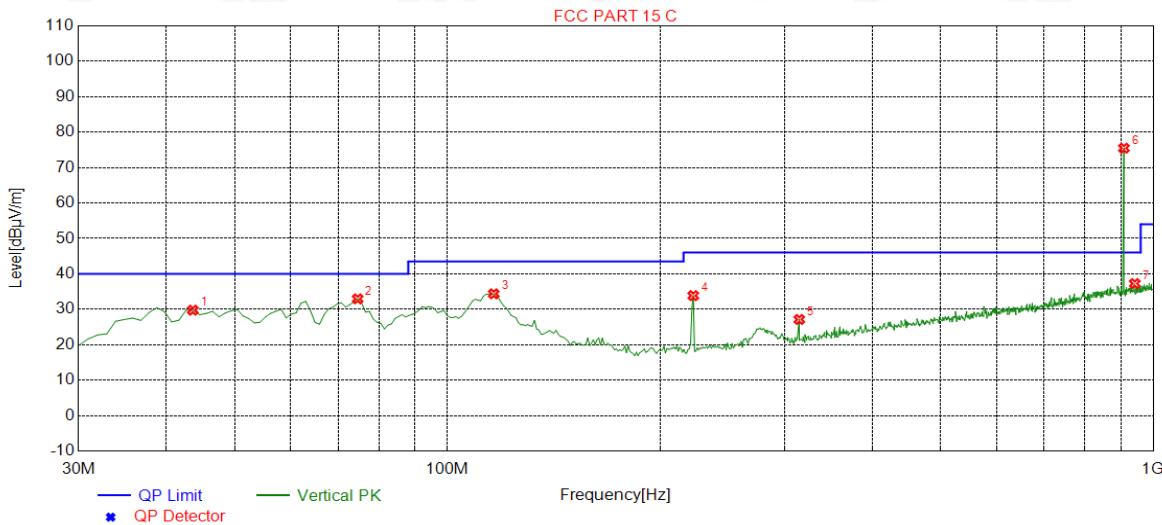
<b>EUT</b>	Smart Plug	<b>Model Name</b>	NAS-WR02ZU
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.5%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	Mode 1	<b>Antenna</b>	Horizontal



NO.	Freq. [MHz]	Level [dB $\mu$ V/m]	Factor [dB]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	48.4300	26.21	14.71	40.00	13.79	150	24	Horizontal
2	73.6500	22.65	11.47	40.00	17.35	150	55	Horizontal
3	116.3300	26.33	13.09	43.50	17.17	150	358	Horizontal
4	222.0600	34.31	13.44	46.00	11.69	100	244	Horizontal
5	278.3200	25.72	16.14	46.00	20.28	100	272	Horizontal
6	908.4000	80.53	30.19	--	--	100	228	Horizontal
7	974.7800	37.45	30.86	54.00	16.55	100	260	Horizontal

**RESULT: PASS**

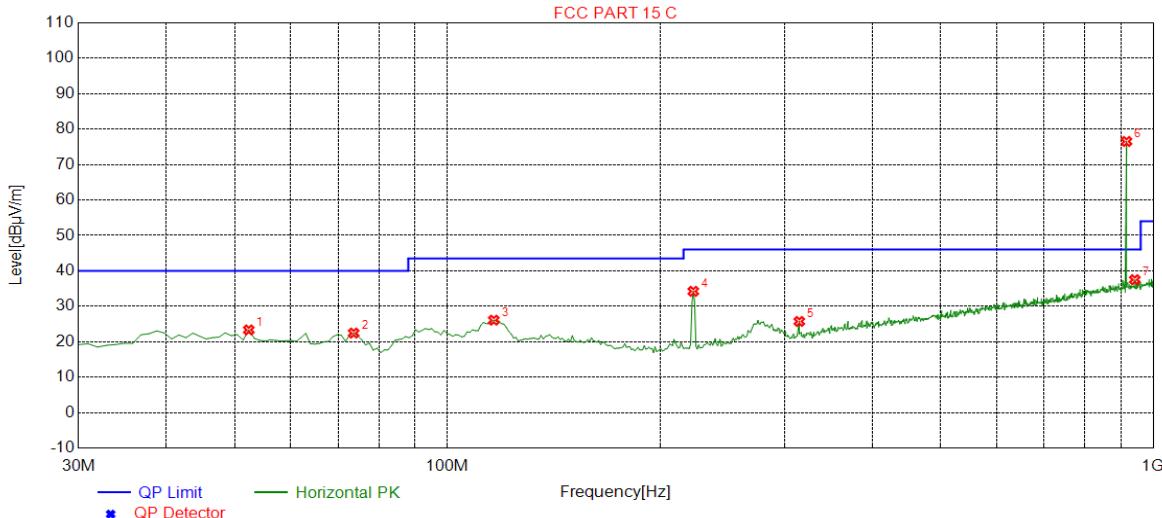
<b>EUT</b>	Smart Plug	<b>Model Name</b>	NAS-WR02ZU
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.5%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	Mode 1	<b>Antenna</b>	Vertical



NO.	Freq. [MHz]	Level [dB $\mu$ V/m]	Factor [dB]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	43.5800	29.75	14.84	40.00	10.25	100	4	Vertical
2	74.6200	32.95	11.27	40.00	7.05	100	138	Vertical
3	116.3300	34.37	13.09	43.50	9.13	100	3	Vertical
4	223.0300	33.85	13.51	46.00	12.15	100	360	Vertical
5	315.1800	27.14	16.48	46.00	18.86	100	1	Vertical
6	908.4000	75.47	30.19	--	--	100	110	Vertical
7	941.8000	37.25	30.61	46.00	8.75	100	341	Vertical

**RESULT: PASS**

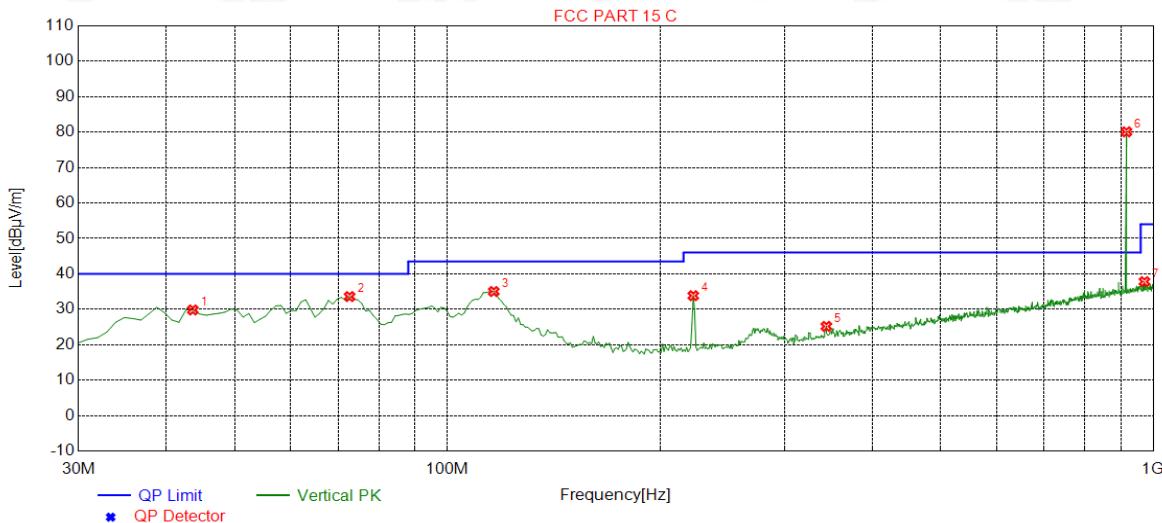
<b>EUT</b>	Smart Plug	<b>Model Name</b>	NAS-WR02ZU
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.5%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	Mode 2	<b>Antenna</b>	Horizontal



NO.	Freq. [MHz]	Level [dB $\mu$ V/m]	Factor [dB]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	52.3100	23.34	14.49	40.00	16.66	150	134	Horizontal
2	73.6500	22.44	11.47	40.00	17.56	100	69	Horizontal
3	116.3300	26.09	13.09	43.50	17.41	150	7	Horizontal
4	223.0300	34.23	13.51	46.00	11.77	150	271	Horizontal
5	315.1800	25.73	16.48	46.00	20.27	100	1	Horizontal
6	916.0000	76.52	30.27	--	--	100	226	Horizontal
7	941.8000	37.51	30.61	46.00	8.49	100	2	Horizontal

**RESULT: PASS**

<b>EUT</b>	Smart Plug	<b>Model Name</b>	NAS-WR02ZU
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.5%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	Mode 2	<b>Antenna</b>	Vertical



NO.	Freq. [MHz]	Level [dB $\mu$ V/m]	Factor [dB]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	43.5800	29.82	14.84	40.00	10.18	100	191	Vertical
2	72.6800	33.59	11.67	40.00	6.41	100	128	Vertical
3	116.3300	35.02	13.09	43.50	8.48	100	222	Vertical
4	223.0300	33.84	13.51	46.00	12.16	100	359	Vertical
5	344.2800	25.18	17.64	46.00	20.82	100	23	Vertical
6	916.0000	80.09	30.27	--	--	100	301	Vertical
7	971.8700	37.81	30.82	54.00	16.19	100	211	Vertical

## RESULT: PASS

**Note:** 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

2. The "Factor" value can be calculated automatically by software of measurement system.
3. The emission signal above the limit is the fundamental wave.

**The field strength of fundamental and harmonic emissions**

<b>EUT</b>	Smart Plug	<b>Model Name</b>	NAS-WR02ZU
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.5%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	Mode 1	<b>Antenna</b>	Horizontal

Frequency	Reading Level	Factor	Emission Level	Limit	Margin	Value type
(MHz)	(dB $\mu$ V)	(dB/m)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
908.400	50.34	30.19	80.53	114.00	33.47	Peak
908.400	46.49	30.19	76.68	94.00	17.32	Average
1816.800	28.69	12.87	41.56	74.00	32.44	Peak
1816.800	25.37	12.87	38.24	54.00	15.76	Average
2725.200	34.77	9.55	44.32	74.00	29.68	Peak
2725.200	30.58	9.55	40.13	54.00	13.87	Average

<b>EUT</b>	Smart Plug	<b>Model Name</b>	NAS-WR02ZU
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.5%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	Mode 1	<b>Antenna</b>	Vertical

Frequency	Reading Level	Factor	Emission Level	Limit	Margin	Value type
(MHz)	(dB $\mu$ V)	(dB/m)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
908.400	45.28	30.19	75.47	114.00	38.53	Peak
908.400	41.19	30.19	71.38	94.00	22.62	Average
1816.800	29.71	12.87	42.58	74	31.42	Peak
1816.800	26.68	12.87	39.55	54	14.45	Average
2725.200	35.63	9.55	45.18	74	28.82	Peak
2725.200	31.72	9.55	41.27	54	12.73	Average



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

<b>EUT</b>	Smart Plug	<b>Model Name</b>	NAS-WR02ZU
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.5%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	Mode 2	<b>Antenna</b>	Horizontal

Frequency	Reading Level	Factor	Emission Level	Limit	Margin	Value type
(MHz)	(dB $\mu$ V)	(dB/m)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
916.000	46.25	30.27	76.52	114.00	37.48	Peak
916.000	42.09	30.27	72.36	94.00	21.64	Average
1832.000	28.71	13.56	42.27	74.00	31.73	Peak
1832.000	24.97	13.56	38.53	54.00	15.47	Average
2748.000	34.95	9.5	44.45	74.00	29.55	Peak
2748.000	31.39	9.5	40.89	54.00	13.11	Average

<b>EUT</b>	Smart Plug	<b>Model Name</b>	NAS-WR02ZU
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	55.5%
<b>Pressure</b>	960hPa	<b>Test Voltage</b>	Normal Voltage
<b>Test Mode</b>	Mode 2	<b>Antenna</b>	Vertical

Frequency	Reading Level	Factor	Emission Level	Limit	Margin	Value type
(MHz)	(dB $\mu$ V)	(dB/m)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
916.000	49.82	30.27	80.09	114.00	33.91	Peak
916.000	46.29	30.27	76.56	94.00	17.44	Average
1832.000	28.71	13.56	42.27	74	31.73	Peak
1832.000	25.13	13.56	38.69	54	15.31	Average
2748.000	34.95	9.5	44.45	74	29.55	Peak
2748.000	31.24	9.5	40.74	54	13.26	Average

**Note:** Other harmonic emissions from 1G to 9.3 GHz are considered as ambient noise. No recording in the test report.

Factor = Antenna Factor + Cable loss - Amplifier gain, Over=Measure-Limit.

The "Factor" value can be calculated automatically by software of measurement 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

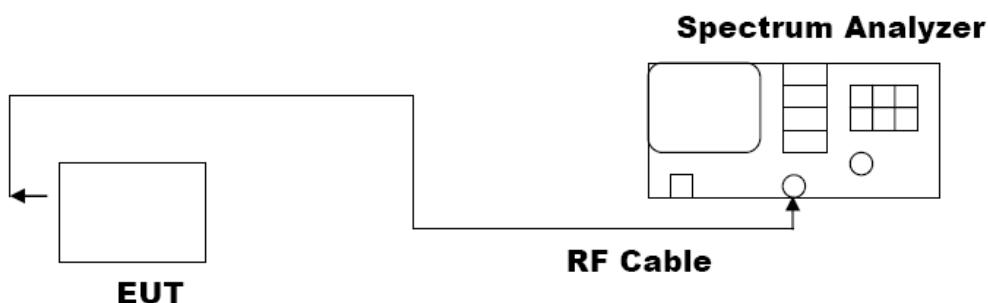
Tel: +86-755 2523 4088 E-mail: agc@agc-cert.com Service Hotline:400 089 2118

## 9. BANDWIDTH

### 9.1. MEASUREMENT PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set SPA Centre Frequency = Operation Frequency, RBW= 3 KHz, VBW $\geq$ 3xRBW.
4. Set SPA Trace 1 Max hold, then View.

### 9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

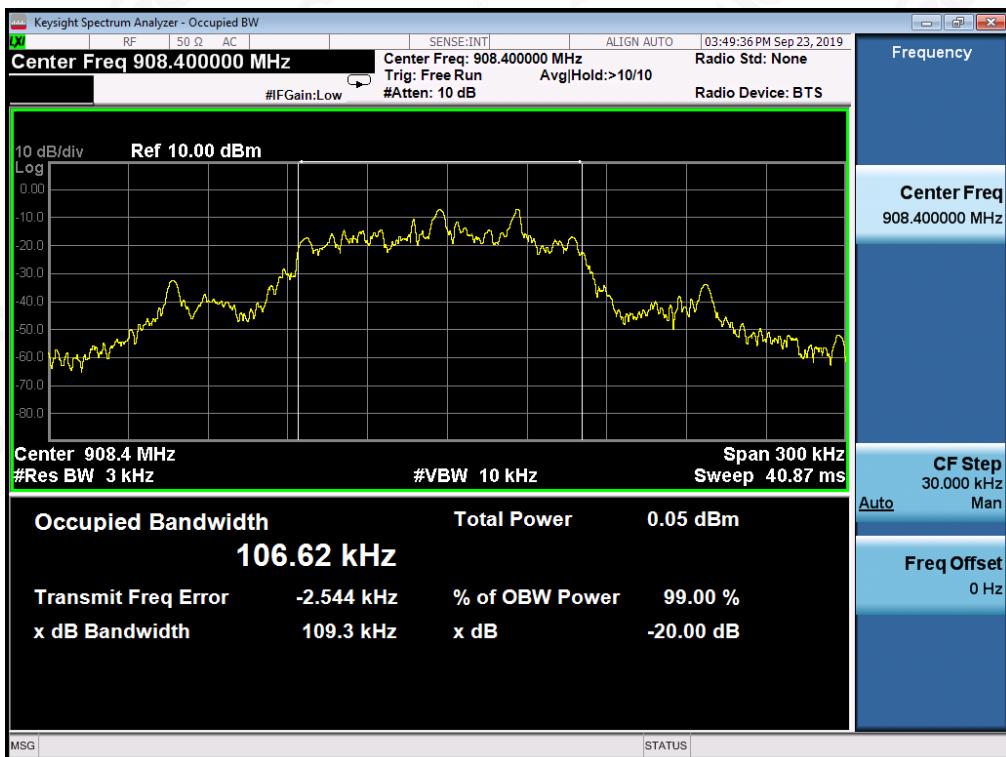


### 9.3. MEASUREMENT RESULTS

TEST ITEM	20dB BANDWIDTH
TEST MODULATION	FSK

Test Data (KHz)	Criteria
908.4MHz	PASS

TEST PLOT OF BANDWIDTH FOR 908.4MHz



TEST ITEM	20dB BANDWIDTH
TEST MODULATION	GFSK

Test Data (KHz)	Criteria
916.0MHz	PASS

## TEST PLOT OF BANDWIDTH FOR 916.0MHz



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

## 10. FCC LINE CONDUCTED EMISSION TEST

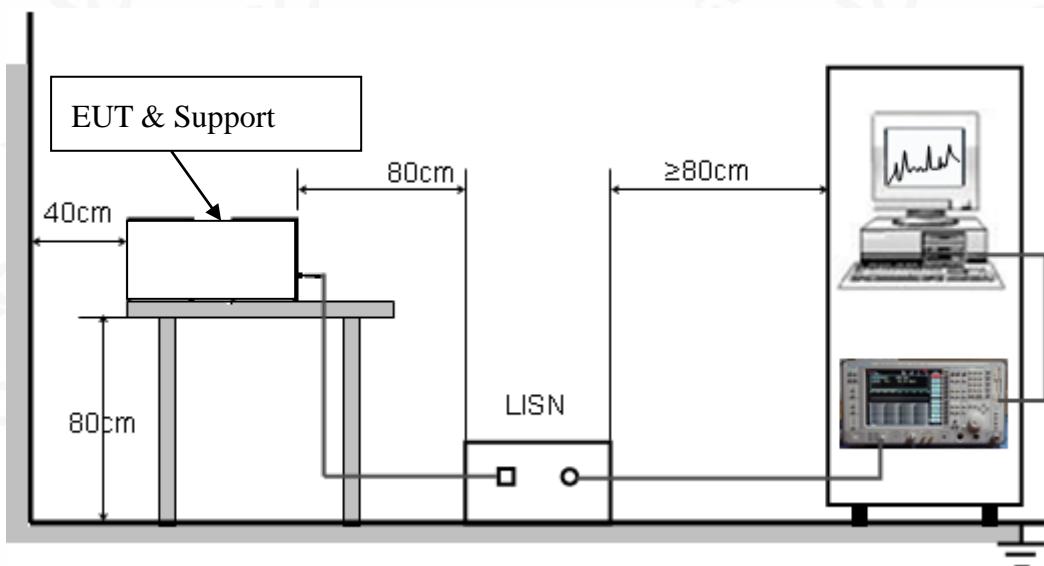
### 10.1 LIMITS OF LINE CONDUCTED EMISSION TEST

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.

### 10.2 BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



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

### 10.3 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 AC120V/60Hz power from 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.

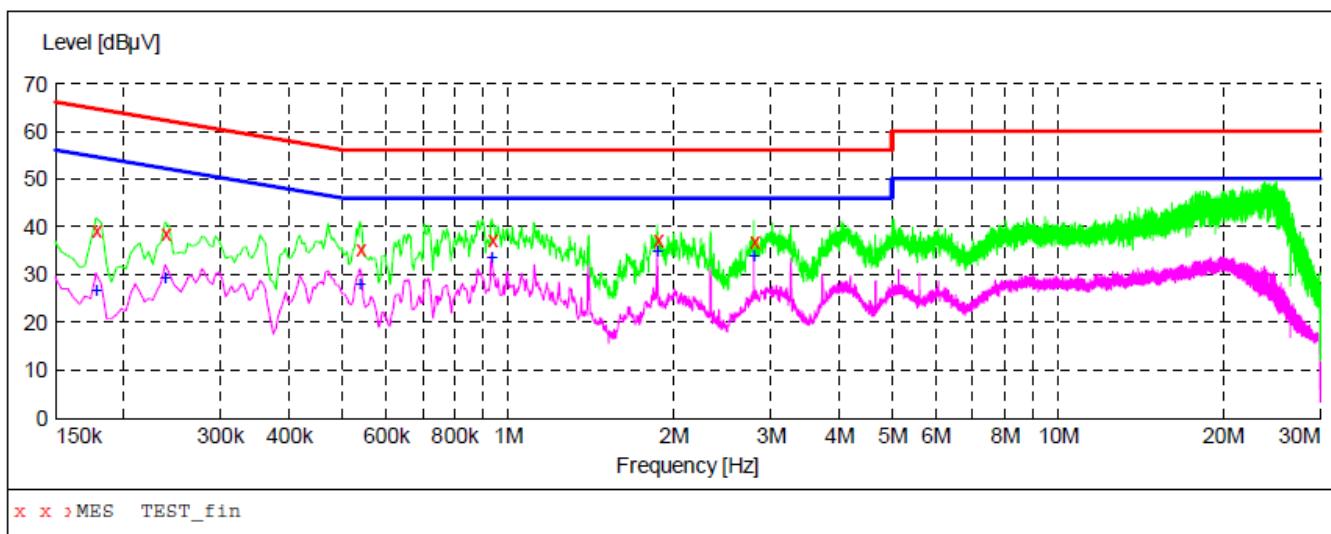
### 10.4 FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

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.

## 10.5 TEST RESULT OF LINE CONDUCTED EMISSION TEST

908.4MHz

Line Conducted Emission Test Line 1-L



### MEASUREMENT RESULT: "TEST\_fin"

9/30/2019 10:48AM

Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Detector	Line	PE
0.178000	39.30	10.9	65	25.3	QP	L1	FLO
0.238000	38.60	10.9	62	23.6	QP	L1	FLO
0.538000	35.40	11.0	56	20.6	QP	L1	FLO
0.934000	37.40	11.2	56	18.6	QP	L1	FLO
1.866000	37.20	11.5	56	18.8	QP	L1	FLO
2.802000	37.00	11.5	56	19.0	QP	L1	FLO

### MEASUREMENT RESULT: "TEST\_fin2"

9/30/2019 10:48AM

Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Detector	Line	PE
0.178000	27.00	10.9	55	27.6	AV	L1	FLO
0.238000	29.40	10.9	52	22.8	AV	L1	FLO
0.538000	28.30	11.0	46	17.7	AV	L1	FLO
0.934000	33.80	11.2	46	12.2	AV	L1	FLO
1.866000	34.90	11.5	46	11.1	AV	L1	FLO
2.802000	33.90	11.5	46	12.1	AV	L1	FLO



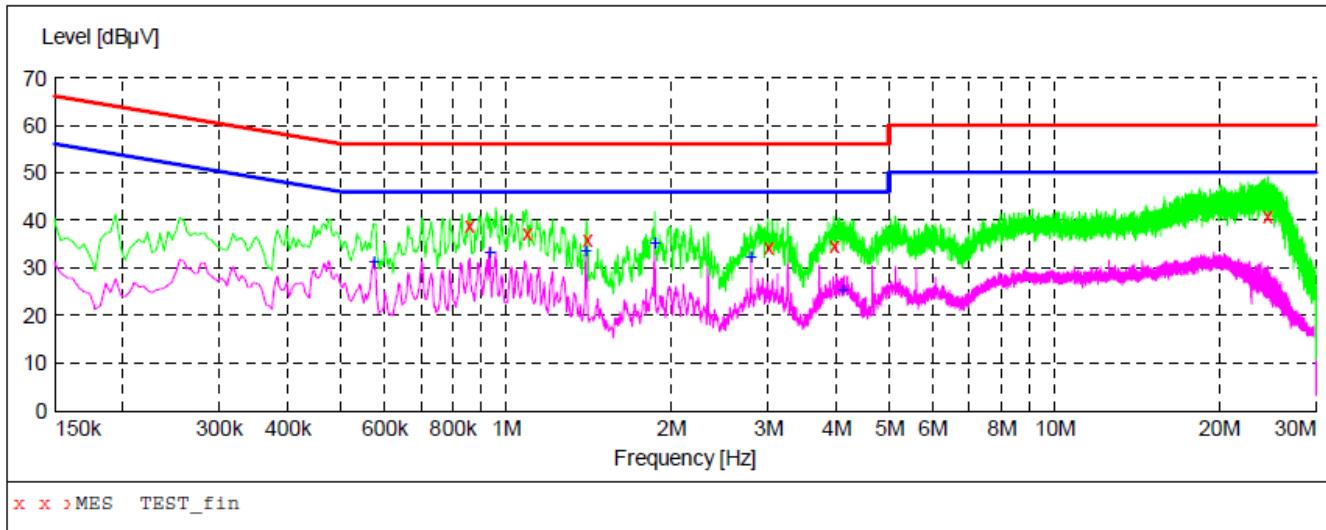
Attestation of Global Compliance

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

## Line Conducted Emission Test Line 2-N


**MEASUREMENT RESULT: "TEST\_fin"**

9/30/2019 10:59AM

Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Detector	Line	PE
0.854000	38.90	11.0	56	17.1	QP	N	FLO
1.090000	37.30	11.4	56	18.7	QP	N	FLO
1.402000	36.10	11.5	56	19.9	QP	N	FLO
3.002000	34.40	11.5	56	21.6	QP	N	FLO
3.954000	34.80	11.6	56	21.2	QP	N	FLO
24.422000	41.10	12.7	60	18.9	QP	N	FLO

**MEASUREMENT RESULT: "TEST\_fin2"**

9/30/2019 10:59AM

Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Detector	Line	PE
0.574000	31.50	10.8	46	14.5	AV	N	FLO
0.934000	33.20	11.2	46	12.8	AV	N	FLO
1.398000	33.70	11.5	46	12.3	AV	N	FLO
1.866000	35.30	11.5	46	10.7	AV	N	FLO
2.802000	32.50	11.5	46	13.5	AV	N	FLO
4.110000	25.50	11.6	46	20.5	AV	N	FLO



Attestation of Global Compliance

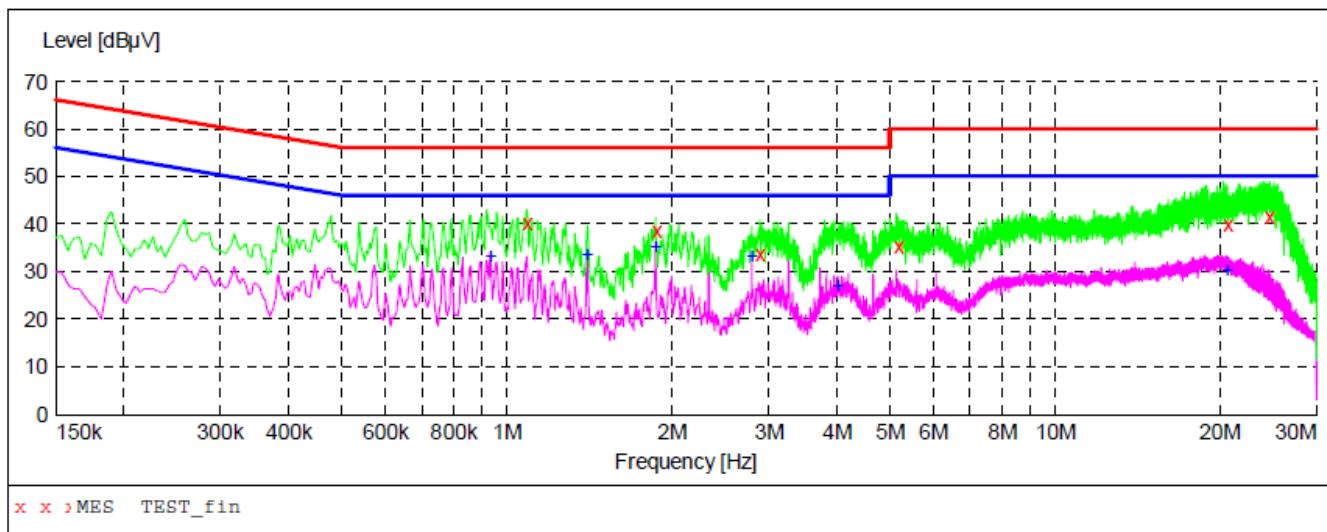
Attestation of Global Compliance(Shenzhen)Co.,Ltd.

 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

916.0MHz

## Line Conducted Emission Test Line 1-L


**MEASUREMENT RESULT: "TEST\_fin"**

9/30/2019 10:52AM

Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Detector	Line	PE
1.086000	40.20	11.4	56	15.8	QP	L1	FLO
1.866000	38.70	11.5	56	17.3	QP	L1	FLO
2.882000	33.80	11.5	56	22.2	QP	L1	FLO
5.174000	35.20	11.7	60	24.8	QP	L1	FLO
20.626000	39.80	12.5	60	20.2	QP	L1	FLO
24.602000	41.60	12.7	60	18.4	QP	L1	FLO

**MEASUREMENT RESULT: "TEST\_fin2"**

9/30/2019 10:52AM

Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Detector	Line	PE
0.934000	33.30	11.2	46	12.7	AV	L1	FLO
1.402000	33.70	11.5	46	12.3	AV	L1	FLO
1.866000	35.30	11.5	46	10.7	AV	L1	FLO
2.802000	33.30	11.5	46	12.7	AV	L1	FLO
4.014000	27.20	11.6	46	18.8	AV	L1	FLO
20.650000	30.40	12.5	50	19.6	AV	L1	FLO



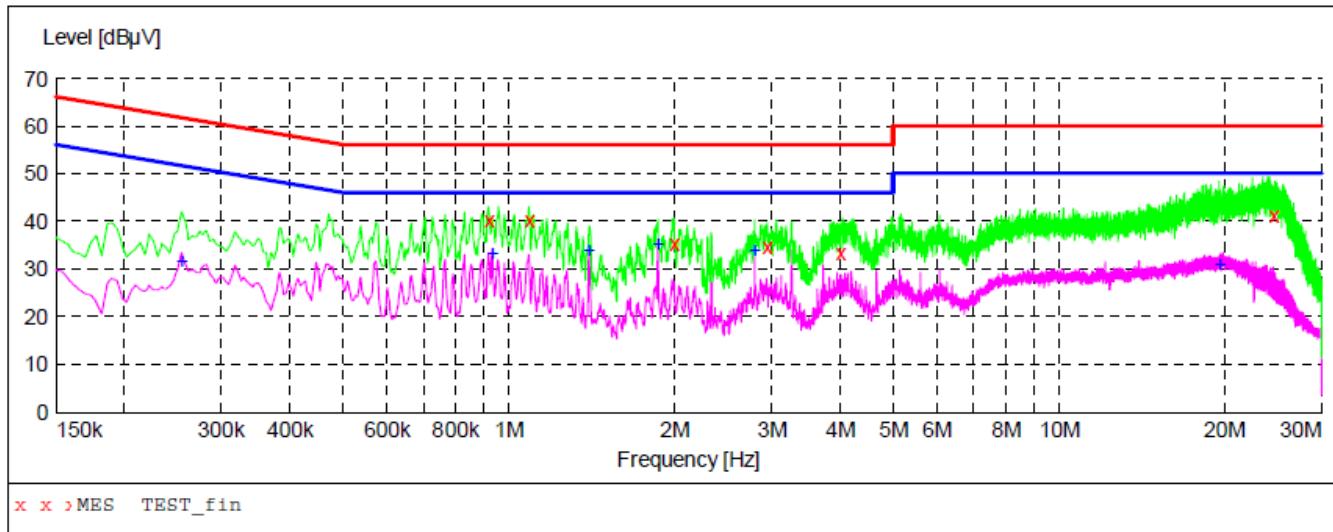
Attestation of Global Compliance

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

## Line Conducted Emission Test Line 2-N


**MEASUREMENT RESULT: "TEST\_fin"**

9/30/2019 11:03AM

Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Detector	Line	PE
0.918000	40.20	11.2	56	15.8	QP	N	FLO
1.086000	40.30	11.4	56	15.7	QP	N	FLO
1.994000	35.40	11.5	56	20.6	QP	N	FLO
2.938000	34.80	11.5	56	21.2	QP	N	FLO
3.998000	33.40	11.6	56	22.6	QP	N	FLO
24.506000	41.20	12.7	60	18.8	QP	N	FLO

**MEASUREMENT RESULT: "TEST\_fin2"**

9/30/2019 11:03AM

Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Detector	Line	PE
0.254000	31.90	10.9	52	19.7	AV	N	FLO
0.934000	33.30	11.2	46	12.7	AV	N	FLO
1.398000	33.90	11.5	46	12.1	AV	N	FLO
1.866000	35.50	11.5	46	10.5	AV	N	FLO
2.798000	34.00	11.5	46	12.0	AV	N	FLO
19.634000	31.00	12.5	50	19.0	AV	N	FLO

**RESULT: PASS**

Note: The mode 1 is the worst case, and only the data of the worst case recorded in this test report.

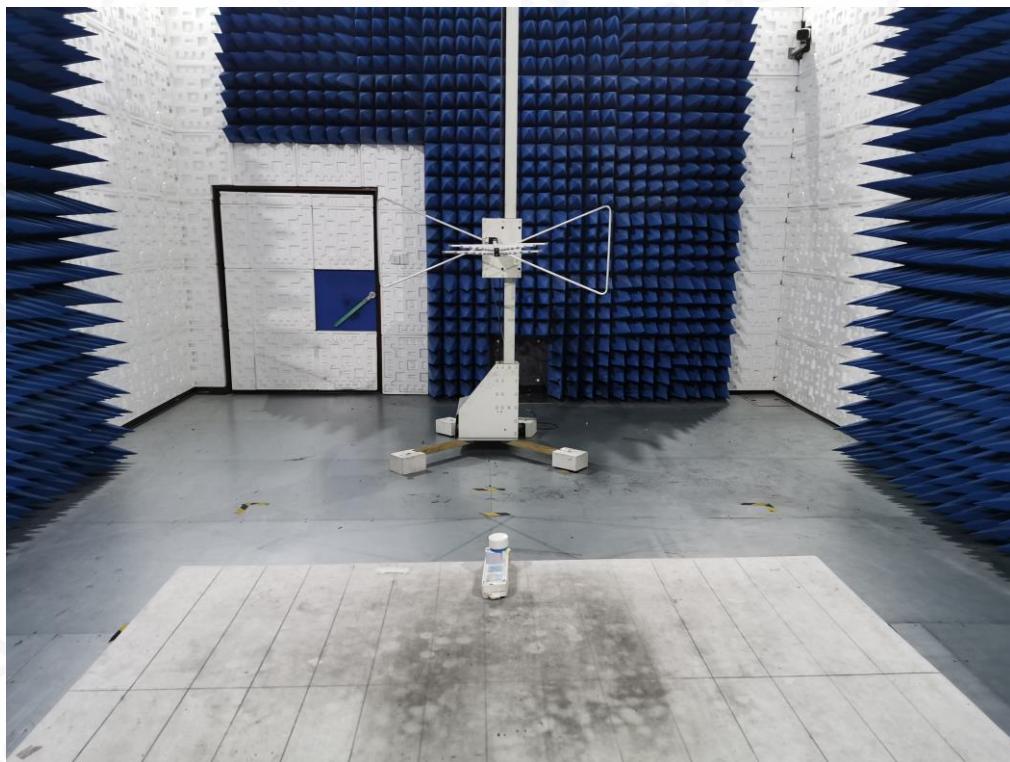
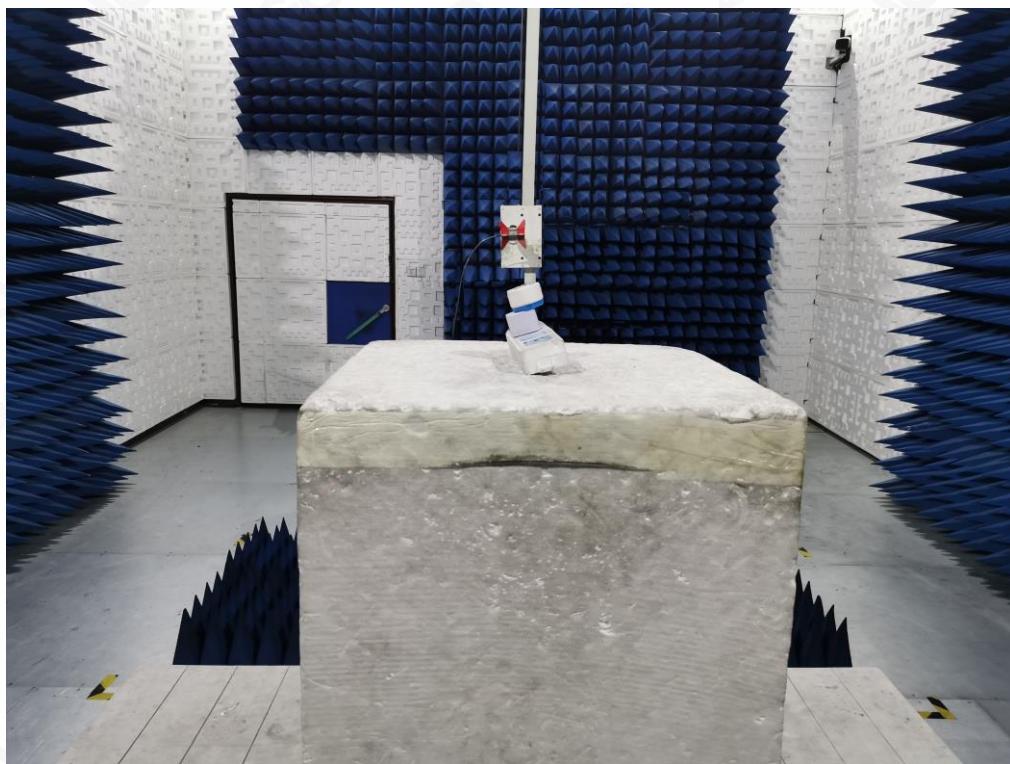


Attestation of Global Compliance

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

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

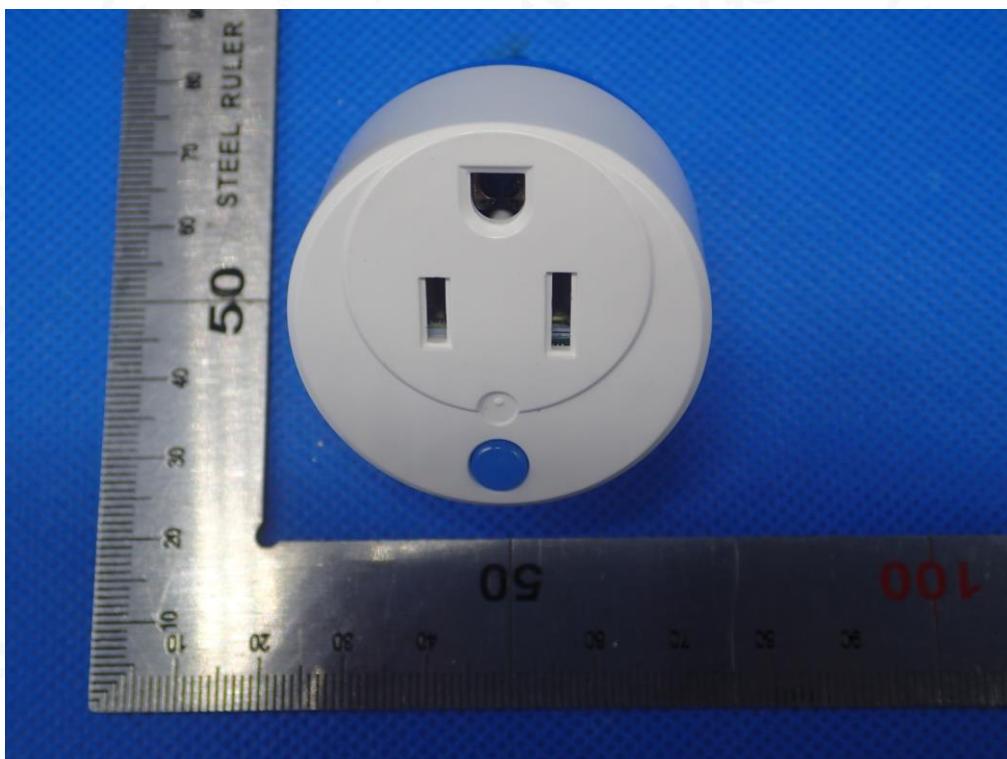
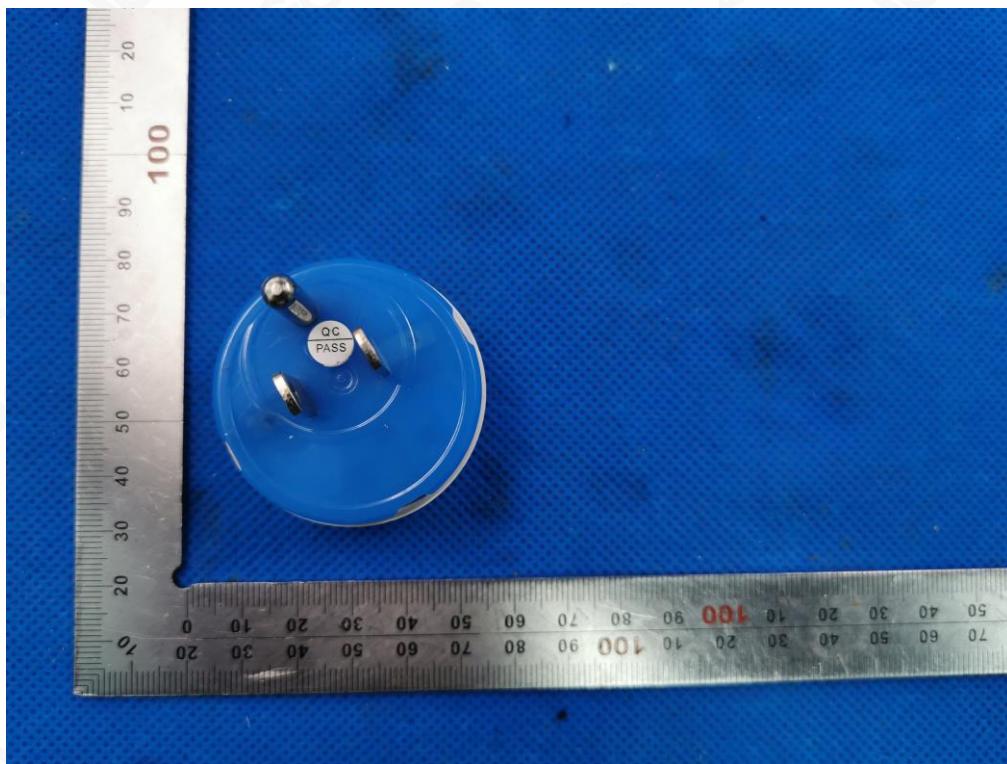
Tel: +86-755 2523 4088      E-mail: agc@agc-cert.com      Service Hotline: 400 089 2118

## FCC LINE CONDUCTED EMISSION TEST SETUP

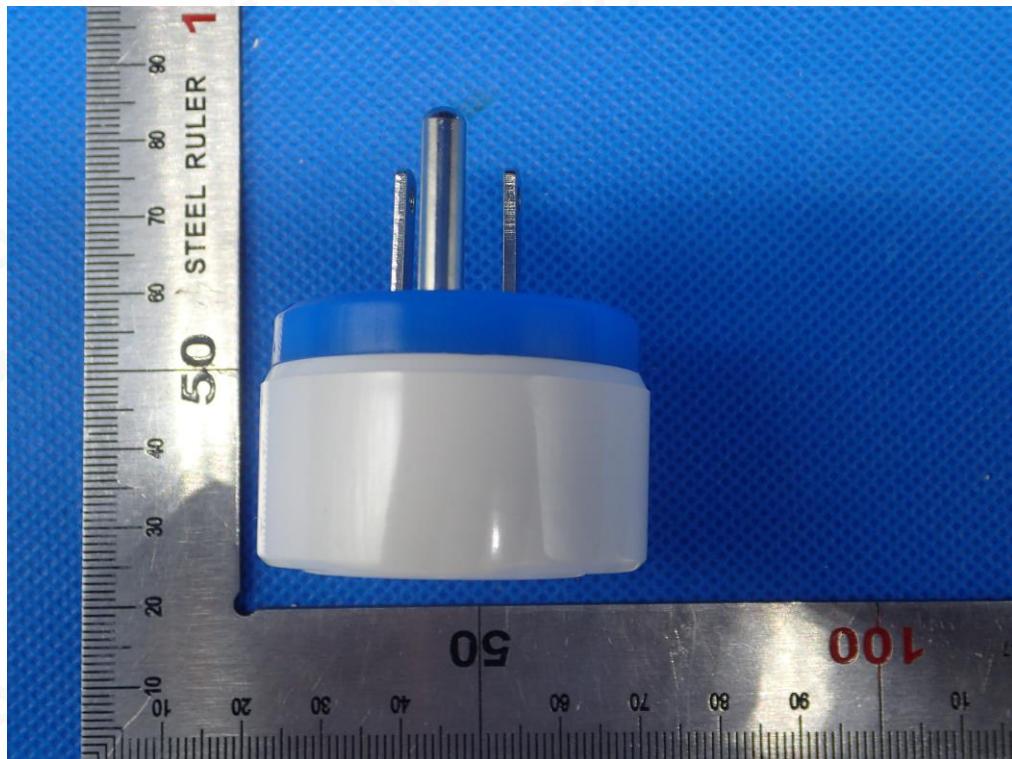


Attestation of Global Compliance

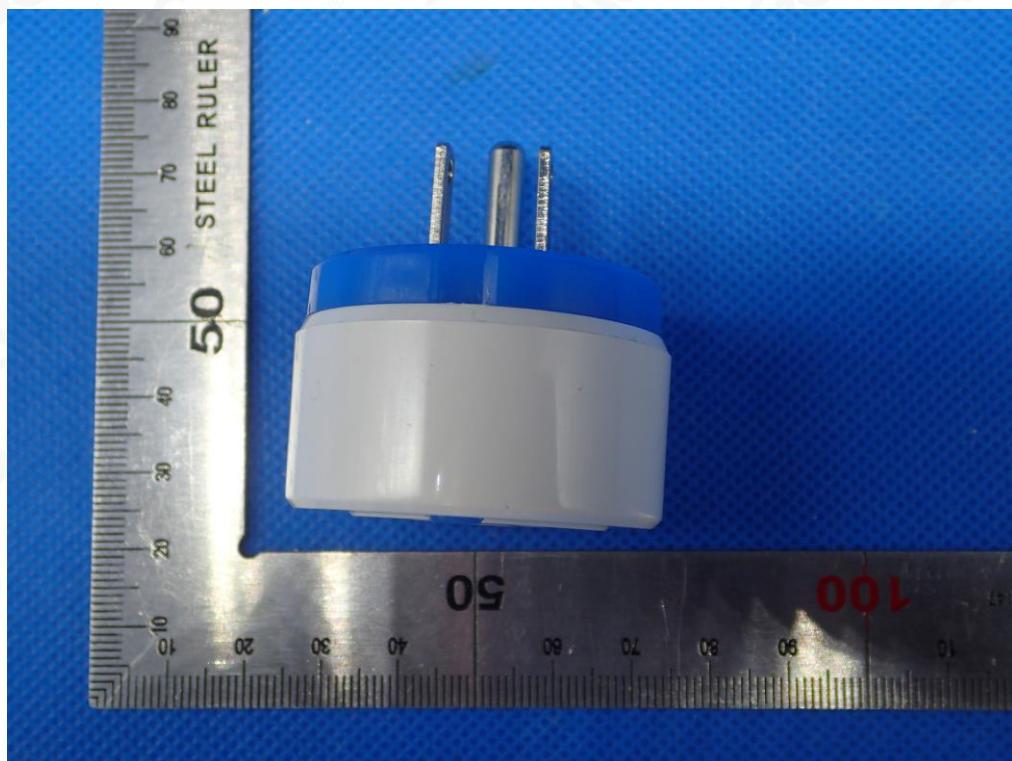
Attestation of Global Compliance(Shenzhen)Co.,Ltd.  
Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,  
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China  
Tel: +86-755 2523 4088      E-mail: agc@agc-cert.com      Service Hotline: 400 089 2118

**APPENDIX B: PHOTOGRAPHS OF EUT**  
**TOP VIEW OF EUT****BOTTOM VIEW OF EUT**

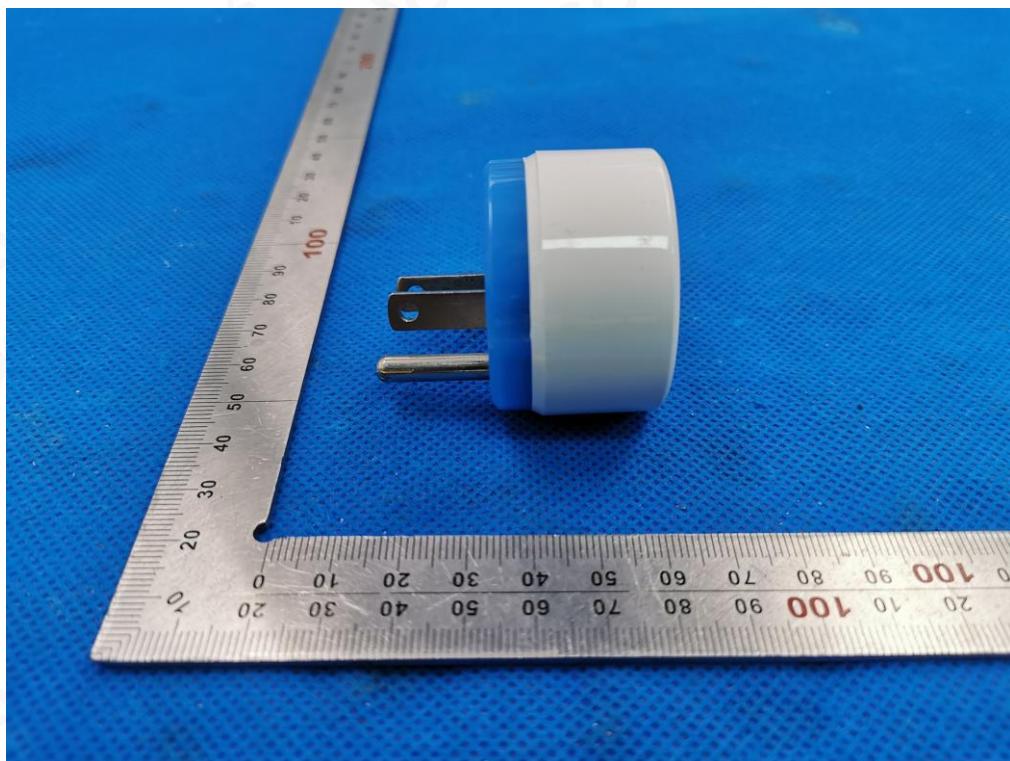
FRONT VIEW OF EUT



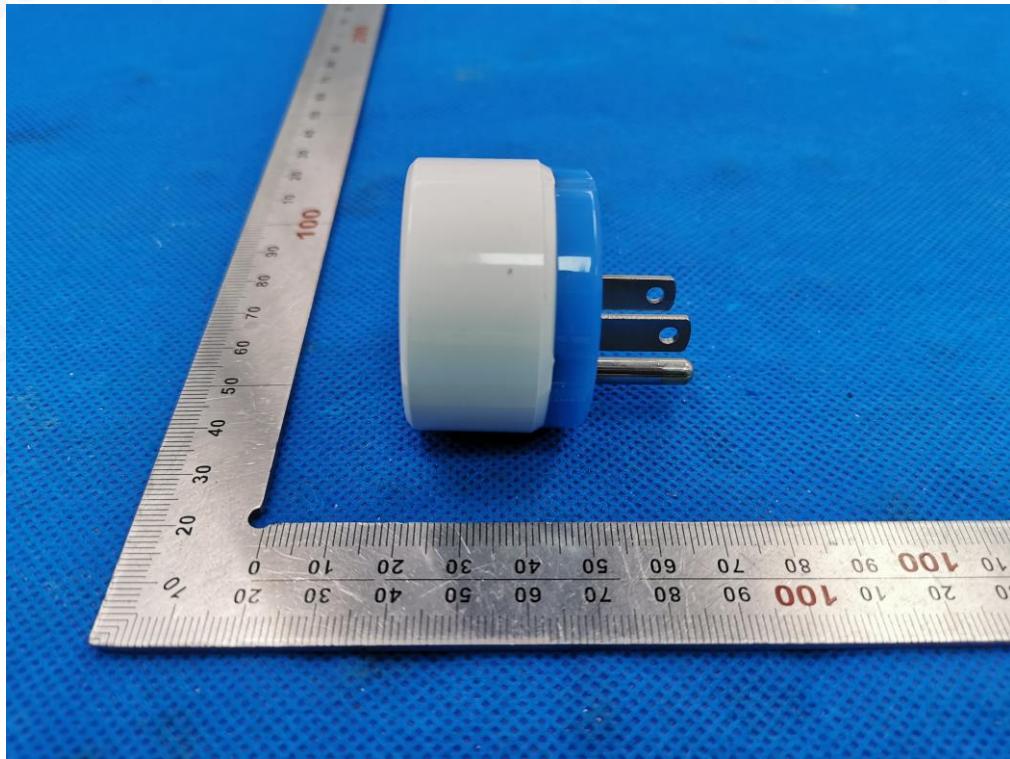
BACK VIEW OF EUT



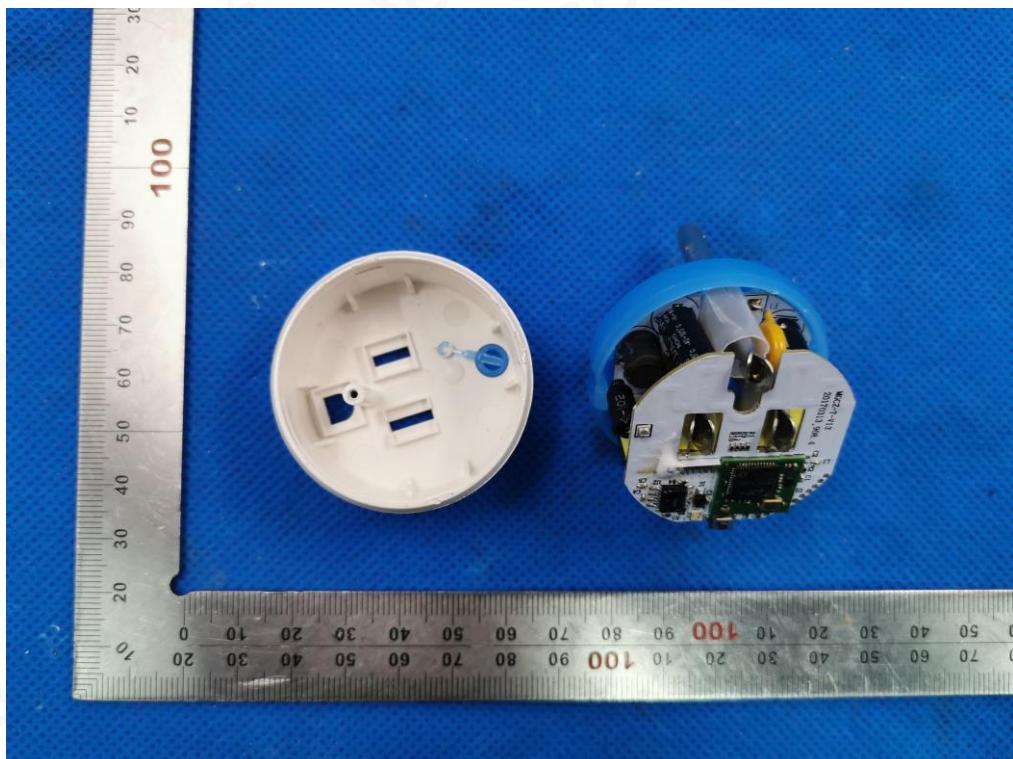
LEFT VIEW OF EUT



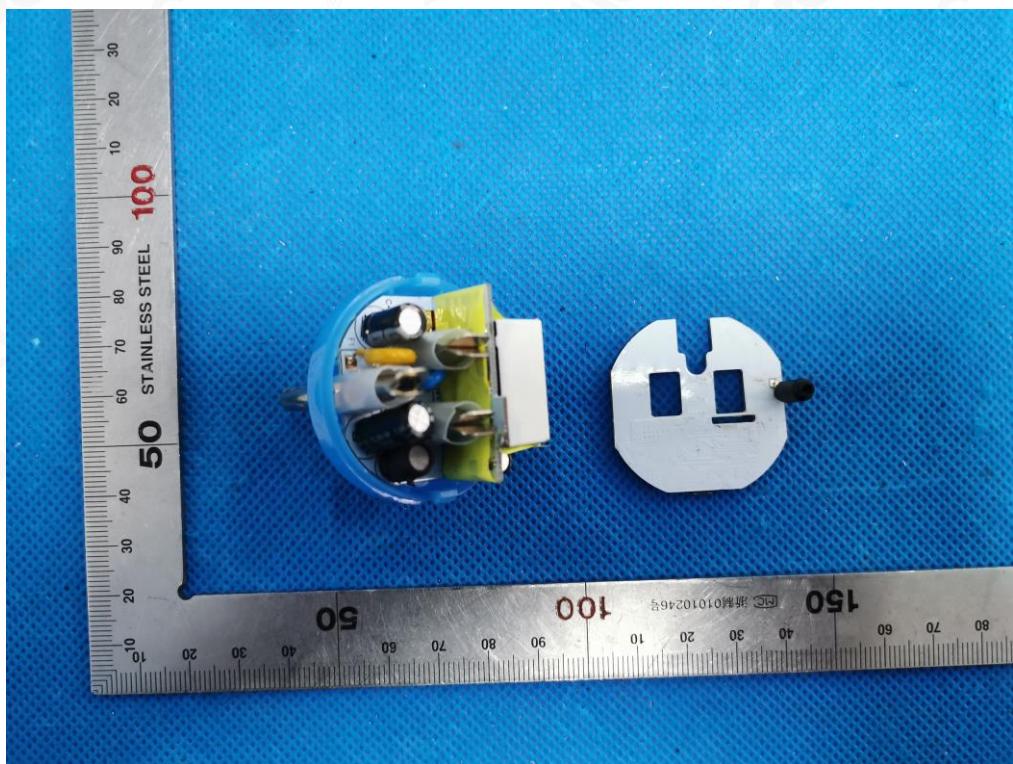
RIGHT VIEW OF EUT



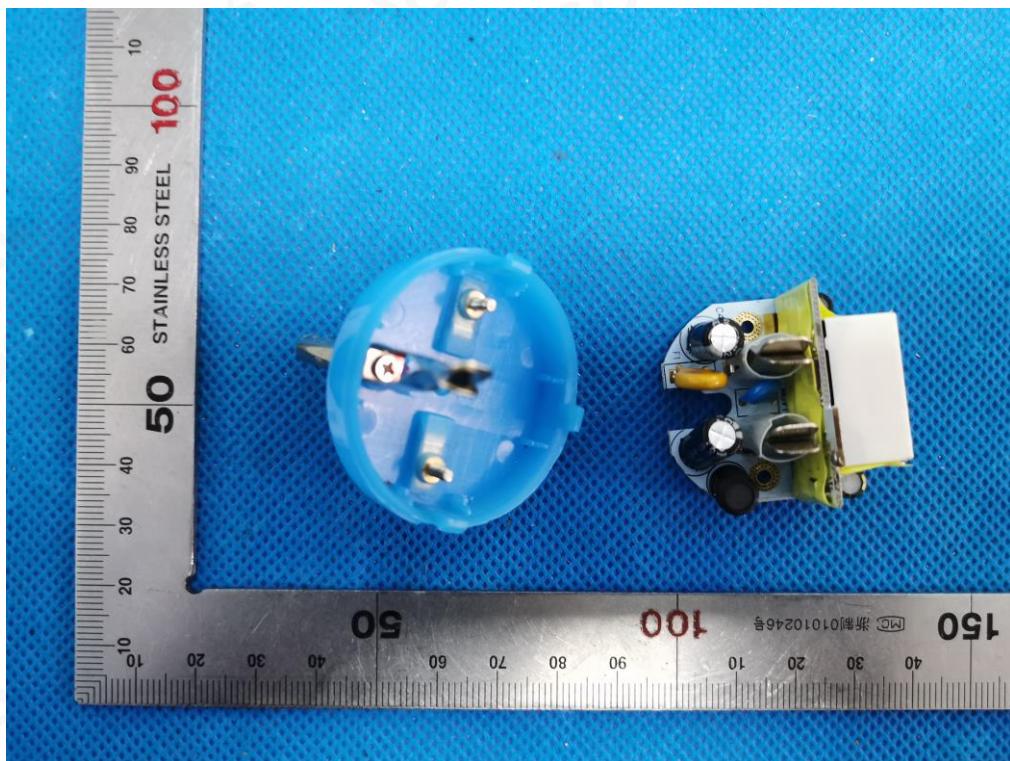
## OPEN VIEW OF EUT (FIGURE 1)



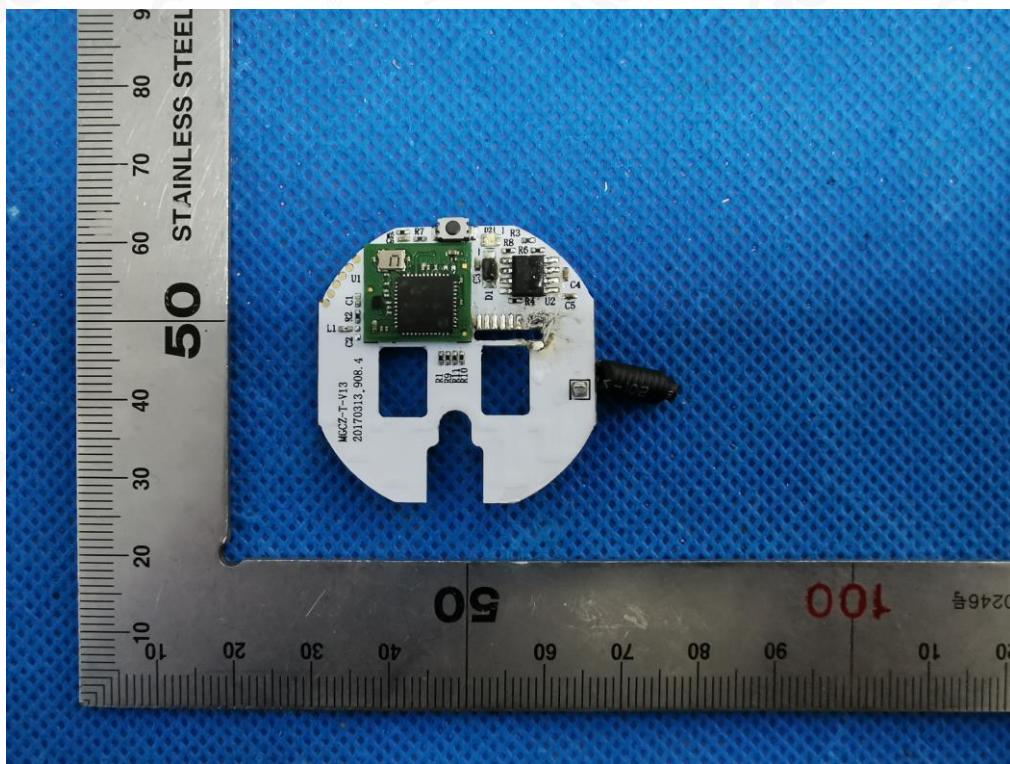
## OPEN VIEW OF EUT (FIGURE 2)



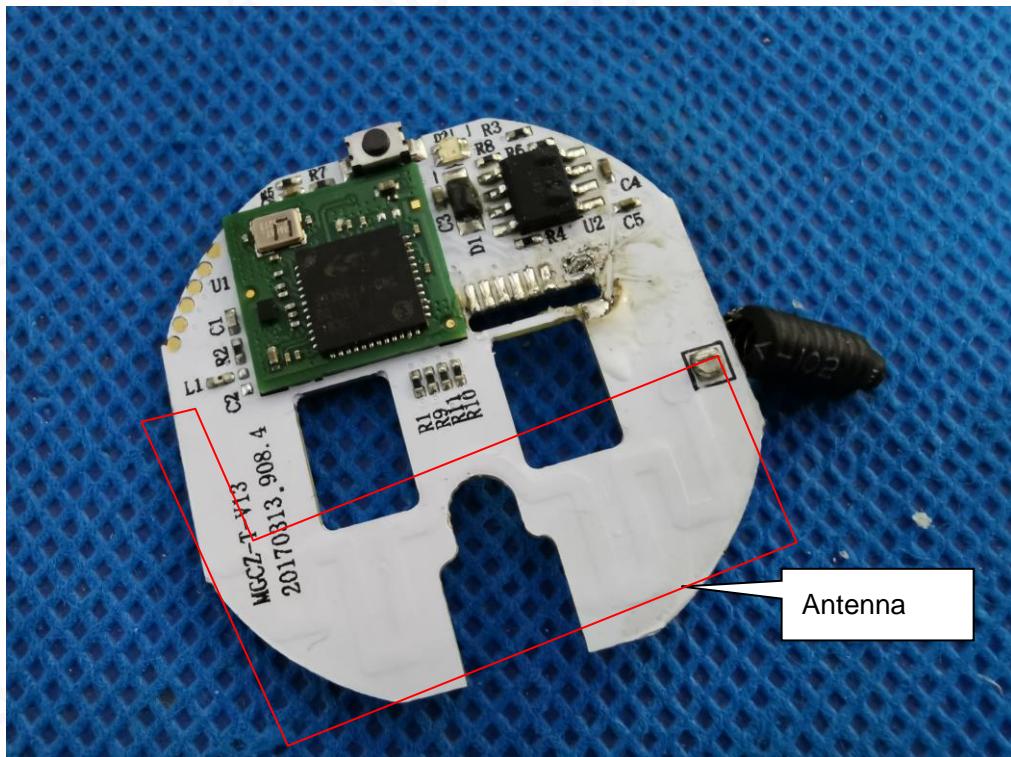
## OPEN VIEW OF EUT (FIGURE 3)



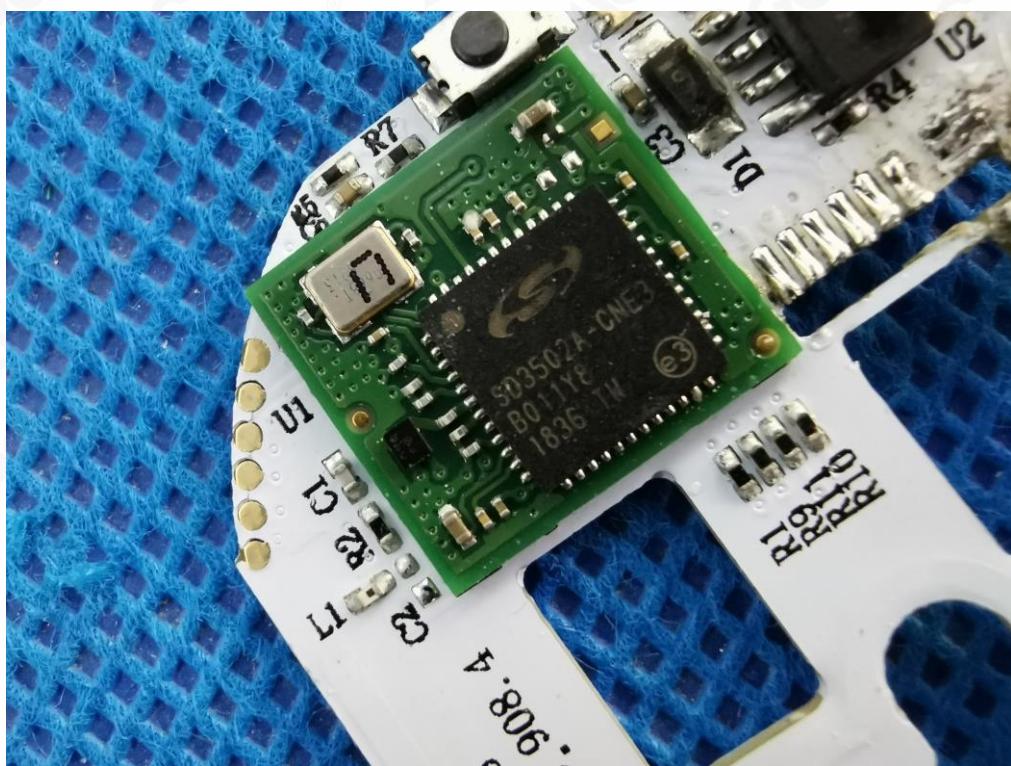
## INTERNAL VIEW OF EUT (FIGURE 1)



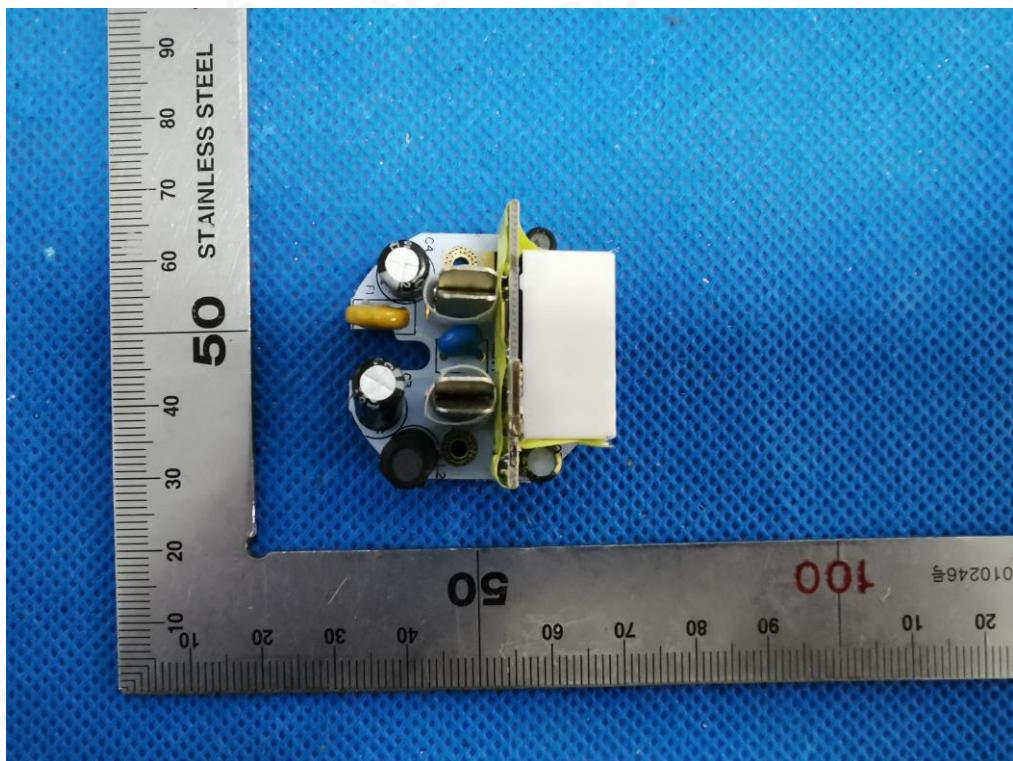
INTERNAL VIEW OF EUT (FIGURE 2)



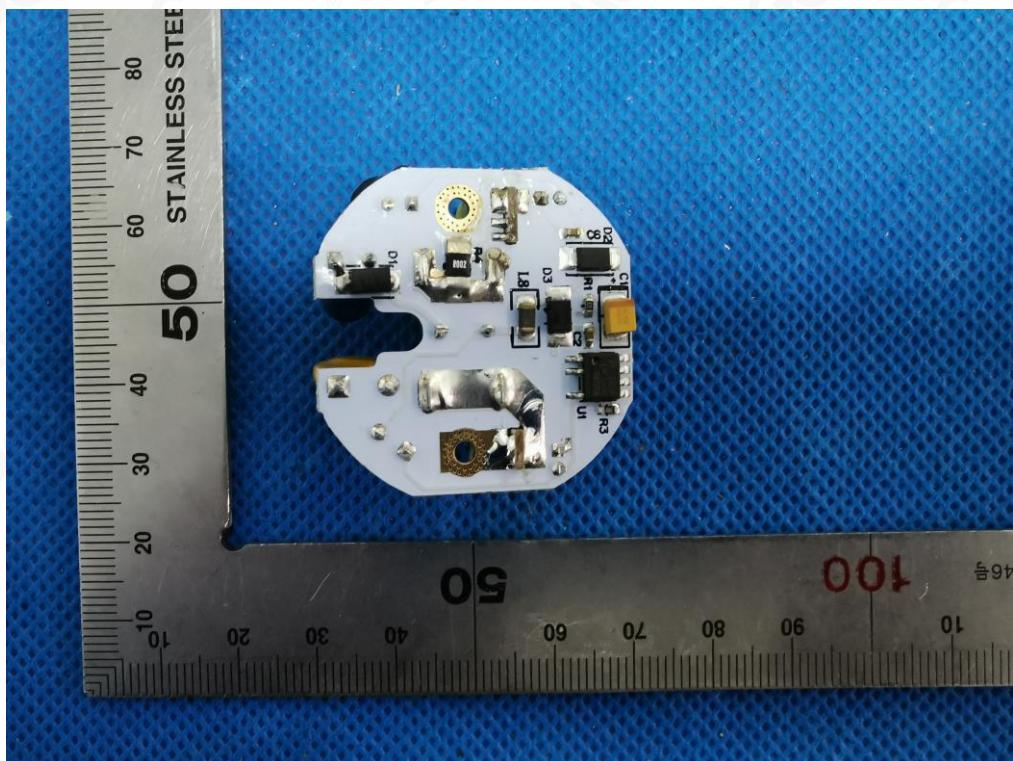
INTERNAL VIEW OF EUT (FIGURE 3)



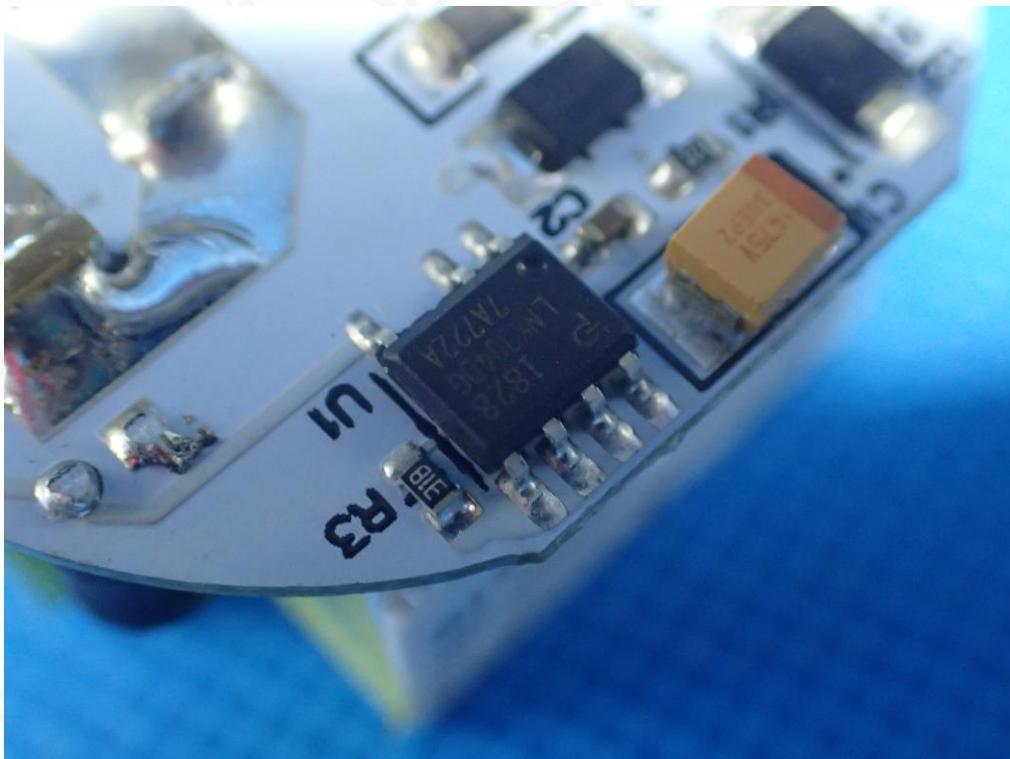
INTERNAL VIEW OF EUT (FIGURE 4)



INTERNAL VIEW OF EUT (FIGURE 5)



## INTERNAL VIEW OF EUT (FIGURE 6)

**----END OF REPORT----**

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