

---

# FCC Test Report

---

Report No.: AGC08360161101FE03

**FCC ID** : 2AF63EZI  
**APPLICATION PURPOSE** : Original Equipment  
**PRODUCT DESIGNATION** : EZI, STD  
**BRAND NAME** : NEOSEN  
**MODEL NAME** : NEO02013132EZI, NEO02013132STD  
**CLIENT** : NEOSEN ENERGY  
**DATE OF ISSUE** : Dec. 21, 2016  
**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.



### Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Dec. 21, 2016	Valid	Original Report

## 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
<b>3. MEASUREMENT UNCERTAINTY.....</b>	<b>6</b>
<b>4. DESCRIPTION OF TEST MODES.....</b>	<b>6</b>
<b>5. SYSTEM TEST CONFIGURATION .....</b>	<b>7</b>
5.1. CONFIGURATION OF EUT SYSTEM.....	7
5.2. EQUIPMENT USED IN EUT SYSTEM.....	7
5.3. SUMMARY OF TEST RESULTS .....	7
<b>6. TEST FACILITY.....</b>	<b>8</b>
<b>7. RADIATED EMISSION.....</b>	<b>9</b>
7.1 TEST LIMIT .....	9
7.2. MEASUREMENT PROCEDURE.....	10
7.3. TEST SETUP .....	12
7.4. TEST RESULT .....	13
<b>8. 20DB BANDWIDTH .....</b>	<b>16</b>
8.1. MEASUREMENT PROCEDURE.....	16
8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION).....	16
8.3. MEASUREMENT RESULTS .....	17
<b>9. FCC LINE CONDUCTED EMISSION TEST .....</b>	<b>18</b>
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
<b>APPENDIX A: PHOTOGRAPHS OF TEST SETUP.....</b>	<b>22</b>
<b>APPENDIX B: PHOTOGRAPHS OF EUT .....</b>	<b>24</b>

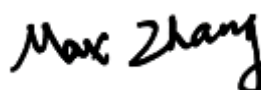
## 1. VERIFICATION OF CONFORMITY

<b>Applicant</b>	NEOSEN ENERGY
<b>Address</b>	1506 CAPITAL AVE., SUITE 150, PLANO TX 75074
<b>Manufacturer</b>	SUGA ELECTRONICS (DONGGUAN) COMPANY LIMITED
<b>Address</b>	SUGA HIGH TECH IND PARK, 8 FULONG ROAD, SANZHONG, QINGXI TOWN, DONGGUAN, GUANGDONG
<b>Product Designation</b>	EZI, STD
<b>Brand Name</b>	NEOSEN
<b>Test Model</b>	NEO02013132EZI
<b>Series Model</b>	NEO02013132STD
<b>Model Difference</b>	All are the same except the appearance and model name.
<b>Date of test</b>	Dec. 12, 2016 to Dec. 21, 2016
<b>Deviation</b>	None
<b>Condition of Test Sample</b>	Normal
<b>Test Result</b>	Pass
<b>Report Template</b>	AGCRT-US-BR/RF

We hereby certify that:

The above equipment was tested by Dongguan Precise Testing Service 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.

Tested by



Max Zhang(Zhang Yi)

Dec. 21, 2016

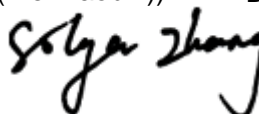
Reviewed by



Bart Xie(Xie Xiaobin)

Dec. 21, 2016

Approved by



Solger Zhang(Zhang Hongyi)

Dec. 21, 2016

Authorized Officer

## 2. GENERAL INFORMATION

### 2.1. PRODUCT DESCRIPTION

A major technical description of EUT is described as following

<b>Operation Frequency</b>	119.8kHz
<b>Maximum field strength</b>	54.22dBuV/m(AV)@3m
<b>Modulation</b>	FSK
<b>Number of channels</b>	1
<b>Antenna Gain</b>	0dBi
<b>Antenna Designation</b>	Integrated Antenna (Met 15.203 Antenna requirement)
<b>Hardware Version</b>	1.0
<b>Software Version</b>	0.64
<b>Power Supply</b>	DC 19V by adapter

Note: The Micro USB is only used for update the software.

### 3. MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 3.18\text{dB}$
2	All emissions, radiated	$\pm 3.91\text{dB}$
3	Temperature	$\pm 0.5^\circ\text{C}$
4	Humidity	$\pm 2\%$

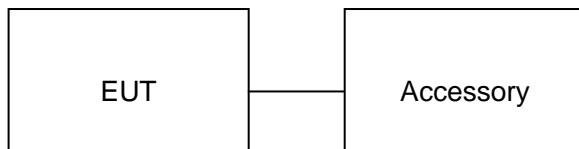
### 4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Normal Working Mode
Note: 1. For Radiated Emission, 3axis were chosen for testing for each applicable mode.	

## 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	EZI	NEO02013132EZI	2AF63EZI	EUT
2	Adapter	SND1901350P2	AC100-240V 50/60Hz DC 19V/1.35A	Support

### 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

<b>Site</b>	Dongguan Precise Testing Service Co., Ltd.
<b>Location</b>	Building D, Baoding Technology Park, Guangming Road2, Dongcheng District, Dongguan, Guangdong, China.
<b>FCC Registration No.</b>	371540
<b>Description</b>	The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2014.

### ALL TEST EQUIPMENT LIST

Radiated Emission Test Site					
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
EMI Test Receiver	Rohde & Schwarz	ESCI	101417	July 3, 2016	July 2, 2017
Trilog Broadband Antenna (25M-1GHz)	SCHWARZBECK	VULB9160	9160-3355	July 3, 2016	July 2, 2017
Signal Amplifier	SCHWARZBECK	BBV 9475	9745-0013	July 3, 2016	July 2, 2017
RF Cable	SCHWARZBECK	AK9515E	96221	July 3, 2016	July 2, 2017
3m Anechoic Chamber	CHENGYU	966	PTS-001	June 3, 2016	June 2, 2017
MULTI-DEVICE Positioning Controller	Max-Full	MF-7802	MF780208339	N/A	N/A
Active loop antenna (9K-30MHz)	Schwarzbeck	FMZB1519	1519-038	June 3, 2016	June 2, 2017
Spectrum analyzer	Agilent	E4407B	MY46185649	June 3, 2016	June 2, 2017

Conducted Emission Test Site					
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
EMI Test Receiver	Rohde & Schwarz	ESCI	101417	July 3, 2016	July 2, 2017
Artificial Mains Network	Narda	L2-16B	000WX31025	July 3, 2016	July 2, 2017
Artificial Mains Network (AUX)	Narda	L2-16B	000WX31026	July 3, 2016	July 2, 2017
RF Cable	SCHWARZBECK	AK9515E	96222	July 3, 2016	July 2, 2017
Shielded Room	CHENGYU	843	PTS-002	June 3, 2016	June 2, 2017



## 7. RADIATED EMISSION

### 7.1 TEST LIMIT

Standard FCC 15.209

Frequency (MHz)	Distance Meters	Field Strengths Limit	
		μ V/m	dB(μV)/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(μV)/m (Peak) 54.0 dB(μV)/m (Average)	
Remark: (1) Emission level dBμ 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.			

## 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. For emissions above 1GHz, use 1MHz VBW and 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.

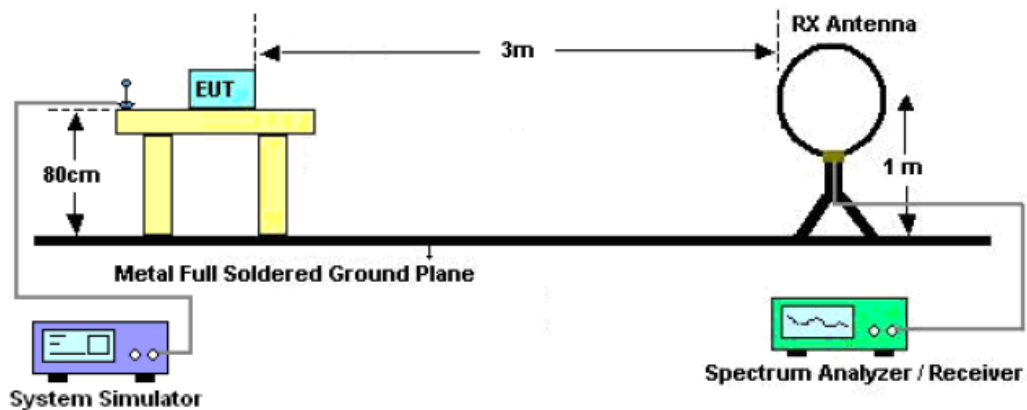
The following table is the setting of spectrum analyzer and receiver.

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
Start ~Stop Frequency	1GHz~26.5GHz 1MHz/1MHz for Peak, 1MHz/10Hz for Average

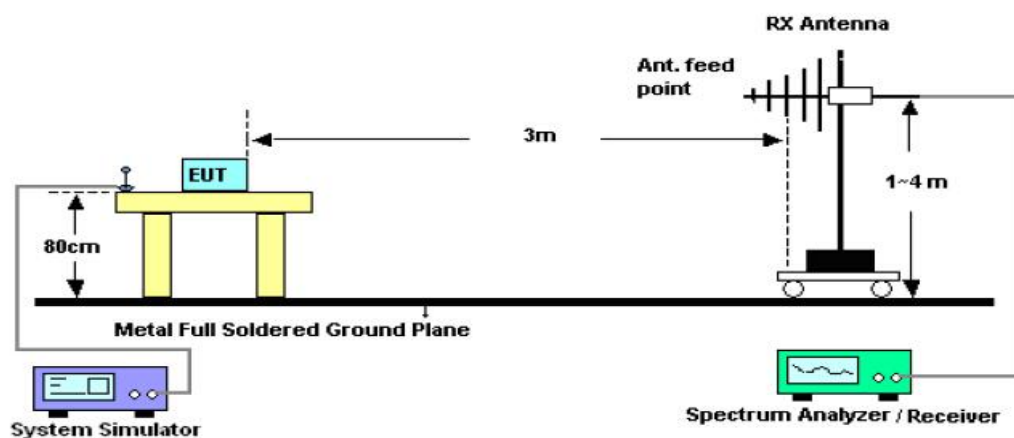
Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

### 7.3. TEST SETUP

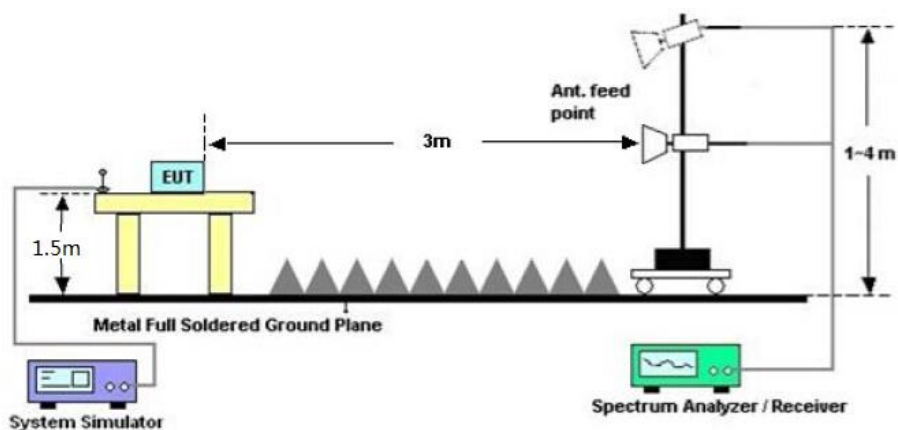
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



## 7.4. TEST RESULT

### RADIATED EMISSION BELOW 30MHZ

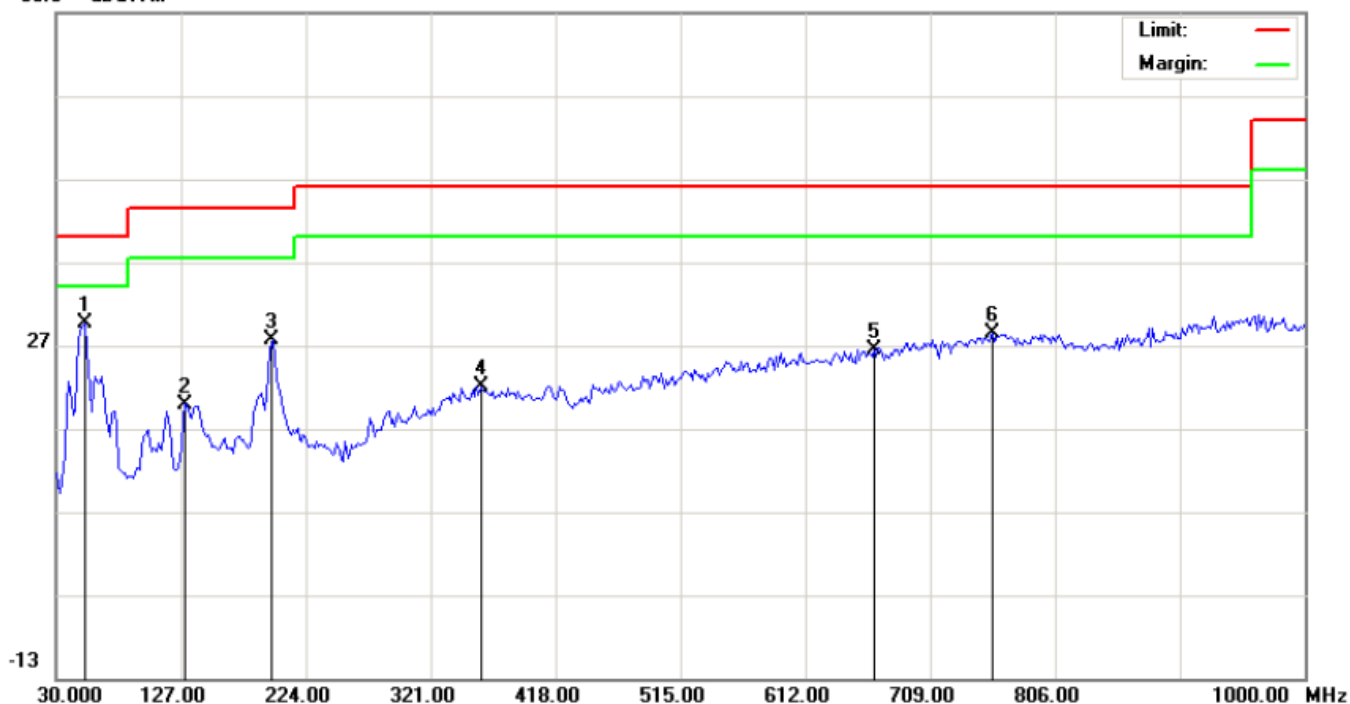
Frequency MHz	Polarization	Reading dB(uV) PK	Factor dB (1/m)	Level dB(uV/m) PK	Limit dB(uV/m) PK	Margin dB	Pass/Fail
0.1198	Face	43.82	10.40	54.22	66.03	11.81	Pass
0.1198	Side	36.14	10.40	46.54	66.03	19.49	Pass

Note: No other emissions found between lowest internal used/generated frequencies to 30MHz.

### RADIATED EMISSION 30MHz- 1GHZ

EUT :	EZI	Model Name. :	NEO02013132EZI
Temperature :	20 °C	Relative Humidity:	48%
Pressure :	1010 hPa	Test Voltage :	DC19V
Test Mode :	Mode 1	Polarization :	Horizontal

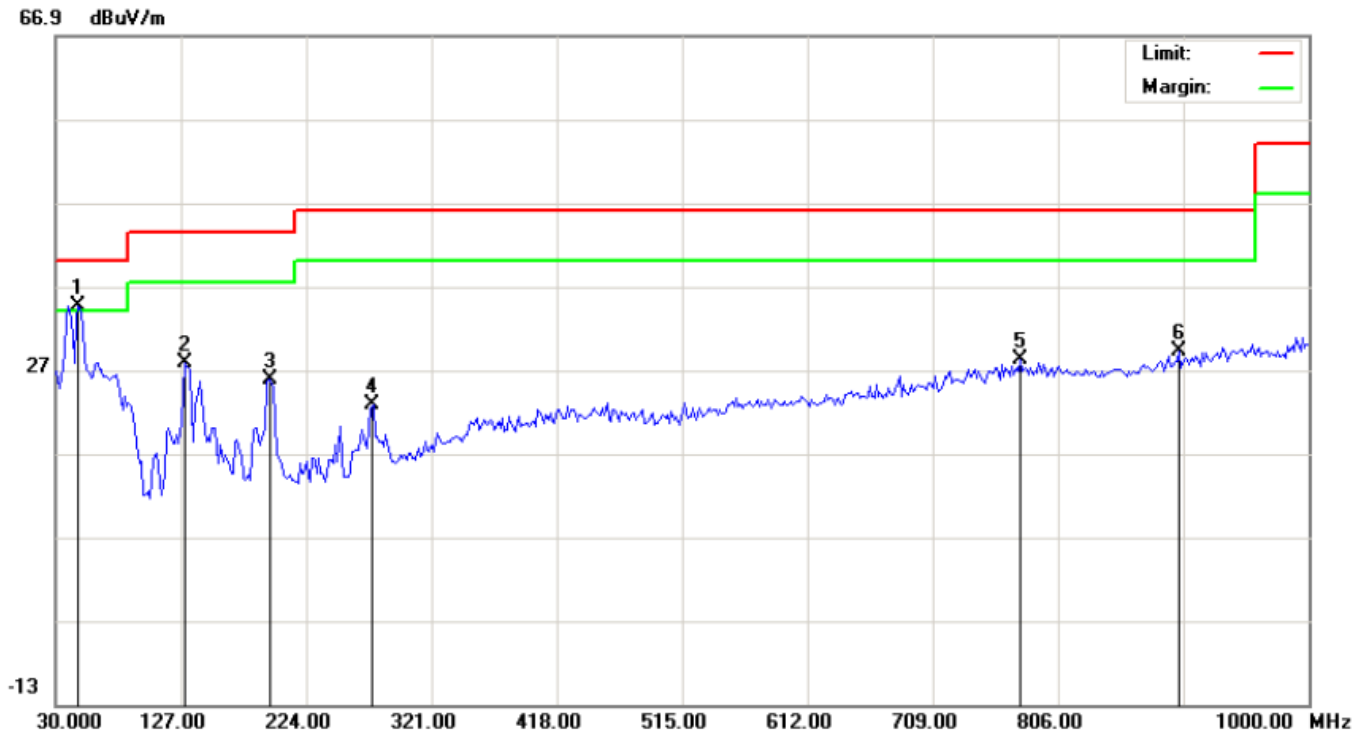
66.9 dBuV/m



No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	52.6332	21.12	8.41	29.53	40.00	-10.47	peak			
2		130.2332	9.26	10.64	19.90	43.50	-23.60	peak			
3		198.1331	15.78	11.91	27.69	43.50	-15.81	peak			
4		359.8000	3.23	18.80	22.03	46.00	-23.97	peak			
5		665.3500	2.09	24.26	26.35	46.00	-19.65	peak			
6		757.5000	1.74	26.73	28.47	46.00	-17.53	peak			

**RESULT: PASS**

EUT :	EZI	Model Name. :	NEO02013132EZI
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC19V
Test Mode :	Mode 1	Polarization :	Vertical



No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	47.7832	26.12	8.39	34.51	40.00	-5.49	peak			
2		130.2332	16.71	11.13	27.84	43.50	-15.66	peak			
3		196.5166	15.95	9.88	25.83	43.50	-17.67	peak			
4		275.7332	8.14	14.68	22.82	46.00	-23.18	peak			
5		776.8999	1.15	27.00	28.15	46.00	-17.85	peak			
6		899.7667	0.64	28.60	29.24	46.00	-16.76	peak			

**RESULT: PASS**

**Note:**

Factor=Antenna Factor + Cable loss, Margin=Result-Limit.

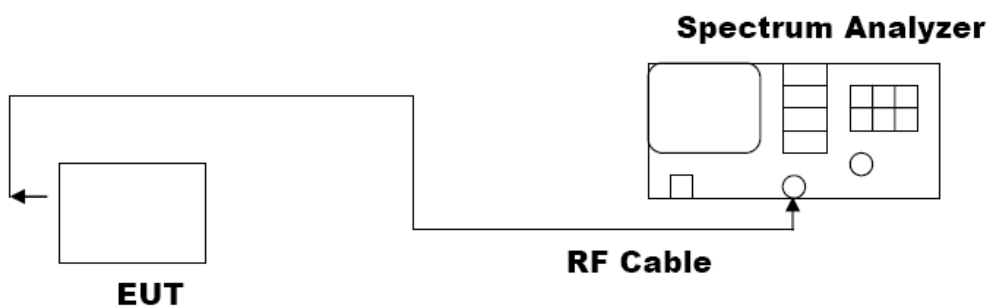
The “Factor” value can be calculated automatically by software of measurement system.

## 8. 20DB BANDWIDTH

### 8.1. 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 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)



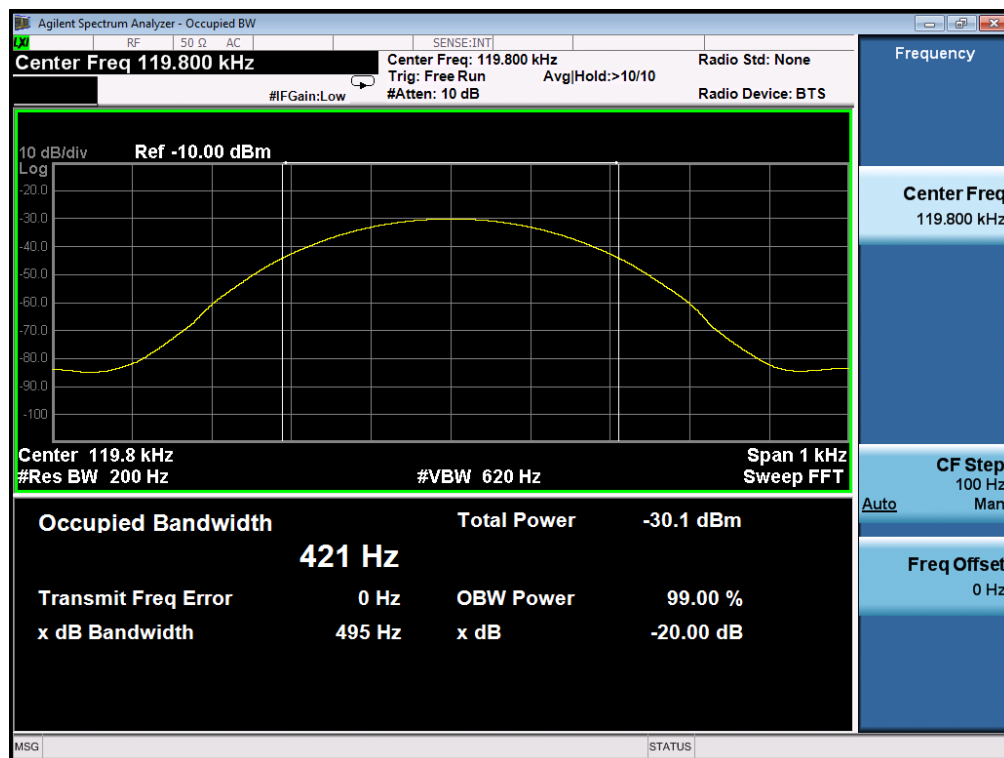


### 8.3. MEASUREMENT RESULTS

TEST ITEM	20DB BANDWIDTH
TEST MODULATION	FSK

Test Data (Hz)		Criteria
Operate Channel	421	PASS

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



9. FCC LINE CONDUCTED EMISSION TEST

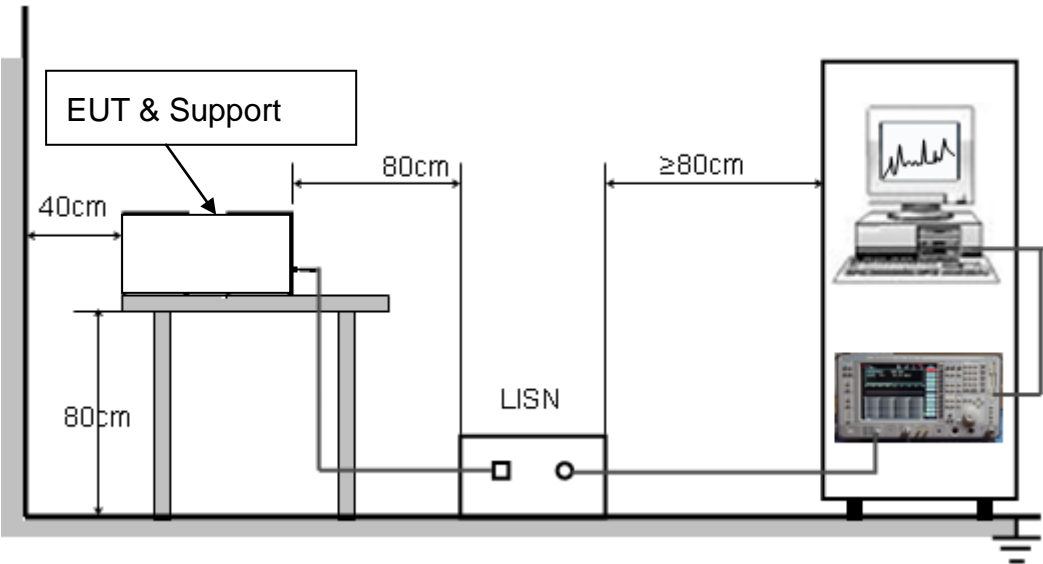
9.1. LIMITS OF LINE CONDUCTED EMISSION TEST

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.

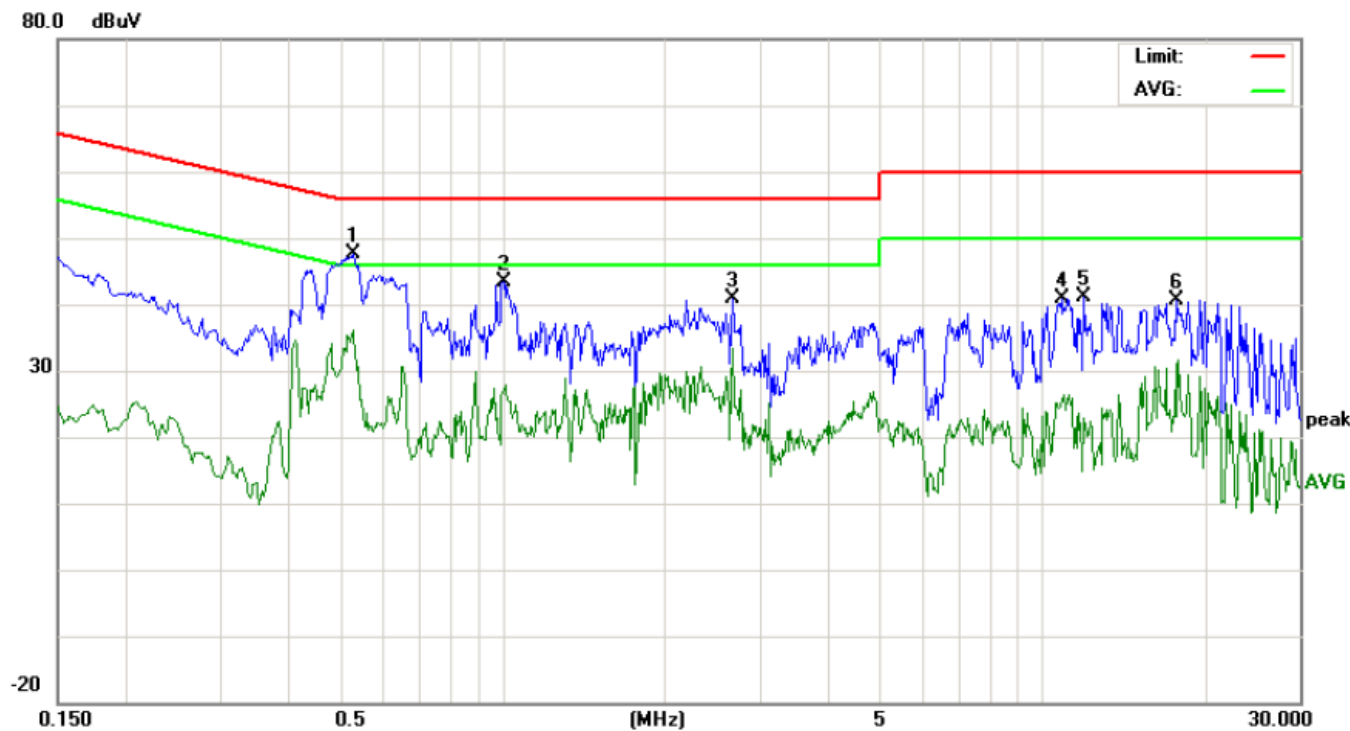
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

### **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.

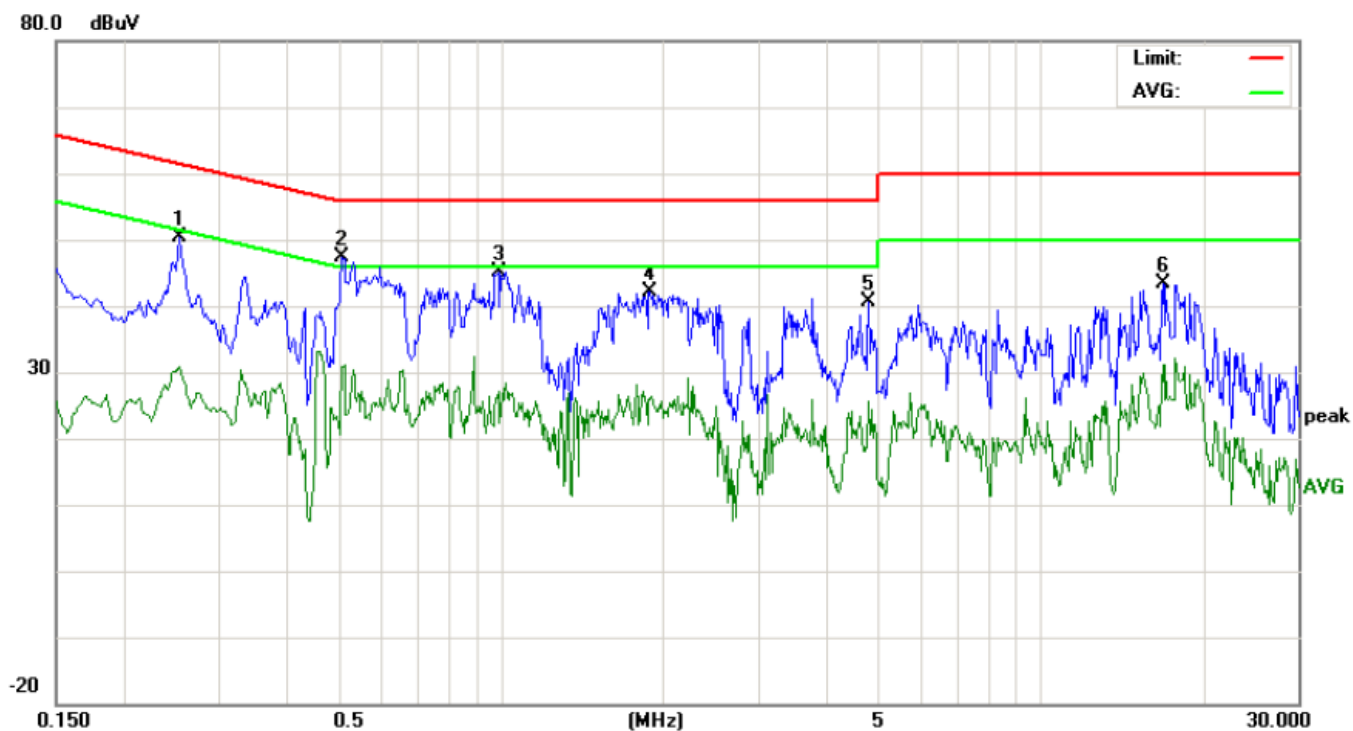
9.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

LINE CONDUCTED EMISSION TEST-L



No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor dB	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.5299	37.20		25.67	10.37	47.57		36.04	56.00	46.00	-8.43	-9.96	P	
2	1.0100	33.08		16.81	10.37	43.45		27.18	56.00	46.00	-12.55	-18.82	P	
3	2.6699	30.50		22.93	10.47	40.97		33.40	56.00	46.00	-15.03	-12.60	P	
4	10.8899	30.77		15.89	10.10	40.87		25.99	60.00	50.00	-19.13	-24.01	P	
5	11.9539	30.88		12.66	10.14	41.02		22.80	60.00	50.00	-18.98	-27.20	P	
6	17.7299	30.48		21.06	10.12	40.60		31.18	60.00	50.00	-19.40	-18.82	P	

# LINE CONDUCTED EMISSION TEST-N

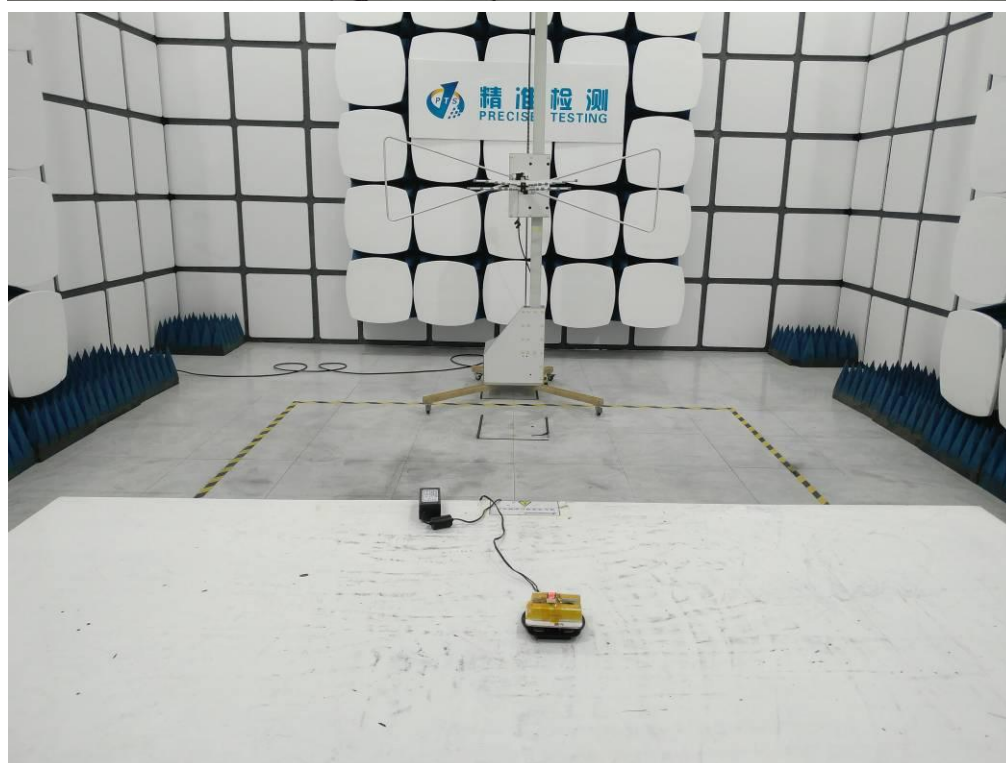
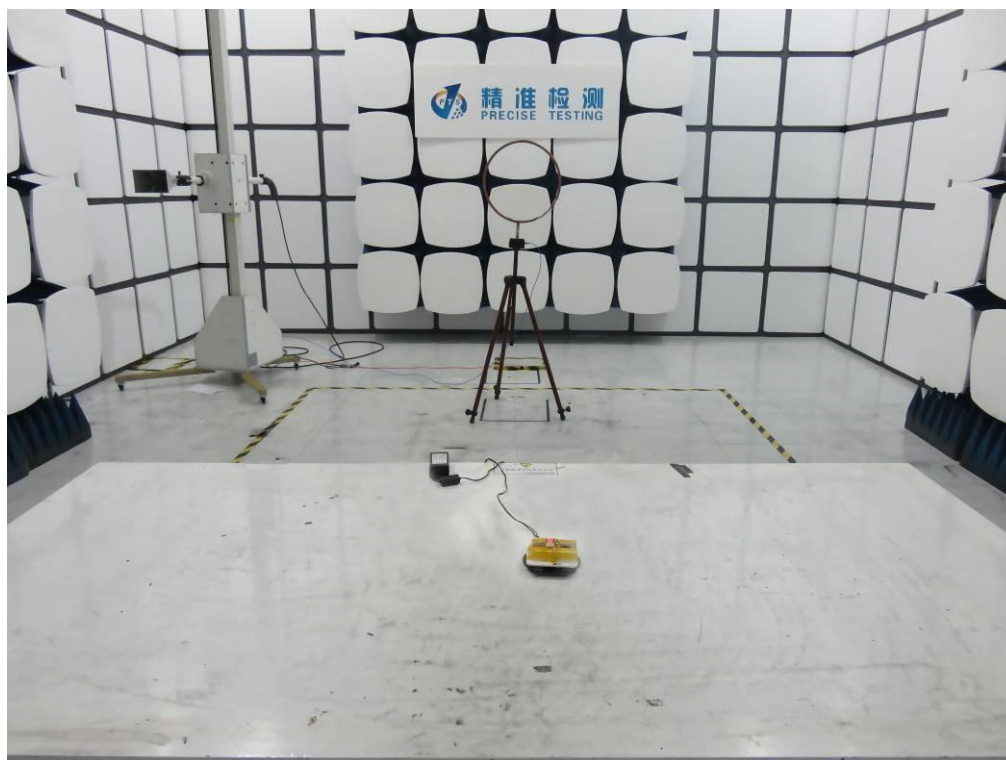


No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.2540	40.17		20.51	10.27	50.44		30.78	61.62	51.62	-11.18	-20.84	P	
2	0.5100	36.94		20.58	10.39	47.33		30.97	56.00	46.00	-8.67	-15.03	P	
3	0.9899	34.86		16.74	10.37	45.23		27.11	56.00	46.00	-10.77	-18.89	P	
4	1.8939	31.89		15.55	10.25	42.14		25.80	56.00	46.00	-13.86	-20.20	P	
5	4.8059	30.49		15.50	10.23	40.72		25.73	56.00	46.00	-15.28	-20.27	P	
6	16.8418	33.29		20.92	10.13	43.42		31.05	60.00	50.00	-16.58	-18.95	P	

RESULT: PASS

## APPENDIX A: PHOTOGRAPHS OF TEST SETUP

### FCC RADIATED EMISSION TEST SETUP BELOW 1GHZ



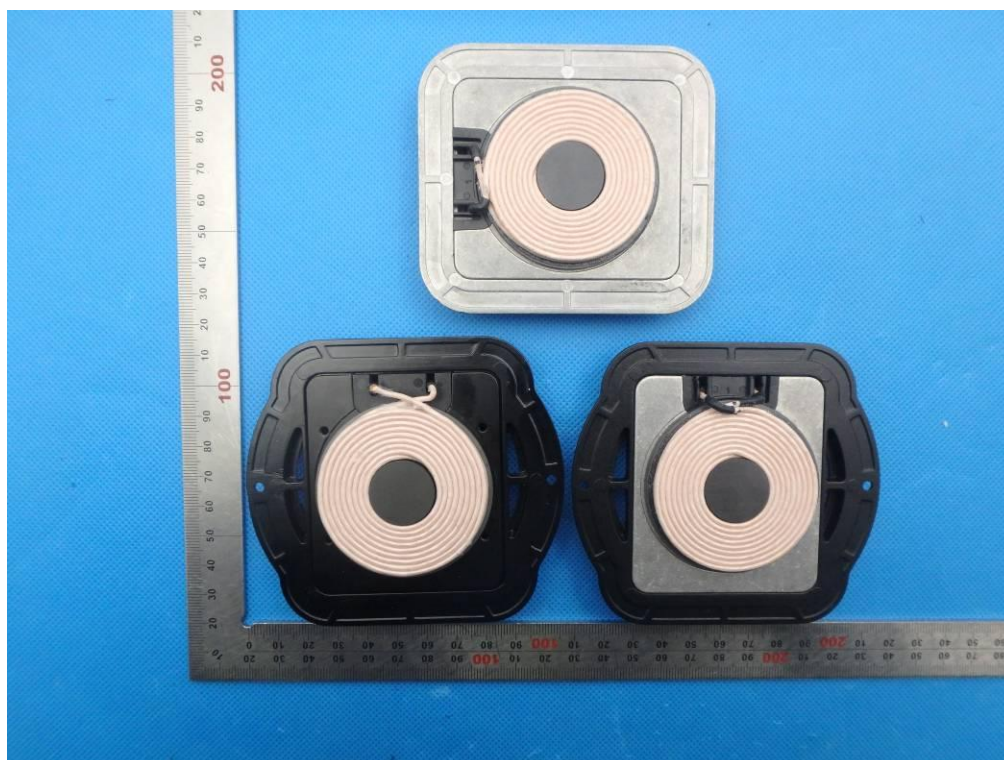
### FCC LINE CONDUCTED EMISSION TEST SETUP



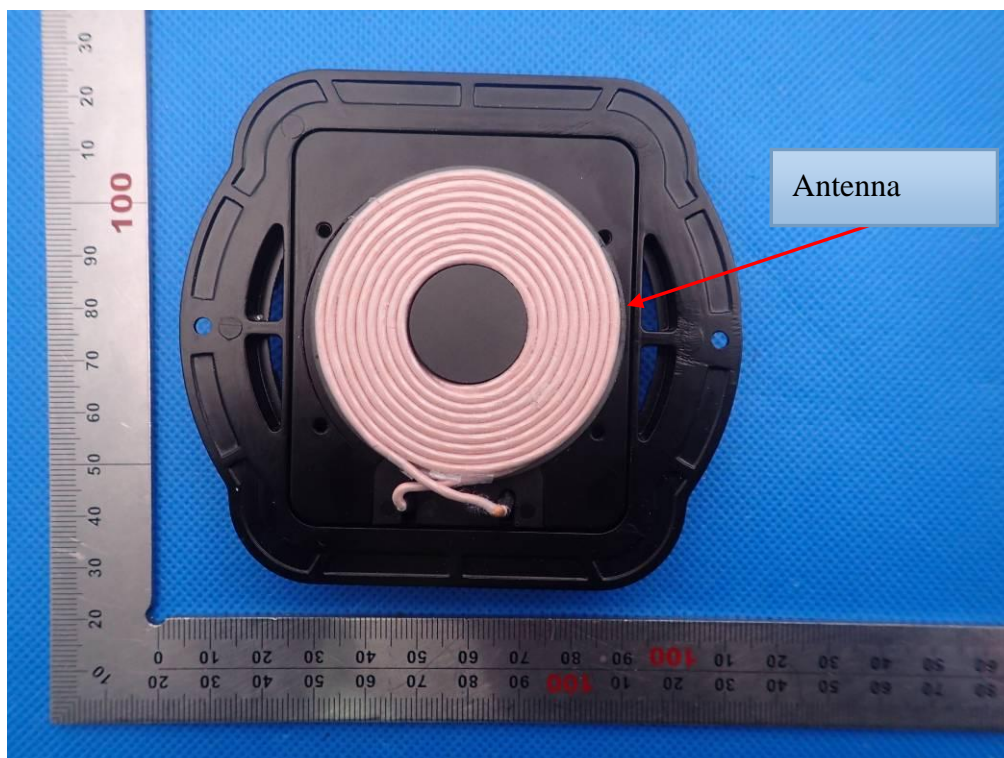


## APPENDIX B: PHOTOGRAPHS OF EUT

### ALL VIEW OF EUT

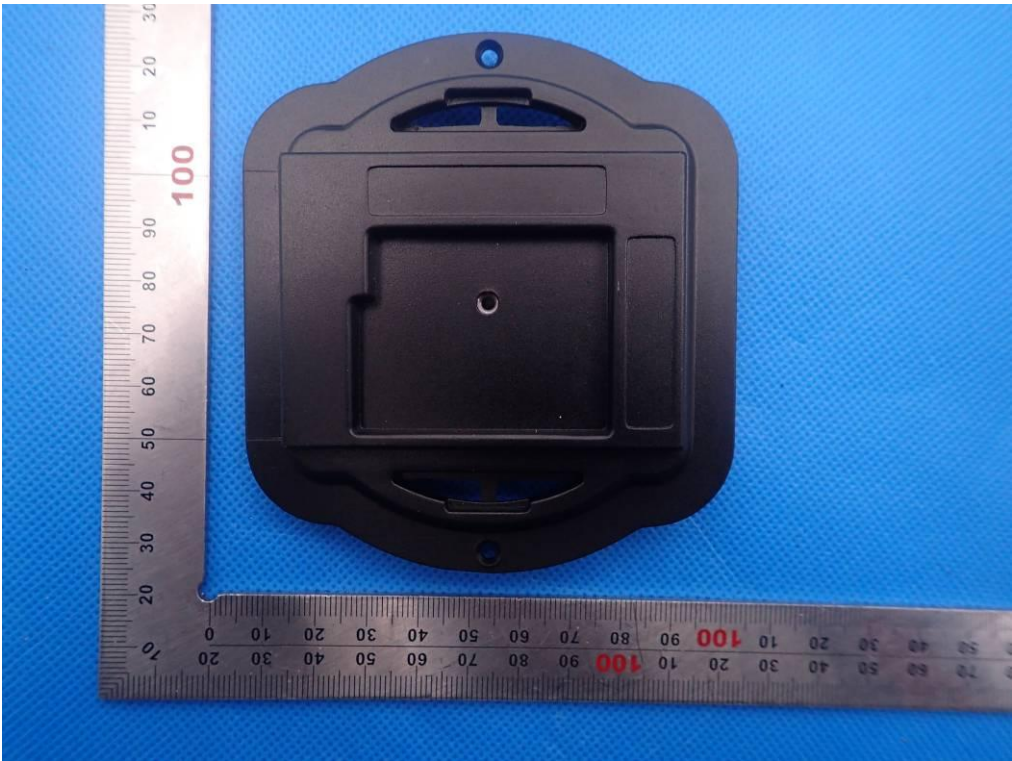


### TOP VIEW OF EUT

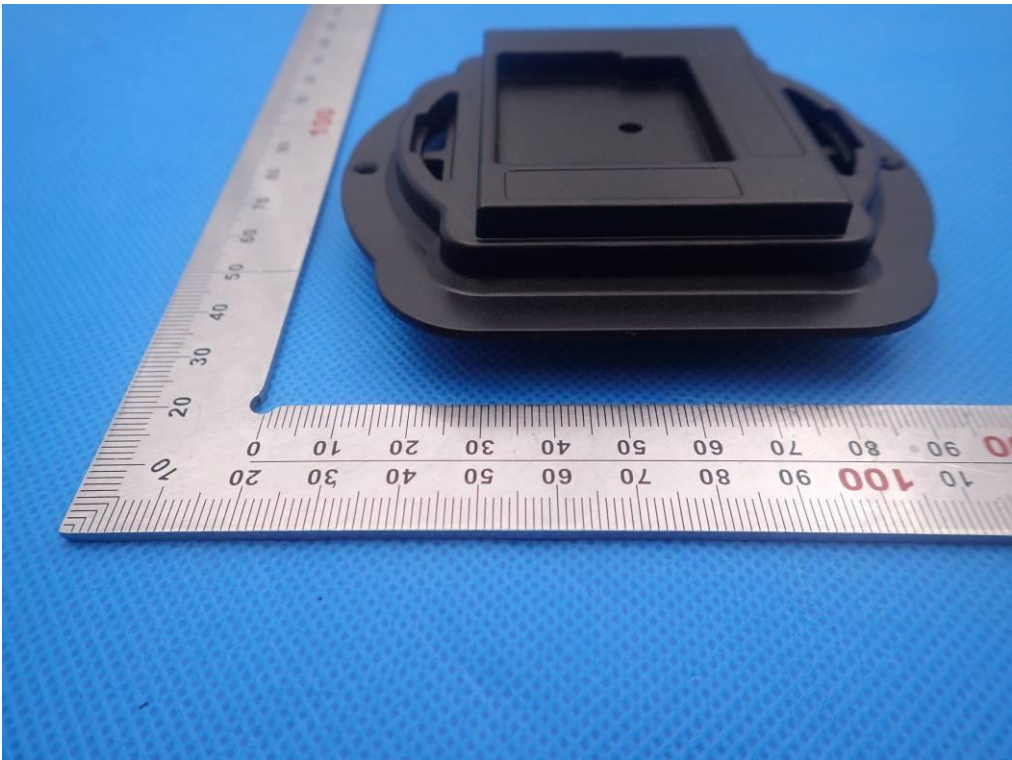




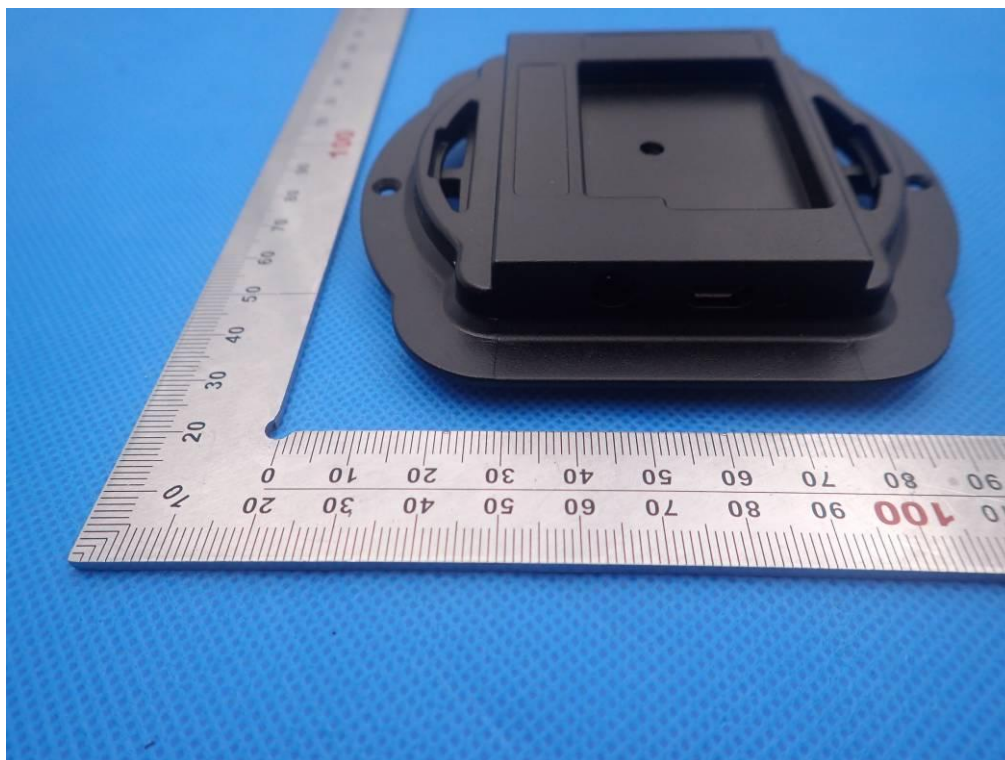
BOTTOM VIEW OF EUT



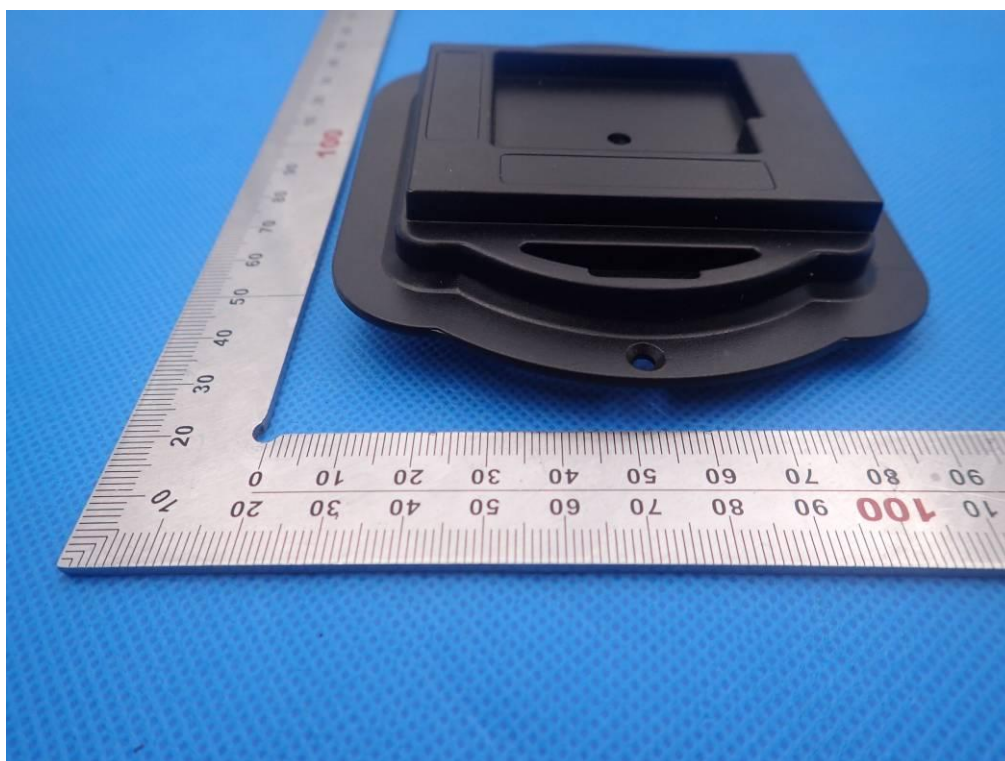
FRONT VIEW OF EUT



BACK VIEW OF EUT

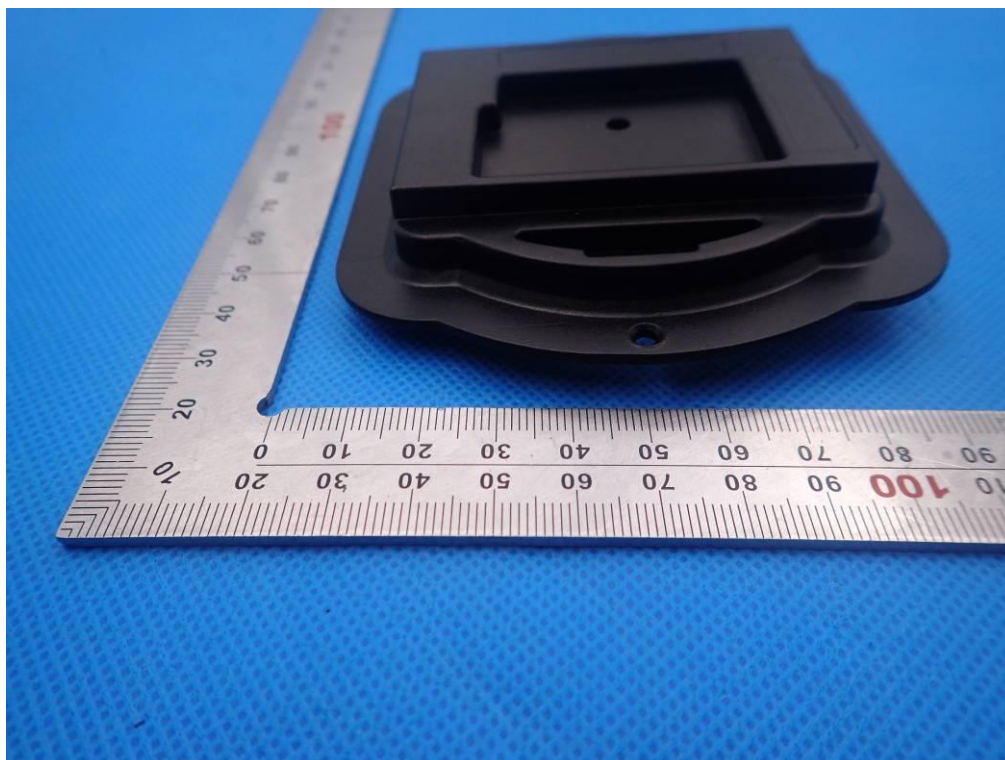


LEFT VIEW OF EUT

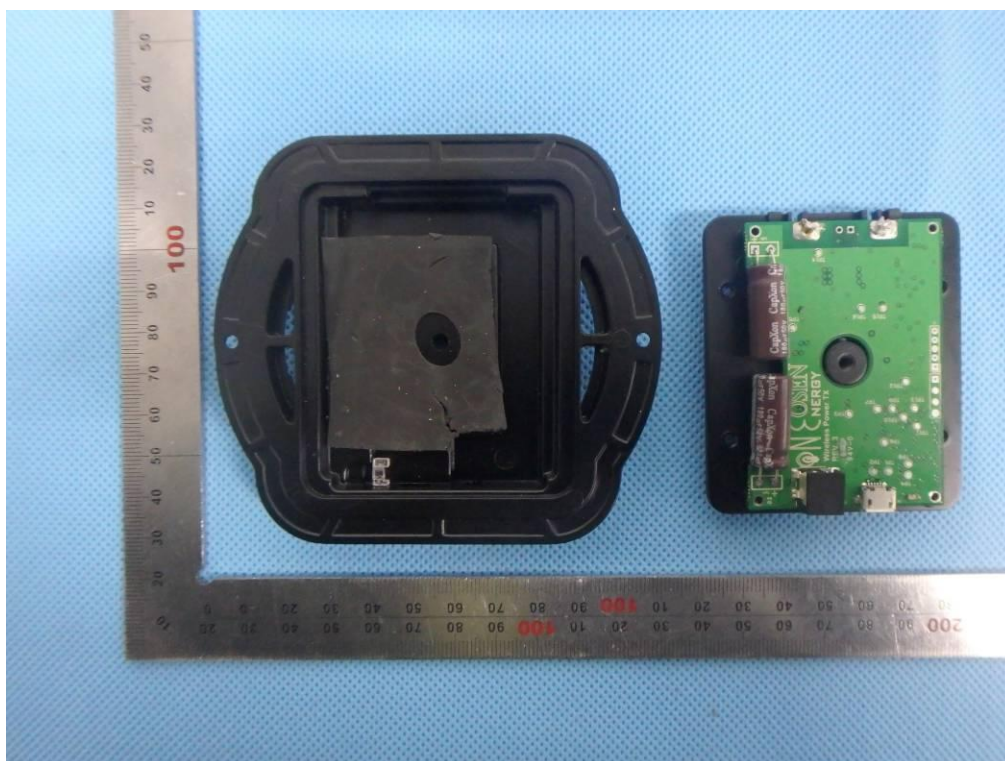




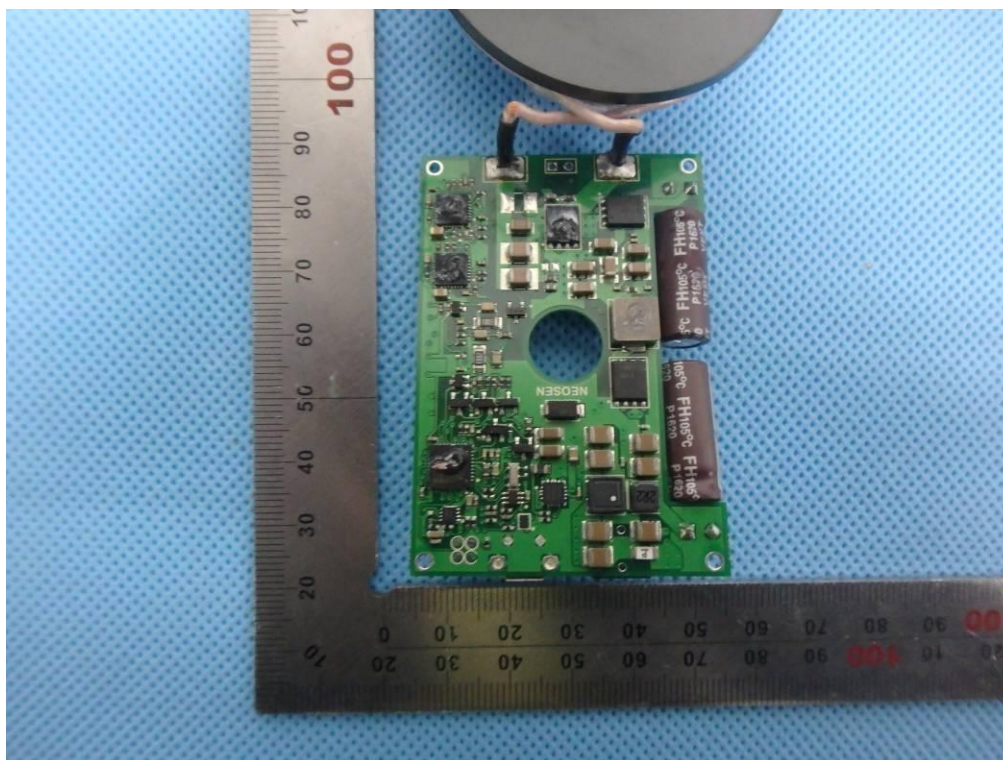
RIGHT VIEW OF EUT



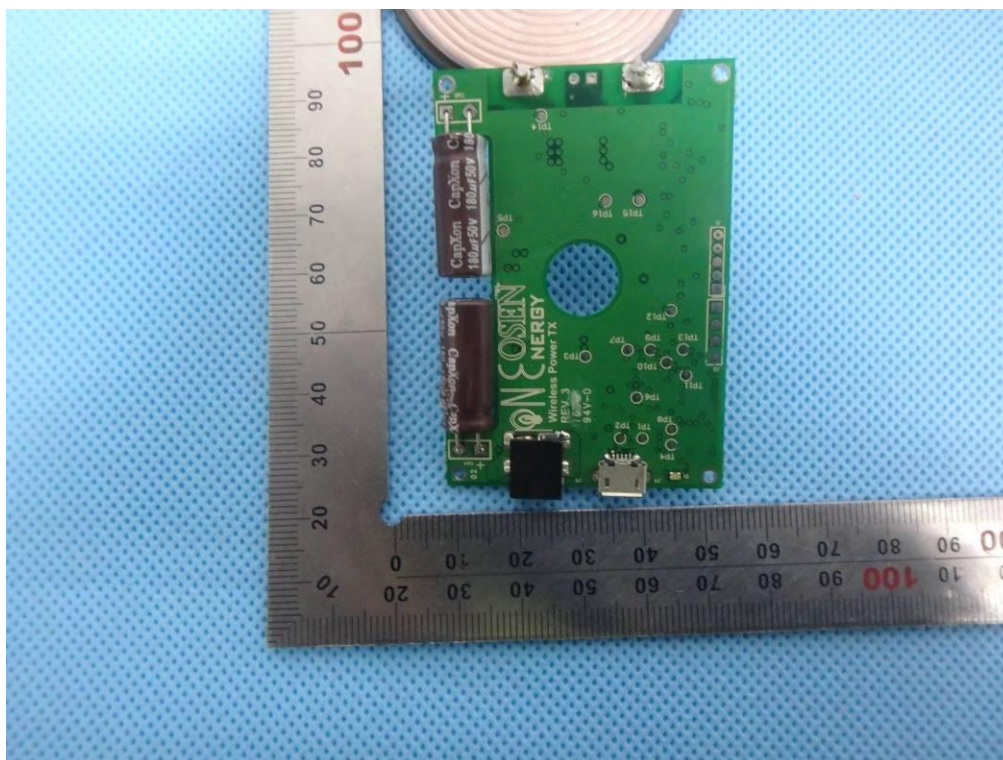
OPEN VIEW OF EUT



INTERNAL VIEW OF EUT-1



INTERNAL VIEW OF EUT-2



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