Test Report

Applicant:	Adec & Partner AG
Address of Applicant:	Staldenbachstrasse 30 CH-8808, Pfaffikon, Switzerland
Equipment Under Test (EUT):	
EUT Name:	2.4G Wireless Headphone
Model No.:	Swing Digital
Serial No.:	Not supplied by client
Standards:	FCC PART15 SUBPART B: 2013
Date of Receipt:	May 21, 2013
Date of Test:	May 22 to Jun. 28, 2013
Date of Issue:	Jun. 30, 2013
Test Result :	**PASS***

* In the configuration tested, the EUT complied with the standards specified above.

Tested by:

Sandy Yu / EMC Engineer

Authorized Signature:

Henly.xie / Manager

This report refers to the General Conditions for Inspection and Testing Services, printed overleaf

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

All test results in this report can be traceable to National or International Standards.

The test report prepare by:

Guangzhou Huesent Testing Service Co.,Ltd.

No.91, Dongguanzhuang Road,Guangzhou,China.

Tel: 86-20-28263298 Fax: 86-20-28263237 http://www.hst.org.cn E-mail:hst@hst.org.cn

2. Test Summary

Test	Test Requirement	Test Method	Class / Severity	Result
Radiated Emission (9kHz to 25GHz)	FCC PART 15, SUBPART B	ANSI C63.4:2003	Class B	PASS
Conducted Emission (150kHz to 30MHz)	FCC PART 15, SUBPART B	ANSI C63.4:2003	Class B	PASS

Note:

Please refer to the RF report HST201305-1864-FCC of HST for the RF part.

This report shown that the EUT was tested without the wireless function for its USB port, and the port is used to transfer digital audio signal via a USB input cable from a personal computer.

The wireless microphone system with an associated receiver for transmitting voice. They include a base with an adapter (FCC id: **U94SWING1212**), two headphones (FCC id: **U94SWING1212R**). This report is used for the base.

3. Contents

4. General Information

4.1 Client Information

Applicant:	Adec & Partner AG
Address of Applicant:	Staldenbachstrasse 30 CH-8808, Pfaffikon, Switzerland

4.2 General Description of E.U.T.

EUT Name:	2.4G Wireless Headphone
Item No.:	Listed on the cover page
Trade Name:	NA
Serial No.:	Not supplied by client

4.3 Details of E.U.T.

Power Supply:	12Vdc, by AC/DC adapter, model:HS06-1200500US, input: 100-240VAC, 50/60Hz, output: 12.0VDC500mA
Power Cord:	160cm DC output power cable between the adapter to the base, No USB cable.
Main function & Fittings:	Wireless microphone system with an associated receiver for transmitting voice. They include a base, two headphones and a adapter. And the base has an USB input port. One headphone is called the headset with two earphones. It's built-in touch the power switch, and earphone connecting rod by a switching of power supply. The other we called the neck set without headphones, and it's added a headphone output block and an audio induction coil, a power switch to toggle switch.
Oscillating Frequency:	Base's RF module IC (model: CC8520), crystal frequency: 48.0MHz, location: X1; Audio codec IC (model: CM102S+) for USB's crystal frequency: 12.0MHz, location: X2.
Frequency Range: for each microphone.	for all the models listed in the cover. 76 channels with 1MHz step
Modulation: 8FSK.	
Antenna Type: Fixed; Gained: 2 dBi; Antenna length: 70mm.	

4.4 Description of Support Units

AC/DC adapter, model:HS06-1200500US, input: 100-240VAC, 50/60Hz, output: 12.0VDC500mA

4.5 Standards Applicable for Testing

The standard used was FCC PART 15, SUBPART B, Class B 2013

The EUT belongs to part 15 class B computing device peripheral.

Equipment Class: JBP.

4.6 Test Location

All tests were subcontract to the laboratory following:

Guangdong Environment Radiation Monitoring Center.

860, South Guangzhou Avenue, Guangzhou, P.R. China

Tel: 86-20-84281721 Fax: N/A Email: Kevin.ma@nemko.com

FCC- Registration No: 667318 on on Sep. 29, 2009

CNAS- Accreditation No: L5539.

4.8 Deviation from Standards

None.

4.9 Abnormalities from Standard Conditions

None.

5. Equipments Used during Test

Test Equipment	Manufactory	Model No.	Serial No. / Equipment No.	Cal Date	Cal Due to Dat
3m Semi-anechoic Chamber	Albatross Projecets Gm	SAC-3M	/ / 1.001	2012-10-9	2014-10-9
Spectrum Analyzer	R&S	FSP30	101230 / 1.003	2012-7-30	2013-7-30
EMI Receiver	R & S	ESCI	100849 / 1.002	2012-7-30	2013-7-30
Two-Line V-Network	R & S	ENV216	100101 / 1.004	2012-7-30	2013-7-30
Shielding Room	Albatross Projecets Gm	4x4x3 m	/ / 1.001.01	2012-10-9	2014-10-9
18G RF Pre-amplifier	MITEQ	AFS44	1381096 / 1.01.1	2013-6-8	2014-6-8
1G-18GHz Double Ridged Guide Antenna	R & S	HF906	100685 / 1.01	2013-5-22	2014-5-22
15G-26.5(40)GHz Double Ridged Guide Antenna	Schwarzbeck	BBHA 9170	/ / EMC7001	2013-6-8	2014-6-8
9k-30MHz Loop Antenna	BJ 2nd Factory	ZN30900A	B2-005; / EMC6001	2012-9-24	2013-9-24
Biconilog Antenna	Schwarzbeck	VULB9163	9163-378 / 1.011	2013-5-22	2015-5-22
Audio Generator	HK LONGWEI	TAG-101	399795 / EMC0010	2012-11-30	2013-11-30

6. Test Results

6.1 Conducted Emissions Mains Terminals, 150 kHz to 30MHz

Test Requirement:	FCC Part 15 B
Test Method:	ANSI C63.4: 2003
Class / Severity:	Class B
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth)
	Quasi-Peak if maximised peak within 6dB of Quasi-Peak limit
Test Date:	Jun. 3, 2013

6.1.1 E.U.T. Operation

Operating Environment:

Temperature: 25.0°C Humidity:50% RH Atmospheric Pressure: 1020mBar

EUT Operation:

1. Connect the EUT via a power cable to an AC/DC adapter in 120VAC/60Hz.

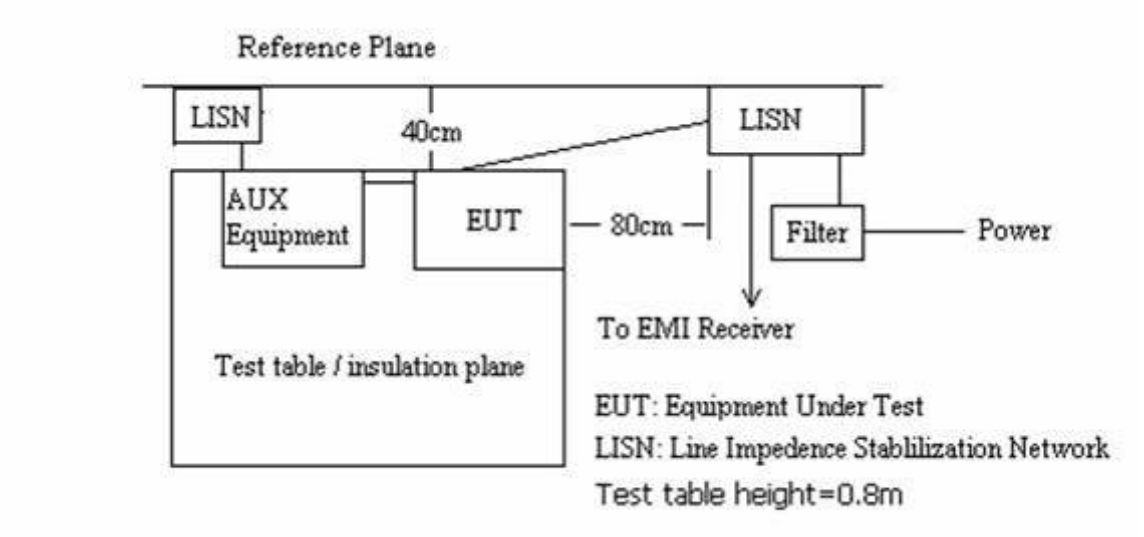
2. The EUT has three functions: charging for a headphone with a battery/ transferring audio signal mode from an USB, audio or microphone port/ wireless transmitting to the headphone. Pre-test the EUT in each mode, and choose the following modes as the worst cases for the final measurement.

Test the EUT work normally in transferring audio signal mode from a notebook (notebook: manufactory: Lenovo, model: F41, CPU: Intel's core i3, 2.93GHz; battery: manufactory: Adec & Partner AG, model: AP12A, rechargeable li-polymer 3.7VDC 240mAh; headphone: manufactory: Adec & Partner AG, model: swing digital, use for head).

Test the EUT work normally in transferring audio signal mode from an audio generator (see page 6 in this report, item 11 of section 5: equipments list).

Note: The EUT is carried through all the tests with wireless transmitting function closed.

6.1.2 Plan View of Test Setup

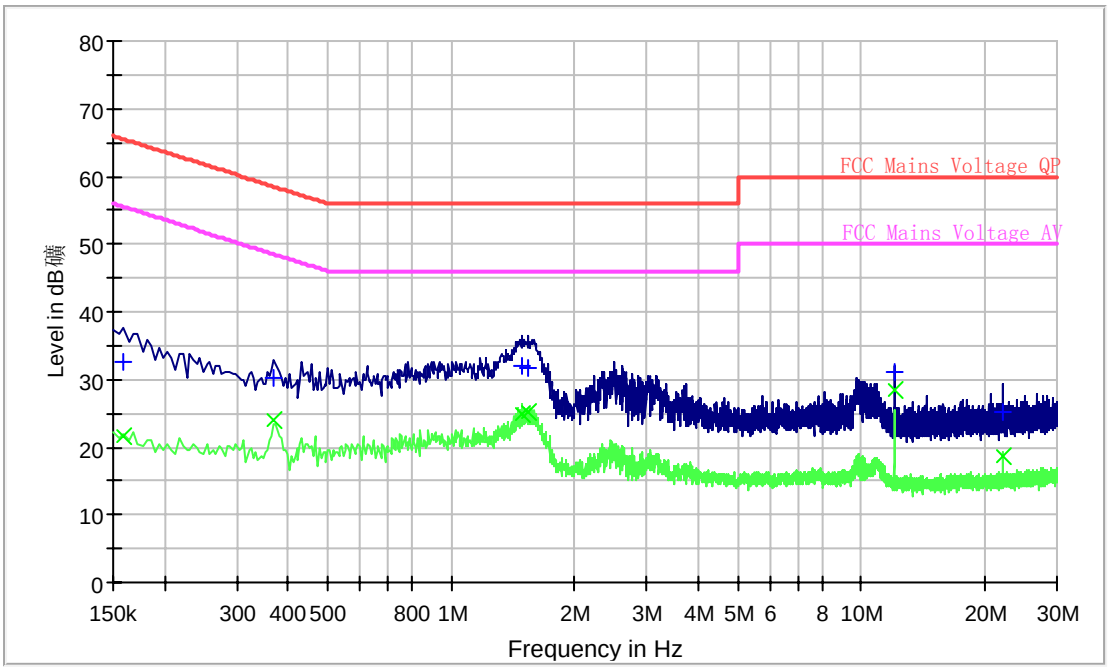


6.1.3 Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized emission were detected when Peak measurement level is over Average Limit.

Live Line. Transferring audio signal mode from an audio generator

Voltage ENV216 PRE



QP

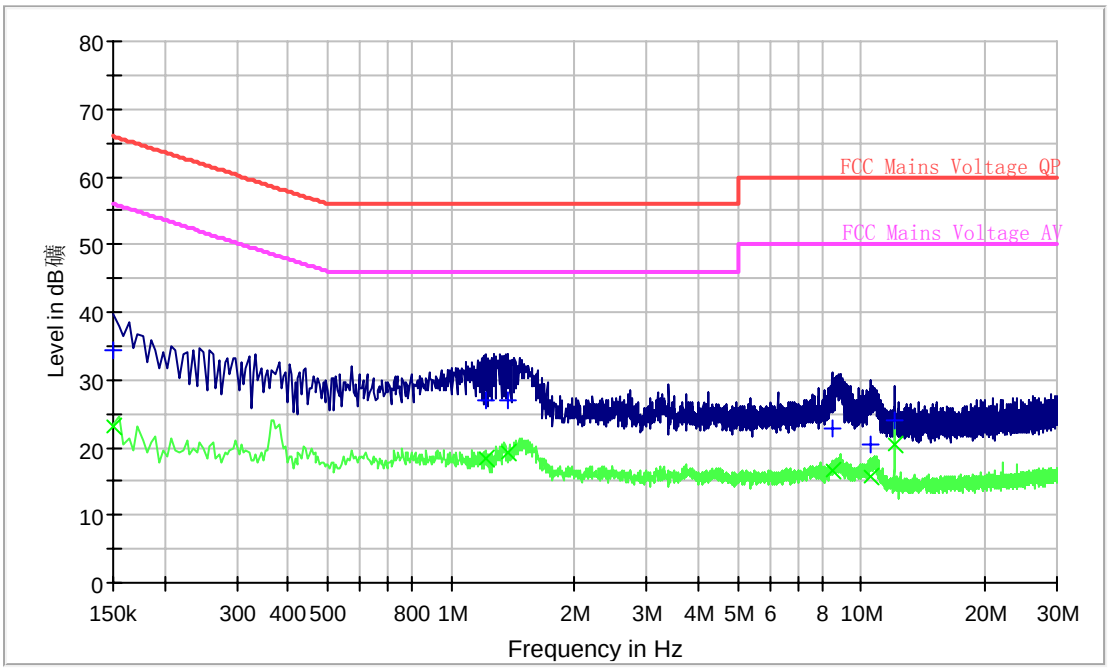
Frequency (MHz)	QuasiPeak (dBuV/m)	Average (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Comment
0.159000	32.6	21.7	1000.000	9.000	Off	L1	19.9	32.9	65	
0.370500	30.4	23.9	1000.000	9.000	Off	L1	19.9	28.1	58.5	
1.491000	31.9	24.9	1000.000	9.000	Off	L1	19.9	24.1	56.0	
1.540500	31.7	25.1	1000.000	9.000	Off	L1	19.9	24.3	56.0	
11.998500	31.2	28.4	1000.000	9.000	Off	L1	20.1	28.8	60.0	
22.119000	25.3	18.6	1000.000	9.000	Off	L1	20.3	34.7	60.0	

AVE

Frequency (MHz)	QuasiPeak (dBuV/m)	Average (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Comment
0.159000	32.6	21.7	1000.000	9.000	Off	L1	19.9	33.8	55.5	
0.370500	30.4	23.9	1000.000	9.000	Off	L1	19.9	24.6	48.5	
1.491000	31.9	24.9	1000.000	9.000	Off	L1	19.9	21.1	46.0	
1.540500	31.7	25.1	1000.000	9.000	Off	L1	19.9	20.9	46.0	
11.998500	31.2	28.4	1000.000	9.000	Off	L1	20.1	21.6	50.0	
22.119000	25.3	18.6	1000.000	9.000	Off	L1	20.3	31.4	50.0	

Neutral Line. Transferring audio signal mode from an audio generator

Voltage ENV216 PRE



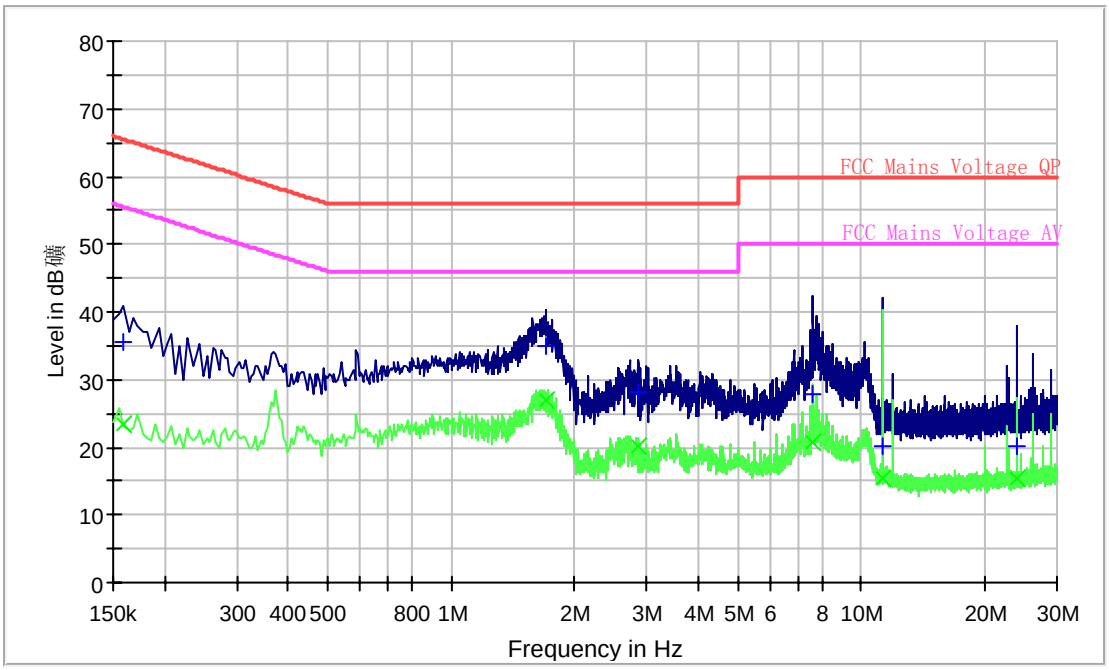
QP

Frequency (MHz)	QuasiPeak (dBuV/m)	Average (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Comment
0.150000	34.3	23.1	1000.000	9.000	Off	N	19.9	31.7	66.0	
1.212000	26.9	18.4	1000.000	9.000	Off	N	19.9	29.1	56.0	
1.374000	27.0	19.2	1000.000	9.000	Off	N	20.0	29.0	56.0	
8.470500	22.7	16.6	1000.000	9.000	Off	N	20.2	37.3	60.0	
10.536000	20.4	15.8	1000.000	9.000	Off	N	20.2	39.6	60.0	
12.003000	24.1	20.4	1000.000	9.000	Off	N	20.2	35.9	60.0	

AVE

Frequency (MHz)	QuasiPeak (dBuV/m)	Average (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Comment
0.150000	34.3	23.1	1000.000	9.000	Off	N	19.9	32.9	56.0	
1.212000	26.9	18.4	1000.000	9.000	Off	N	19.9	27.6	46.0	
1.374000	27.0	19.2	1000.000	9.000	Off	N	20.0	26.8	46.0	
8.470500	22.7	16.6	1000.000	9.000	Off	N	20.2	33.4	50.0	
10.536000	20.4	15.8	1000.000	9.000	Off	N	20.2	34.2	50.0	
12.003000	24.1	20.4	1000.000	9.000	Off	N	20.2	29.6	50.0	

Live Line. Transferring audio signal mode from a notebook



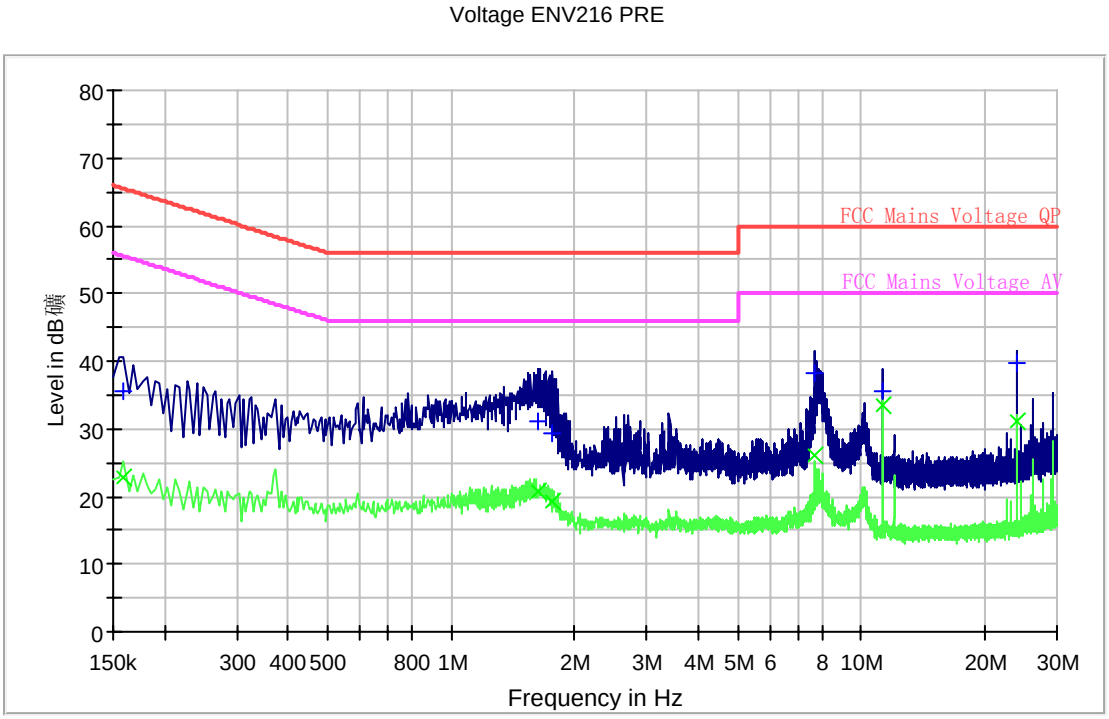
QP

Frequency (MHz)	QuasiPeak (dBuV/m)	Average (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Comment
0.159000	35.6	23.3	1000.000	9.000	Off	L1	19.9	29.9	65.5	
1.702500	35.0	26.8	1000.000	9.000	Off	L1	19.9	21.0	56.0	
2.850000	28.0	20.1	1000.000	9.000	Off	L1	20.0	28.0	56.0	
7.642500	27.8	20.9	1000.000	9.000	Off	L1	20.1	32.2	60.0	
11.256000	20.2	15.5	1000.000	9.000	Off	L1	20.1	39.8	60.0	
23.968500	20.1	15.3	1000.000	9.000	Off	L1	20.3	39.9	60.0	

AVE

Frequency (MHz)	QuasiPeak (dBuV/m)	Average (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Comment
0.159000	35.6	23.3	1000.000	9.000	Off	L1	19.9	32.2	55.5	
1.702500	35.0	26.8	1000.000	9.000	Off	L1	19.9	19.2	46.0	
2.850000	28.0	20.1	1000.000	9.000	Off	L1	20.0	25.9	46.0	
7.642500	27.8	20.9	1000.000	9.000	Off	L1	20.1	29.1	50.0	
11.256000	20.2	15.5	1000.000	9.000	Off	L1	20.1	34.5	50.0	
23.968500	20.1	15.3	1000.000	9.000	Off	L1	20.3	34.7	50.0	

Neutral Line. Transferring audio signal mode from a notebook



QP

Frequency (MHz)	QuasiPeak (dBuV/m)	Average (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Comment
0.159000	35.5	23.0	1000.000	9.000	Off	N	19.9	30.0	65.5	
1.626000	31.2	20.7	1000.000	9.000	Off	N	20.0	24.8	56.0	
1.770000	29.2	19.4	1000.000	9.000	Off	N	20.0	26.8	56.0	
7.678500	38.3	26.0	1000.000	9.000	Off	N	20.1	21.7	60.0	
11.292000	35.5	33.6	1000.000	9.000	Off	N	20.2	24.5	60.0	
24.000000	39.7	31.2	1000.000	9.000	Off	N	20.3	20.3	60.0	

AVE

Frequency (MHz)	QuasiPeak (dBuV/m)	Average (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV/m)	Comment
0.159000	35.5	23.0	1000.000	9.000	Off	N	19.9	32.5	55.5	
1.626000	31.2	20.7	1000.000	9.000	Off	N	20.0	25.3	46.0	
1.770000	29.2	19.4	1000.000	9.000	Off	N	20.0	26.6	46.0	
7.678500	38.3	26.0	1000.000	9.000	Off	N	20.1	24.0	50.0	
11.292000	35.5	33.6	1000.000	9.000	Off	N	20.2	16.4	50.0	
24.000000	39.7	31.2	1000.000	9.000	Off	N	20.3	18.8	50.0	

6.2 Radiated Emissions, 9kHz to 25GHz

Test Requirement:	FCC Part15 B
Test Method:	ANSI C63.4: 2003
Class:	Class B
Detector:	Peak for pre-scan (200Hz/9kHz/120kHz resolution bandwidth for the scan range of 9kHz-150kHz/150kHz-30MHz/30MHz-1GHz), Average & Peak scan (1MHz resolution bandwidth for the scan range of 1GHz-25GHz) Quasi-Peak if maximised peak within 6dB of limit
Test Date:	Jun. 3, 2013

6.2.1 E.U.T. Operation

Operating Environment:

Temperature: 25°C Humidity:50% RH Atmospheric Pressure: 1020mBar

EUT Operation:

1. Connect the EUT via a power cable to an AC/DC adapter in 120VAC/60Hz.

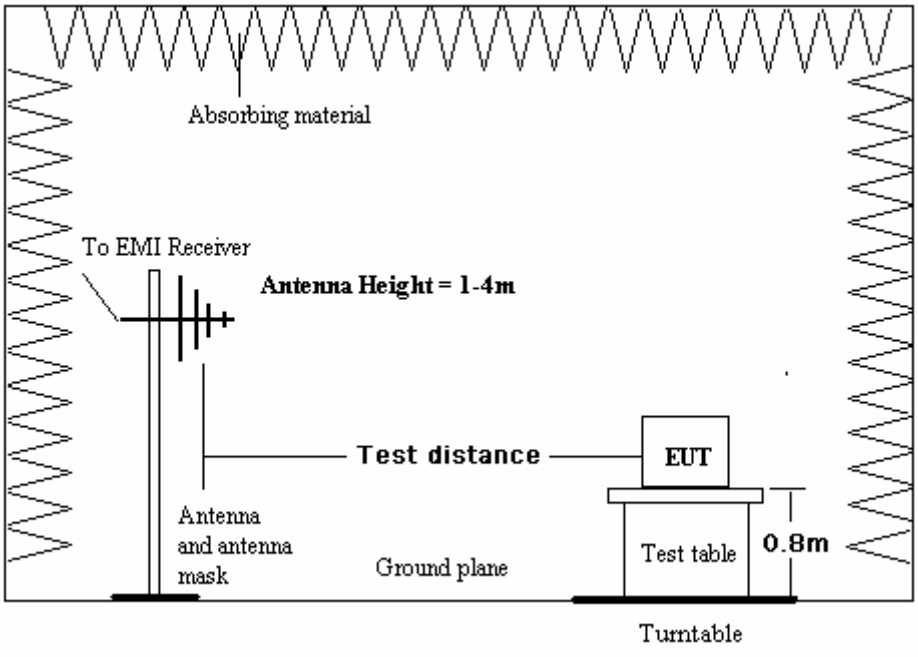
2. The EUT has three functions: charging for a headphone with a battery/ transferring audio signal mode from an USB, audio or microphone port/ wireless transmitting to the headphone. Pre-test the EUT in each mode, and choose the following modes as the worst cases for the final measurement.

Test the EUT work normally in transferring audio signal mode from a notebook (notebook: manufactory: Lenovo, model: F41, CPU: Intel's core i3, 2.93GHz; battery: manufactory: Adec & Partner AG, model: AP12A, rechargeable li-polymer 3.7VDC 240mAh; headphone: manufactory: Adec & Partner AG, model: swing digital, use for head).

Test the EUT work normally in transferring audio signal mode from an audio generator (see page 6 in this report, item 11 of section 5: equipments list).

Note: The EUT is carried through all the tests with wireless transmitting function closed. The processor speed is 48MHz.

6.2.2 Test Setup



6.2.3 Measurement Data

An initial pre-scan was performed in the 3m chamber using the spectrum analyser in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by Bilog antenna with 2 orthogonal polarities

1) 9kHz~30MHz Test result

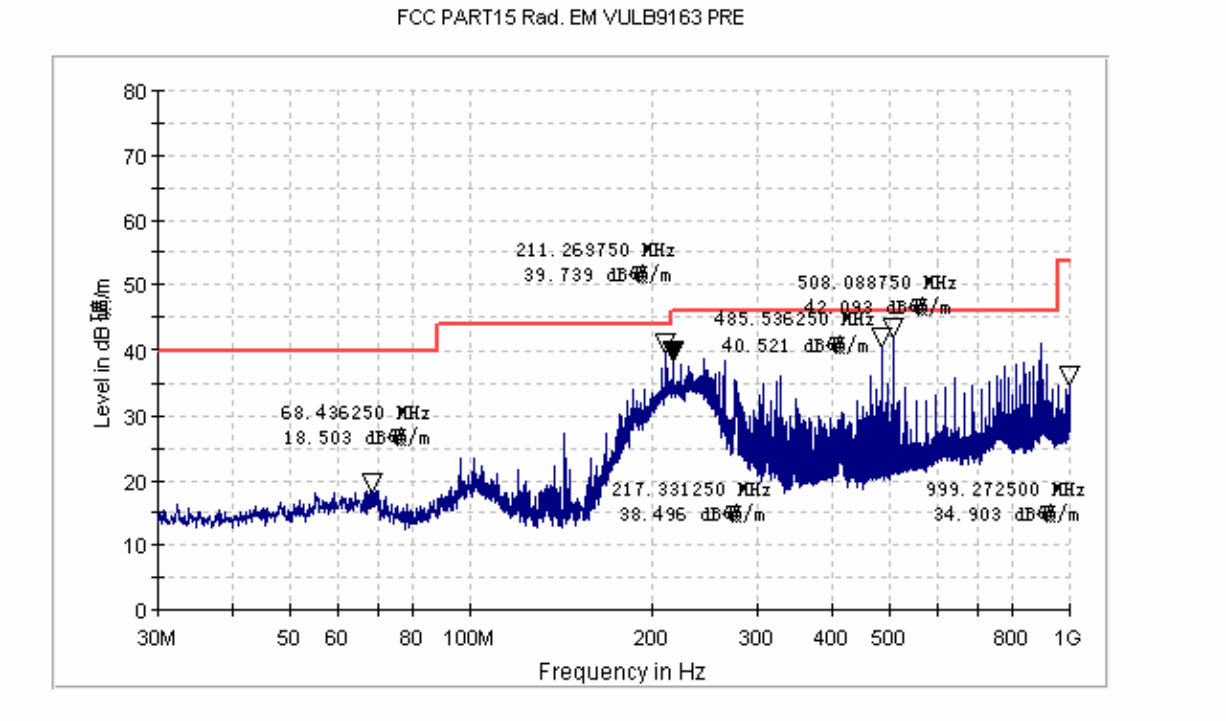
The Low frequency, which started from 9kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not report.

2) 30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Test curves (with the Quasi-peak measurement and QP limit), 30M-1GHz, Horizontal & Vertical:

2.1) Test mode: Transferring audio signal mode from a notebook

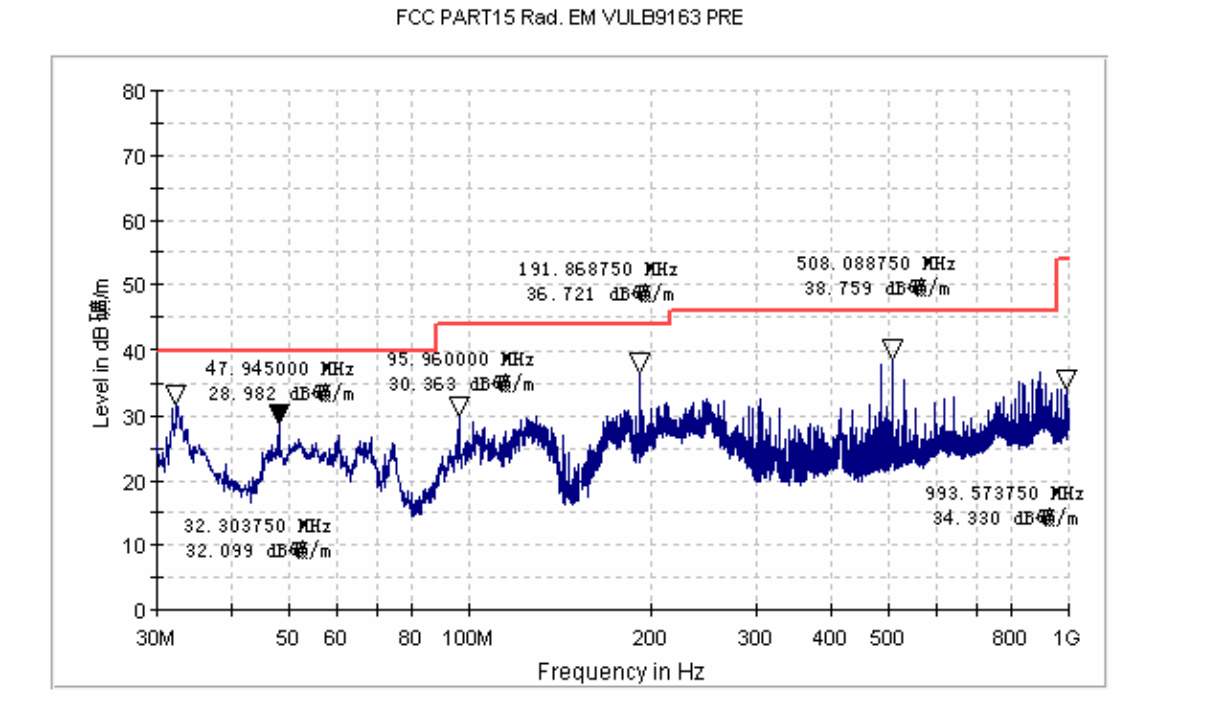
Horizontal



Quasi-peak measurement

Frequency	Level	Transducer	Limit	Margin
MHz	dBuV/m	dB	dBuV/m	dB
68.4	18.5	12.3	40	21.5
211.3	39.7	12.6	43.5	3.8
217.3	38.5	12.7	46	7.5
485.5	40.5	20.1	46	5.5
508.1	42.1	20.3	46	3.9
999.3	34.9	14.5	54	19.1
Note: The transducer factor includes antenna factor and cable loss.				

Vertical



Quasi-peak measurement

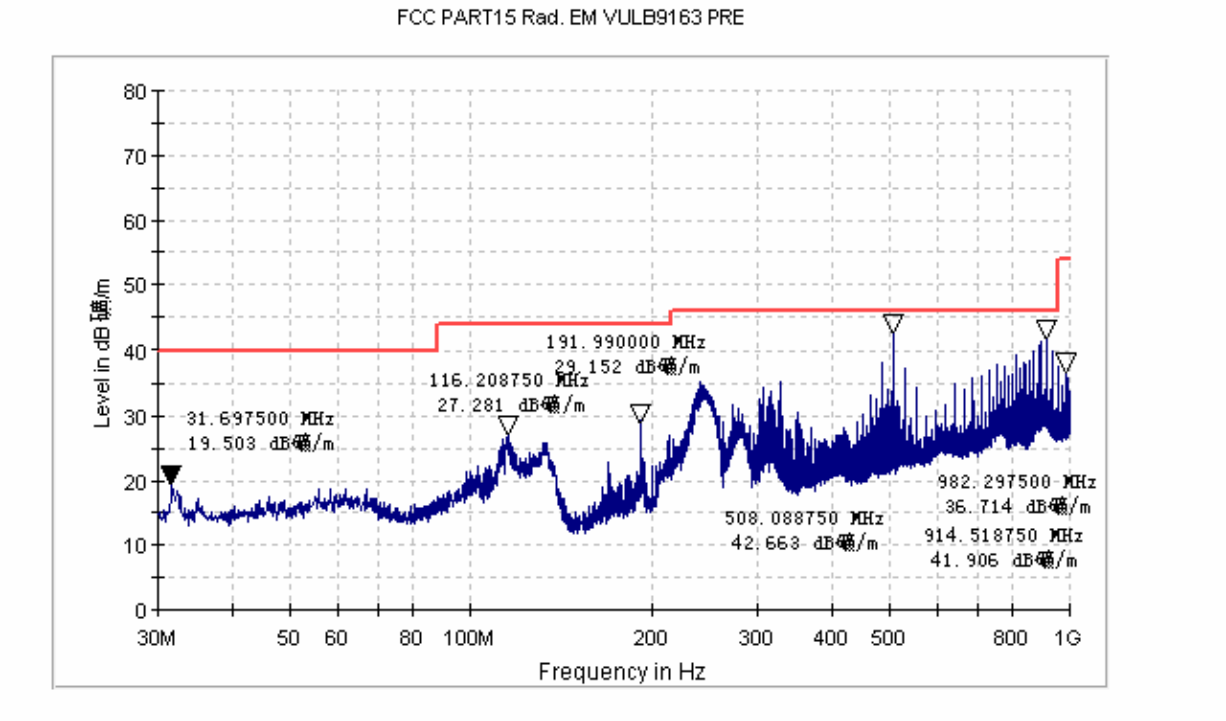
Frequency	Level	Transducer	Limit	Margin
MHz	dBuV/m	dB	dBuV/m	dB
32.3	32.1	16.5	40	7.9
47.9	29.0	12.5	40	11.0
96.0	30.4	11.2	43.5	13.1
192.0	36.7	12.6	43.5	6.8
508.1	38.8	20.3	46	7.2
993.6	34.3	14.5	54	19.7

Note:

The transducer factor includes antenna factor and cable loss.

2.2) Test mode: Transferring audio signal mode from an audio generator

Horizontal



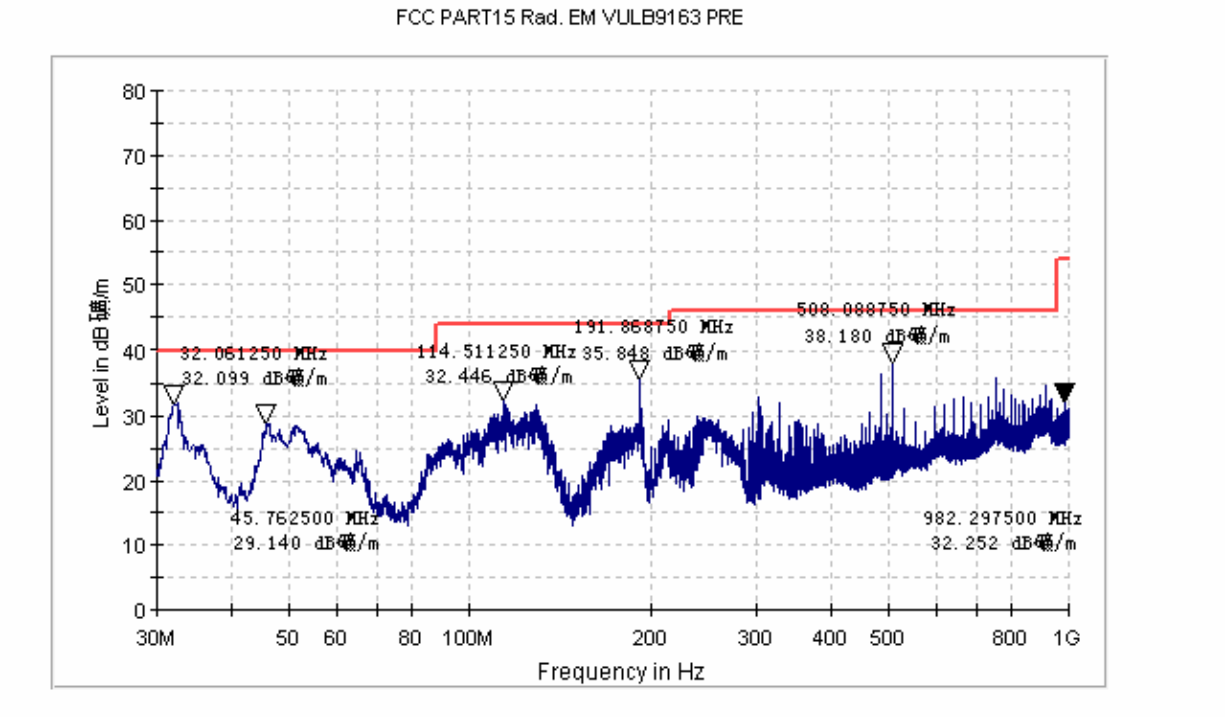
Quasi-peak measurement

Frequency	Level	Transducer	Limit	Margin
MHz	dBuV/m	dB	dBuV/m	dB
31.7	19.5	16.5	40	20.5
116.2	27.3	11.1	43.5	16.2
192.0	29.2	12.7	43.5	14.3
508.1	42.7	20.3	46	3.3
914.5	41.9	14.4	46	4.1
982.3	36.7	14.5	54	17.3

Note:

The transducer factor includes antenna factor and cable loss.

Vertical



Quasi-peak measurement

Frequency	Level	Transducer	Limit	Margin
MHz	dBuV/m	dB	dBuV/m	dB
32.1	32.1	16.5	40	7.9
45.8	29.1	12.8	40	10.9
114.5	32.4	11.2	43.5	11.1
131.9	35.8	11.3	43.5	7.7
508.1	38.2	20.4	46	7.8
982.3	32.3	14.5	54	21.7
Note: The transducer factor includes antenna factor and cable loss.				

3) 1 GHz~25 GHz Radiated Emissions .Average & PK Measurement

The crystal frequencies are 12MHz & 48MHz and the processor speed is 48MHz. The highest operate frequency is 48MHz, and 10th harmonic of the highest fundamental frequency is 480MHz. The frequency range of radiated measurements is up to 1GHz without the wireless function.

The EUT belongs to the frequency bands of 2400 M - 2483.5 MHz

3.1) Test mode: transferring audio signal mode from a notebook

Average measurement

Frequency	Level		Transducer	Limit	Margin	
GHz	dBuV/m		dB	dBuV/m	dB	
	Horizontal	Vertical			Horizontal	Vertical
1.221	30.4	32.2	-12.8	54	23.6	21.8
2.400*	30.7	32.4	-12.2		23.3	21.6
2.4835*	30.6	32.4	-12.1		23.4	21.6
5.332	31.2	32.8	-11.9		22.8	21.2
7.552	30.7	32.0	-8.0		23.3	22.0
10.343	31.2	32.7	-4.6		22.8	21.3
12.625	32.9	33.2	-3.6		21.1	20.8
23.340	33.4	33.8	-0.8		20.6	20.2

Peak measurement

Frequency	Level		Transducer	Limit	Margin	
GHz	dBuV/m		dB	dBuV/m	dB	
	Horizontal	Vertical			Horizontal	Vertical
1.221	52.4	52.2	-12.8	74	21.6	21.8
2.400*	52.3	52.5	-12.2		21.7	21.5
2.4835*	52.5	52.7	-12.1		21.5	21.3
5.733	52.4	52.5	-11.9		21.6	21.5
7.645	51.7	52.5	-8.0		22.3	21.5
11.578	53.4	52.4	-4.5		20.6	21.6
12.865	52.4	53.4	-3.6		21.6	20.6
22.946	54.5	53.2	-0.8		19.5	20.8

Note:

* means the band-edge. The transducer factor includes antenna factor and cable loss.

The EUT is carried through all the tests with wireless transmitting function closed.

500μV/m (54dBuV/m) for AVG limit, and Peak limit= AVG limit + 20dB.

3.2) Test mode: transferring audio signal mode from an audio generator

Average measurement

Frequency	Level		Transducer	Limit	Margin	
GHz	dBuV/m		dB	dBuV/m	dB	
	Horizontal	Vertical			Horizontal	Vertical
1.2395	30.7	32.2	-12.8	54	23.3	21.8
2.400*	30.2	32.8	-12.2		23.8	21.2
2.4835*	31.5	32.6	-12.1		22.5	21.4
5.335	30.6	32.4	-11.9		23.4	21.6
7.478	30.4	32.2	-8.0		23.6	21.8
10.318	32.3	31.7	-4.6		21.7	22.3
13.925	32.4	33.5	-3.5		21.6	20.5
23.362	33.4	33.2	-0.8		20.6	20.8

Peak measurement

Frequency	Level		Transducer	Limit	Margin	
GHz	dBuV/m		dB	dBuV/m	dB	
	Horizontal	Vertical			Horizontal	Vertical
1.2395	52.4	52.1	-12.8	74	21.6	21.9
2.400*	52.4	52.2	-12.2		21.6	21.8
2.4835*	52.4	53.8	-12.1		21.6	20.2
5.623	52.5	53.1	-11.9		21.5	20.9
7.682	51.5	52.7	-8.0		22.5	21.3
11.524	53.5	52.3	-4.5		20.5	21.7
12.915	52.2	53.9	-3.6		21.8	20.1
23.548	53.8	54.2	-0.8		20.2	19.8

Note:

* means the band-edge. The transducer factor includes antenna factor and cable loss.

The EUT is carried through all the tests with wireless transmitting function closed.

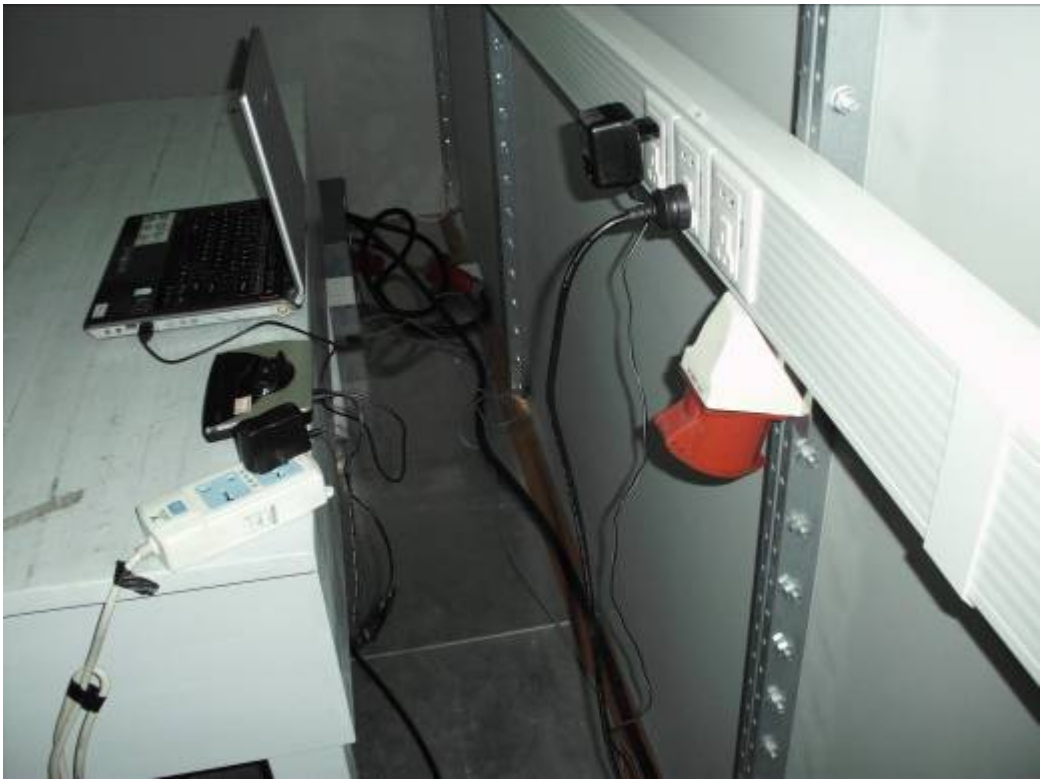
500μV/m (54dBuV/m) for AVG limit, and Peak limit= AVG limit + 20dB.

Note: The EUT's radiated emissions tests are complied with the requirements of FCC Part 15.109.

7. Photographs

7.1 Conducted Emission Test Setup

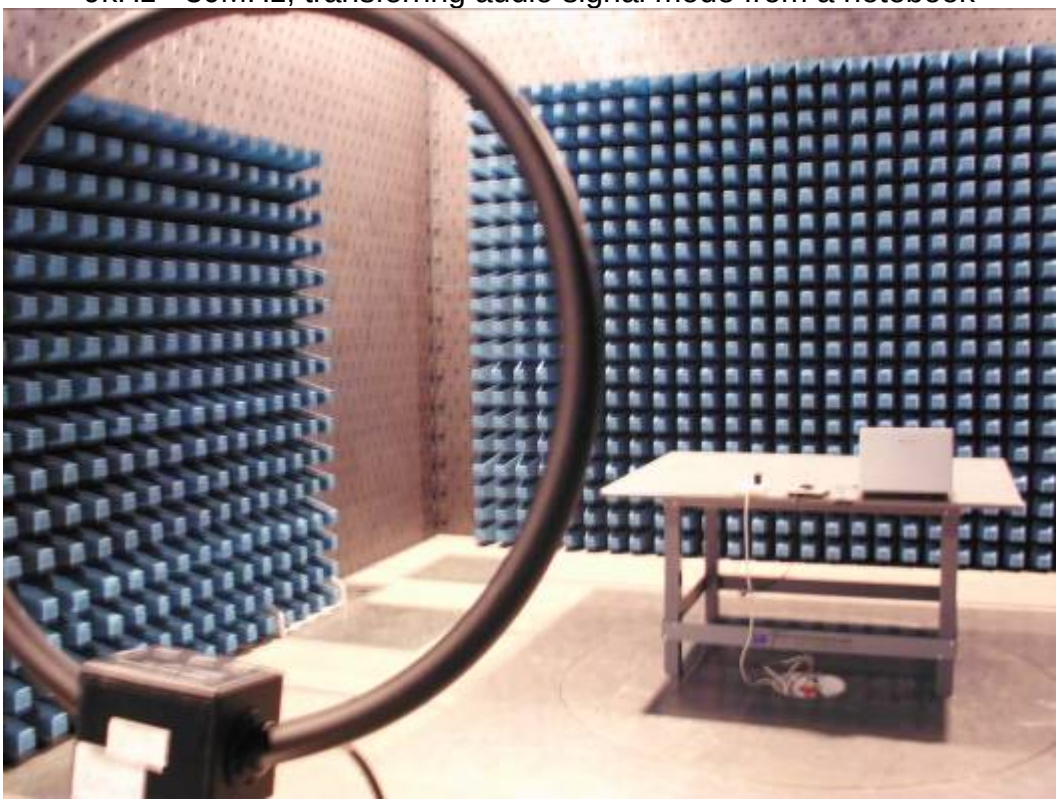
Transferring audio signal mode from a notebook

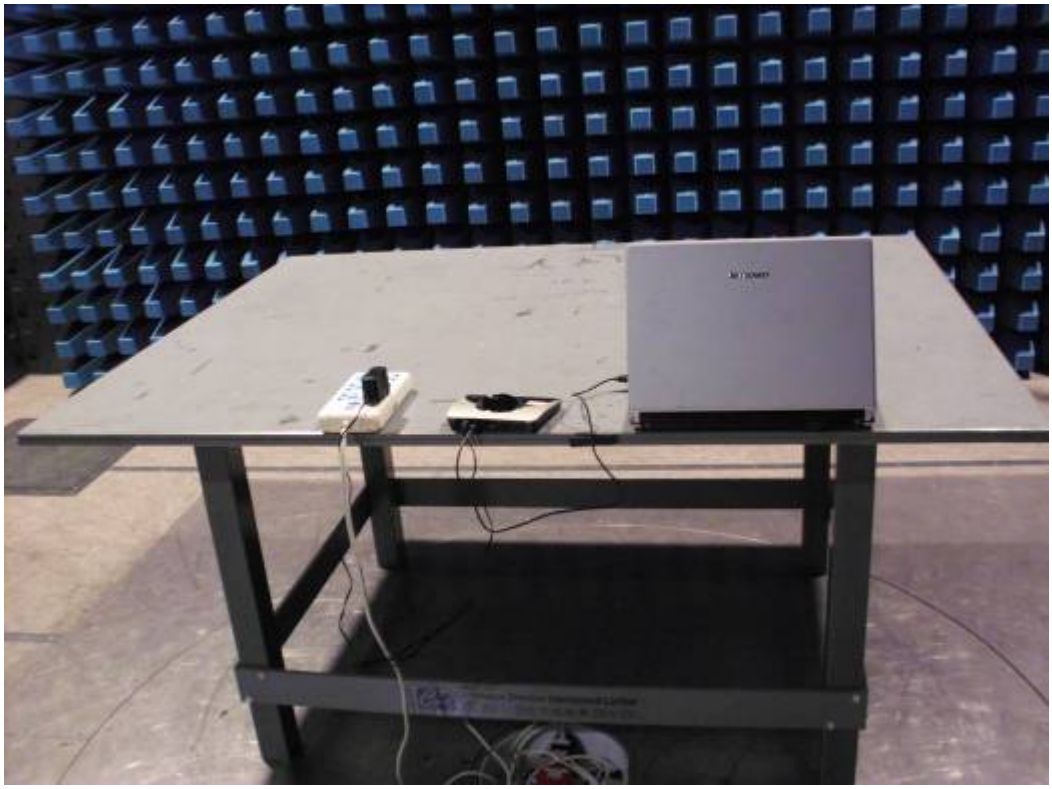


Transferring audio signal mode from an audio generator

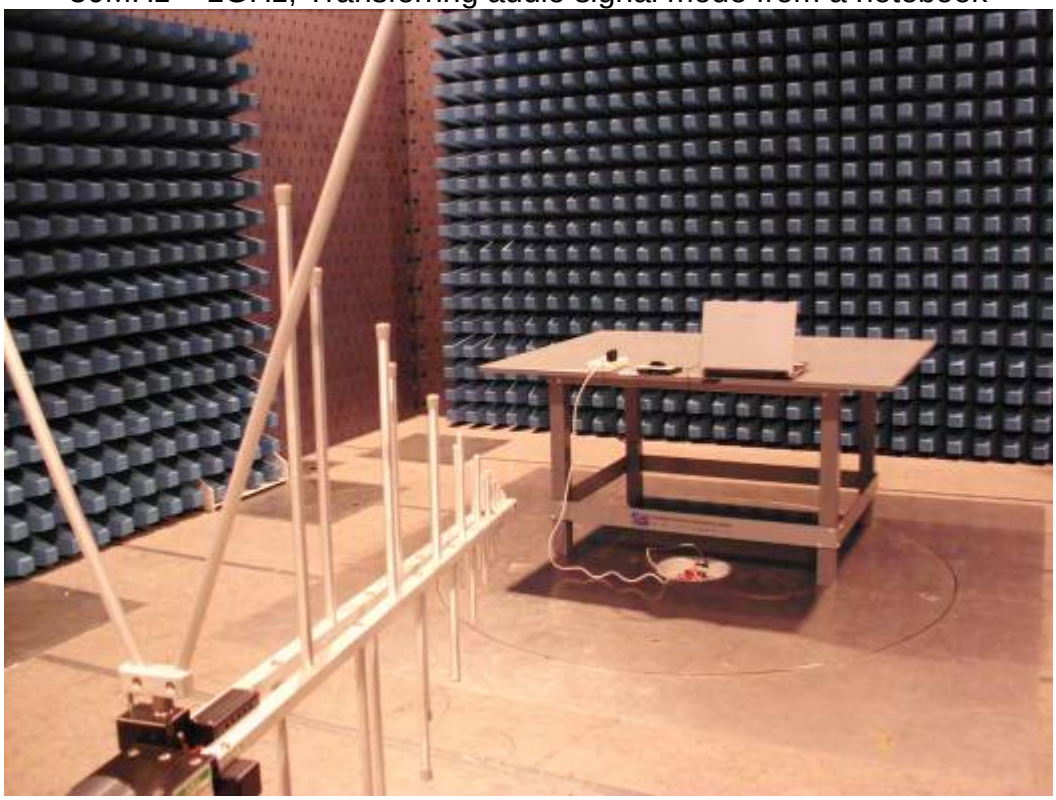
7.2 Radiated Emission Test Setup

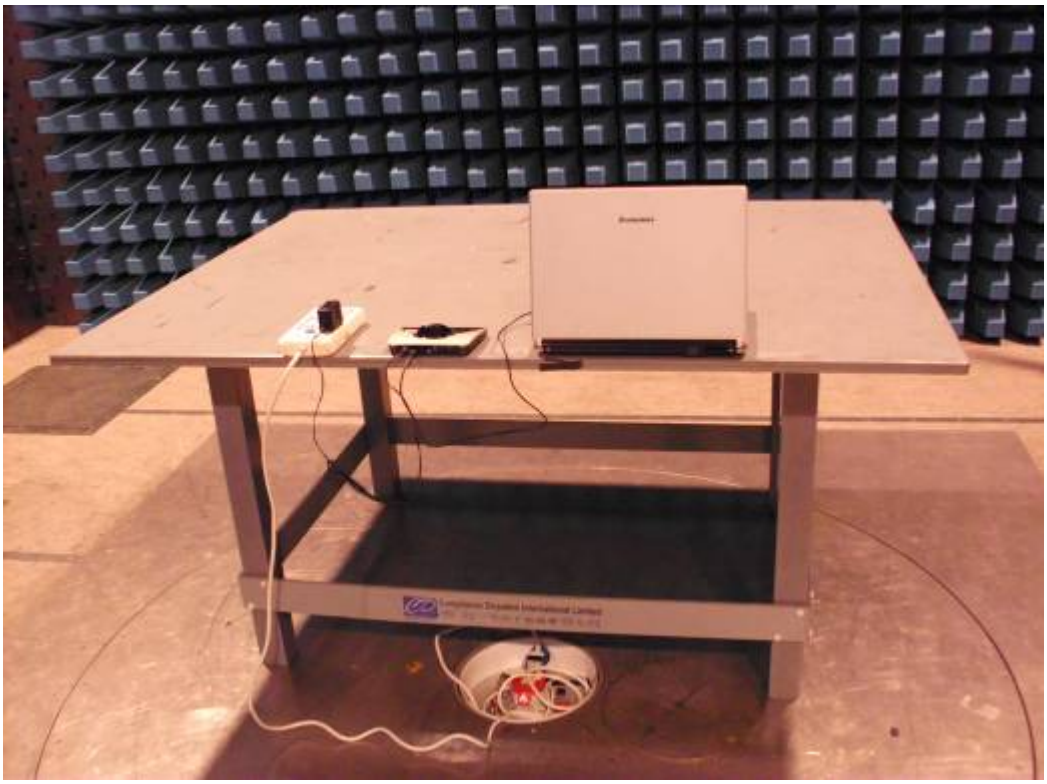
9kHz - 30MHz, transferring audio signal mode from a notebook



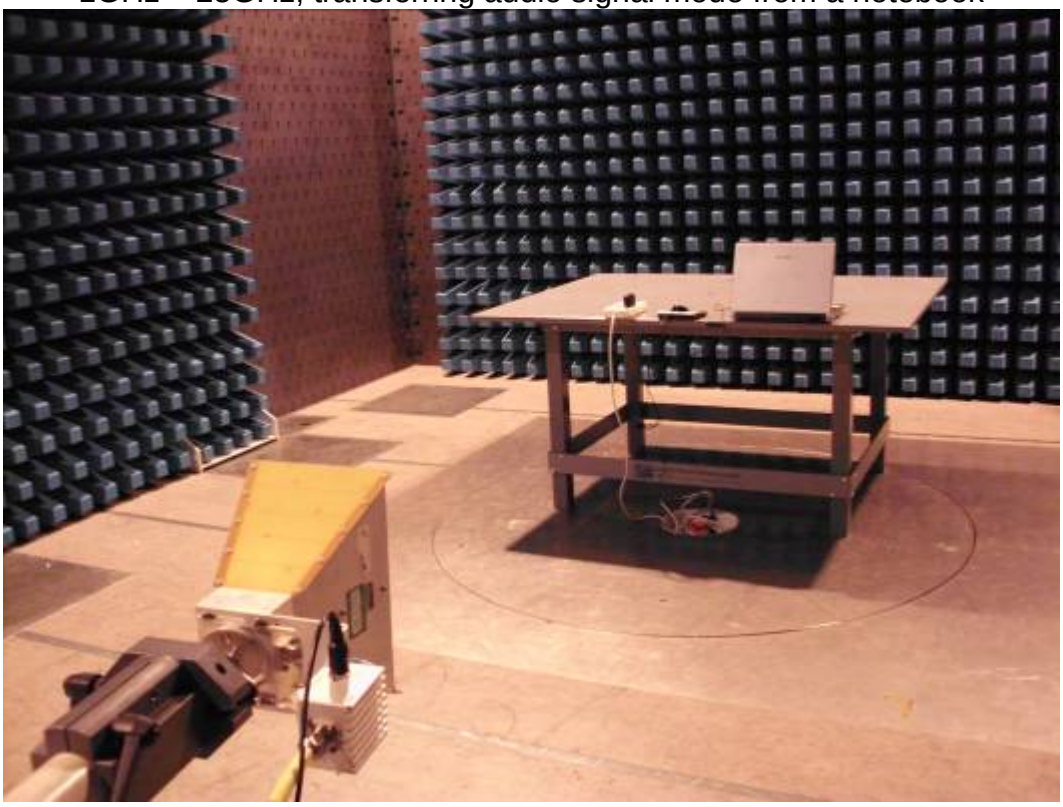


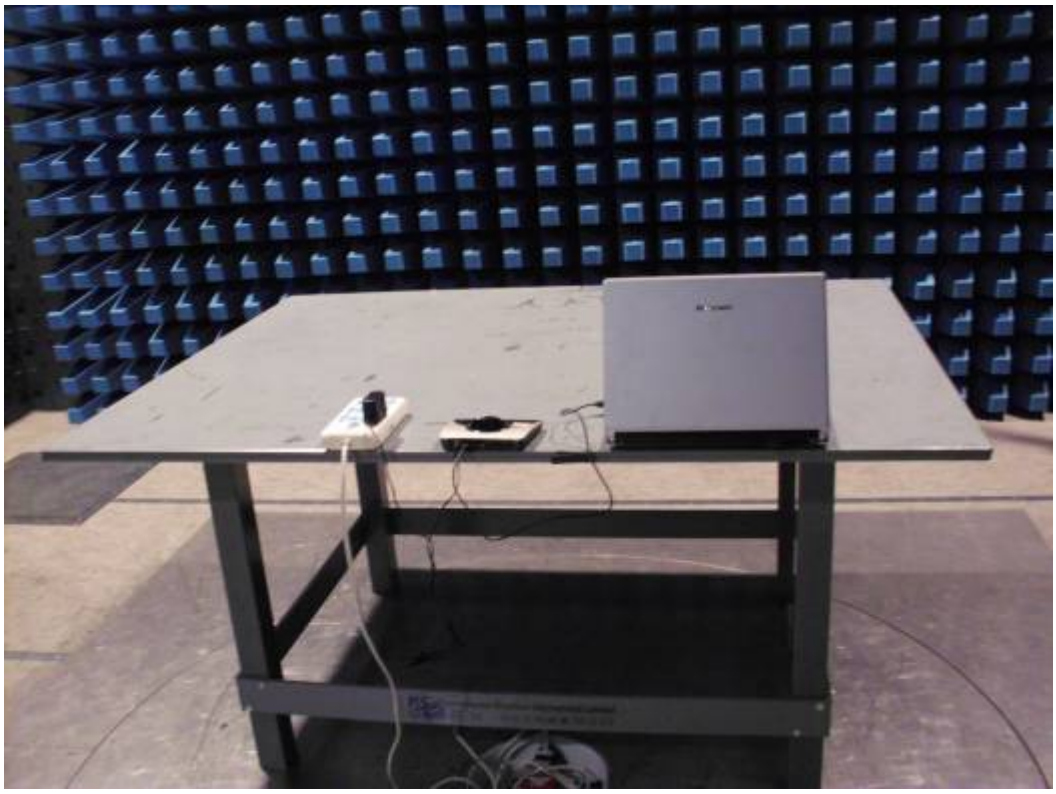
30MHz – 1GHz, Transferring audio signal mode from a notebook



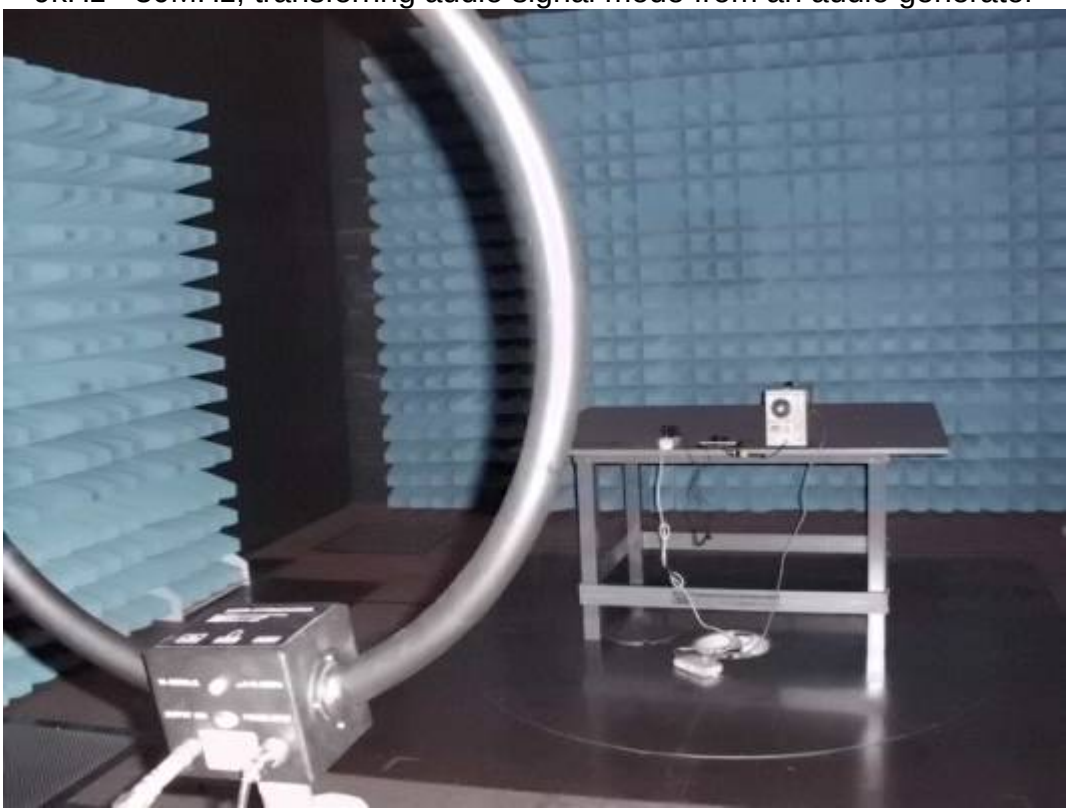


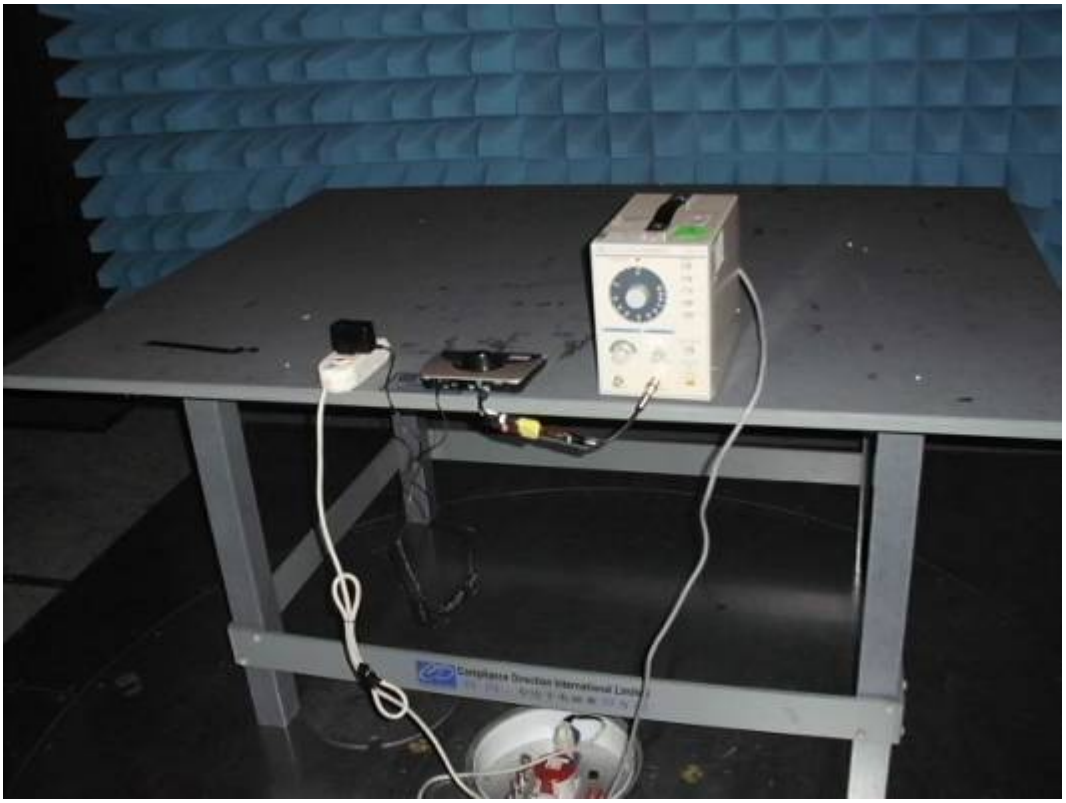
1GHz – 25GHz, transferring audio signal mode from a notebook



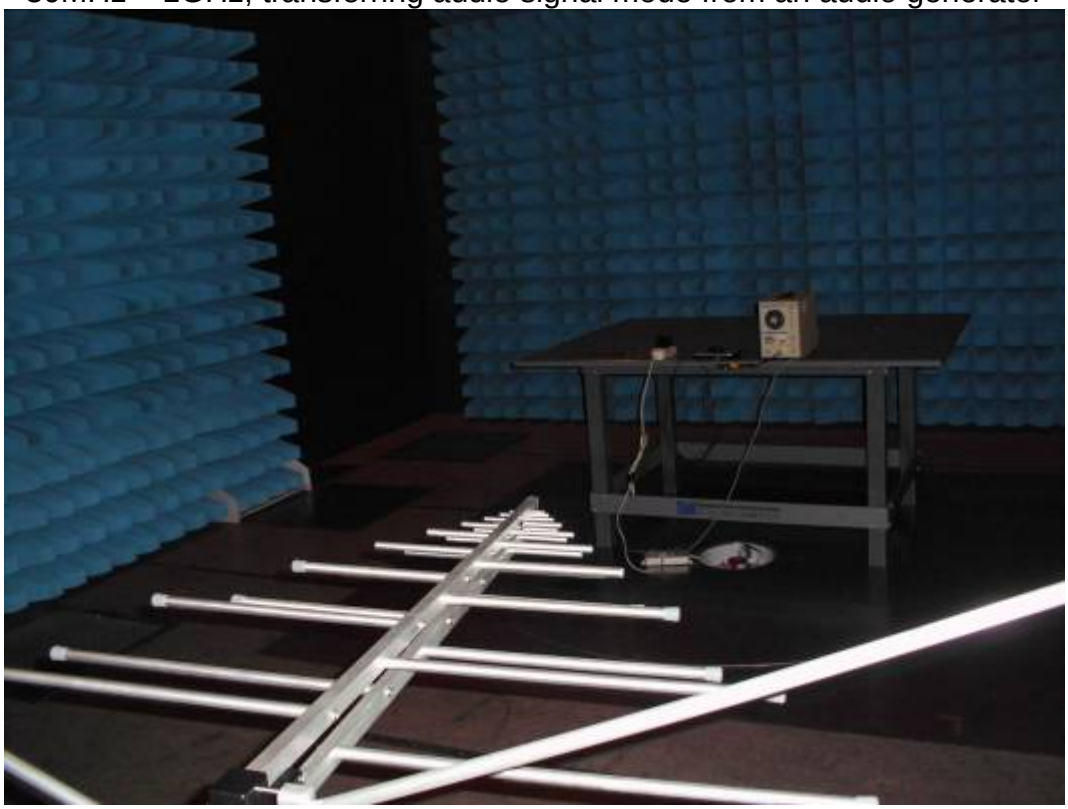


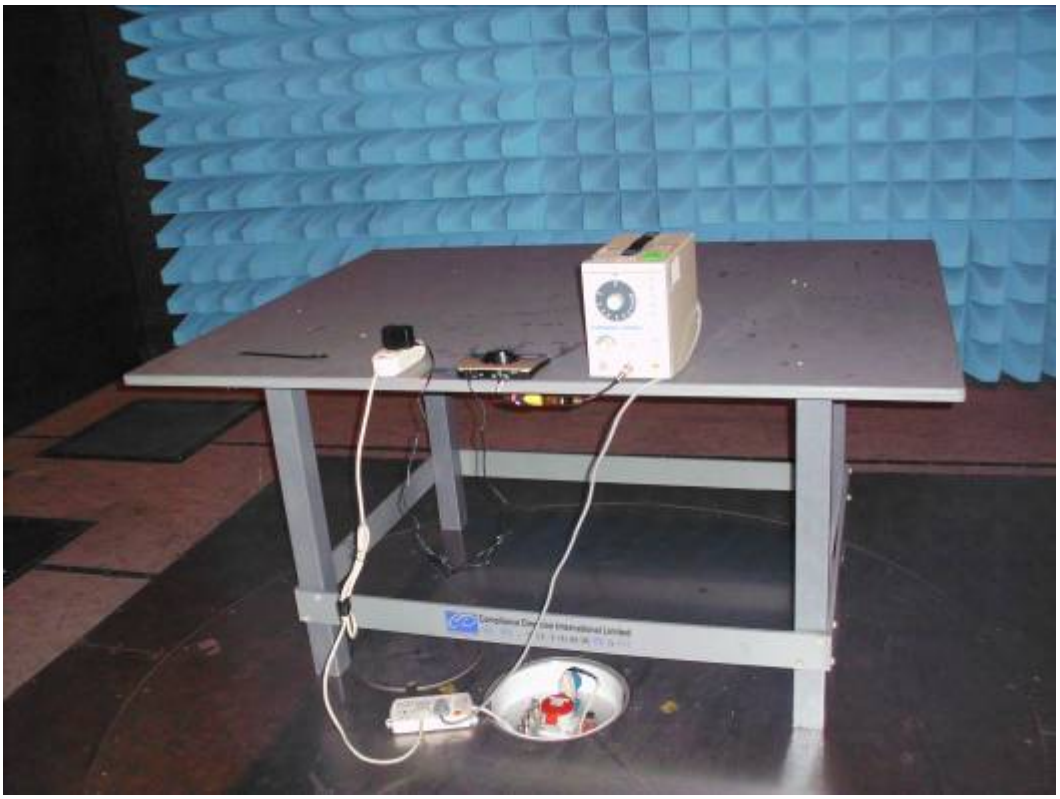
9kHz - 30MHz, transferring audio signal mode from an audio generator



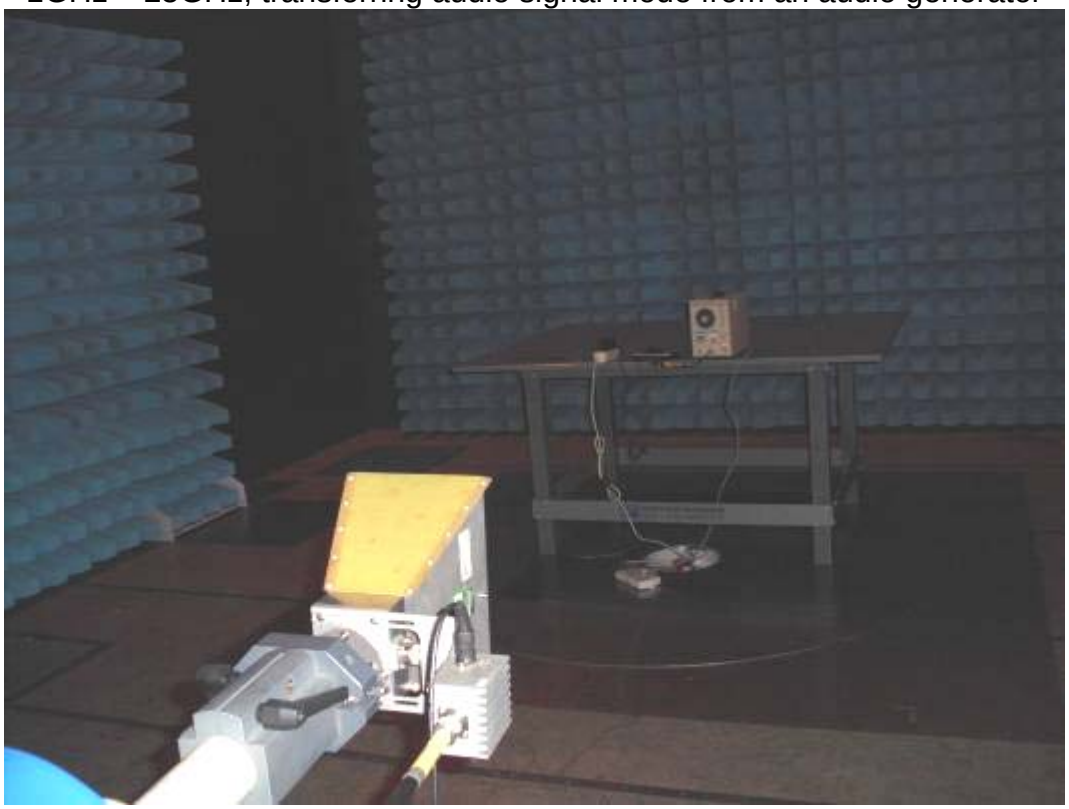


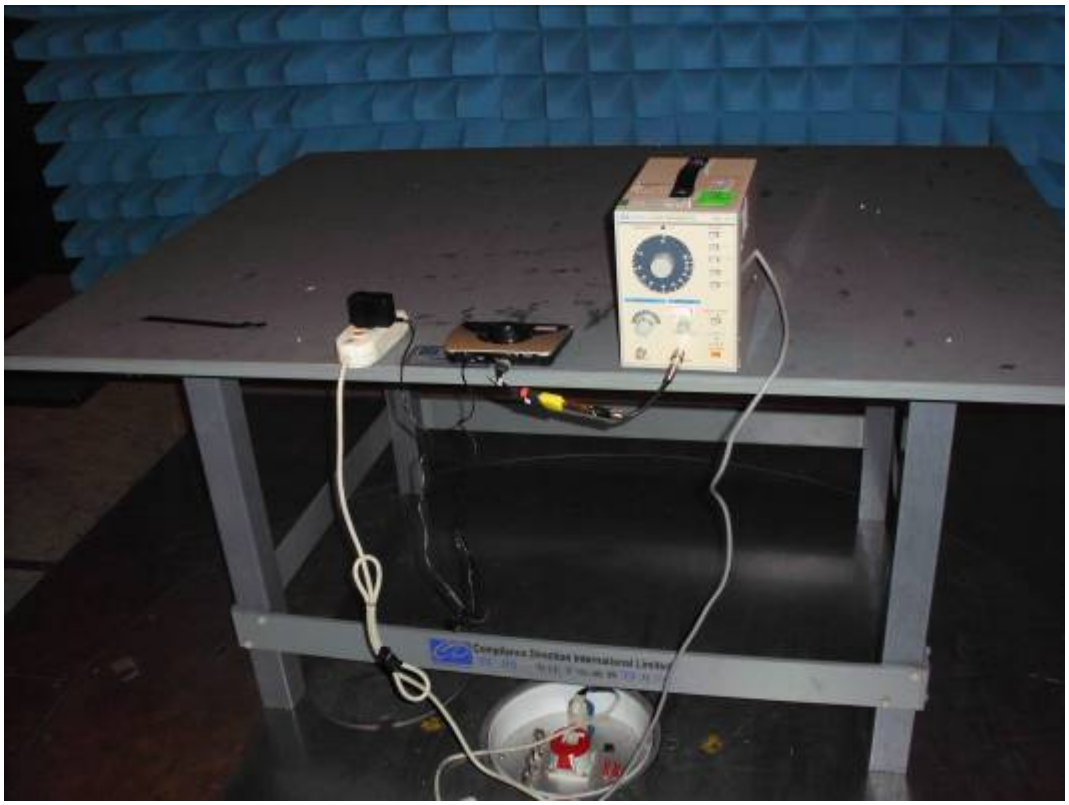
30MHz – 1GHz, transferring audio signal mode from an audio generator





1GHz – 25GHz, transferring audio signal mode from an audio generator

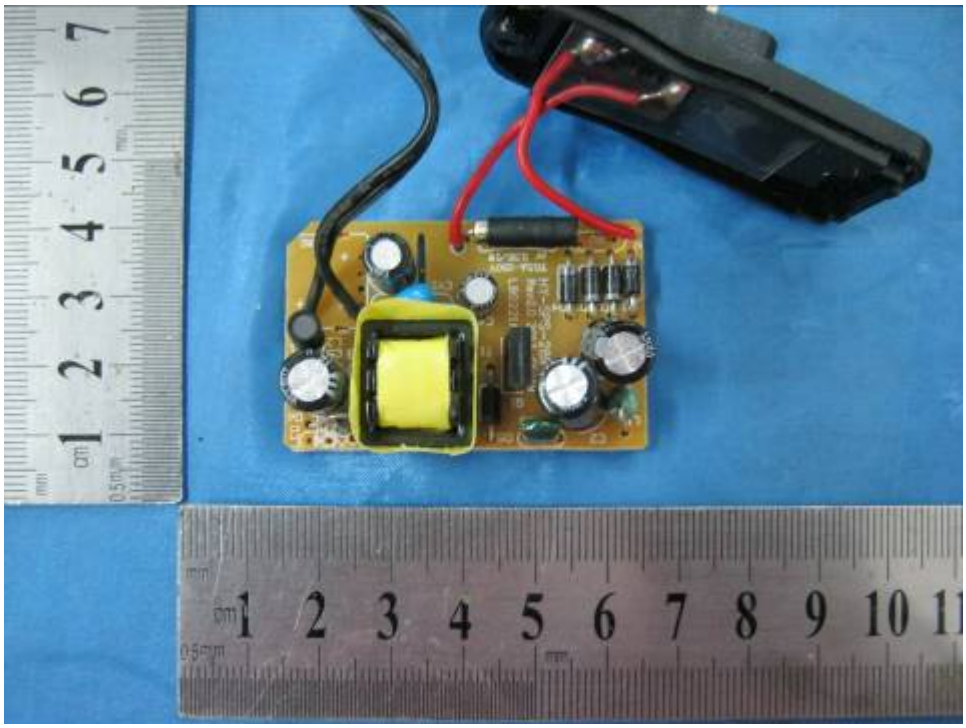


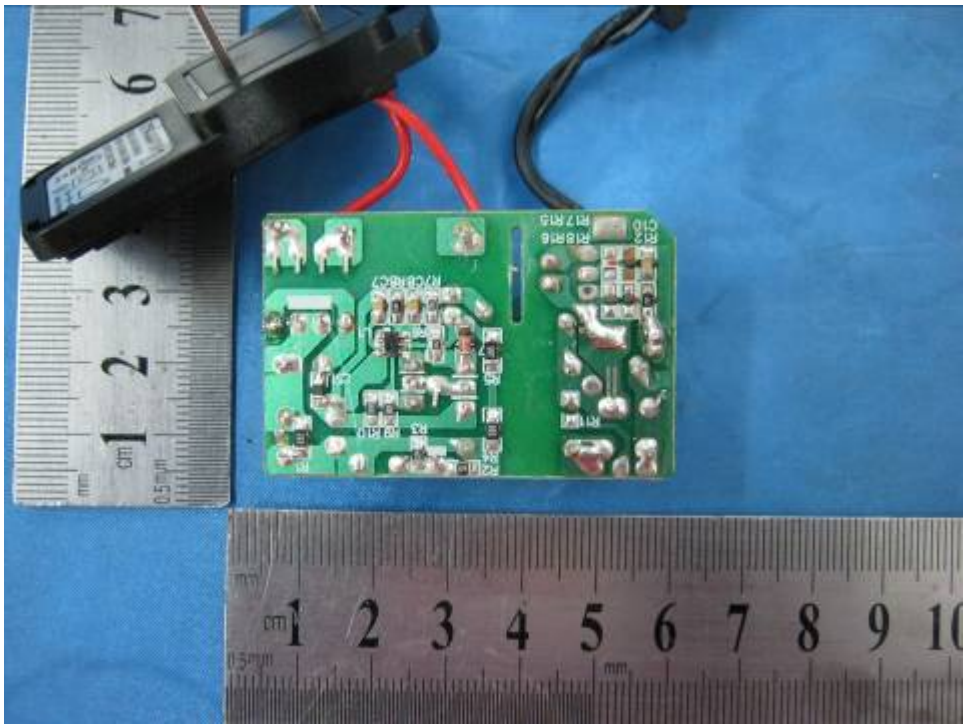


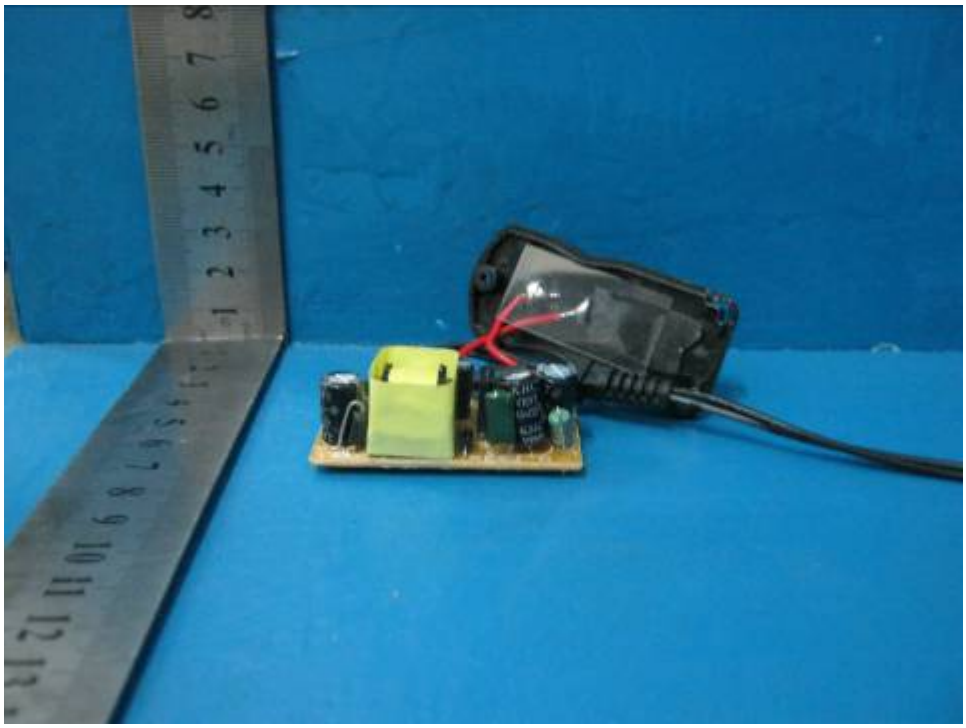
7.3 EUT Constructional Details

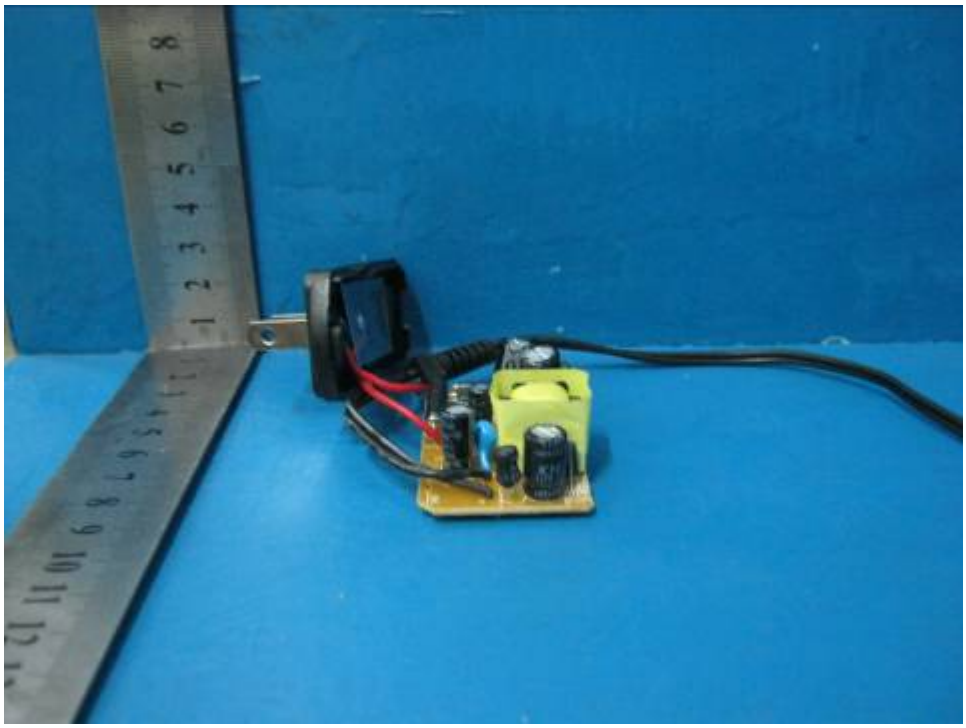
Adapter

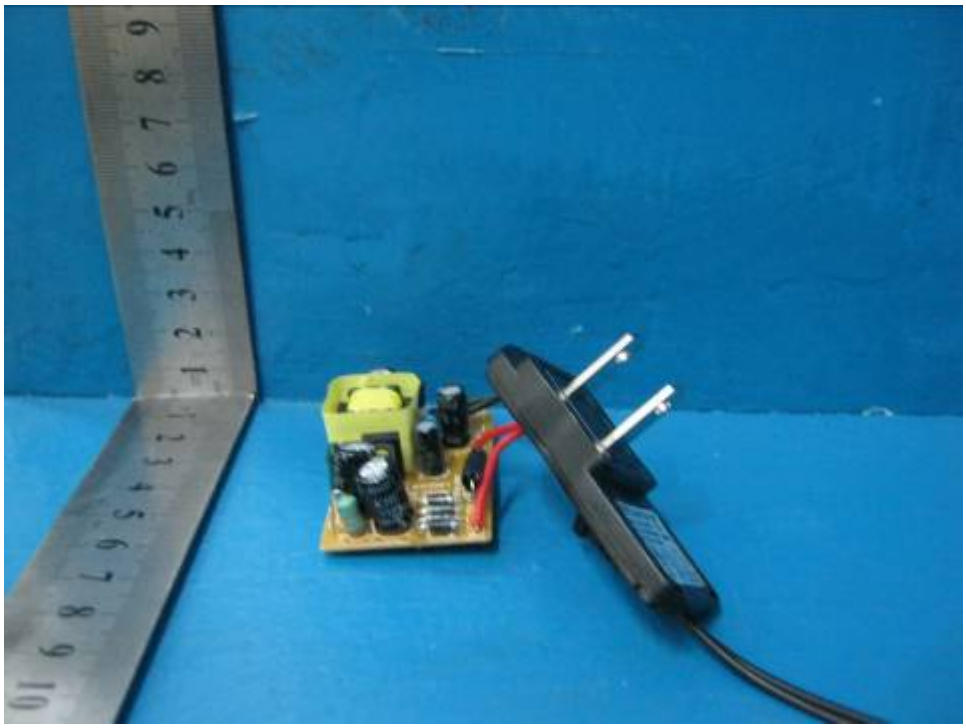

AC/DC ADAPTOR
MODEL:HS06-1200500US
INPUT:100-240VAC 50/60Hz
OUTPUT:12.0V ⎓ 500mA
LISTED
MADE IN CHINA

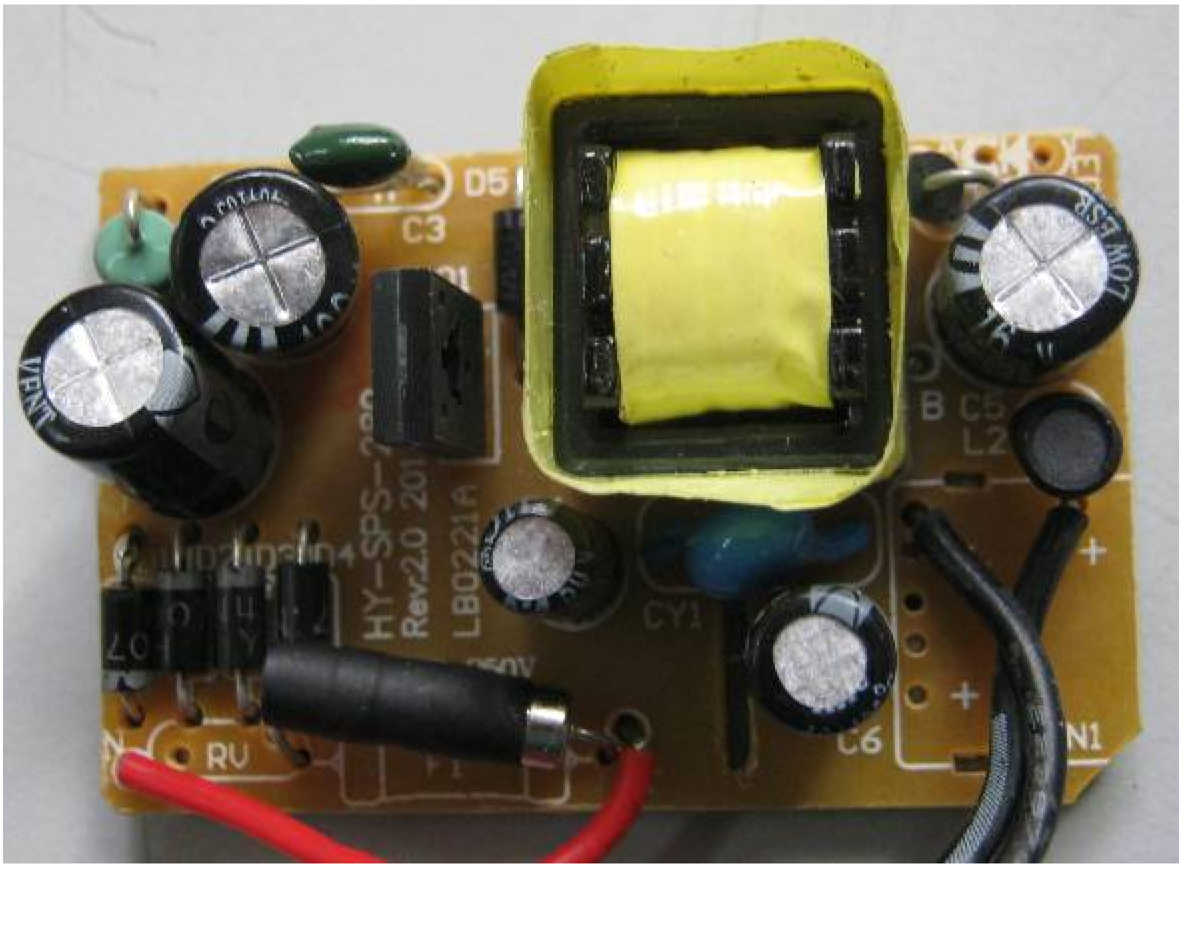


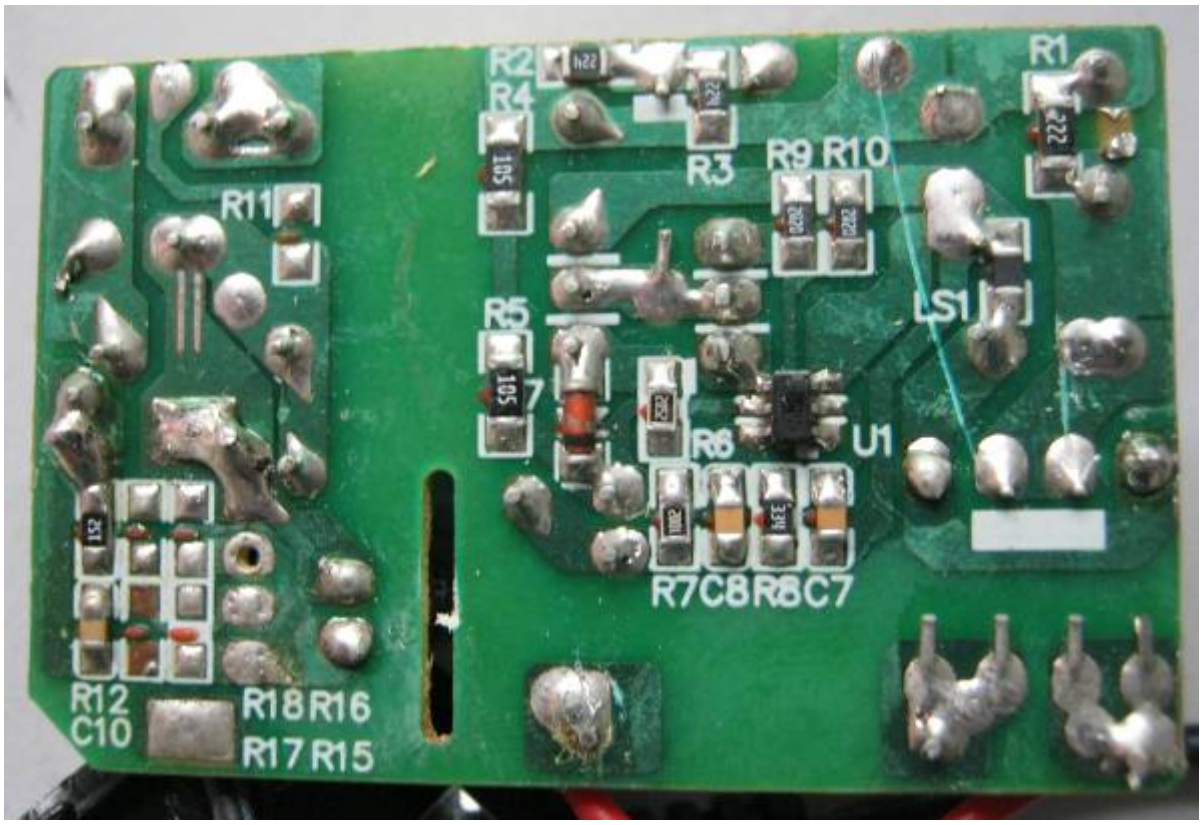









D5
C3
LB0221A
CY1
C6
RU
L2

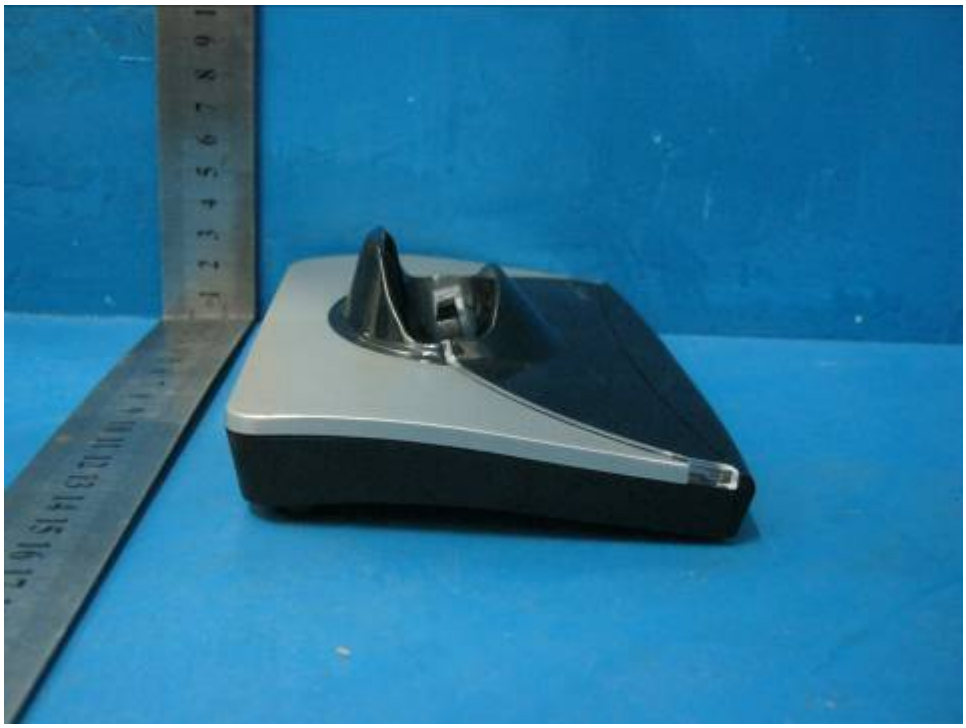

R2
R4
R3
R9 R10
R1
R11
R5
LS1
R6
U1
R7C8R8C7
R12
C10
R18R16
R17R15

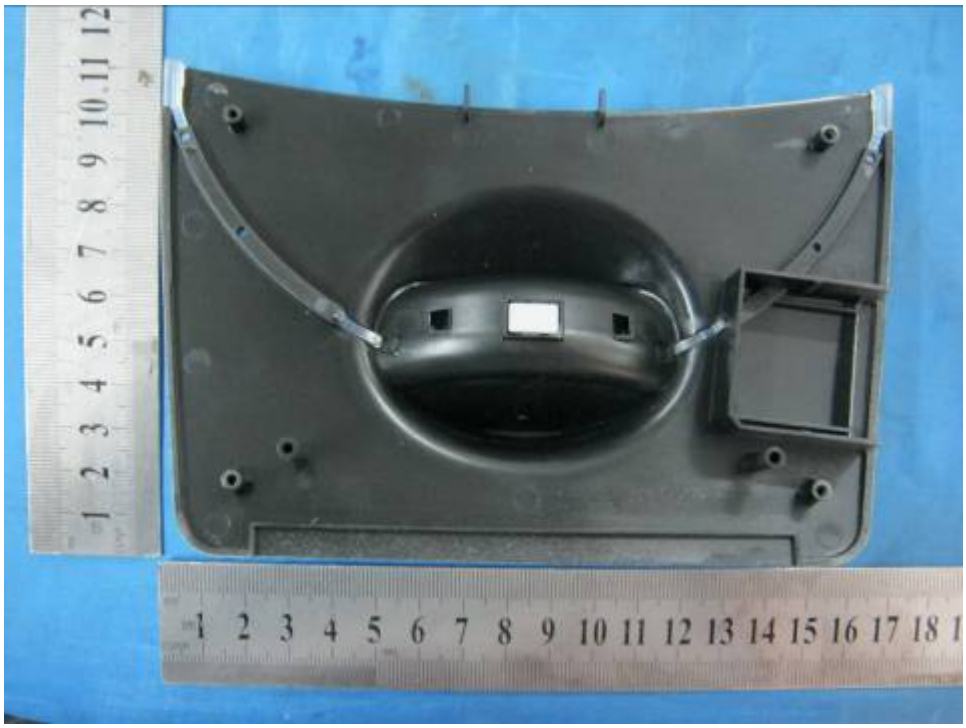
Base

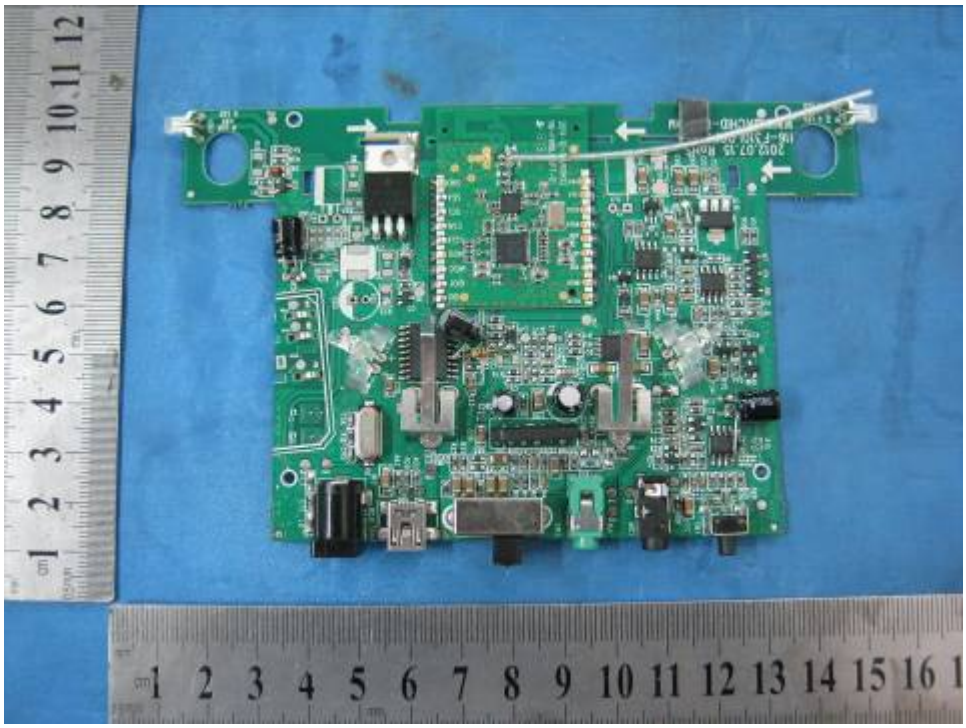

swing
1 2 3 4 5 6 7 8 9 10 11 12 13
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

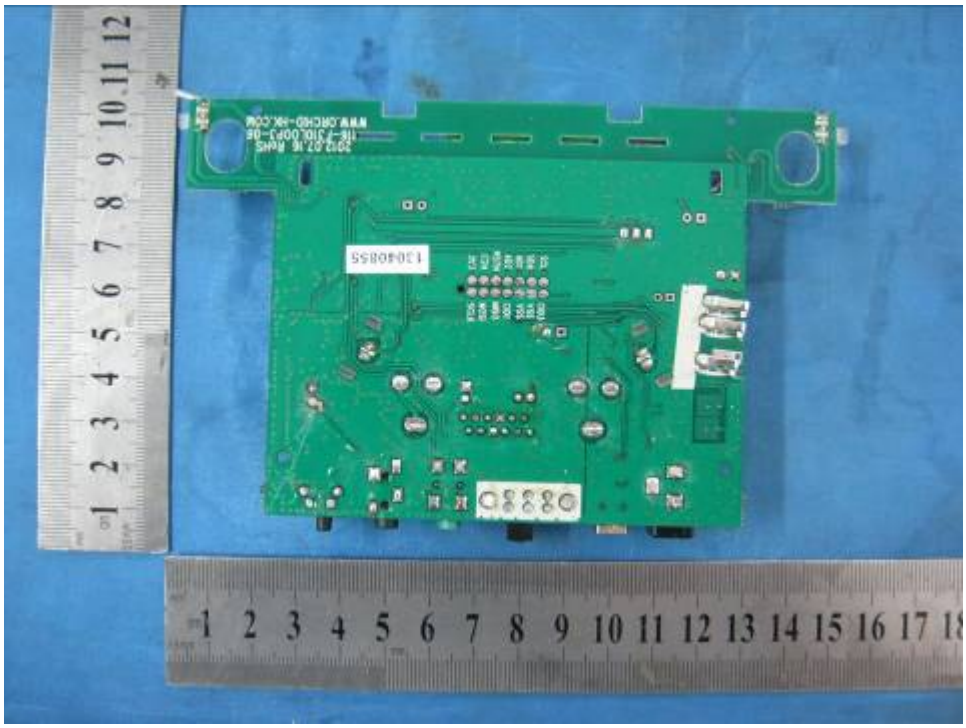

USB
AUDIO
MIC
CONNECT

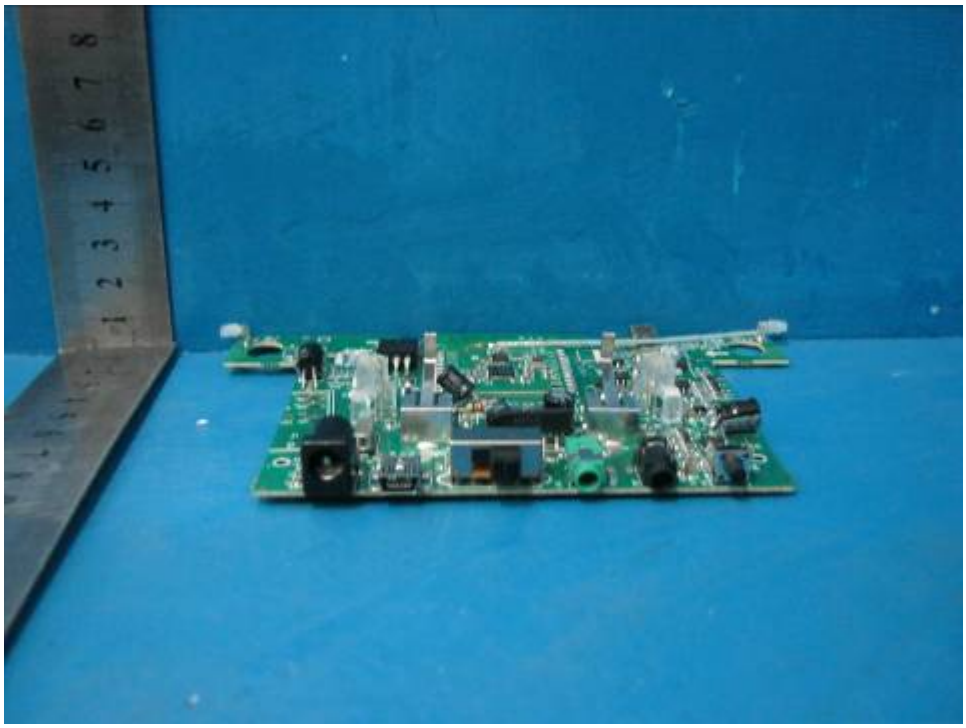

DC 12V
AUDIO
MIC
CONNECT

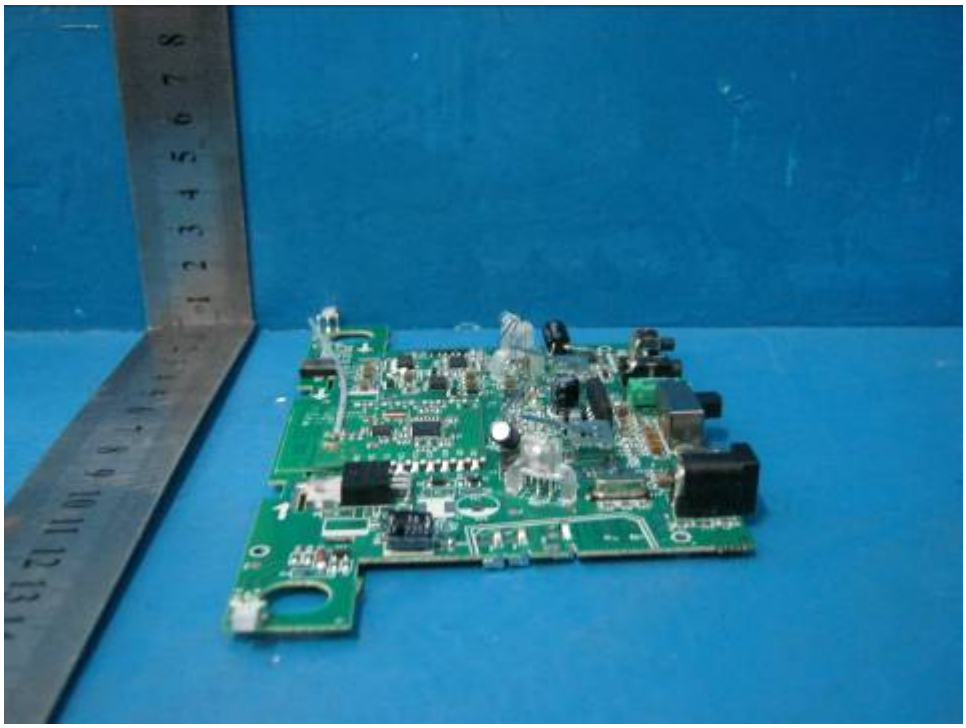


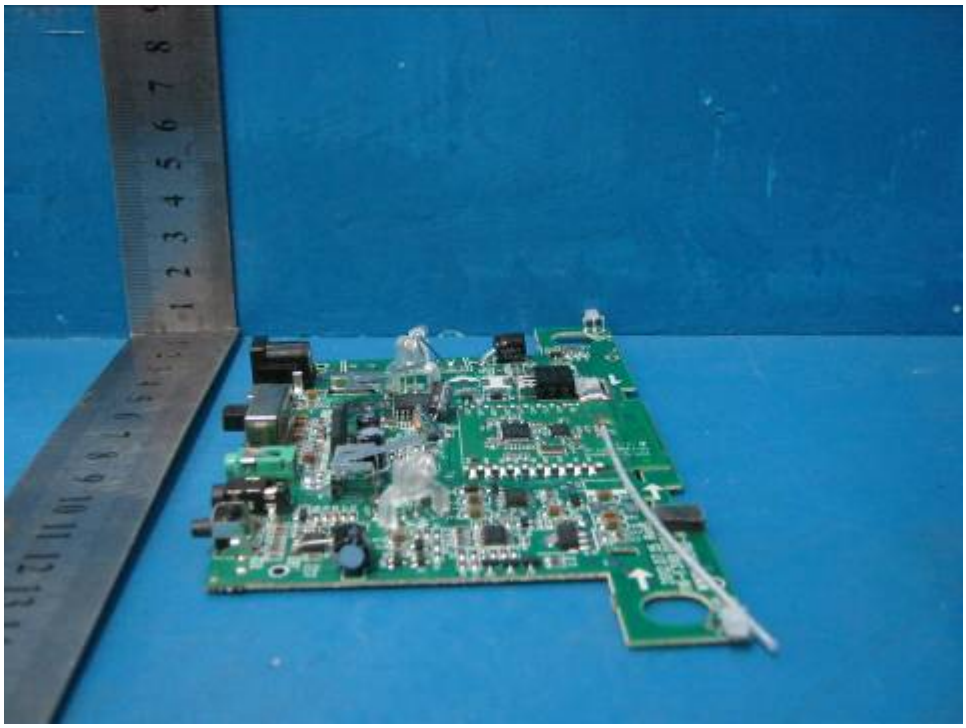


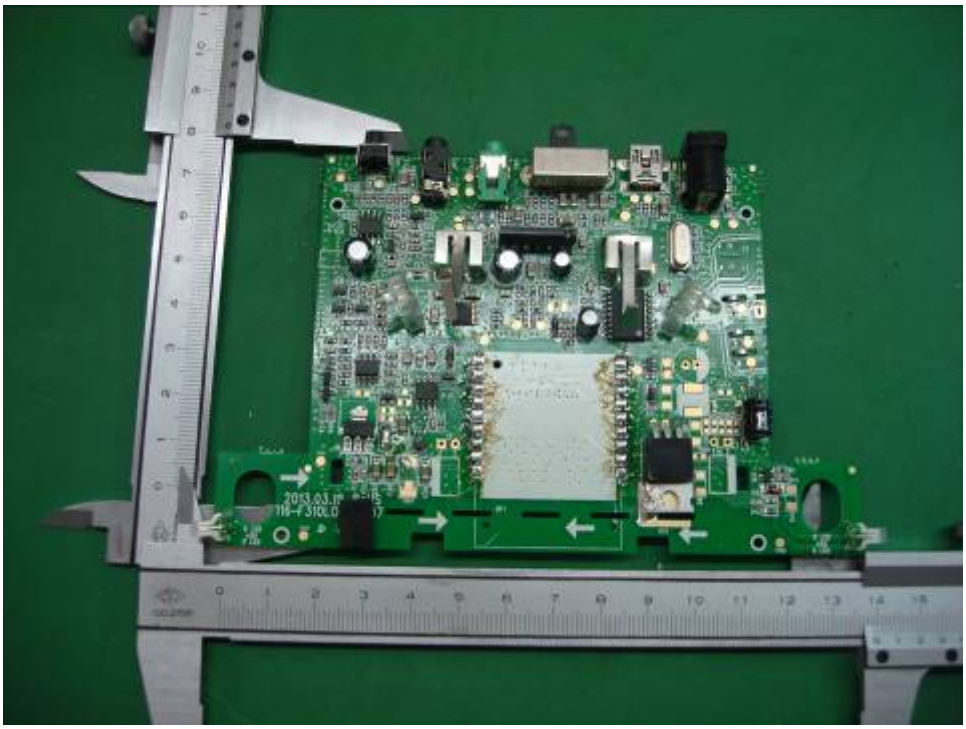


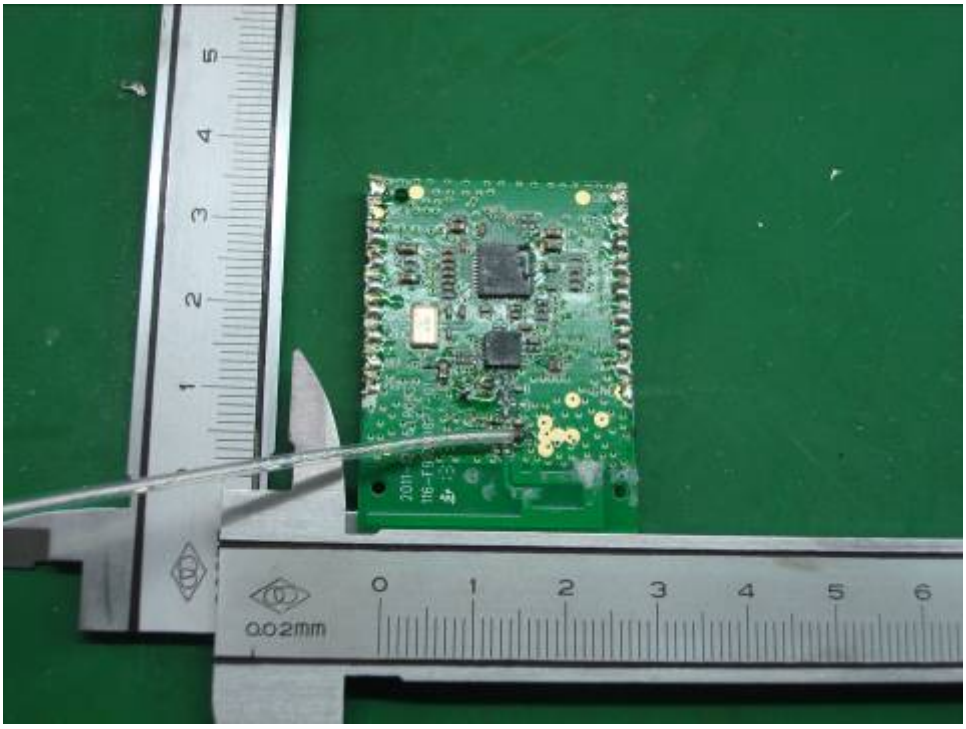


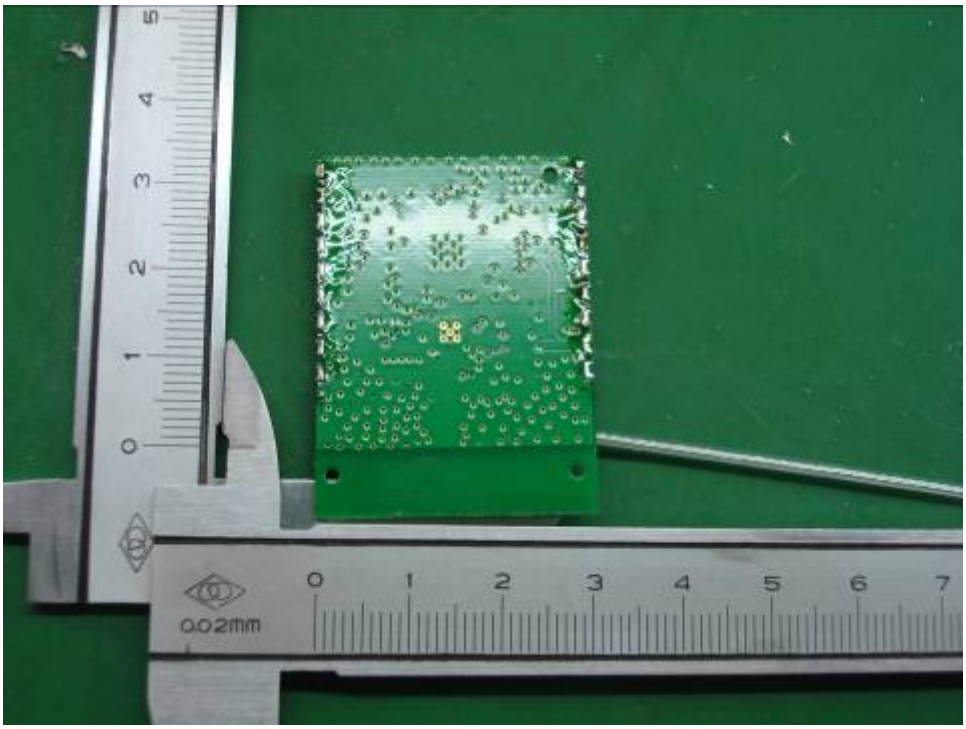


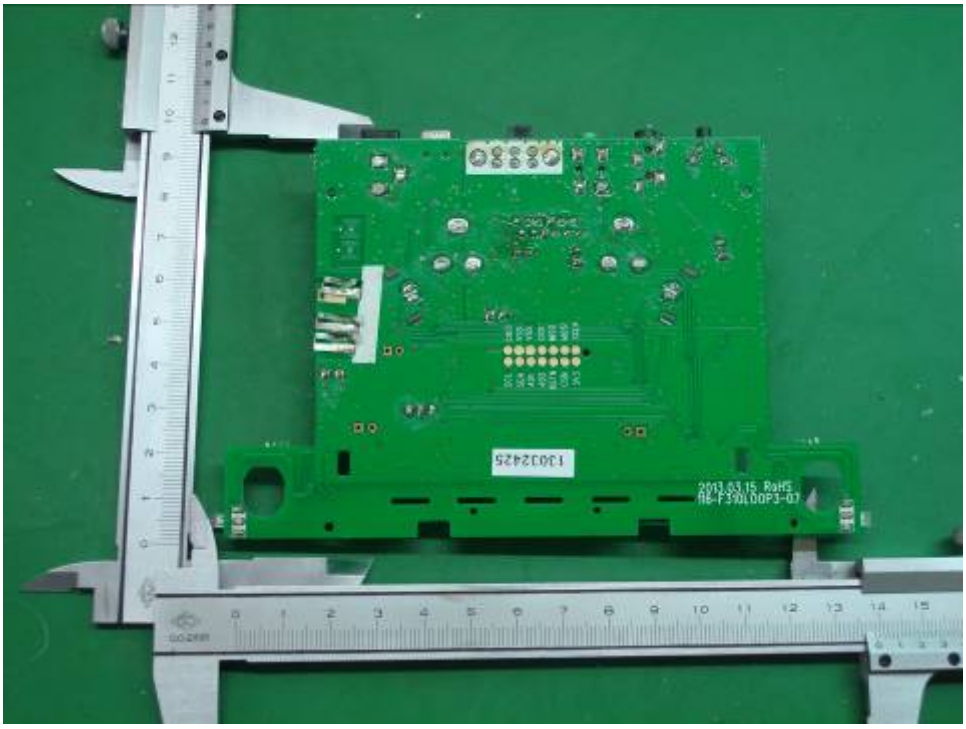


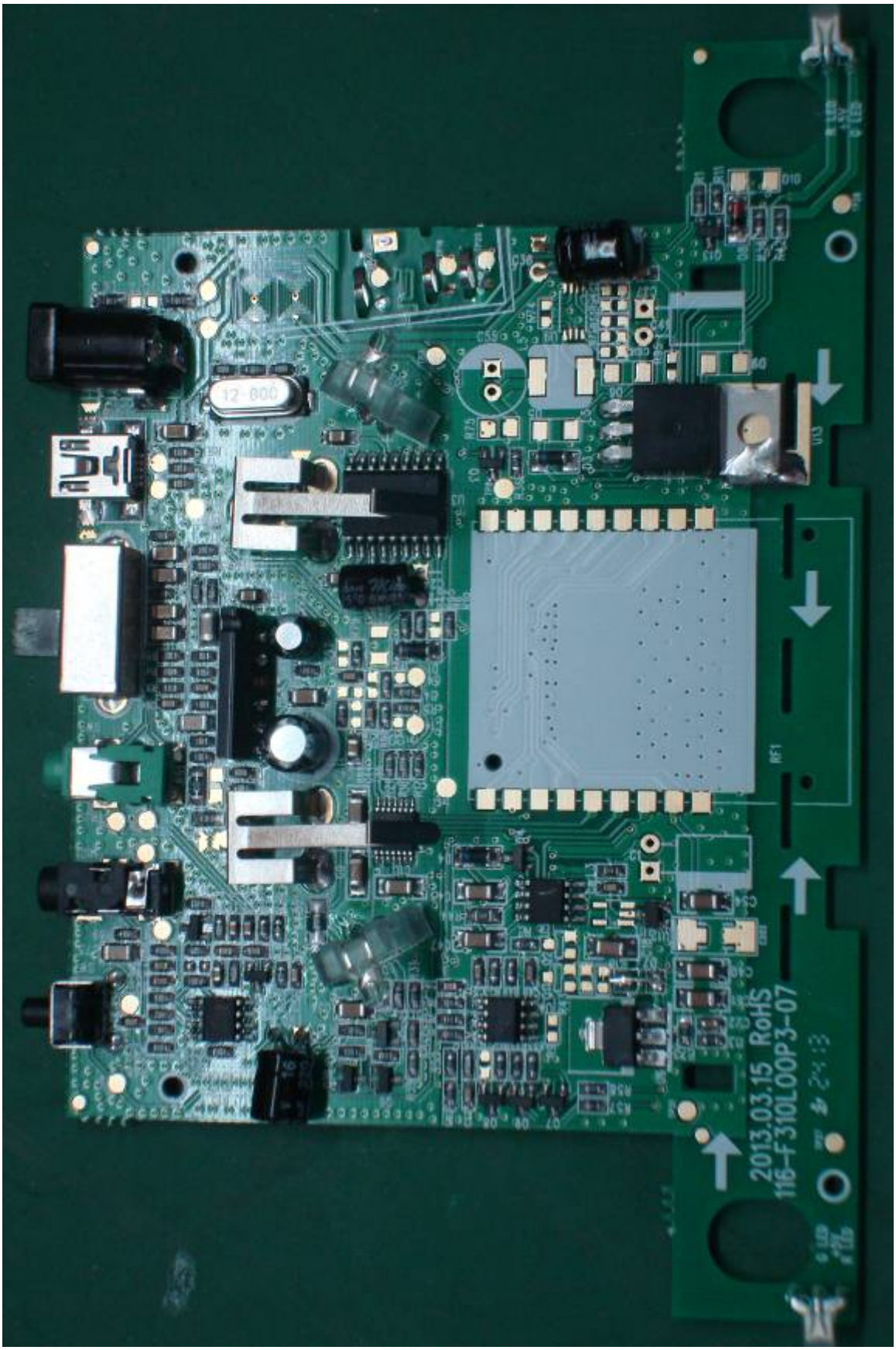


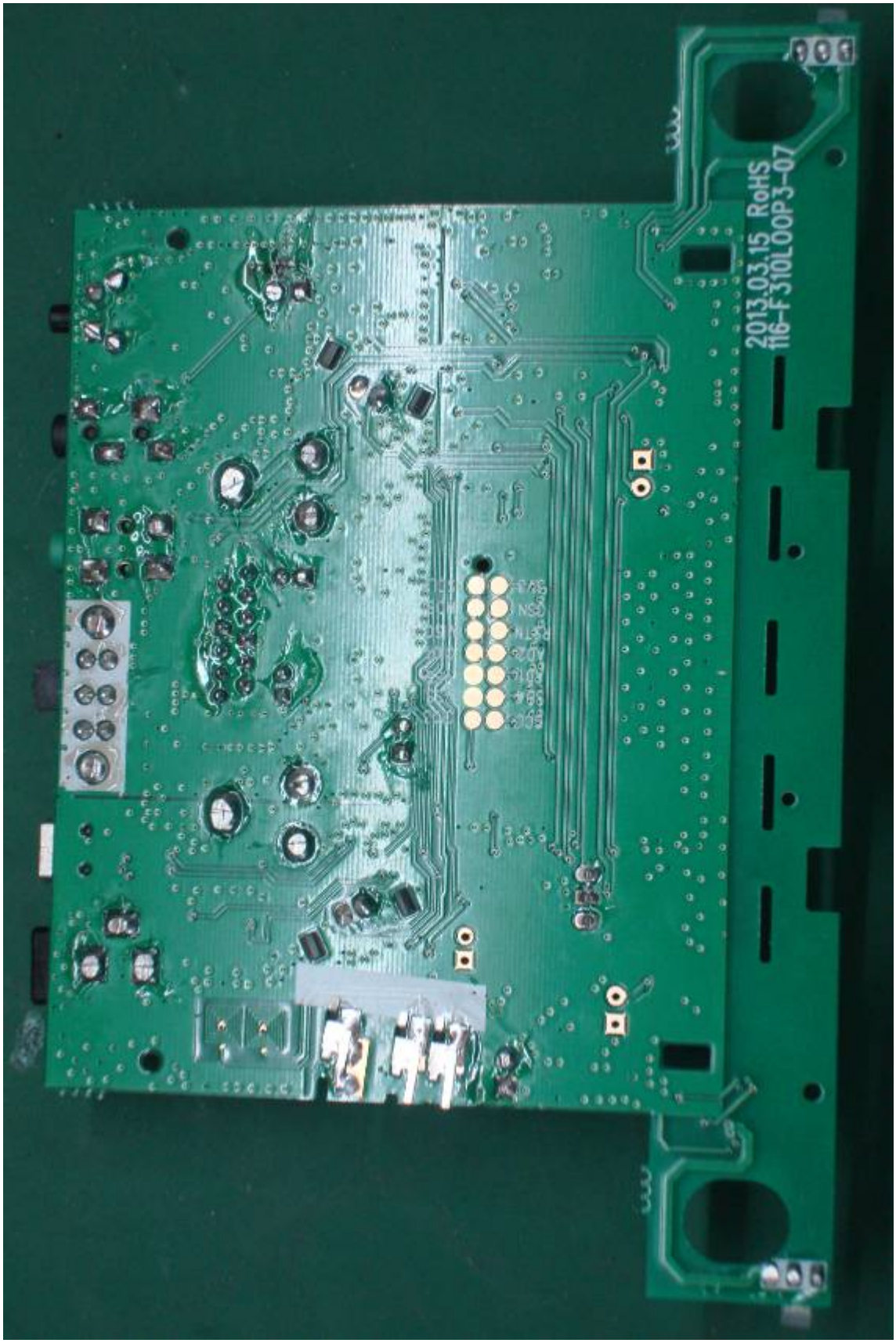


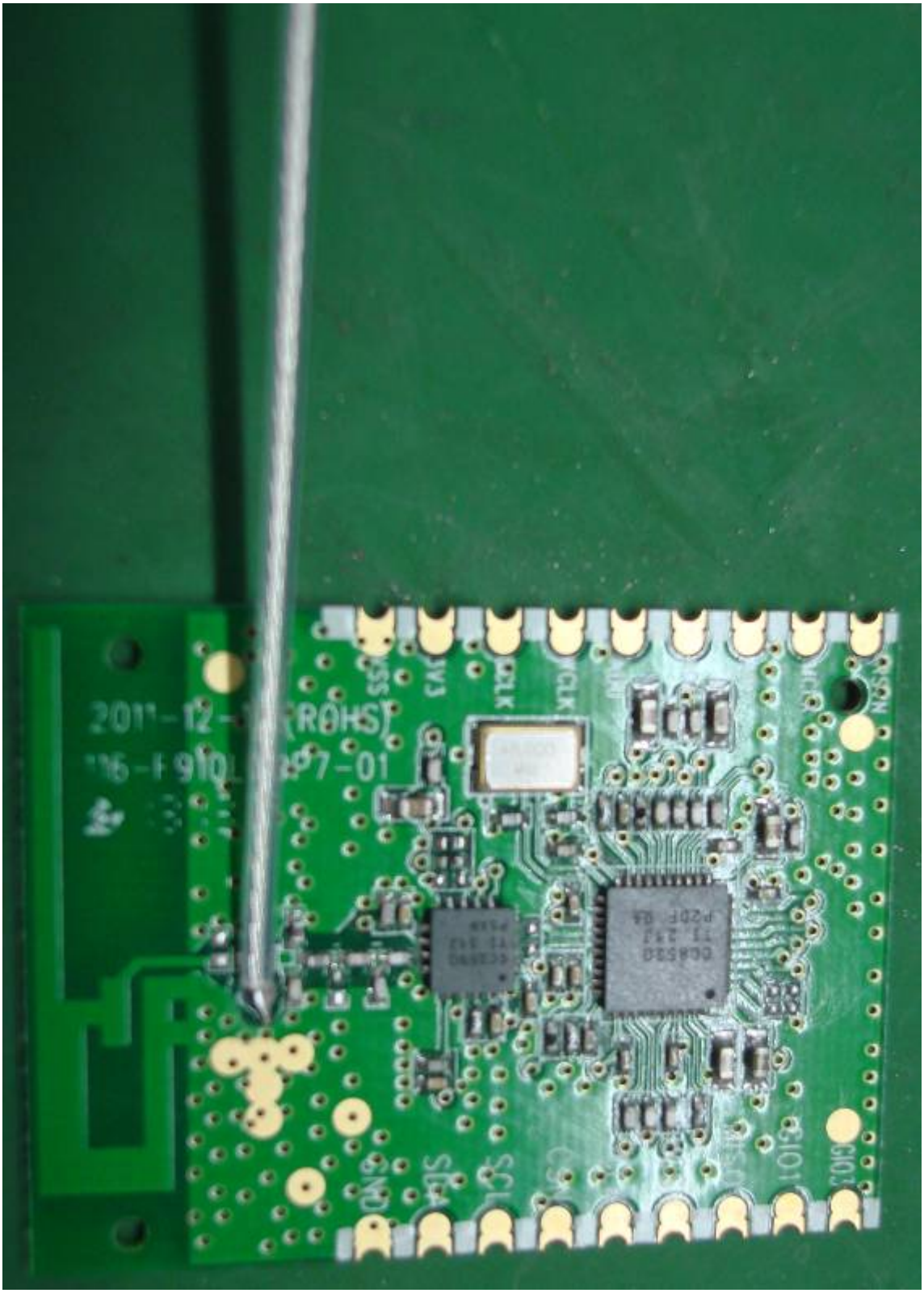

0.02mm

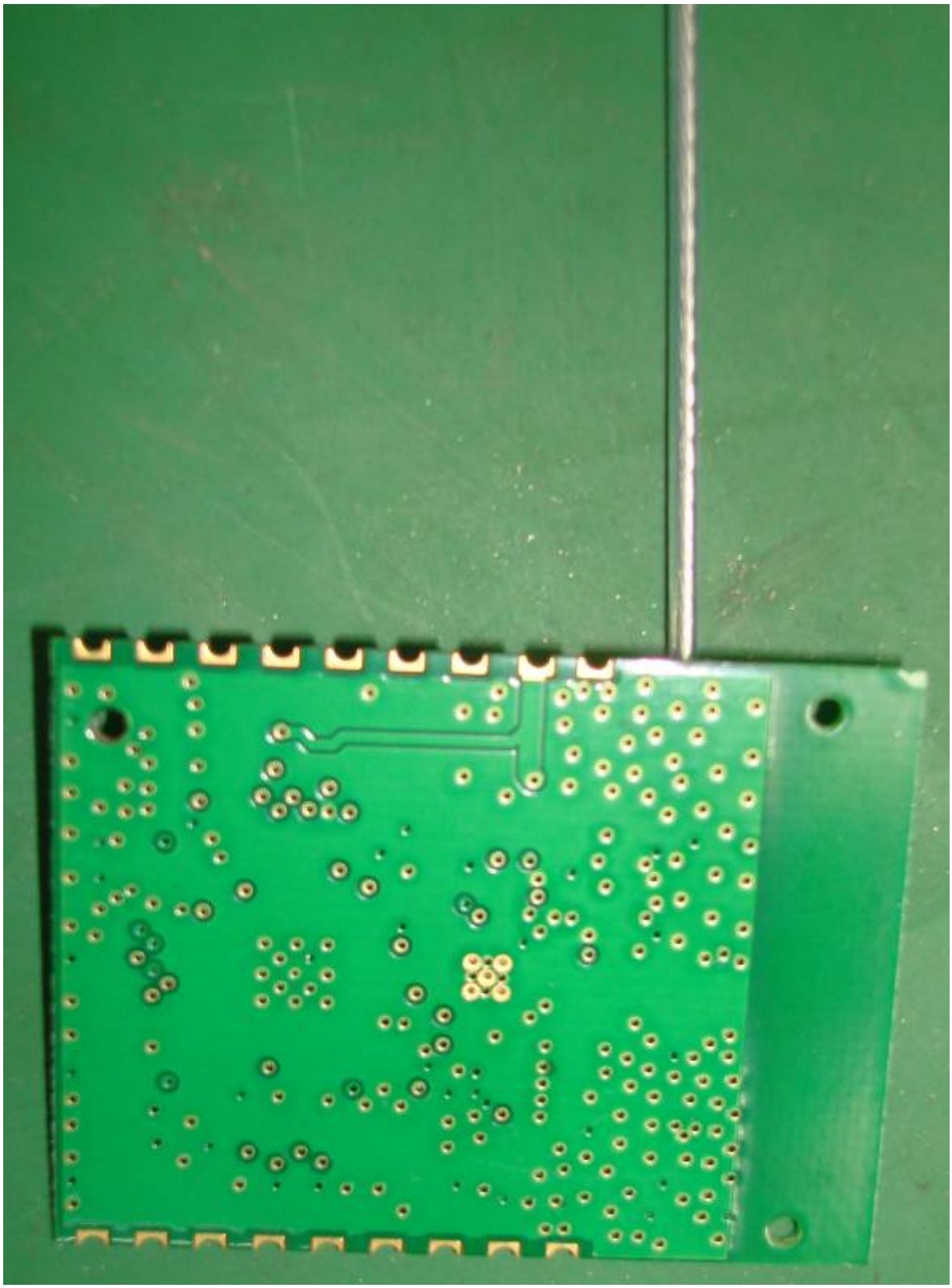

0.02mm




12.000
2013.03.15 RoHS
116-F310L00P3-07

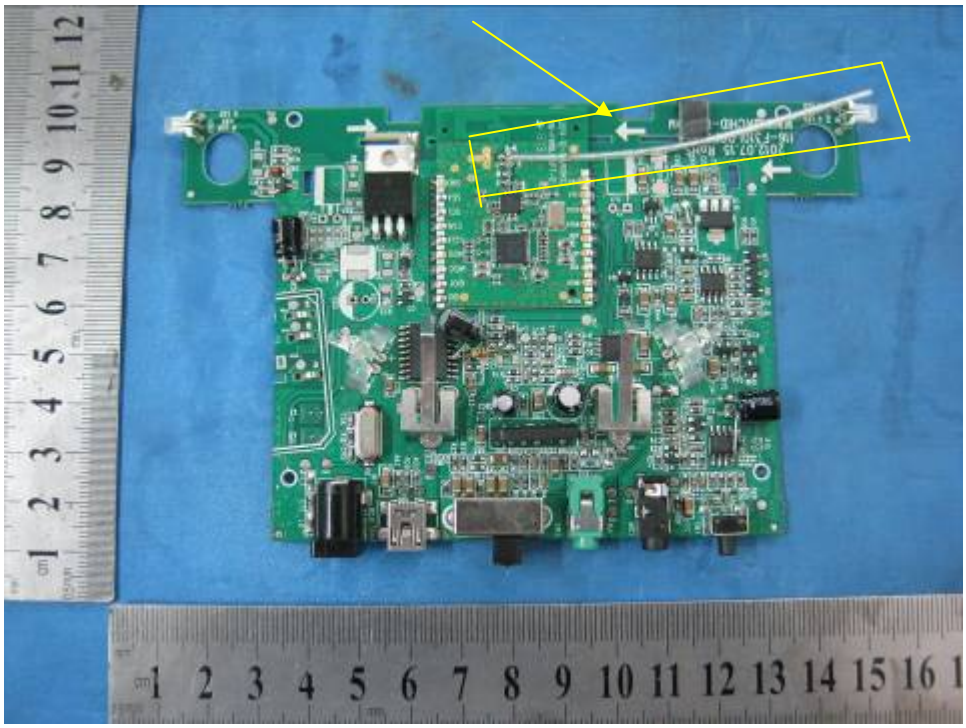

2013.03.15 RoHS
116-F310L00P3-07


CLK
SDA
SCL
GND

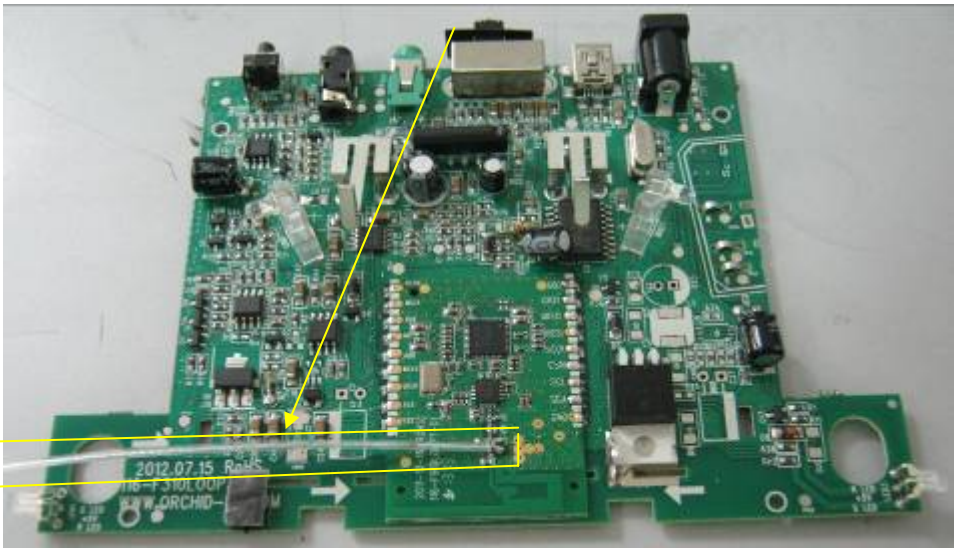


7.4 Antenna Photo

Base Antenna



Antenna



Note:

The EUT was used permanently attached antenna, and it's complied with the requirements of section 15.203: antenna requirement.

*****End of Report*****