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# FCC Test Report

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Report No.: AGC04844151101FE03

**FCC ID** : 2AFHPF2-F6-F3-F4-F5  
**APPLICATION PURPOSE** : Original Equipment  
**PRODUCT DESIGNATION** : IN-CAR FM TRANSMITTER  
**BRAND NAME** : AUKEY  
**MODEL NAME** : BT-F2, BT-F6, BT-F3, BT-F4, BT-F5  
**CLIENT** : Shenzhen Aukey E Business Co., Ltd.  
**DATE OF ISSUE** : Jan.4, 2016  
**STANDARD(S)** : FCC Part 15.239  
**REPORT VERSION** : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd



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### Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Jan.4, 2016	Valid	Original Report

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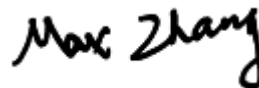
**1. VERIFICATION OF CONFORMITY**

<b>Applicant</b>	Shenzhen Aukey E Business Co., Ltd.
<b>Address</b>	Room 102 Bld P09, Huanan International Printing Paper Packing Logistics Zone, No.1 Huanan Rd, Pinghu Town, Longgang District ,Shenzhen City, Guangdong Province 518000, China
<b>Manufacturer</b>	SHENZHEN SURE THING INDUSTRY AND COMMERCE DEVELOPMENT CO., LTD.
<b>Address</b>	2-3F, Building A, Fuxinlin Industrial Park, Hangcheng Industrial Area, Xixiang Town, Baoan District, Shenzhen
<b>Product Designation</b>	IN-CAR FM TRANSMITTER
<b>Brand Name</b>	AUKEY
<b>Test Model</b>	BT-F2
<b>Series Model</b>	BT-F6, BT-F3, BT-F4, BT-F5
<b>Model Difference</b>	All the same except for the model name.
<b>Date of test</b>	Nov.23, 2015 to Nov.25, 2015
<b>Deviation</b>	None
<b>Condition of Test Sample</b>	Normal
<b>Report Template</b>	AGCRT-US-BR/RF (2013-03-01)

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 radiated emission limits of FCC part 15.239.

Tested by



Max Zhang(Zhang Yi)

Jan.4, 2016

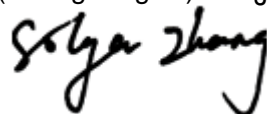
Reviewed by



Rock Hang(Huang Dinglue)

Jan.4, 2016

Approved by



Solger Zhang(Zhang Hongyi)  
Authorized Officer

Jan.4, 2016

## 2. GENERAL INFORMATION

### 2.1. PRODUCT DESCRIPTION

A major technical description of EUT is described as following

<b>Operation Frequency</b>	88.1MHz-107.9MHz
<b>Field Strength(3m)</b>	45.07dBuV/m(AV)@3m
<b>Modulation</b>	FM
<b>Number of channels</b>	199
<b>Hardware Version</b>	FMC01-V1.0
<b>Software Version</b>	HT6812-FMC01-V1.0
<b>Antenna Designation</b>	PCB antenna
<b>Power Supply</b>	DC5.0V by USB port

**NOTE:** 1. About the EUT, please refer to User's Manual.

2. The USB port of the EUT is only for power supply without data exchange.

3. The Operation frequency range is confirmed by Rock Huang.

### 3. MEASUREMENT UNCERTAINTY

Conducted measurement: +/- 3.18dB

Radiated measurement: +/- 3.91dB

### 4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Transmitting mode(Low channel)
2	Transmitting mode(Middle channel)
3	Transmitting mode(High channel)

Note:

1. All the requirements have been tested by modulating the transmitter with a 2.5 kHz tone at a level 16 dB higher than that required to produce a frequency deviation of 75 kHz.
2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
3. Only the result of the worst case was recorded in the report, if no other cases.

### 5. SYSTEM TEST CONFIGURATION

#### 5.1. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	IN-CAR FM TRANSMITTER	N/A	BT-F2	EUT
2	Adapter	N/A	JKY36-SP0502000	Support

Note: The adapter is provided by AGC lab.

#### 5.2. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
15.239	Field Strength of Fundamental and Spurious Emission	Compliant
15.215	Bandwidth	Compliant
15.209	Line 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 C63.4:2009.

### ALL TEST EQUIPMENT LIST

<b>Radiated Emission Test Site</b>					
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
EMI Test Receiver	Rohde & Schwarz	ESCI	101417	July 4, 2015	July 3, 2016
Trilog Broadband Antenna (25M-1GHz)	SCHWARZBECK	VULB9160	9160-3355	July 4, 2015	July 3, 2016
Signal Amplifier	SCHWARZBECK	BBV 9475	9745-0013	July 4, 2015	July 3, 2016
RF Cable	SCHWARZBECK	AK9515E	96221	July 4, 2015	July 3, 2016
3m Anechoic Chamber	CHENGYU	966	PTS-001	June 6, 2015	June 5, 2016
MULTI-DEVICE Positioning Controller	Max-Full	MF-7802	MF780208339	N/A	N/A
Active loop antenna (9K-30MHz)	Schwarzbeck	FMZB1519	1519-038	June 6, 2015	June 5, 2016

<b>Conducted Emission Test Site</b>					
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
EMI Test Receiver	Rohde & Schwarz	ESCI	101417	July 4, 2015	July 3, 2016
Artificial Mains Network	Narda	L2-16B	000WX31025	July 8, 2015	July 7, 2016
Artificial Mains Network (AUX)	Narda	L2-16B	000WX31026	July 8, 2015	July 7, 2016
RF Cable	SCHWARZBECK	AK9515E	96222	July 4, 2015	July 3, 2016
Shielded Room	CHENGYU	843	PTS-002	June 6,2015	June 5,2016

## 7. LINE CONDUCTED EMISSION TEST

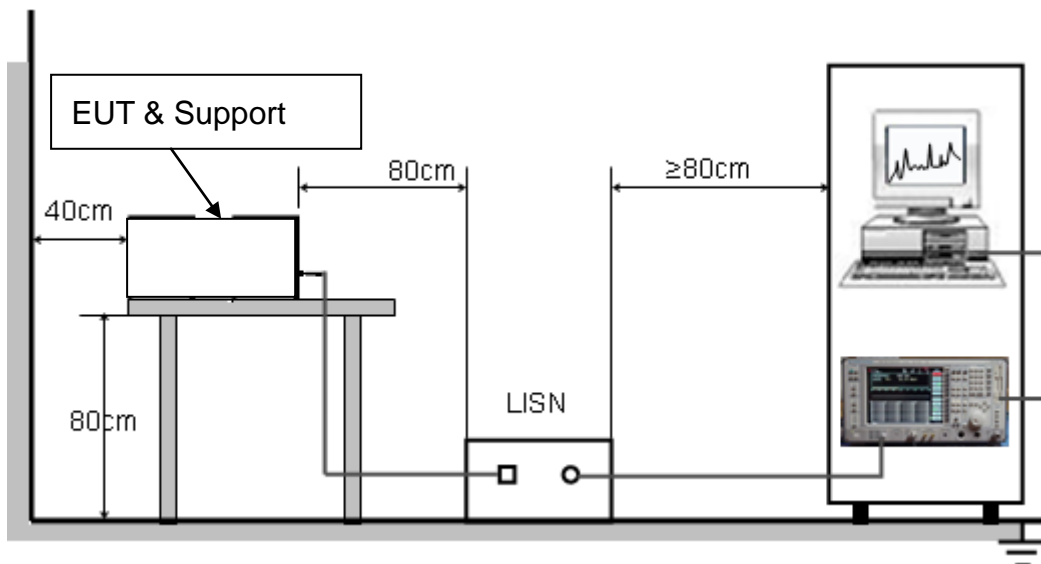
### 7.1. LIMITS OF LINE CONDUCTED EMISSION TEST

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 0.50 MHz.

### 7.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST





### **7.3. 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 C63.4 (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 C63.4.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
4. All support equipments received AC120V/60Hz power from a LISN, if any.
5. The EUT received DC5.0V 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.

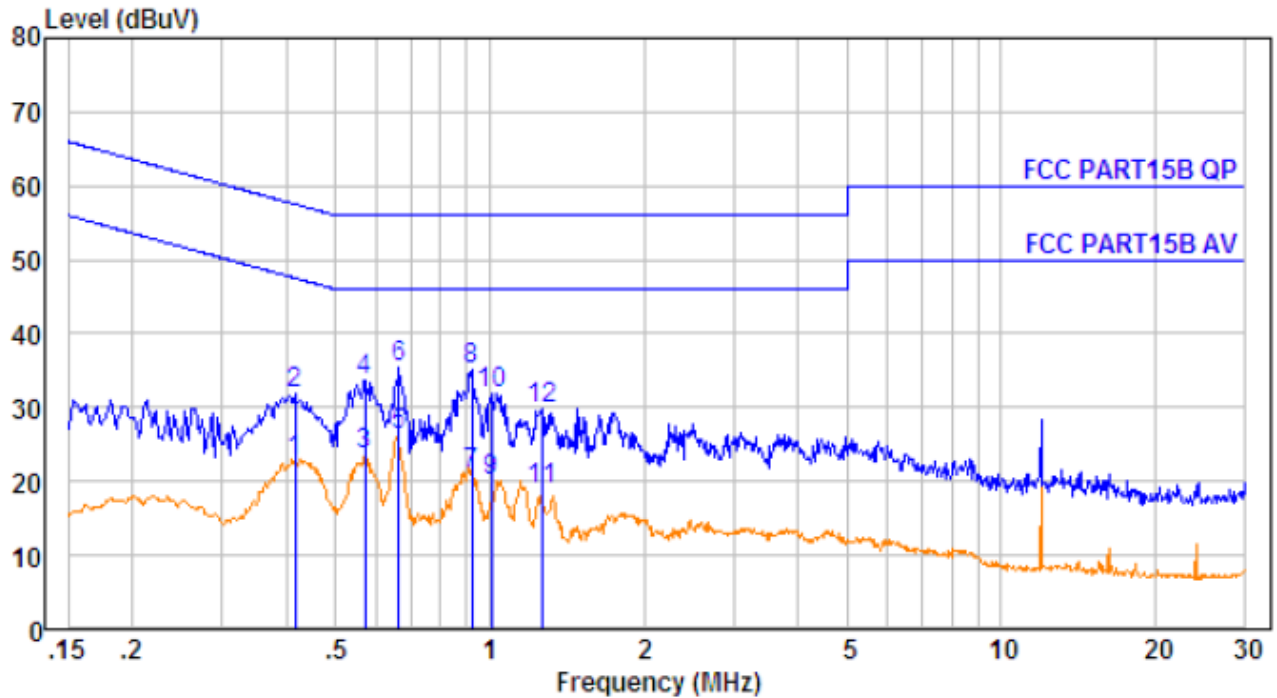
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

### **7.4. 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.

### 7.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

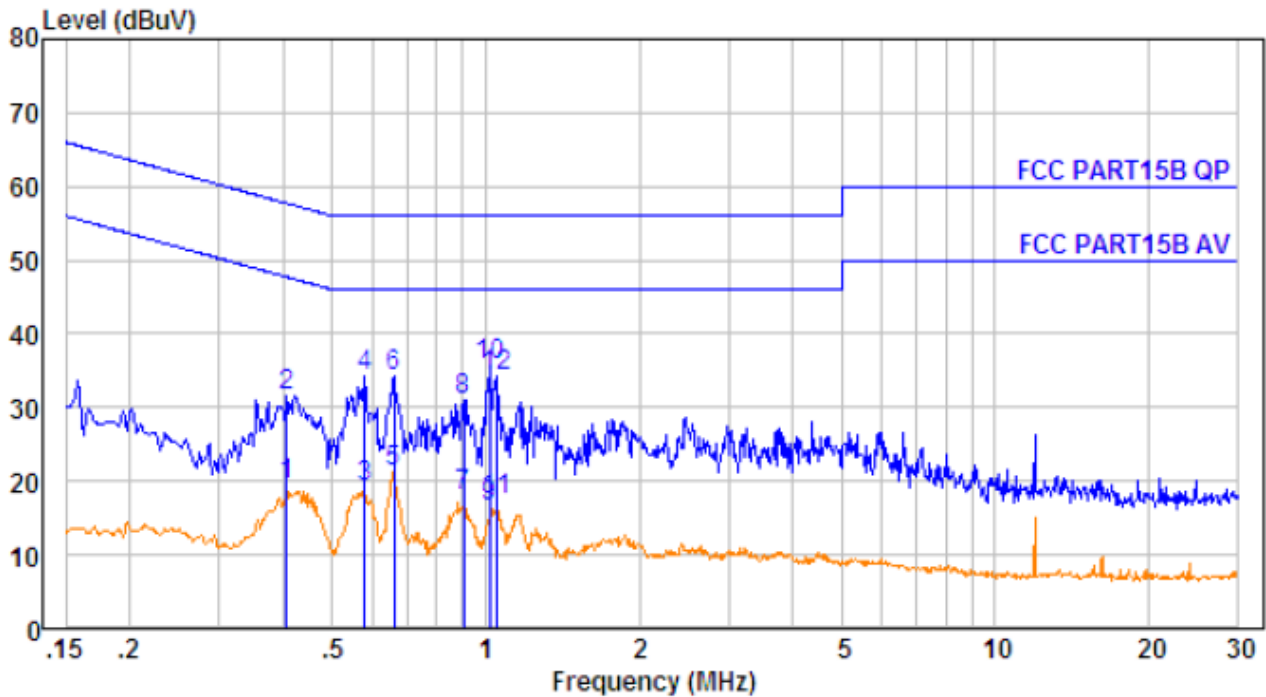
Line Conducted Emission Test Line 1-L



No.	Freq MHz	Cable Loss dB	Clamp Factor dB	Receiver Reading dBpW	Emission Level dBpW	Limit dBpW	Over Limit dB	Remark
1.	0.417	10.64	0.60	11.59	22.83	47.51	-24.68	Average
2.	0.417	10.64	0.60	20.59	31.83	57.51	-25.68	Peak
3.	0.570	10.66	0.60	12.46	23.72	46.00	-22.28	Average
4.	0.570	10.66	0.60	22.46	33.72	56.00	-22.28	Peak
5.	0.665	10.66	0.60	15.07	26.33	46.00	-19.67	Average
6.	0.665	10.66	0.60	24.07	35.33	56.00	-20.67	Peak
7.	0.923	10.67	0.60	9.74	21.01	46.00	-24.99	Average
8.	0.923	10.67	0.60	23.74	35.01	56.00	-20.99	Peak
9.	1.010	10.67	0.60	8.74	20.01	46.00	-25.99	Average
10.	1.010	10.67	0.60	20.74	32.01	56.00	-23.99	Peak
11.	1.262	10.68	0.60	7.59	18.87	46.00	-27.13	Average
12.	1.262	10.68	0.60	18.59	29.87	56.00	-26.13	Peak

**RESULT:PASS**

Line Conducted Emission Test Line 2-N



No.	Freq MHz	Cable Loss dB	Clamp Factor dB	Receiver Reading dBpW	Emission Level dBpW	Limit dBpW	Over Limit dB	Remark
1.	0.406	10.64	0.60	8.39	19.63	47.73	-28.10	Average
2.	0.406	10.64	0.60	20.39	31.63	57.73	-26.10	Peak
3.	0.579	10.66	0.60	7.97	19.23	46.00	-26.77	Average
4.	0.579	10.66	0.60	22.97	34.23	56.00	-21.77	Peak
5.	0.661	10.66	0.60	10.07	21.33	46.00	-24.67	Average
6.	0.661	10.66	0.60	23.07	34.33	56.00	-21.67	Peak
7.	0.904	10.67	0.60	6.81	18.08	46.00	-27.92	Average
8.	0.904	10.67	0.60	19.81	31.08	56.00	-24.92	Peak
9.	1.016	10.67	0.60	5.37	16.64	46.00	-29.36	Average
10.	1.016	10.67	0.60	24.37	35.64	56.00	-20.36	Peak
11.	1.049	10.67	0.60	6.02	17.29	46.00	-28.71	Average
12.	1.049	10.67	0.60	23.02	34.29	56.00	-21.71	Peak

**RESULT:PASS**

## 8. RADIATED EMISSION

### 8.1. MEASUREMENT PROCEDURE

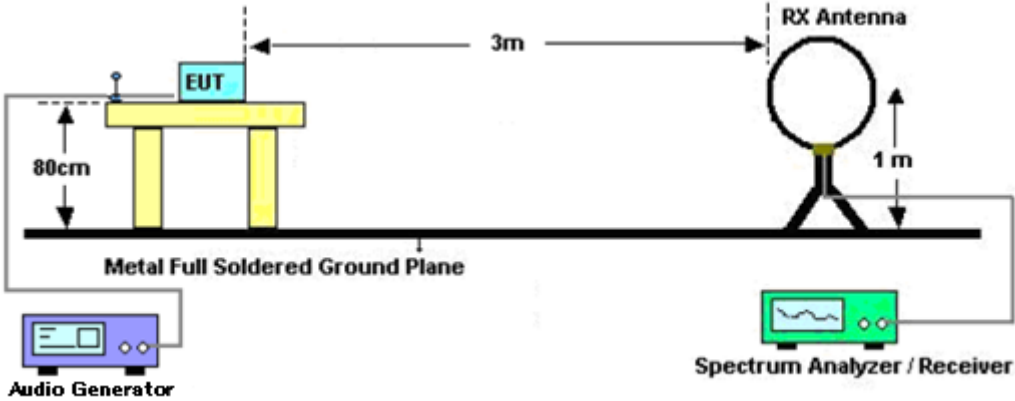
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground and opposite the horn antenna. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power 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 below 1GHz, use 120KHz RBW and VBW $\geq$ 3RBW for QP reading.
7. 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.
8. Only the worst case is reported.

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

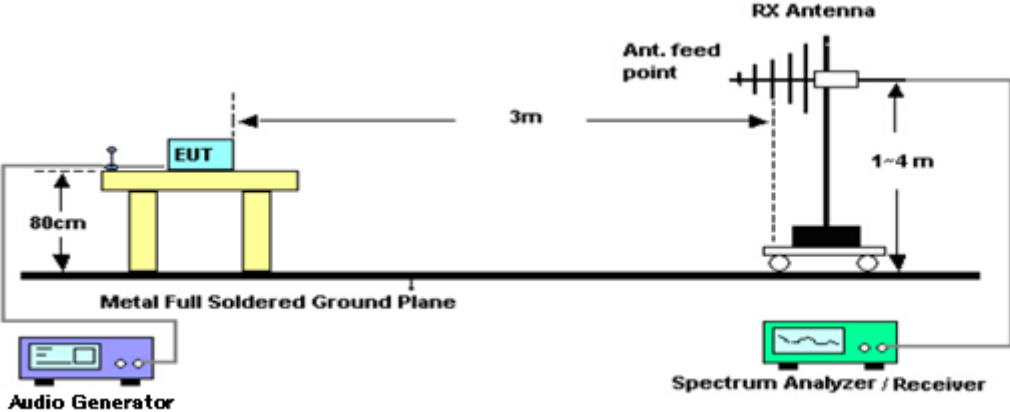
Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RBW 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RBW 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RBW 120KHz for QP

8.2. TEST SETUP

Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



**8.3. TEST RESULT FOR FIELD STRENGTH OF FUNDAMENTAL**

Frequency MHz	Polarization	Level dB(uV/m) PK	Limit dB(uV/m) PK	Margin dB	Pass/Fail	Detector
88.100	H	47.05	67.96	20.91	Pass	PK
88.100	V	45.64	67.96	22.32	Pass	PK
98.000	H	46.57	67.96	21.39	Pass	PK
98.000	V	45.29	67.96	22.67	Pass	PK
107.900	H	47.78	67.96	20.18	Pass	PK
107.900	V	46.66	67.96	21.30	Pass	PK
Frequency MHz	Polarization	Level dB(uV/m) AV	Limit dB(uV/m) AV	Margin dB	Pass/Fail	Detector
88.100	H	43.25	47.96	4.71	Pass	AV
88.100	V	42.46	47.96	5.50	Pass	AV
98.000	H	44.12	47.96	3.84	Pass	AV
98.000	V	42.86	47.96	5.10	Pass	AV
107.900	H	45.07	47.96	2.89	Pass	AV
107.900	V	43.82	47.96	4.14	Pass	AV

**8.4. TEST RESULT FOR FIELD STRENGTH OF BAND EDGE EMISSION**

Frequency MHz	Polarization	Level dB(uV/m) QP	Limit dB(uV/m) QP	Margin dB	Pass/Fail	Detector
88.000	H	35.16	40.00	4.84	Pass	QP
88.000	V	34.28	40.00	5.72	Pass	QP
108.000	H	37.25	43.50	6.25	Pass	QP
108.000	V	35.71	43.50	7.79	Pass	QP

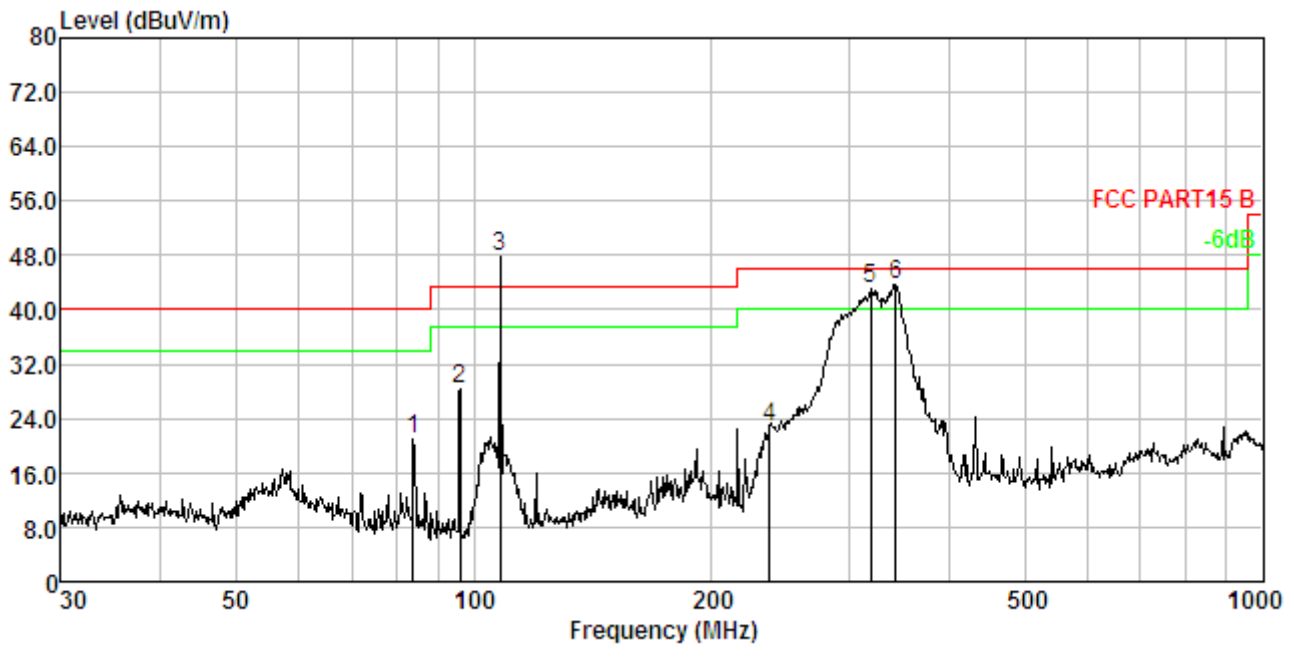
Note: The above two frequencies are the worst case for the band edge emission test.

### 8.5. TEST RESULT FOR SPURIOUS EMISSION

#### RADIATED EMISSION BELOW 30MHz

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

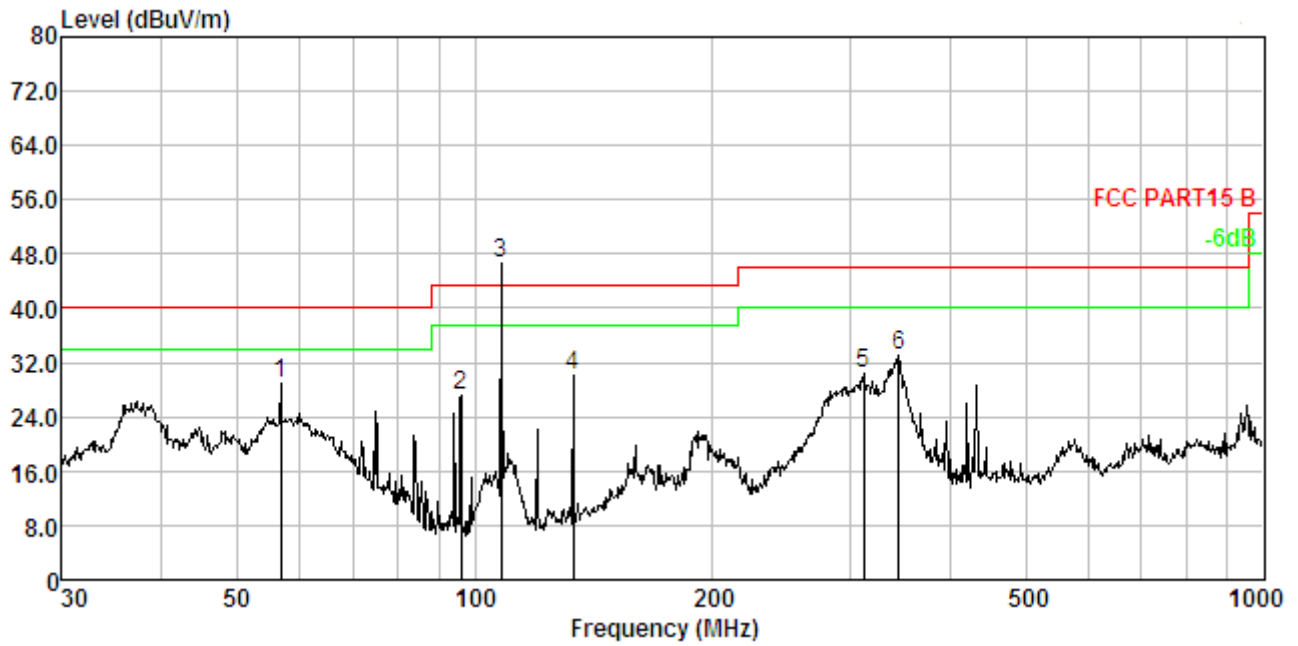
#### RADIATED EMISSION BELOW 1GHZ-Horizontal



No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBuV	Preamp Factor dB	Emission Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark
1.	83.816	1.99	8.70	40.48	30.33	20.84	40.00	-19.16	Peak
2.	96.099	2.11	9.85	46.66	30.38	28.24	43.50	-15.26	Peak
3.	107.888	2.21	10.90	65.09	30.42	47.78			Peak
4.	237.476	2.93	11.59	38.99	30.69	22.82	46.00	-23.18	Peak
5.	318.817	3.19	13.62	57.02	30.79	43.04	46.00	-2.96	Peak
6.	343.180	3.26	14.14	57.04	30.82	43.62	46.00	-2.38	Peak

**RESULT: PASS**

RADIATED EMISSION BELOW 1GHZ-Vertical



No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBuV	Preamp Factor dB	Emission Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark
1.	56.792	1.63	12.00	45.54	30.19	28.98	40.00	-11.02	Peak
2.	96.099	2.11	9.85	45.52	30.38	27.10	43.50	-16.40	Peak
3.	107.888	2.21	10.90	63.97	30.42	46.66			Peak
4.	133.151	2.40	12.87	45.35	30.49	30.13	43.50	-13.37	Peak
5.	311.087	3.17	13.45	44.50	30.78	30.34	46.00	-15.66	Peak
6.	344.386	3.26	14.16	46.36	30.82	32.96	46.00	-13.04	Peak

**RESULT: PASS**

**Note:**

1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin=Measurement-Limit.
2. The "Factor" value can be calculated automatically by software of measurement system.
3. All test modes had been tested. The High channel is the worst case and recorded in the report.

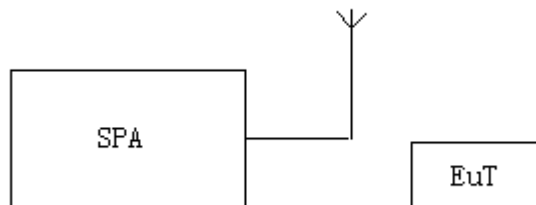


## 9. BANDWIDTH

### 9.1. MEASUREMENT PROCEDURE

1. Set the parameters of SPA as below:  
Centre frequency = Operation Frequency  
RBW=10KHz  
VBW=30KHz  
Span: 500kHz  
Sweep time: Auto
2. Set the EUT to continue transmitting mode. Allow the trace to stabilize. Use the “N dB down” function of SPA to define the bandwidth.
3. Record the plots and Reported.

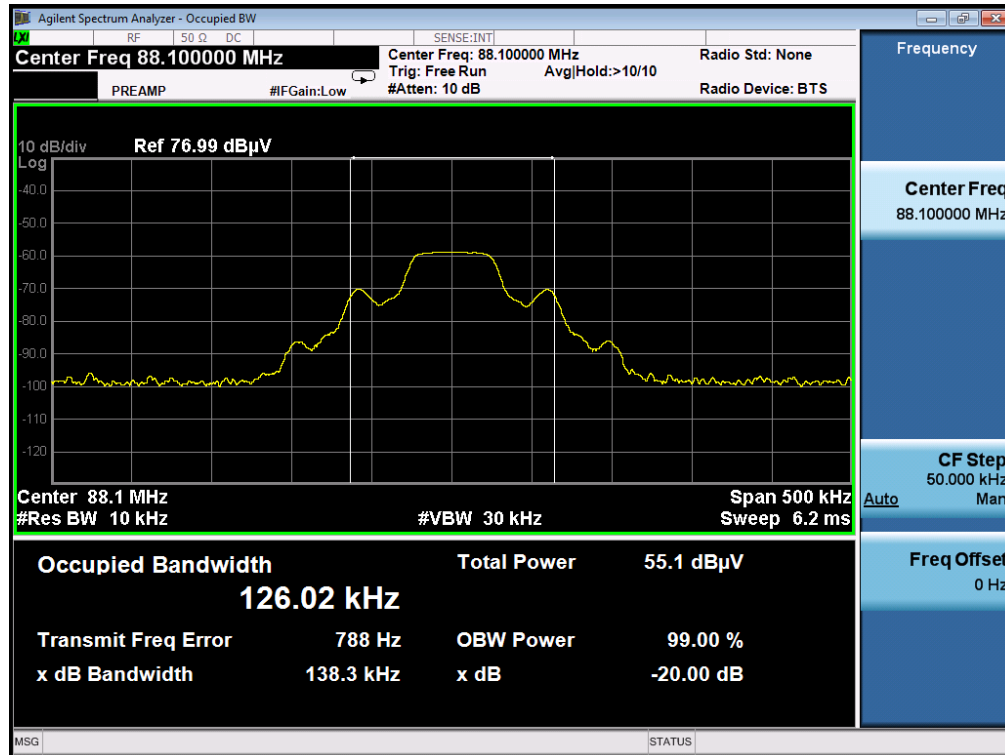
### 9.2. TEST SETUP



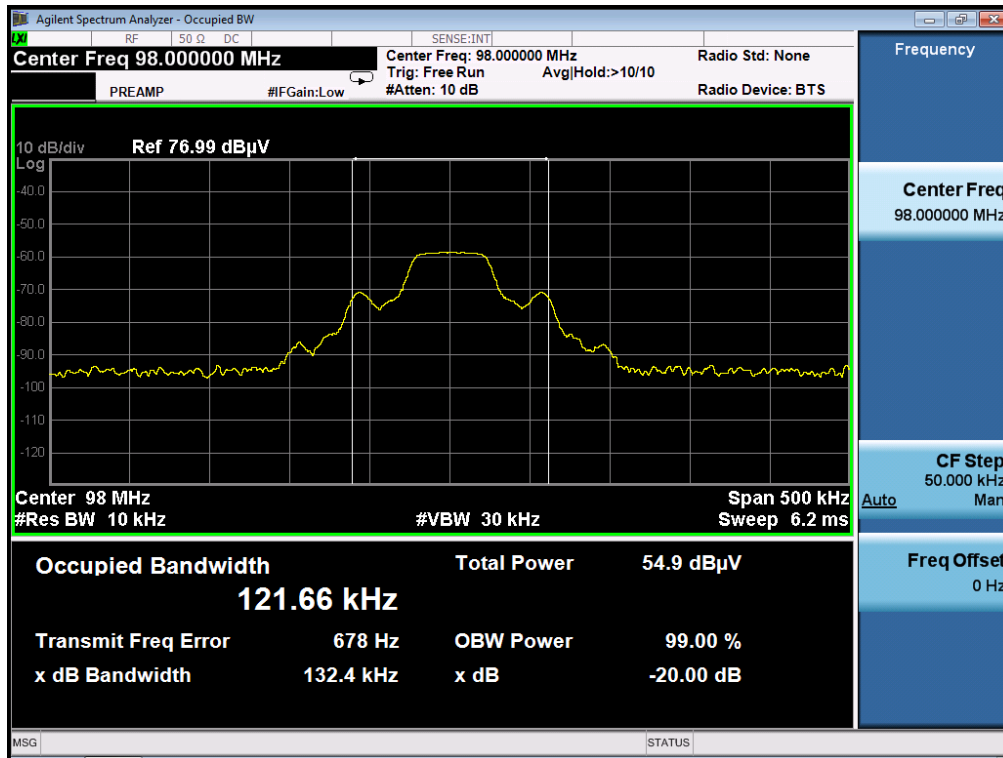
### 9.3. TEST RESULT

Channel	Channel Frequency(MHz)	-20dB bandwidth (kHz)	Limit(kHz)
Low	88.1	138.3	200
Middle	98.0	132.6	200
High	107.9	132.4	200

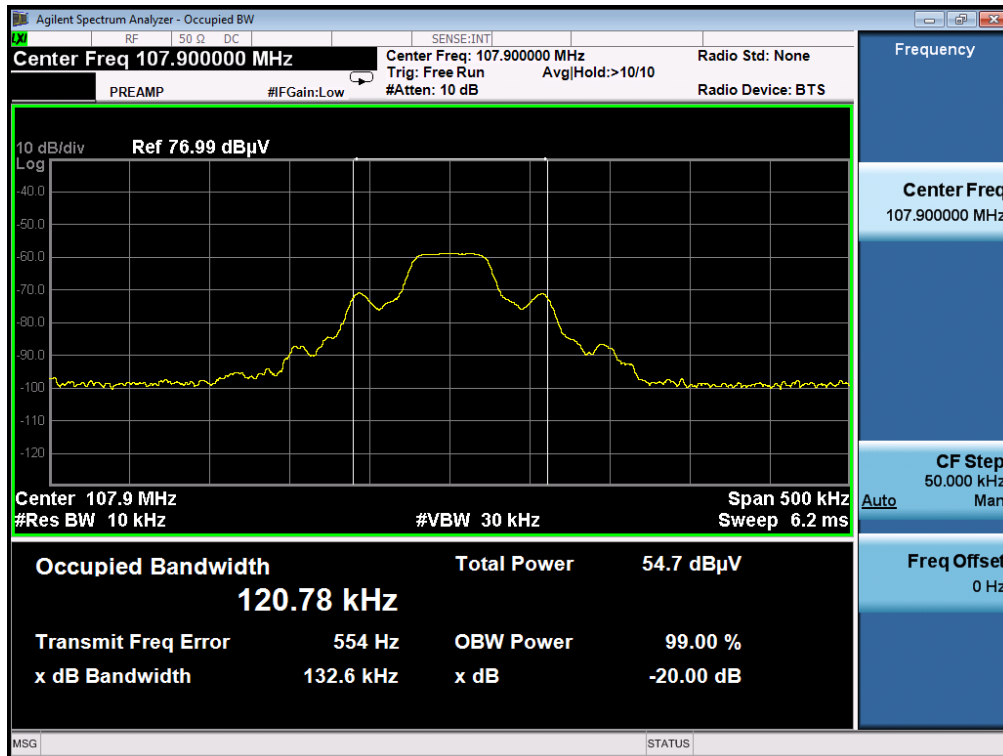
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

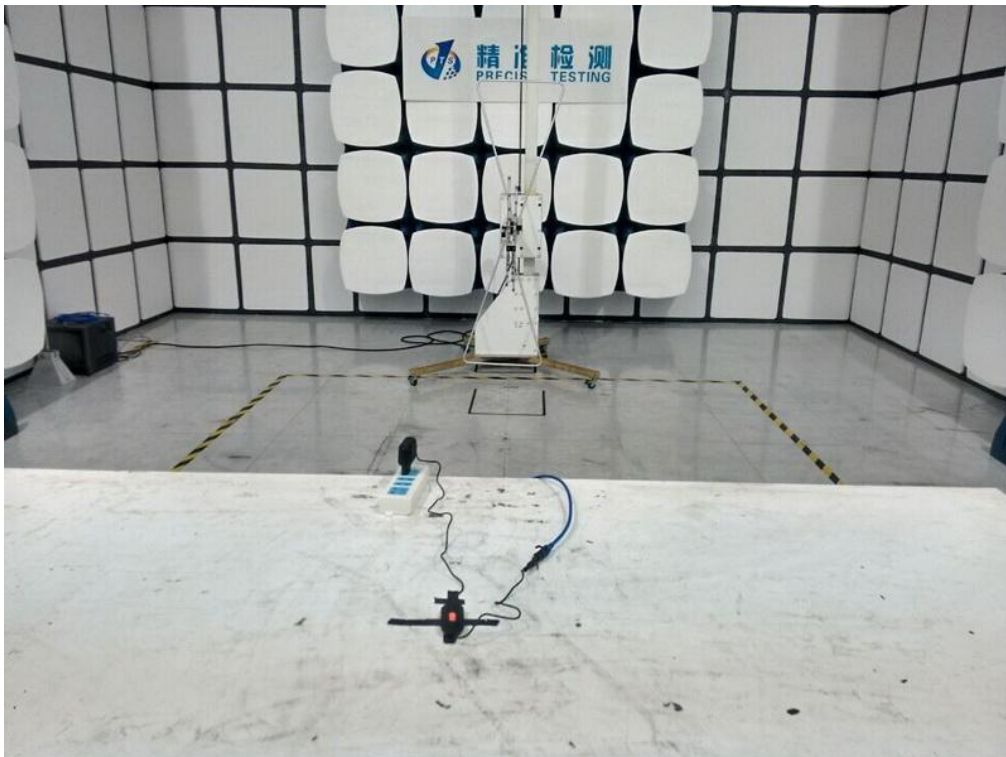


## APPENDIX A: PHOTOGRAPHS OF TEST SETUP

### LINE CONDUCTED EMISSION TEST SETUP



RADIATED EMISSION TEST SETUP BELOW 1G



### 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



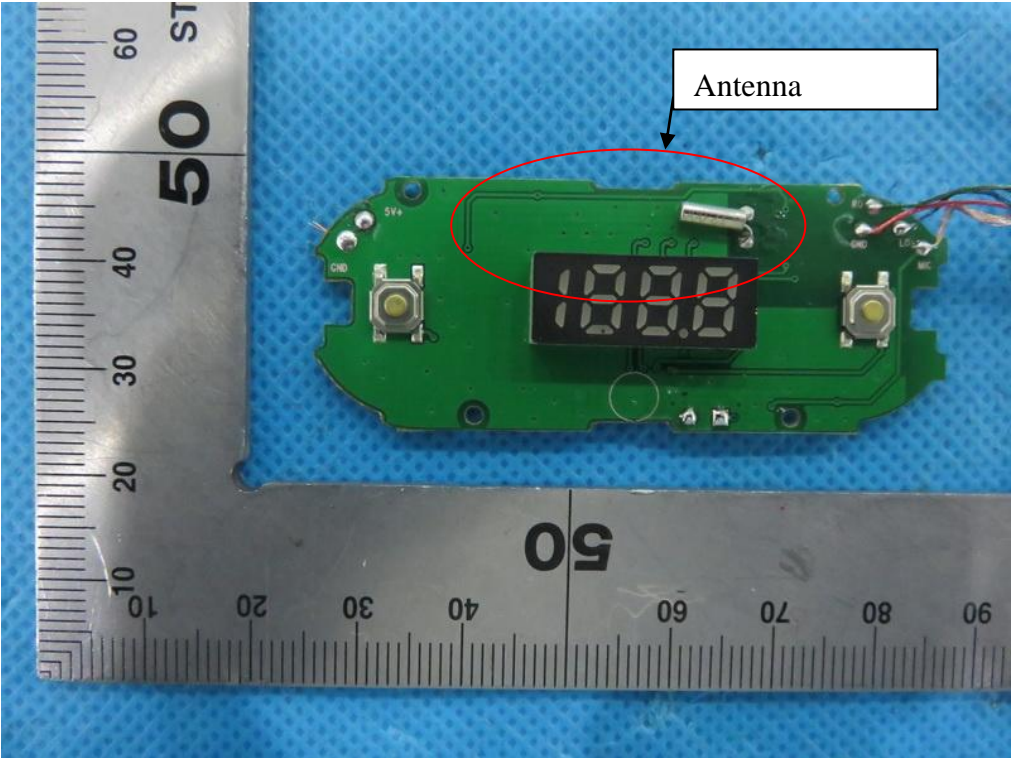
RIGHT VIEW OF EUT



OPEN VIEW OF EUT

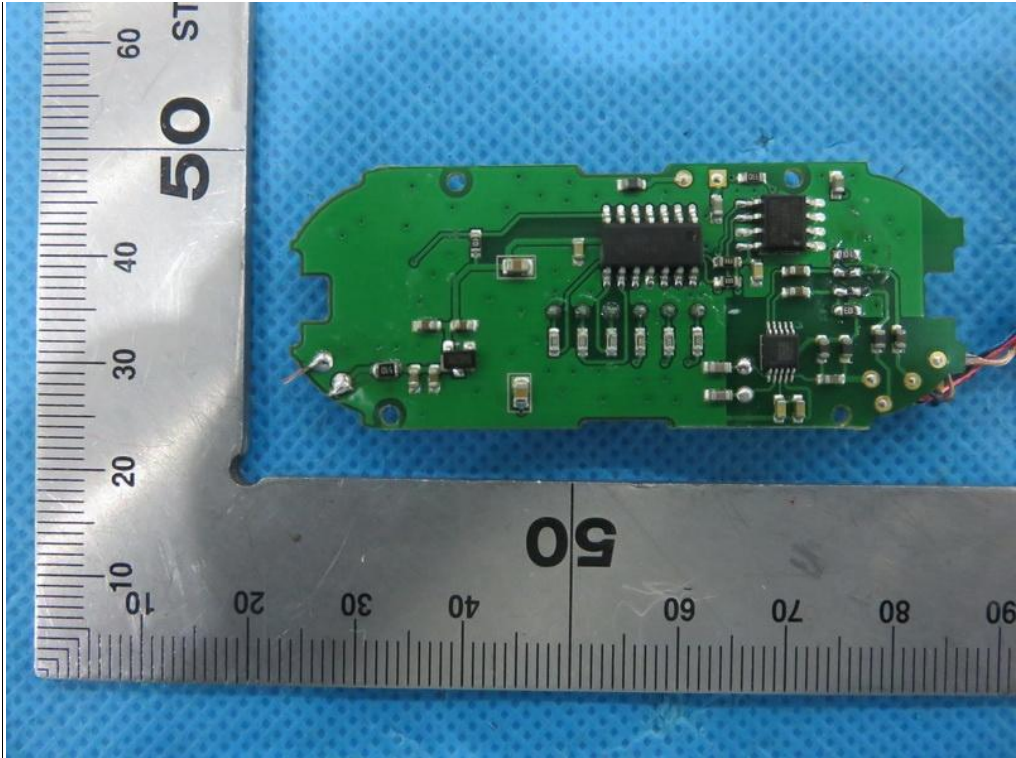


INTERNAL VIEW OF EUT-1





INTERNAL VIEW OF EUT-2



----END OF REPORT----