FCC EMC TEST REPORT

ISSUED BY
Shenzhen BALUN Technology Co., Ltd.

FOR

Bluetooth Garden Speaker

ISSUED TO
PRIMO INTERNATIONAL CO., LTD.

Rm2509 Ginza International Building 7008 Shennan RD., Futian DIstrict Shenzhen China

Prepared by: lihongmei
Li Hongmei
(Reporting Specialist)
Date: Sep 17, 2014

Approved by:
Wei Yanquan
(Chief Engineer)
Date: Sep 17. 2014

Report No.:	BL-SZ1490015-401
EUT Type:	Bluetooth Garden Speaker
Model Name:	DP-2100, NV-03345 , NV-03346
Brand Name:	N/A
Test Standard:	47 CFR Part 15 Subpart B
Test conclusion:	PASS
Test Date:	Sep 4, 2014 ~ Sep 15, 2014
Date of Issue:	Sep 17, 2014

NOTE: This test report can be duplicated completely for the legal use with the approval of the applicant; it shall not be reproduced except in full, without the written approval of Shenzhen BALUN Technology Co., Ltd. BALUN Laboratory. Any objections should be raised within thirty days from the date of issue. To validate the report, please visit BALUN website.

Block B, 1st FL,Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong, P. R. China 518055
TEL: +86-755-66850100, FAX: +86-755-61824271
Email: info@baluntek.com
www.baluntek.com

Revision History

Version	Issue Date	Revisions
Rev. 01	Sep 17, 2014	Initial Issue

TABLE OF CONTENTS

1 GENERAL INFORMATION 4

1.1 Identification of the Testing Laboratory 4

1.2 Identification of the Responsible Testing Location 4

1.3 Test Environment Condition 4

1.4 Announce 5

2 PRODUCT INFORMATION 6

2.1 Applicant 6

2.2 Manufacturer 6

2.3 General Description for Equipment under Test (EUT) 6

2.4 Ancillary Equipment 6

3 SUMMARY OF TEST RESULTS 7

3.1 Test Standards 7

3.2 Verdict 7

3.3 Test Uncertainty 7

4 GENERAL TEST CONFIGURATIONS 8

4.1 Test Environments 8

4.2 Test Equipment List 8

4.3 Test Enclosure list 9

4.4 Test Configurations 9

4.5 Test Setups 10

4.6 Test Conditions 12

5 TEST ITEMS 13

5.1 Emission Tests 13

ANNEX A TEST RESULTS 15

A.1 Radiated Emission 15

A.2 Conducted Emission 19

ANNEX B TEST SETUP PHOTOS 21

B.1 Radiated Field Strength Measurement 21
B.2 Conducted Emission 22
ANNEX C EUT PHOTOS 23
C.1 Appearance of the EUT 23
C.2 Inside of the EUT 28

1 GENERAL INFORMATION

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6683 3402
Fax Number	+86 755 6182 4271

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 11524A-1. The laboratory has been listed by US Federal Communications Commission to perform electromagnetic emission measurements. The recognition numbers of test site are 832625. The laboratory has met the requirements of the IAS Accreditation Criteria for Testing Laboratories (AC89), has demonstrated compliance with ISO/IEC Standard 17025:2005. The accreditation certificate number is TL-588. The laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L6791.
Description	All measurement facilities used to collect the measurement data are located at Block B, FL 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China 518055

1.3 Test Environment Condition

Ambient Temperature	15 to 35℃
Ambient Relative Humidity	30 to 60%
Ambient Pressure	86 to 106 kPa

1.4 Announce

(1) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.

(2) The test report is invalid if there is any evidence and/or falsification.

(3) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.

(4) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.

(5) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.

2 PRODUCT INFORMATION

2.1 Applicant

Applicant	PRIMO INTERNATIONAL CO., LTD.
Address	Rm2509 Ginza International Building 7008 Shennan RD., Futian DIstrict Shenzhen China

2.2 Manufacturer

Manufacturer	PRIMO INTERNATIONAL CO., LTD.
Address	Rm2509 Ginza International Building 7008 Shennan RD., Futian DIstrict Shenzhen China

2.3 General Description for Equipment under Test (EUT)

EUT Type	Bluetooth Garden Speaker
Under Test Model Name	DP-2100
Series Model Name	DP-2100, NV-03345, NV-03346
Description of Model name differentiation	The equipment model DP-2100 and NV-03345, NV-03346 are Bluetooth Garden Speaker, the electrical parameters and internal structure of circuit are same, only the model is different.
Hardware Version	VER:1.2
Software Version	IE286CF8
Network and Wireless connectivity	BT2.1+EDR
About the Product	The equipment is Bluetooth Garden Speaker, it contains BT Module operating at 2.4GHz ISM band.

Note: The above EUT information in section 2.3 was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

2.4 Ancillary Equipment

Ancillary Equipment 1	Battery	
	Brand Name	N/A
	Model No	N/A
	Capacitance	2200 mAh
	Rated Voltage	3.7 V
	Extreme Voltage	Low: 3.3V / High:4.2V
Ancillary Equipment 2	Remote Control	
Ancillary Equipment 3	USB Cable	
Ancillary Equipment 4	Audio Line	

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	FCC 47 CFR Part 15 Subpart B (10-1-09 Edition)	Unintentional Radiators
2	ANSI C63.4-2009	American National Standard for Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

3.2 Verdict

No.	Description	FCC Rule	Test Verdict	Result
1	Radiated Emission	15.109	PASS	Annex A .1
2	Conducted Emission, DC Ports	15.107	PASS	Annex A .2

3.3 Test Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Measurement	Value
Conducted emissions (9KHz-30MHz)	1.12 dB
Radiated emissions (30MHz-1GHz)	2.11 dB
Radiated emissions (1GHz-18GHz)	3.31 dB

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

Environment Parameter	Selected Values During Tests		
	Temperature	Voltage	Relative Humidity
Normal Temperature, Normal Voltage (NTNV)	23°C~25°C	DC 5V	50%-55%

4.2 Test Equipment List

Radiated Emission Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2014.07.07	2015.07.06	☒
Test Antenna-Loop(9kHz-30MHz)	SCHWARZBECK	FMZB 1519	1519-037	2013.07.02	2015.07.01	☒
Test Antenna-Bi-Log(30MHz-3GHz)	SCHWARZBECK	VULB 9163	9163-624	2013.07.03	2015.07.02	☒
Test Antenna-Horn(1-18GHz)	SCHWARZBECK	BBHA 9120D	9120D-1148	2013.07.02	2015.07.01	☒
Test Antenna-Horn(15-26.5GHz)	SCHWARZBECK	BBHA 9170	9170-305	2013.07.02	2015.07.01	☐
Anechoic Chamber	RAINFORD	9m*6m*6m	N/A	2013.10.07	2014.10.06	☒

Conducted disturbance Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2014.07.07	2015.07.06	☒
LISN	SCHWARZBECK	NSLK 8127	8127-687	2014.07.07	2015.07.06	☐
AMN	SCHWARZBECK	NNBM8124	8124-509	2014.07.07	2015.07.06	☒
AMN	SCHWARZBECK	NNBM8124	8124-510	2014.07.07	2015.07.06	☒
ISN	TESEQ	ISN T800	34449	2014.07.07	2015.07.06	☐

4.3 Test Enclosure list

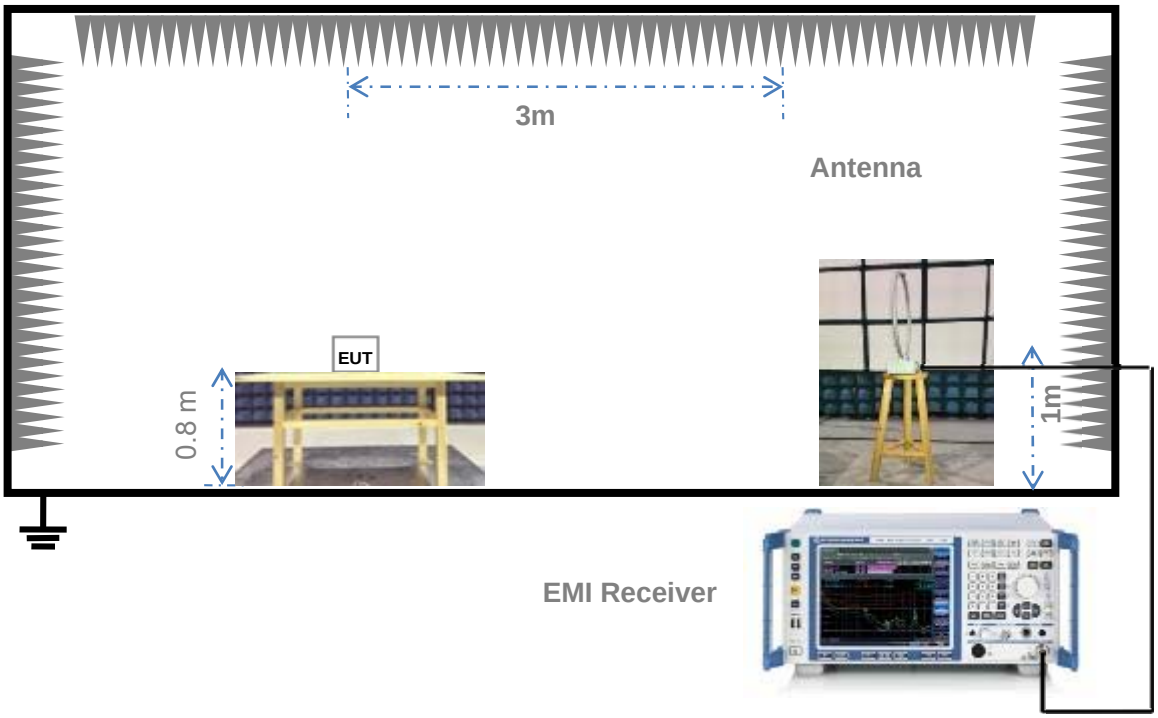
Description	Manufacturer	Model	Serial No.	Length	Description	Use
PC	N/A	N/A	N/A	N/A	Special Handled	☐
Printer	HP	DESKJET 1000	N/A	N/A	N/A	☐
Keyboard	Logitech	Y-BP62a	N/A	N/A	N/A	☐
Mouse	Logitech	M100	N/A	N/A	N/A	☐
USB disk	Kingston	N/A	N/A	N/A	N/A	☐
TF Card	Kingston	N/A	N/A	N/A	N/A	☐
VGA Cable	N/A	N/A	N/A	1.5m	Shielded with core	☐
HDMI Cable	N/A	N/A	N/A	1.5m	Shielded with core	☐
DVI Cable	N/A	N/A	N/A	1.5m	Shielded with core	☐
Coaxial video cable	N/A	N/A	N/A	2m	Shielded with core	☐
Phone	BBK	HCD007TSD	N/A	N/A	N/A	☒
laptop	LENOVO	K29	N/A	N/A	N/A	☒

4.4 Test Configurations

Test Configurations (TC) No.	Description
TC01	The Charge Test mode The EUT configuration of the emission tests is EUT + Battery + laptop + USB cable. During the measurement, the EUT is connected with a laptop via a USB cable supplied by applicant, the EUT is powered by the laptop. And the LED lights is working normally.
TC02	The Working Test mode The EUT configuration of the emission tests is EUT + Battery + Phone + Audio Line. During the measurement, the EUT is connected with the Phone via the audio line, and the data is transmitting between the EUT and the Phone. The EUT working as a player. And the LED lights is working normally.

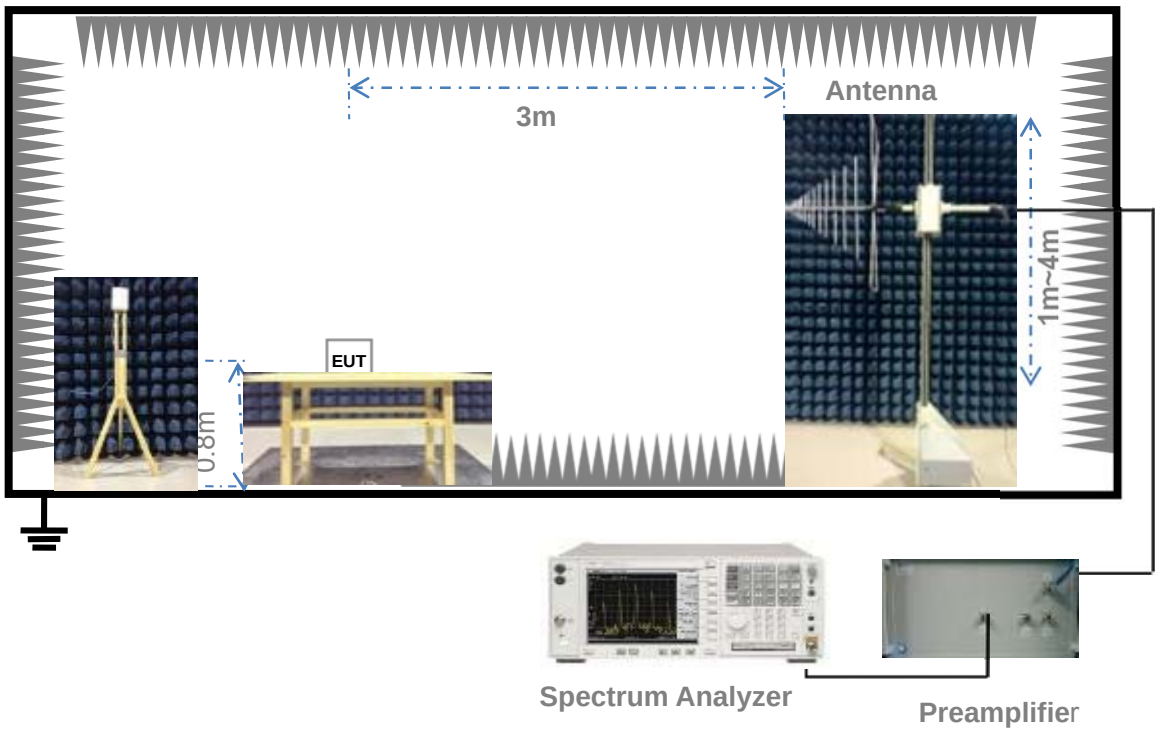
4.5 Test Setups

Test Setup 1



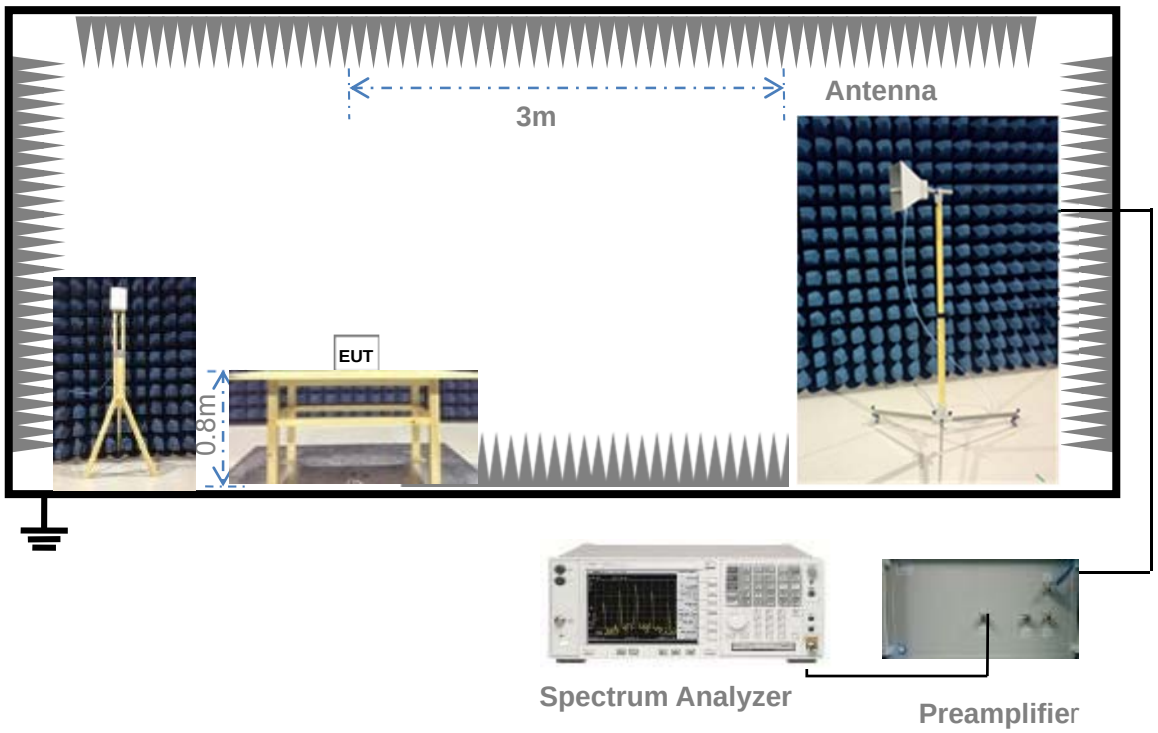
For Radiated Emission Test (Below 30MHz))

Test Setup 2



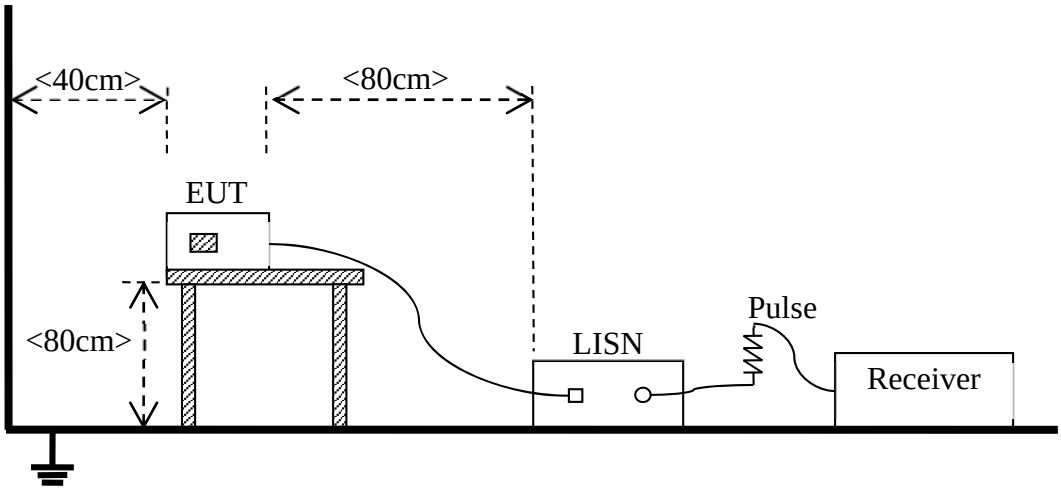
(For Radiated Emission Test (30MHz-1GHz))

Test Setup 3



(For Radiated Emission Test (above 1GHz))

Test Setup 4



(For Conducted Emission, AC Ports Test)

4.6 Test Conditions

Test Case	Test Conditions	
Radiated Emission	Test Env.	NTNV
	Test Setup	Test Setup 1&3
	Test Configuration	TC01~TC02 Note
Conducted Emission, DC Ports	Test Env.	NTNV
	Test Setup	Test Setup 4
	Test Configuration	TC01~TC02 Note

Note: Based on client request, all normal using modes of the normal function were tested but only the worst test data of the worst mode is reported by this report.

5 TEST ITEMS

5.1 Emission Tests

5.1.1 Radiated Emission

5.1.1.1 Limit

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
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:

1) Field Strength (dBμV/m) = 20*log [Field Strength (μV/m)].
2) In the emission tables above, the tighter limit applies at the band edges.
3) For above 1000MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK)

5.1.1.2 Test Procedure

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

An initial pre-scan was performed in the chamber using the EMI Receiver in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by Bi-Log antenna with 2 orthogonal polarities.

5.1.2 Conducted Emission

5.1.2.1 Test Limit

Frequency range (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

NOTE:

1) The limit is applicable to Class B ITE.
2) The lower limit shall apply at the band edges.
3) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50MHz.

5.1.2.2 Test Procedure

The EUT is connected to the power mains through a LISN which provides 50Ω/50μH of coupling impedance for the measuring instrument. The test frequency range is from 150 kHz to 30MHz. The maximum conducted interference is searched using Peak (PK), Quasi-peak (QP) and Average (AV) detectors; the emission levels that are more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed.

ANNEX A TEST RESULTS

A.1 Radiated Emission

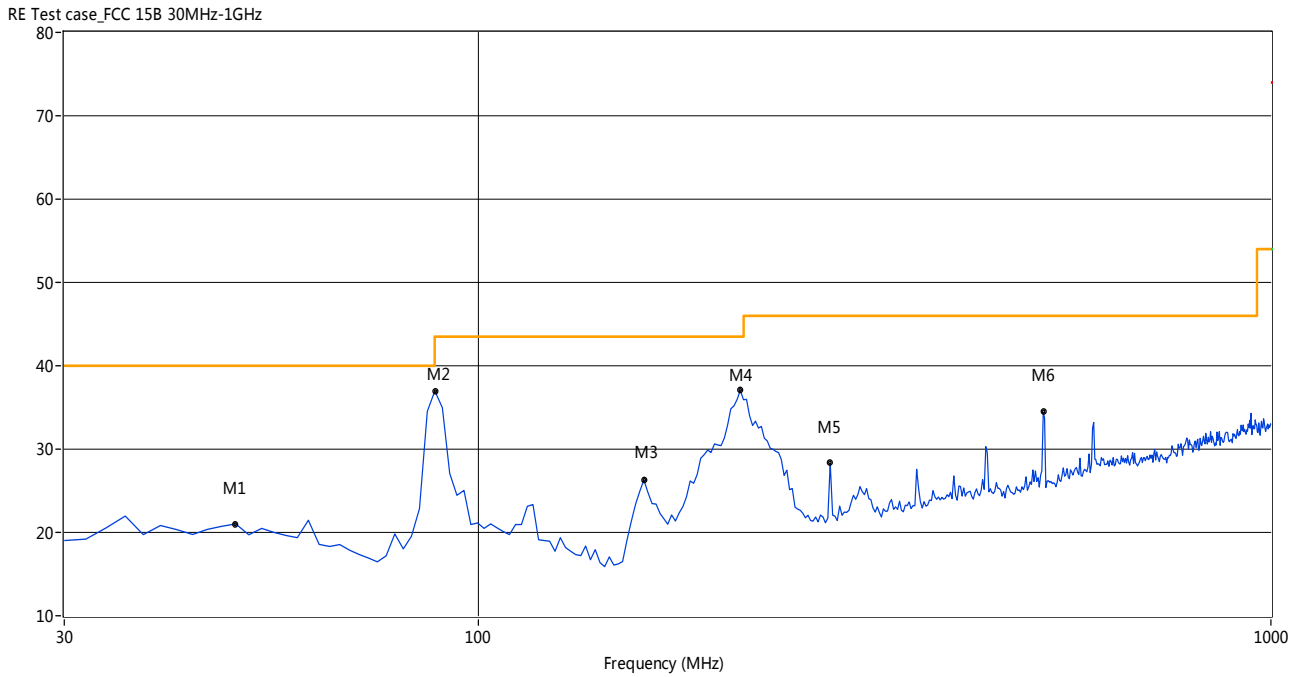
Note 1: The symbol of "--" in the table which means not application.

Note 2: For the test data above 1GHz，According the ANSI C63.4-2009, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.

Test Data and Plots

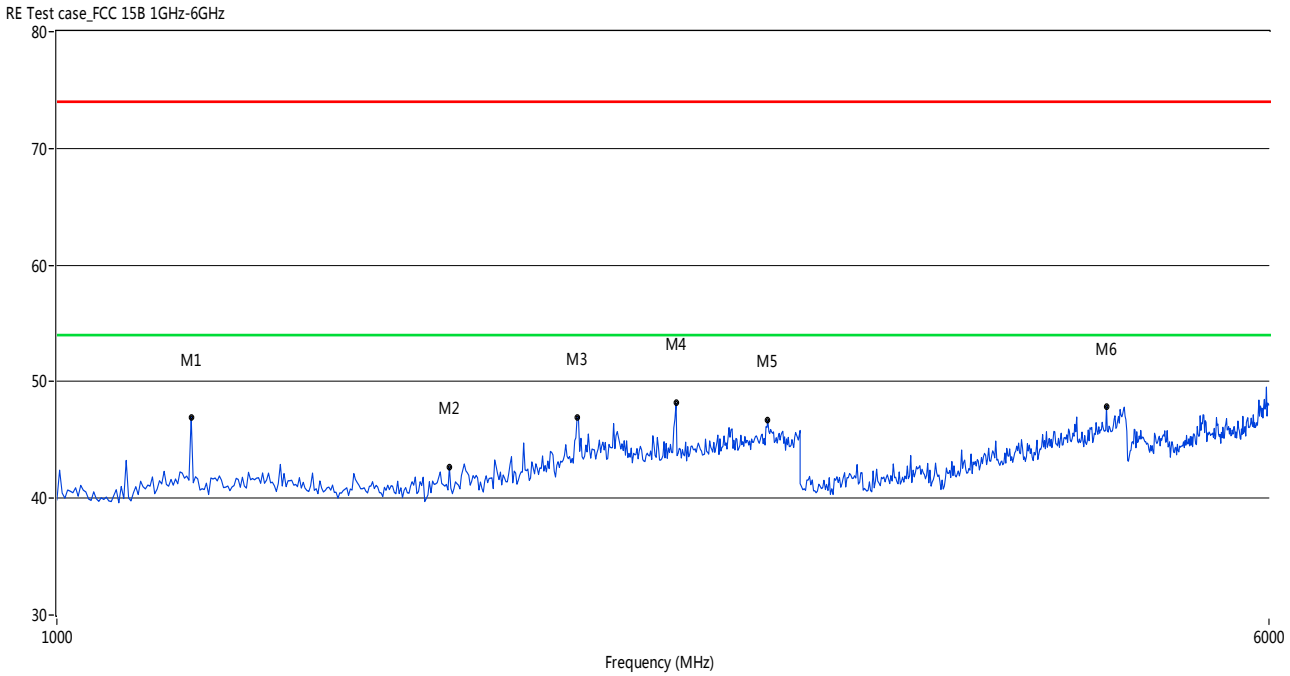
The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

A.1.1 Test Antenna Vertical, 30MHz – 1GHz



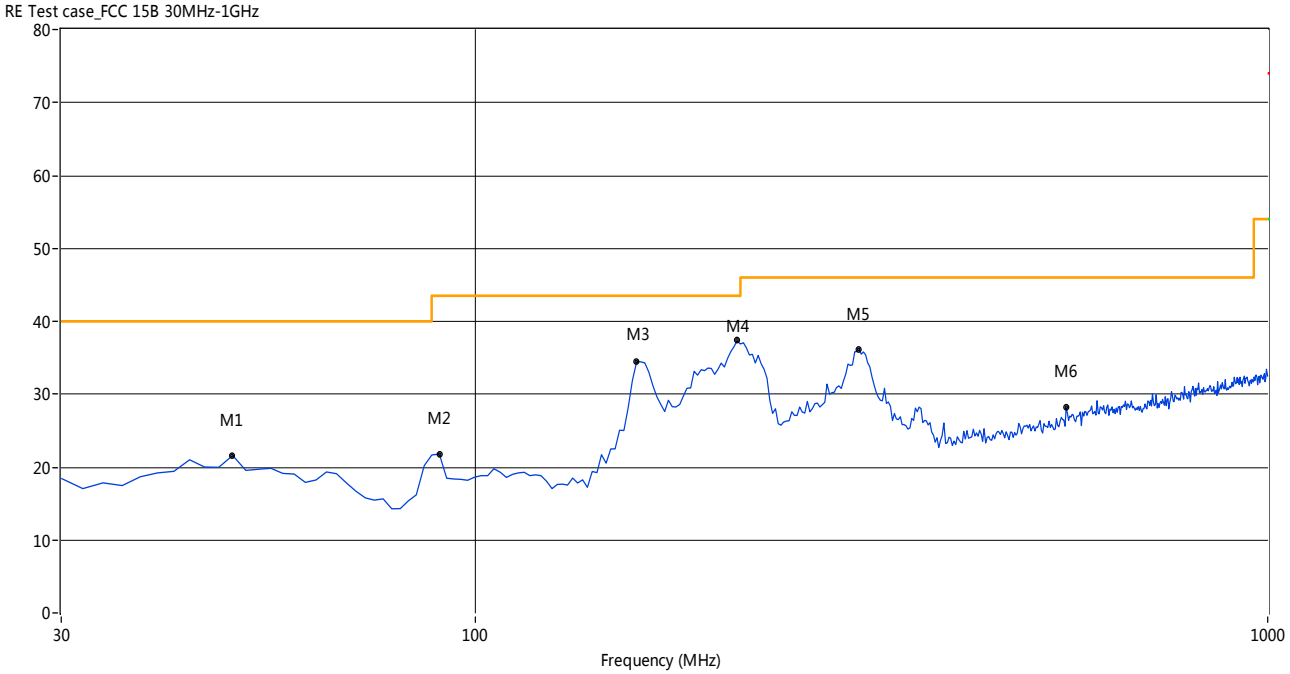
Frequency (MHz)	Peak (dBuV/m)	Q-peak (dBuV/m)	Average (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
49.36	--	21.02	--	-17.98	--	40.0	--	18.98	314.70	100	Vertical	PASS
88.08	--	36.99	--	-22.01	--	43.5	--	6.51	0.00	100	Vertical	PASS
161.66	--	26.31	--	-22.37	--	43.5	--	17.19	241.20	100	Vertical	PASS
213.93	--	37.07	--	-19.70	--	43.5	--	6.43	268.60	100	Vertical	PASS
277.82	--	28.34	--	-17.79	--	46.0	--	17.66	128.50	100	Vertical	PASS
515.97	--	34.44	--	-12.18	--	46.0	--	11.56	358.20	100	Vertical	PASS

A.1.2 Test Antenna Vertical, 1GHz – 6GHz



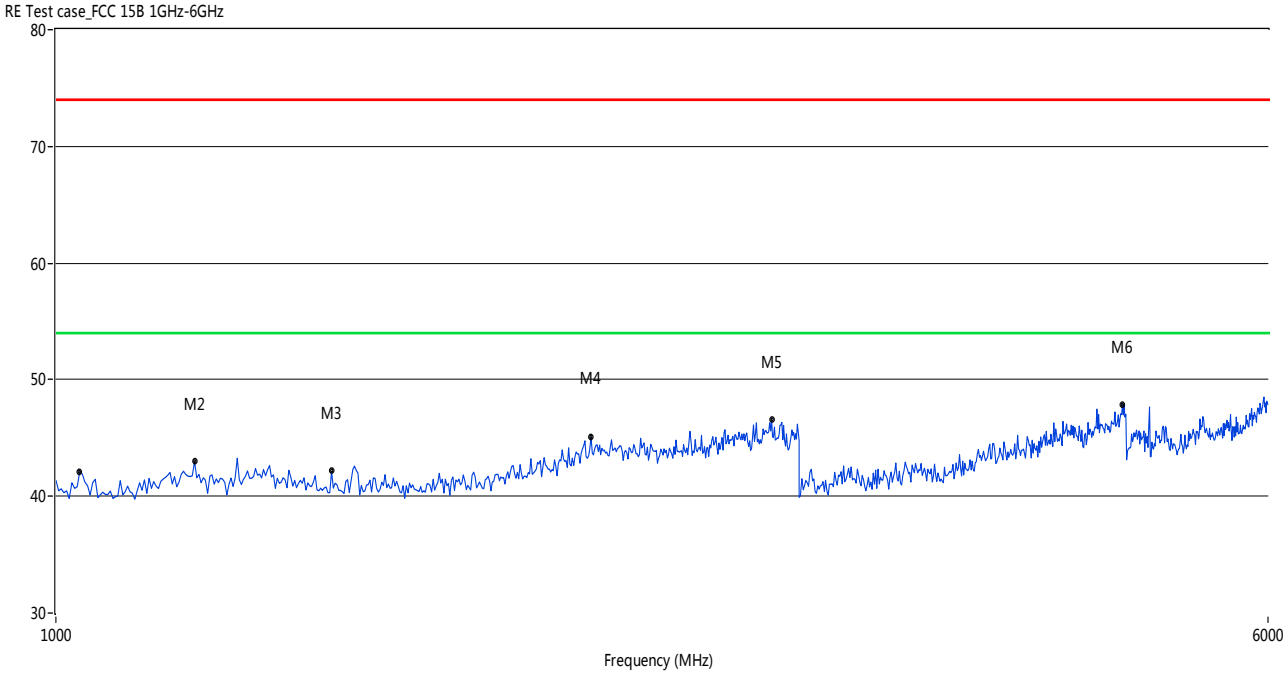
Frequency (MHz)	Peak (dBuV/m)	Q-peak (dBuV/m)	Average (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1219.56	46.99	--	--	-4.24	74.0	--	54.0	7.01	202.00	100	Vertical	PASS
1786.43	42.67	--	--	-3.98	74.0	--	54.0	11.33	263.80	100	Vertical	PASS
2157.68	46.95	--	--	-1.34	74.0	--	54.0	7.05	146.10	100	Vertical	PASS
2497.01	48.16	--	--	-0.51	74.0	--	54.0	5.84	146.10	100	Vertical	PASS
2860.28	46.68	--	--	2.39	74.0	--	54.0	7.32	320.10	100	Vertical	PASS
4718.56	47.87	--	--	11.87	74.0	--	54.0	6.13	200.00	100	Vertical	PASS

A.1.3 Test Antenna Horizontal, 30MHz – 1GHz



Frequency (MHz)	Peak (dBuV/m)	Q-peak (dBuV/m)	Average (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
49.36	--	21.61	--	-17.98	--	40.0	--	18.39	207.40	100	Horizontal	PASS
90.02	--	21.78	--	-21.38	--	43.5	--	21.72	40.30	100	Horizontal	PASS
159.72	--	34.49	--	-22.45	--	43.5	--	9.01	129.70	100	Horizontal	PASS
213.93	--	37.33	--	-19.70	--	43.5	--	6.17	87.00	100	Horizontal	PASS
304.93	--	36.13	--	-17.09	--	46.0	--	9.87	122.00	100	Horizontal	PASS
556.63	--	28.17	--	-11.17	--	46.0	--	17.83	323.20	100	Horizontal	PASS

A.1.4 Test Antenna Horizontal, 1GHz – 6GHz

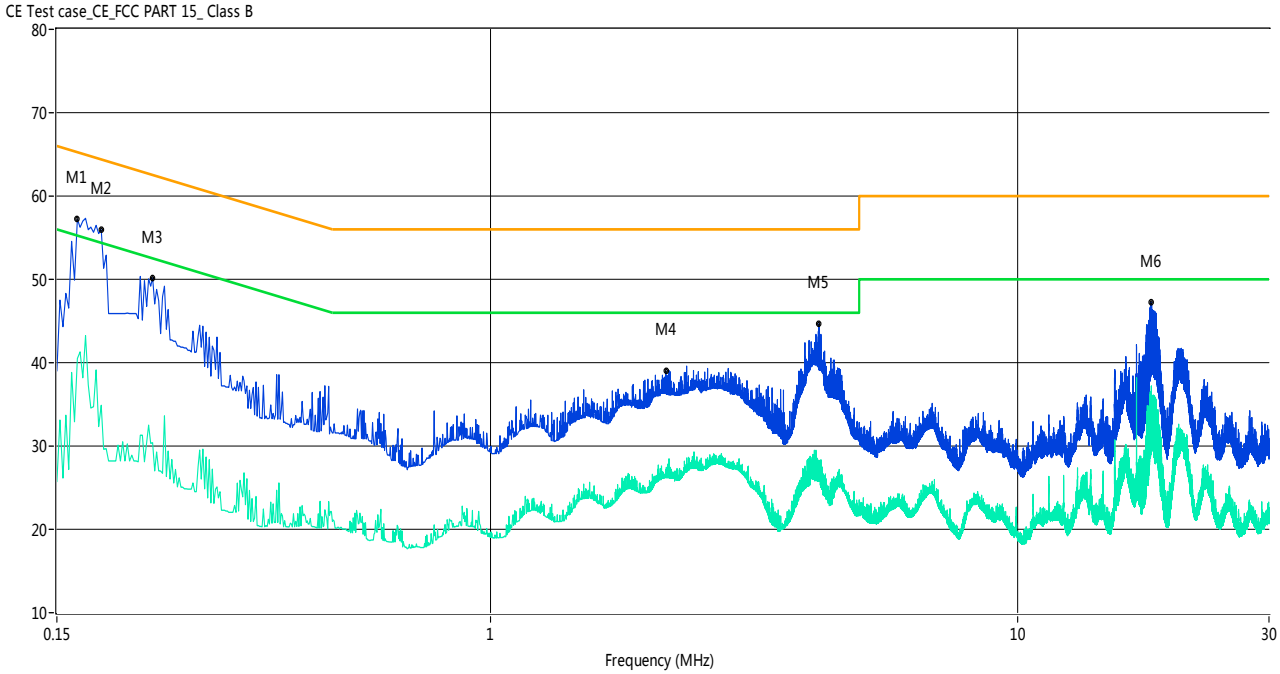


Frequency (MHz)	Peak (dBuV/m)	Q-peak (dBuV/m)	Average (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1035.93	42.10	--	--	-5.34	74.0	--	54.0	11.90	246.40	100	Horizontal	PASS
1227.54	42.97	--	--	-4.23	74.0	--	54.0	11.03	325.30	100	Horizontal	PASS
1502.99	42.16	--	--	-4.36	74.0	--	54.0	11.84	0.90	100	Horizontal	PASS
2205.59	45.10	--	--	-0.67	74.0	--	54.0	8.90	347.80	100	Horizontal	PASS
2880.24	46.58	--	--	1.93	74.0	--	54.0	7.42	285.60	100	Horizontal	PASS
4838.32	47.86	--	--	13.06	74.0	--	54.0	6.14	226.70	100	Horizontal	PASS

A.2 Conducted Emission

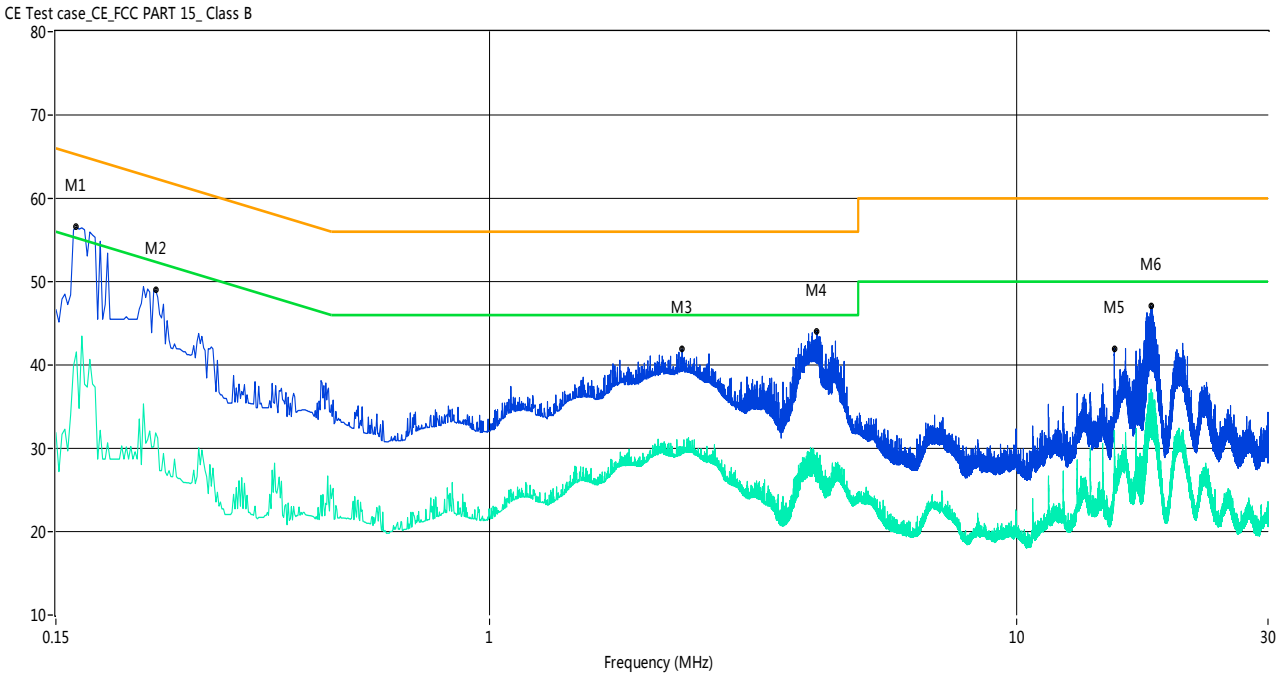
Test Data and Plots

A.2.1 L Phase



Frequency (MHz)	Peak (dBm)	Q-peak (dBuV)	Average (dBuV)	Factor (dB)	QP Limit (dBuV)	AV Limit (dBuV)	Margin (dB)	Line	Verdict
0.16	57.2	--	40.5	10.00	65.6	55.6	15.10	L Line	PASS
0.18	56.0	--	34.9	10.00	65.1	55.1	20.20	L Line	PASS
0.23	50.2	--	30.4	10.00	63.8	53.8	23.40	L Line	PASS
2.15	39.0	--	27.2	10.00	56.0	46.0	18.80	L Line	PASS
4.20	44.7	--	28.3	10.00	56.0	46.0	17.70	L Line	PASS
17.90	47.3	--	34.2	10.00	60.0	50.0	15.80	L Line	PASS

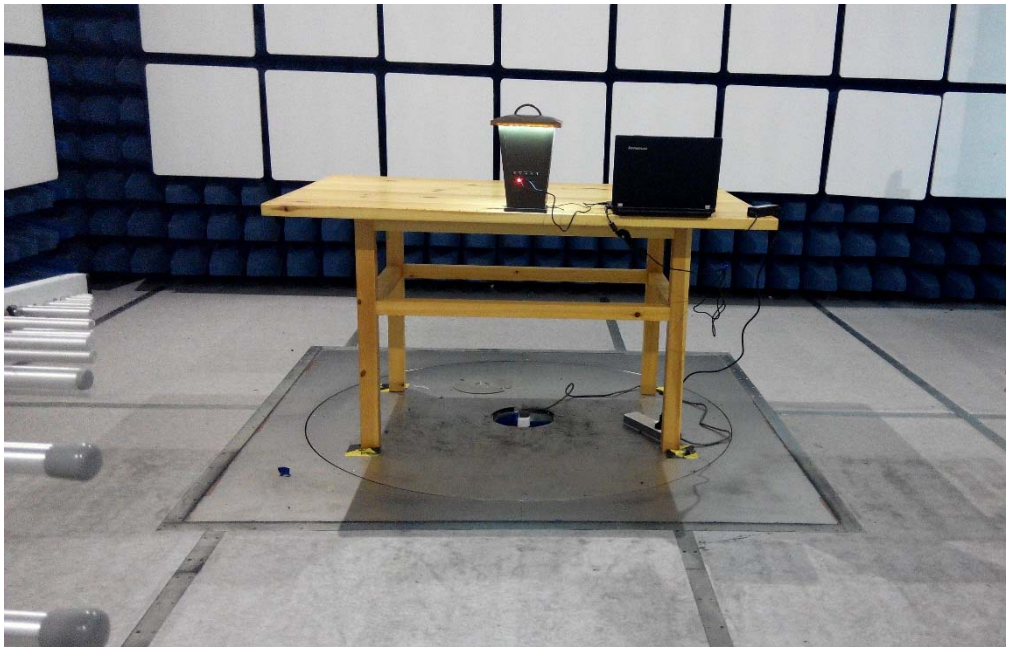
A.2.2 N Phase



Frequency (MHz)	Peak (dBm)	Q-peak (dBuV)	Average (dBuV)	Factor (dB)	QP Limit (dBuV)	AV Limit (dBuV)	Margin (dB)	Line	Verdict
0.16	56.6	--	41.6	10.00	65.6	55.6	14.00	N Line	PASS
0.23	49.0	--	31.8	10.00	63.7	53.7	21.90	N Line	PASS
2.32	41.9	--	30.2	10.00	56.0	46.0	15.80	N Line	PASS
4.18	44.1	--	29.5	10.00	56.0	46.0	16.50	N Line	PASS
15.32	41.9	--	32.1	10.00	60.0	50.0	17.90	N Line	PASS
17.97	47.1	--	35.9	10.00	60.0	50.0	14.10	N Line	PASS

ANNEX B TEST SETUP PHOTOS

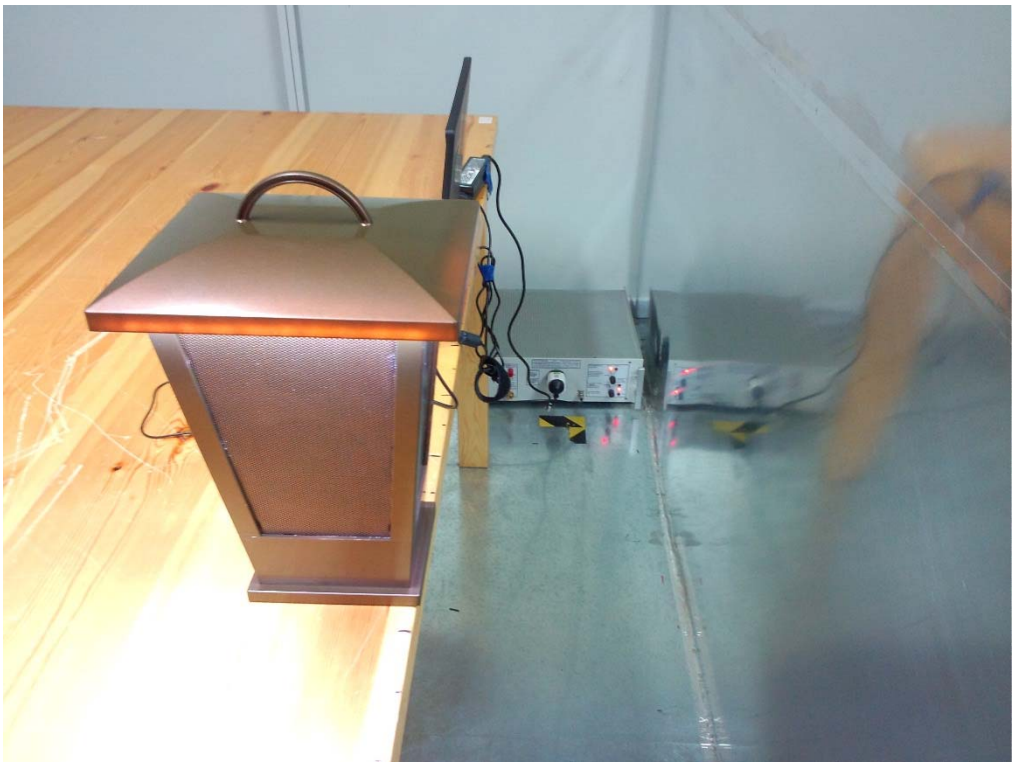
B.1 Radiated Field Strength Measurement



30MHz-1GHz

1GHz -6GHz

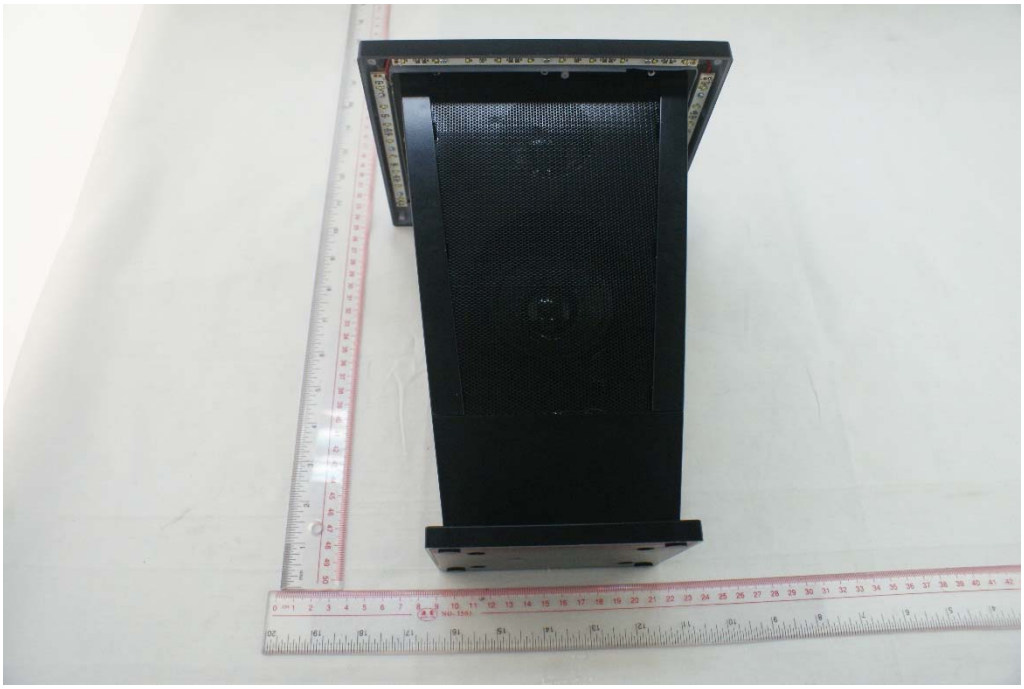
B.2 Conducted Emission



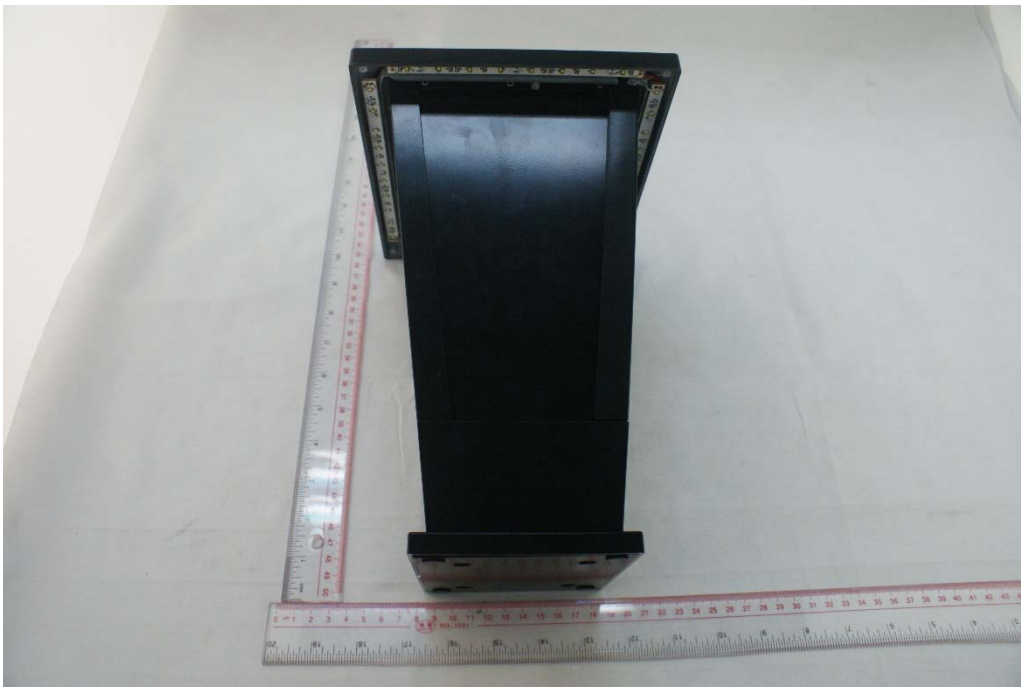
ANNEX C EUT PHOTOS

C.1 Appearance of the EUT

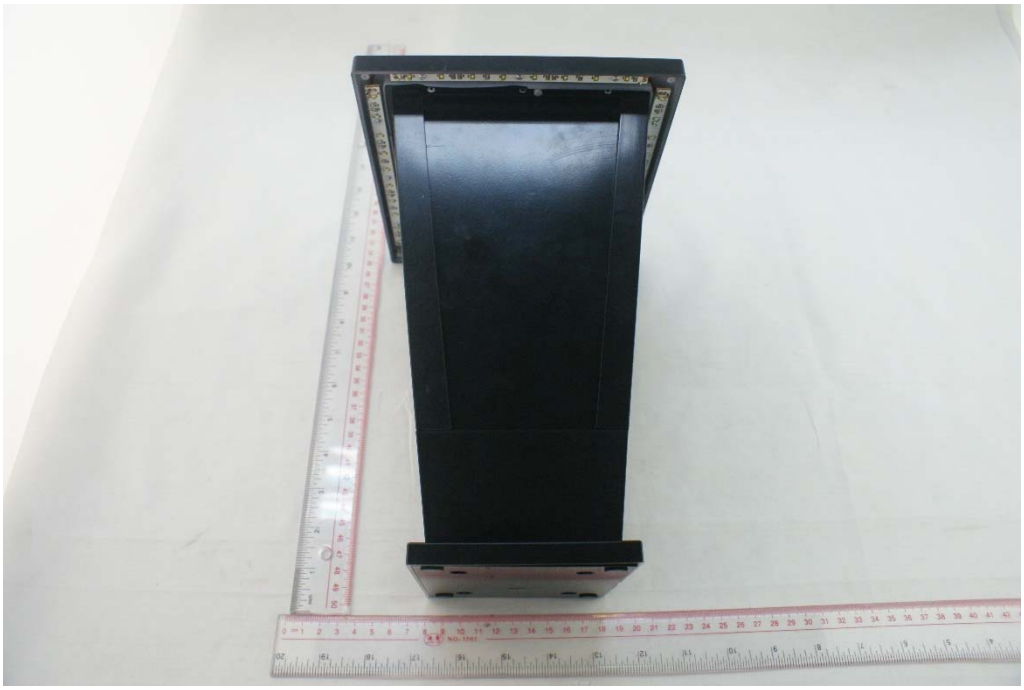
THE FRONT OF EUT



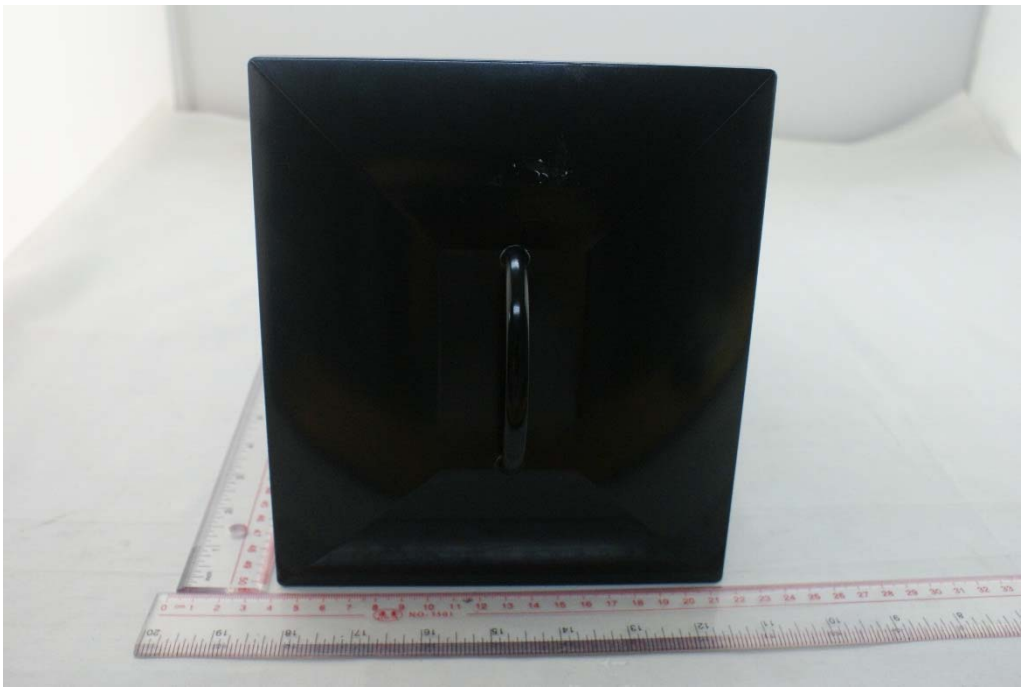
THE BACK OF EUT



THE LEFT OF EUT



THE RIGHT OF EUT



THE UP OF EUT

THE DOWN OF EUT

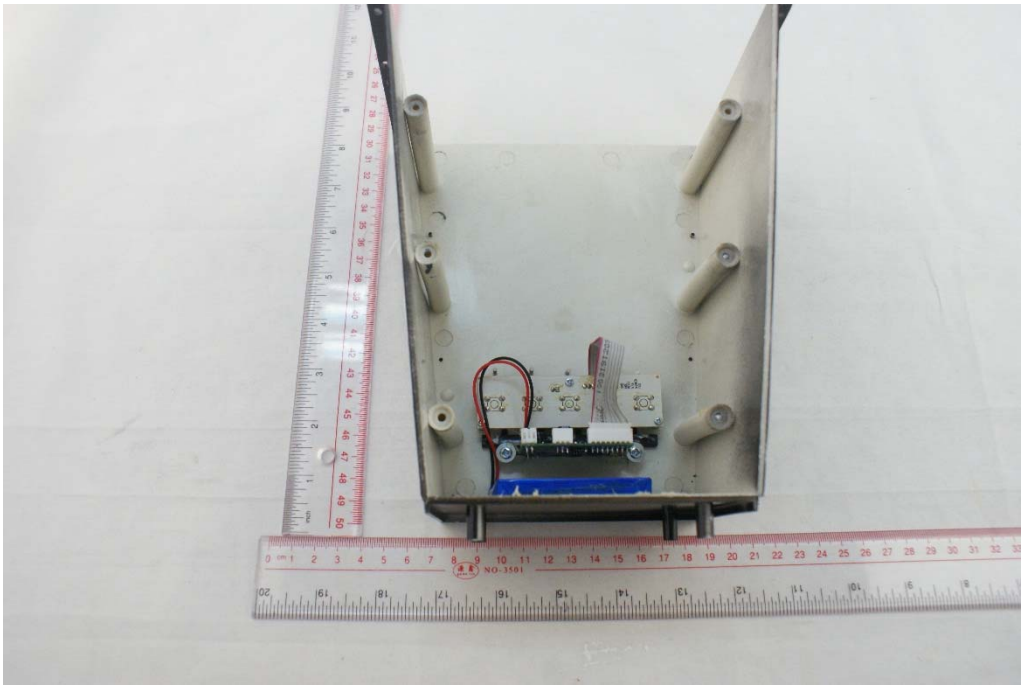
REMOTE CONTROL 1

REMOTE CONTROL 2

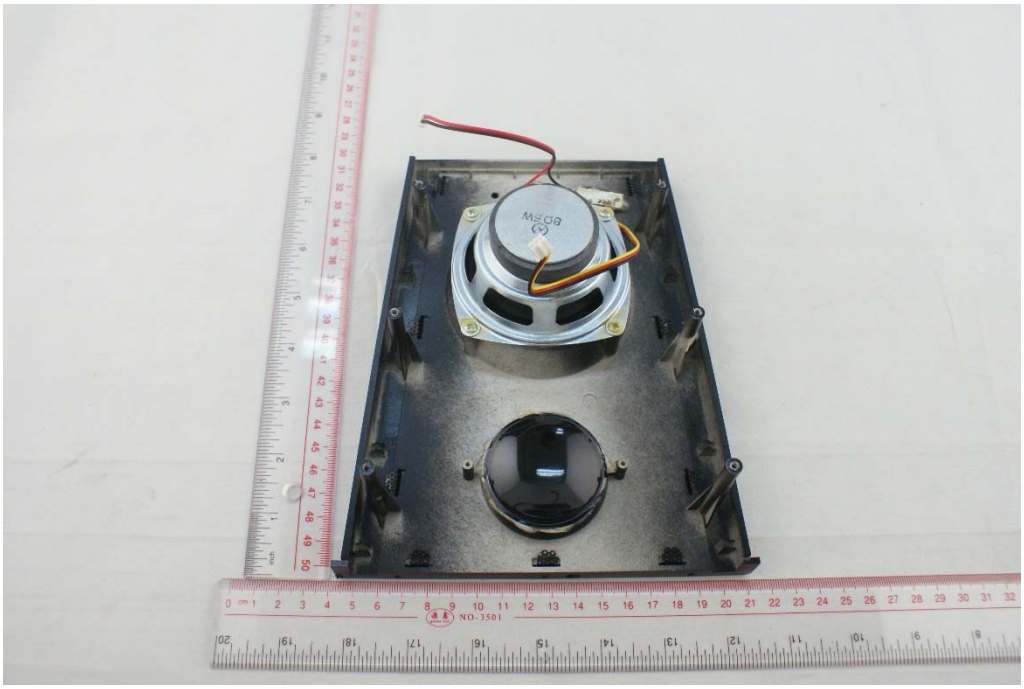
USB DATA CABLE

AUDIO LINE

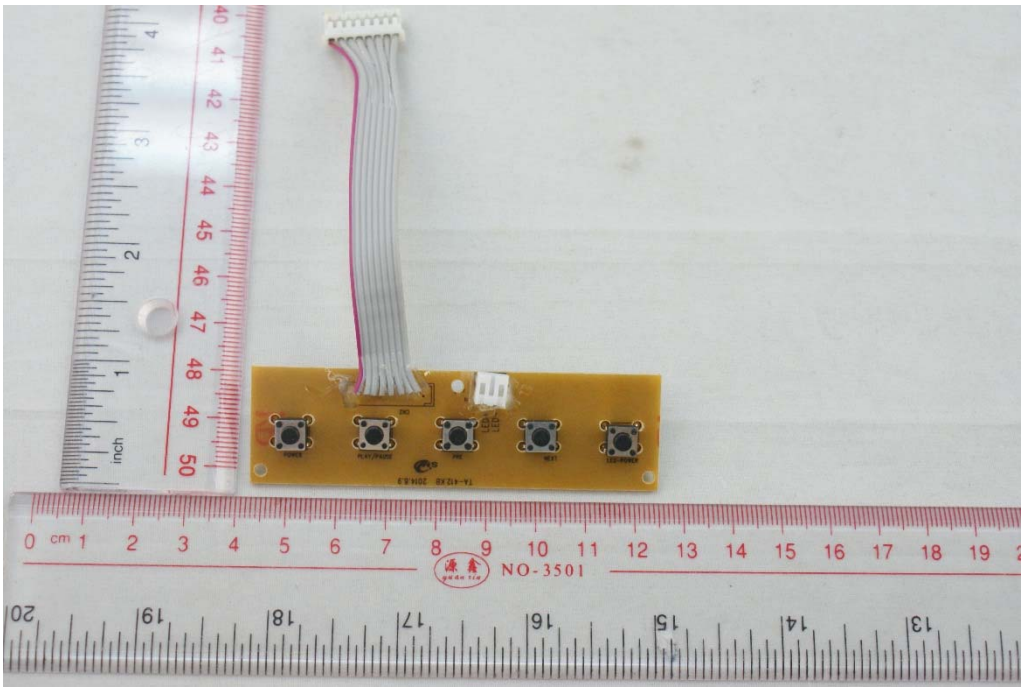
C.2 Inside of the EUT



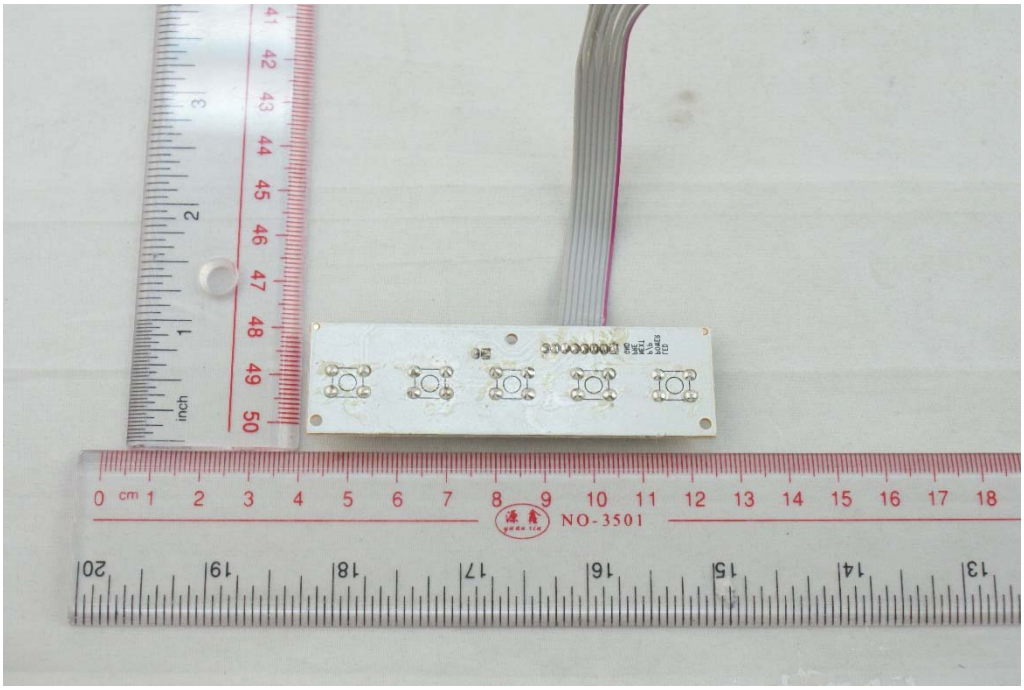
EUT UNCOVER VIEW 1



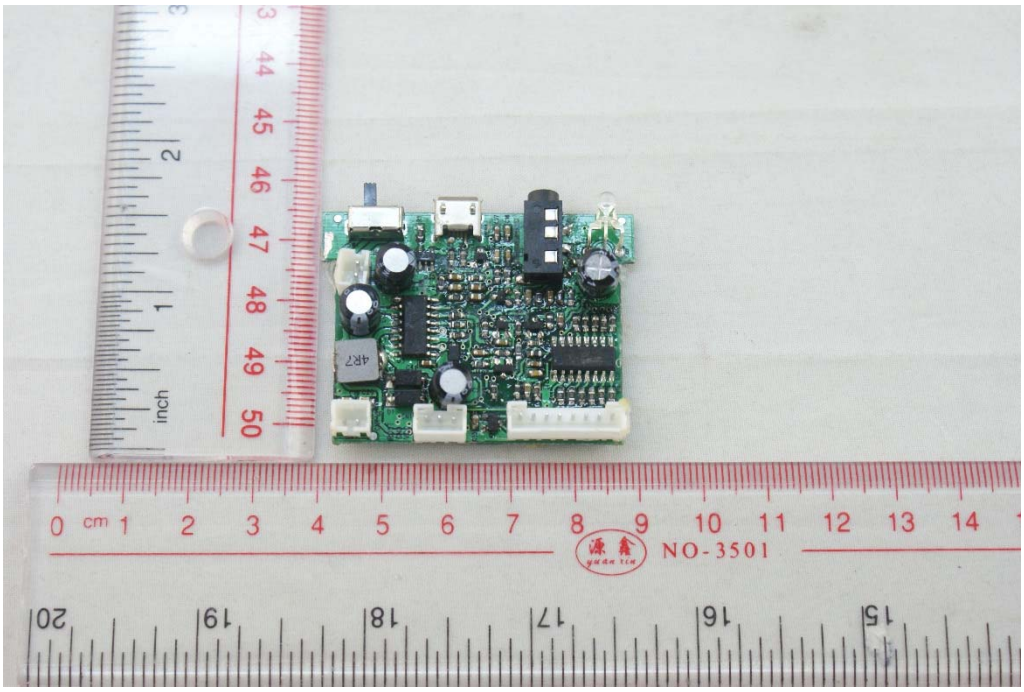
EUT UNCOVER VIEW 2



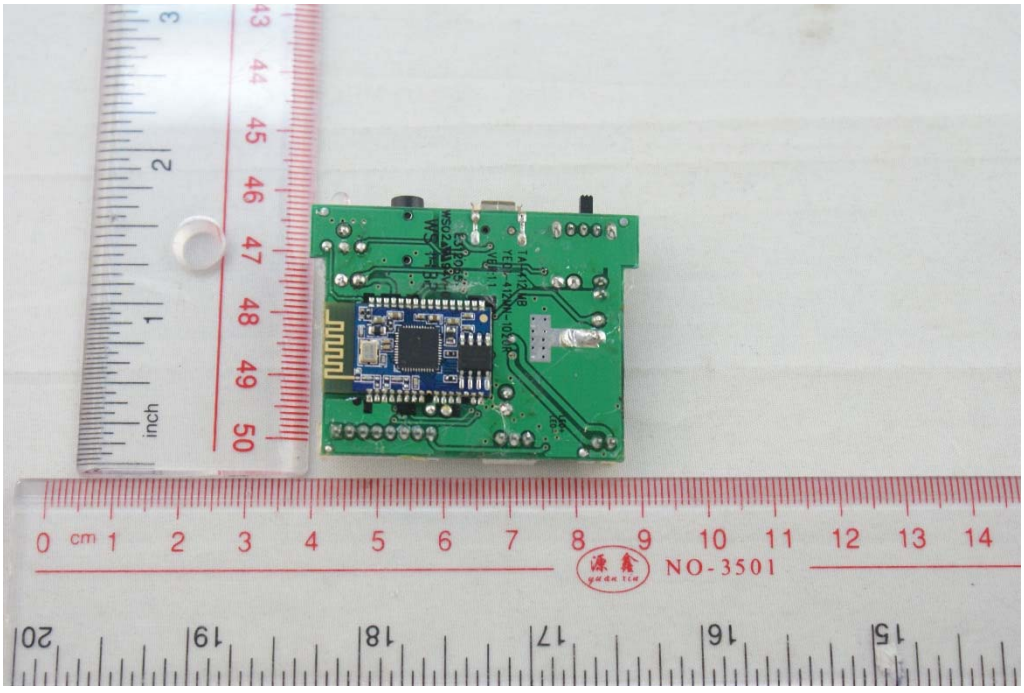
MAIN BOARD VIEW 1



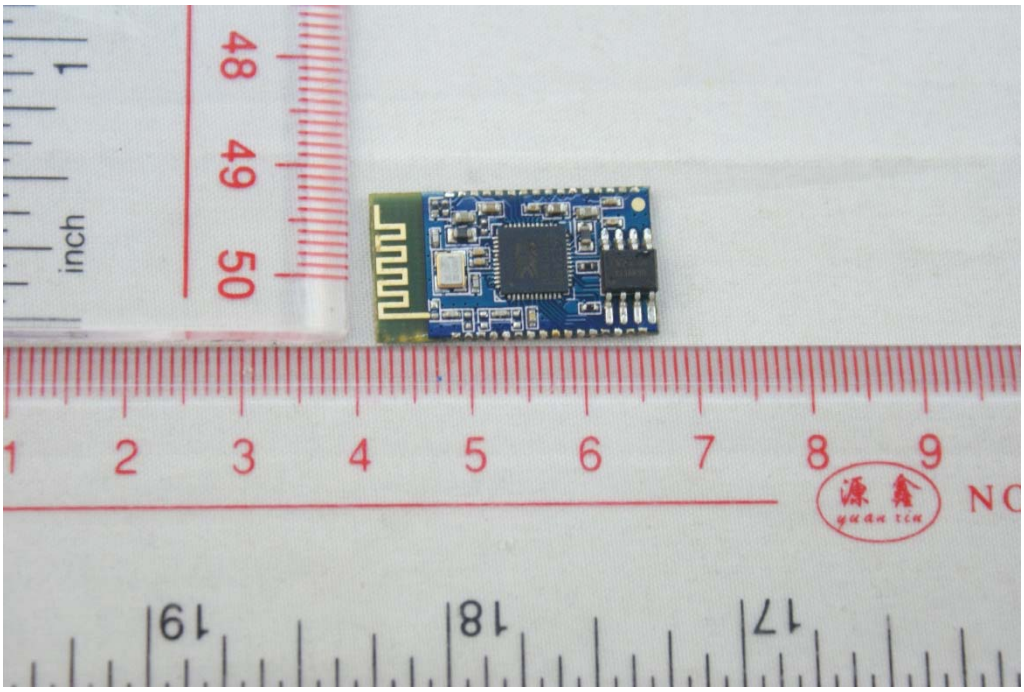
MAIN BOARD VIEW 2



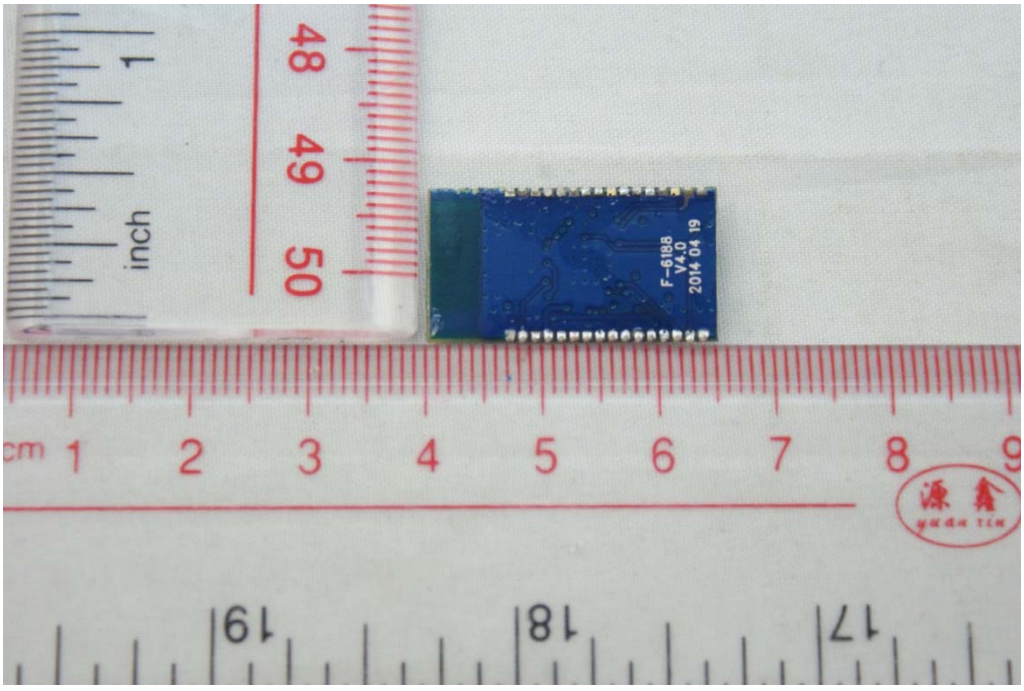
MAIN BOARD VIEW 3



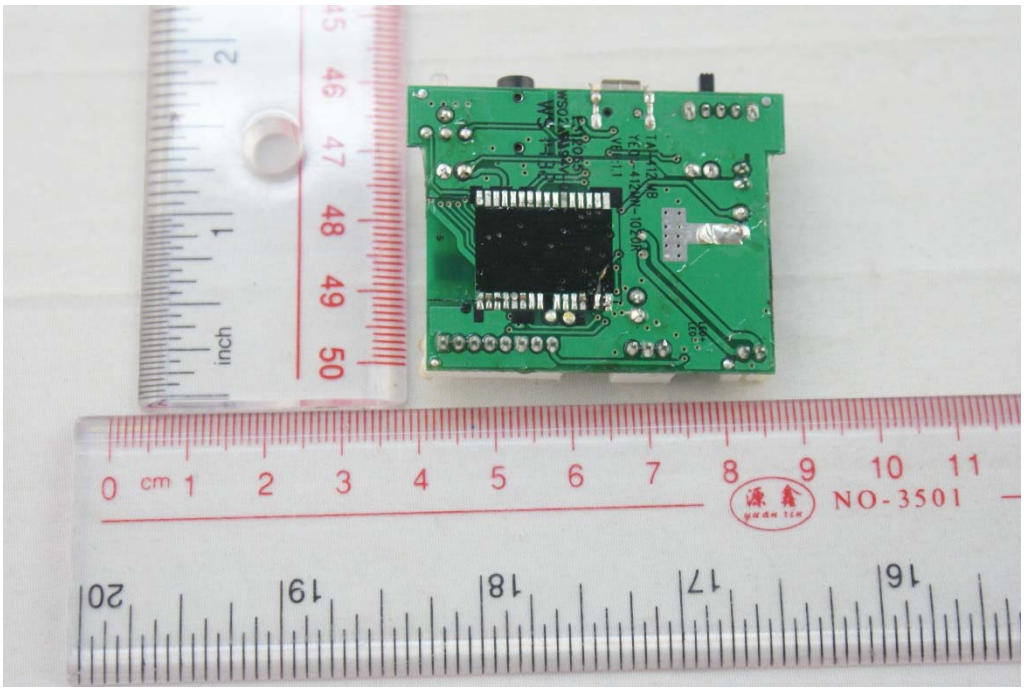
MAIN BOARD VIEW 4



MAIN BOARD VIEW 5



MAIN BOARD VIEW 6



MAIN BOARD VIEW 7

--END OF REPORT--