

FCC

EMC

TEST REPORT

ISSUED BY  
Shenzhen BALUN Technology Co., Ltd.



FOR  
**RYOBI P746 RADIO WITH BLUETOOTH**

ISSUED TO  
ONE WORLD TECHNOLOGIES, INC

1428 PEARMAN DAIRY ROAD ANDERSON SOUTH CAROLINA 29625  
USA



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Date Jun. 9, 2015

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Wei Yanquan  
(Chief Engineer)

Date Jun. 9, 2015

Report No.: BL-SZ1560021-401

EUT Type: RYOBI P746 RADIO WITH BLUETOOTH

Model Name: P746

Brand Name: N/A

Test Standard: 47 CFR Part 15 Subpart B

FCC ID: VMZP746

Test conclusion: Pass

Test Date: May. 25 2015 ~ Jun. 9, 2015

Date of Issue: Jun. 9, 2015

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**Revision History**

Version	Issue Date	Revisions
<u>Rev. 01</u>	<u>Jun. 9, 2015</u>	<u>Initial Issue</u>

**TABLE OF CONTENTS**

1	GENERAL INFORMATION.....	3
1.1	Identification of the Testing Laboratory.....	3
1.2	Identification of the Responsible Testing Location.....	3
1.3	Announce.....	3
2	PRODUCT INFORMATION.....	4
2.1	Applicant.....	4
2.2	Manufacturer.....	4
2.3	General Description for Equipment under Test (EUT).....	4
2.4	Ancillary Equipment.....	4
3	SUMMARY OF TEST RESULTS.....	5
3.1	Test Standards.....	5
3.2	Verdict.....	5
3.3	Test Uncertainty.....	5
4	GENERAL TEST CONFIGURATIONS.....	6
4.1	Test Environments.....	6
4.2	Test Equipment List.....	6
4.3	Test Enclosure list.....	7
4.4	Test Configurations.....	8
4.5	Test Setups.....	9
4.6	Test Conditions.....	11
5	TEST ITEMS.....	12
5.1	Emission Tests.....	12
ANNEX A	TEST RESULTS.....	14
A.1	Radiated Emission.....	14
A.2	Conducted Emission.....	18



## 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	<p>The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 11524A-1.</p> <p>The laboratory has been listed by US Federal Communications Commission to perform electromagnetic emission measurements. The recognition numbers of test site are 832625.</p> <p>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.</p> <p>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.</p>
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 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	ONE WORLD TECHNOLOGIES, INC
Address	1428 PEARMAN DAIRY ROAD ANDERSONSOUTH CAROLINA 29625 USA

### 2.2 Manufacturer

Manufacturer	ONE WORLD TECHNOLOGIES, INC
Address	1428 PEARMAN DAIRY ROAD ANDERSONSOUTH CAROLINA 29625 USA

### 2.3 General Description for Equipment under Test (EUT)

EUT Type	RYOBI P746 RADIO WITH BLUETOOTH
Model Name	P746
Hardware Version	N/A
Software Version	N/A
Network and Wireless connectivity	Bluetooth
About the Product	The equipment is Bluetooth Radio, intended for used with information technology equipment.

### 2.4 Ancillary Equipment

Ancillary Equipment 1	Battery	
	Brand Name	RYOBI
	Model No	N/A
	Serial No	N/A
	Capacitance	2.5 Ah
	Rated Voltage	18.0 V
	Extreme Voltage	Low: 14.0 V, High: 23.0 V

### 3 SUMMARY OF TEST RESULTS

#### 3.1 Test Standards

No.	Identity	Document Title
1	FCC 47 CFR Part 15 Subpart B (10-1-14 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	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 (9 KHz-30 MHz)	2.79 dB
Radiated emissions (30 MHz-1 GHz)	3.45 dB
Radiated emissions (1 GHz-18 GHz)	3.67 dB

## 4 GENERAL TEST CONFIGURATIONS

### 4.1 Test Environments

Environment Parameter	Selected Values During Tests			
	Temperature	Voltage	Relative Humidity	Ambient Pressure
Normal Temperature, Normal Voltage (NTNV)	23°C~26°C	DC 18 V	50%-55%	100 to 102 kPa

### 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	<input checked="" type="checkbox"/>
Test Antenna-Loop(9 kHz-30 MHz)	SCHWARZBECK	FMZB 1519	1519-037	2013.07.02	2015.07.01	<input type="checkbox"/>
Test Antenna-Bi-Log(30 MHz-3 GHz)	SCHWARZBECK	VULB 9163	9163-624	2013.07.03	2015.07.02	<input checked="" type="checkbox"/>
Test Antenna-Horn(1-18 GHz)	SCHWARZBECK	BBHA 9120D	9120D-1148	2013.07.02	2015.07.01	<input checked="" type="checkbox"/>
Test Antenna-Horn(15-26.5 GHz)	SCHWARZBECK	BBHA 9170	9170-305	2013.07.02	2015.07.01	<input type="checkbox"/>
Anechoic Chamber	RAINFORD	9 m*6 m*6 m	N/A	2015.02.28	2016.02.27	<input checked="" type="checkbox"/>

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	<input checked="" type="checkbox"/>
LISN	SCHWARZBECK	NSLK 8127	8127-687	2014.07.07	2015.07.06	<input checked="" type="checkbox"/>
AMN	SCHWARZBECK	NNBM8124	8124-509	2014.07.07	2015.07.06	<input type="checkbox"/>
AMN	SCHWARZBECK	NNBM8124	8124-510	2014.07.07	2015.07.06	<input type="checkbox"/>
ISN	TESEQ	ISN T800	34449	2014.07.07	2015.07.06	<input type="checkbox"/>
Shielded Enclosure	ChangNing	CN-130701	130703	N/A	N/A	<input checked="" type="checkbox"/>

### 4.3 Test Enclosure list

Description	Manufacturer	Model	Serial No.	Length	Description	Use
PC	N/A	N/A	N/A	N/A	Special Handled	<input type="checkbox"/>
Printer	HP	DESKJET 1000	N/A	N/A	N/A	<input type="checkbox"/>
Keyboard	Logitech	Y-BP62a	N/A	N/A	N/A	<input type="checkbox"/>
Mouse	Logitech	M100	N/A	N/A	N/A	<input type="checkbox"/>
USB disk	Kingston	N/A	N/A	N/A	N/A	<input type="checkbox"/>
TF Card	Kingston	N/A	N/A	N/A	N/A	<input type="checkbox"/>
VGA Cable	N/A	N/A	N/A	1.5 m	Shielded with core	<input type="checkbox"/>
HDMI Cable	N/A	N/A	N/A	1.5 m	Shielded with core	<input type="checkbox"/>
DVI Cable	N/A	N/A	N/A	1.5 m	Shielded with core	<input type="checkbox"/>
Coaxial video cable	N/A	N/A	N/A	2.0 m	Shielded with core	<input type="checkbox"/>
IPhone	Apple	5S	N/A	N/A	N/A	<input checked="" type="checkbox"/>
laptop	LENOVO	K29	N/A	N/A	N/A	<input type="checkbox"/>
Artificial load	N/A	N/A	N/A	N/A	5 $\Omega$ /100 W	<input checked="" type="checkbox"/>
Earphone	N/A	N/A	N/A	1.5 m	N/A	<input checked="" type="checkbox"/>
Cable	N/A	N/A	N/A	1.0 m	N/A	<input checked="" type="checkbox"/>
Audio Line	N/A	N/A	N/A	1.0 m	N/A	<input checked="" type="checkbox"/>

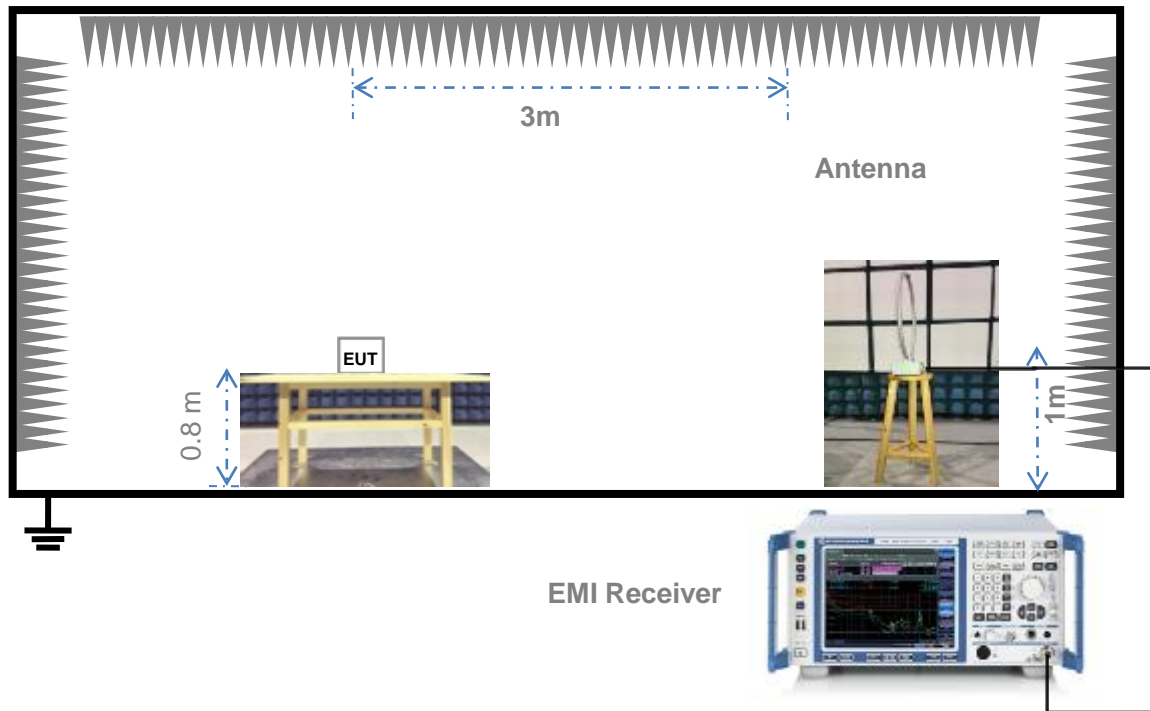
## 4.4 Test Configurations

Test Configurations (TC) No.	Description
TC01	<u>The Audio(DC) Test Mode</u> The EUT configuration of the emission tests is EUT + iPhone + Audio Line + Earphone + Cable + Artificial Load + Battery. During the measurement, the EUT is connected with the iPhone via audio line and the iPhone play the music as a player. The EUT is also connected with the artificial load through the cable until the test end. The EUT is powered by the battery.
TC02	<u>The Audio(AC) Test Mode</u> The EUT configuration of the emission tests is EUT + iPhone + Audio Line + Earphone + Cable + Artificial Load. During the measurement, the EUT is connected with the iPhone via audio line and the iPhone play the music as a player. The EUT is also connected with the artificial load through the cable until the test end. The EUT is powered by the AC power.
TC03	<u>The FM Test Mode</u> The EUT configuration of the emission tests is EUT + Battery + Earphone + Cable + Artificial Load. During the measurement, the EUT is connected with the earphone and the FM function is active. The EUT is also connected with the artificial load through the cable until the test end.
TC04	<u>The AM Test Mode</u> The EUT configuration of the emission tests is EUT + Battery + Earphone + Cable + Artificial Load. During the measurement, the EUT is connected with the earphone and the AM function is active. The EUT is also connected with the artificial load through the cable until the test end.



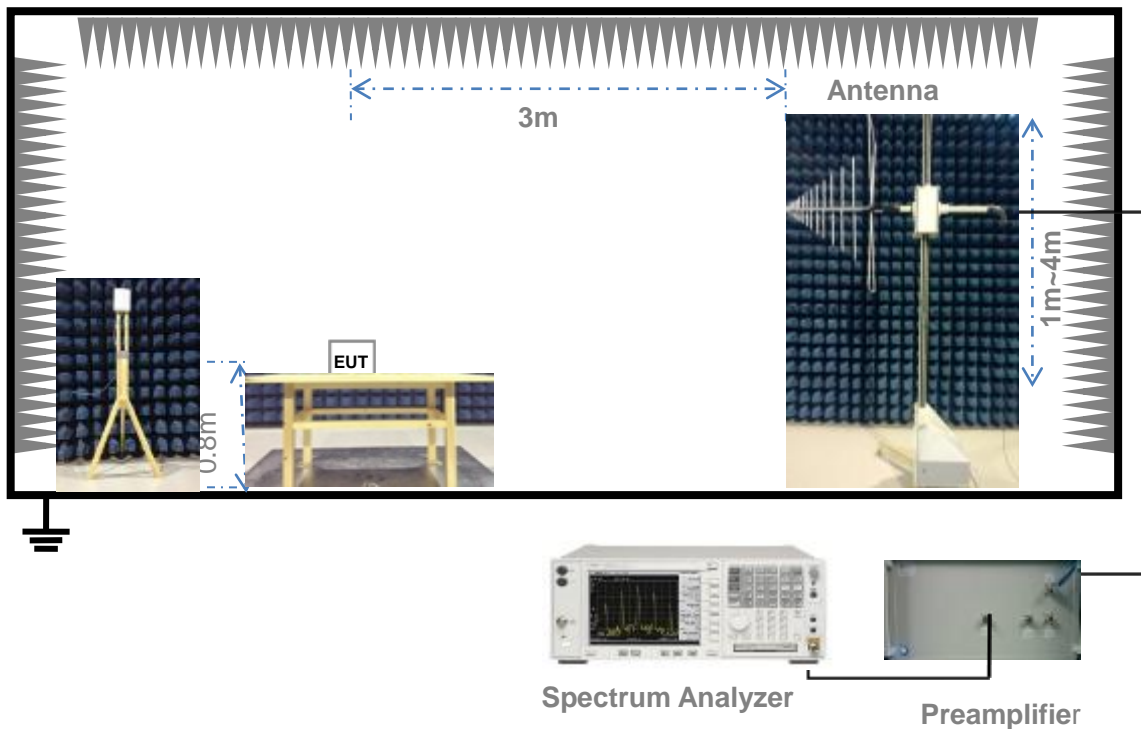
## 4.5 Test Setups

### Test Setup 1



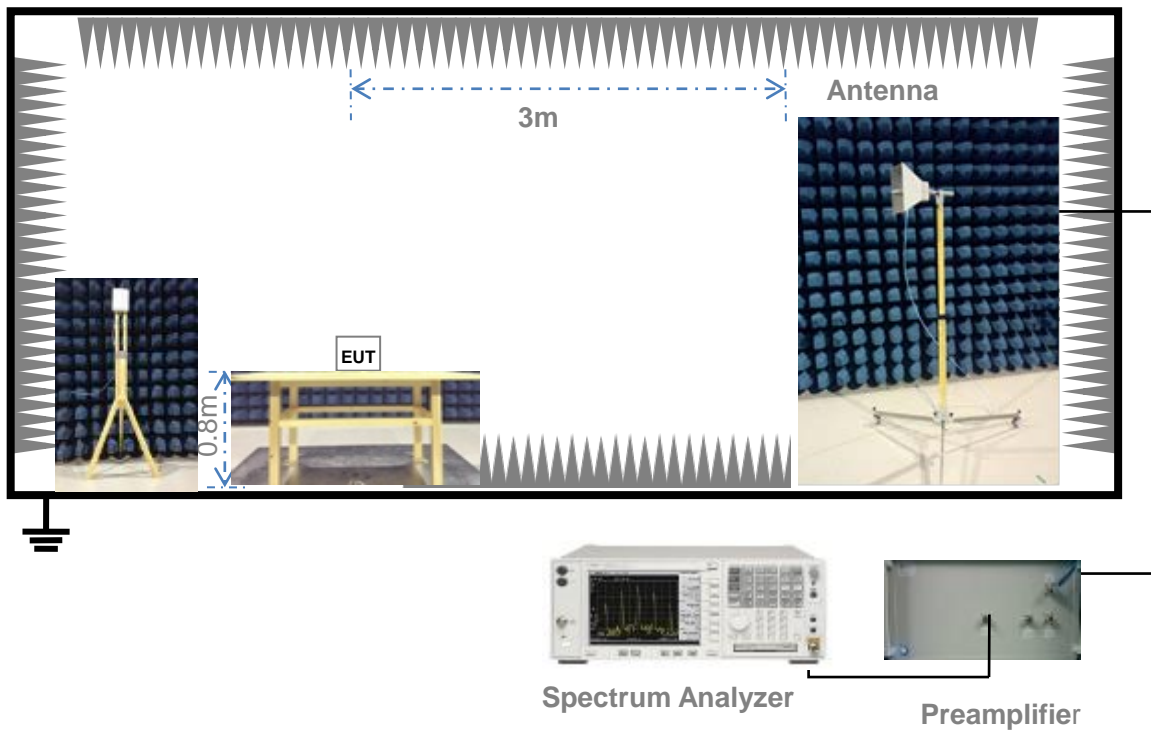
For Radiated Emission Test (Below 30 MHz))

### Test Setup 2



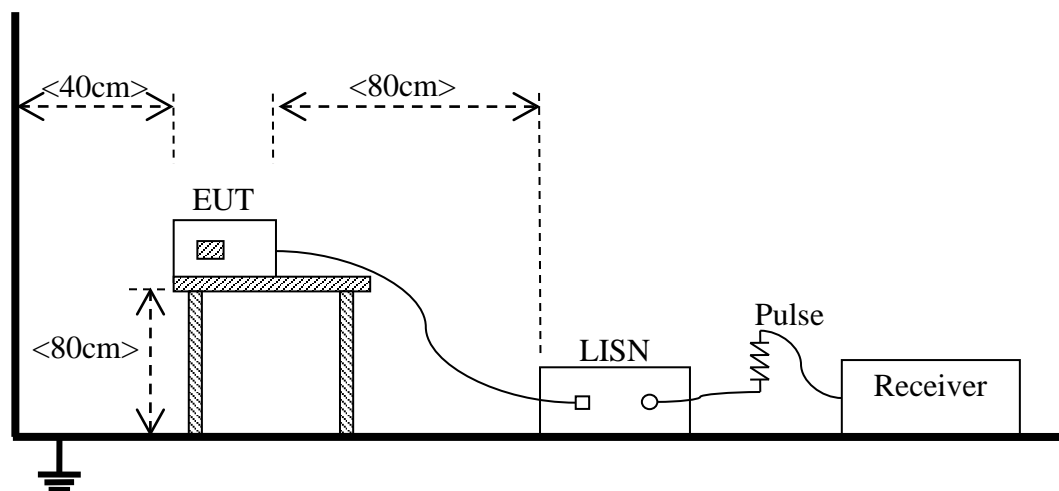
(For Radiated Emission Test (30 MHz-1 GHz))

### Test Setup 3



(For Radiated Emission Test (above 1 GHz))

### 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~TC04 <sup>Note</sup>
Conducted Emission	Test Env.	NTNV
	Test Setup	Test Setup 4
	Test Configuration	TC02

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. The Audio(AC) Test Mode is the worst test mode in this report.

## 5 TEST ITEMS

### 5.1 Emission Tests

#### 5.1.1 Radiated Emission

##### 5.1.1.1 Limit

Frequency (MHz)	Field Strength ( $\mu\text{V/m}$ )	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 ( $\text{dB}\mu\text{V/m}$ ) =  $20 \cdot \log [\text{Field Strength } (\mu\text{V/m})]$ .
- 2) In the emission tables above, the tighter limit applies at the band edges.
- 3) For above 1000 MHz, limit field strength of harmonics: 54  $\text{dB}\mu\text{V/m}@3\text{ m}$  (AV) and 74  $\text{dB}\mu\text{V/m}@3\text{ m}$  (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 (dB $\mu$ V)	
	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 - 0.50 MHz.

### 5.1.2.2 Test Procedure

The EUT is connected to the power mains through a LISN which provides 50  $\Omega$ /50  $\mu$ H of coupling impedance for the measuring instrument. The test frequency range is from 150 kHz to 30 MHz. 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

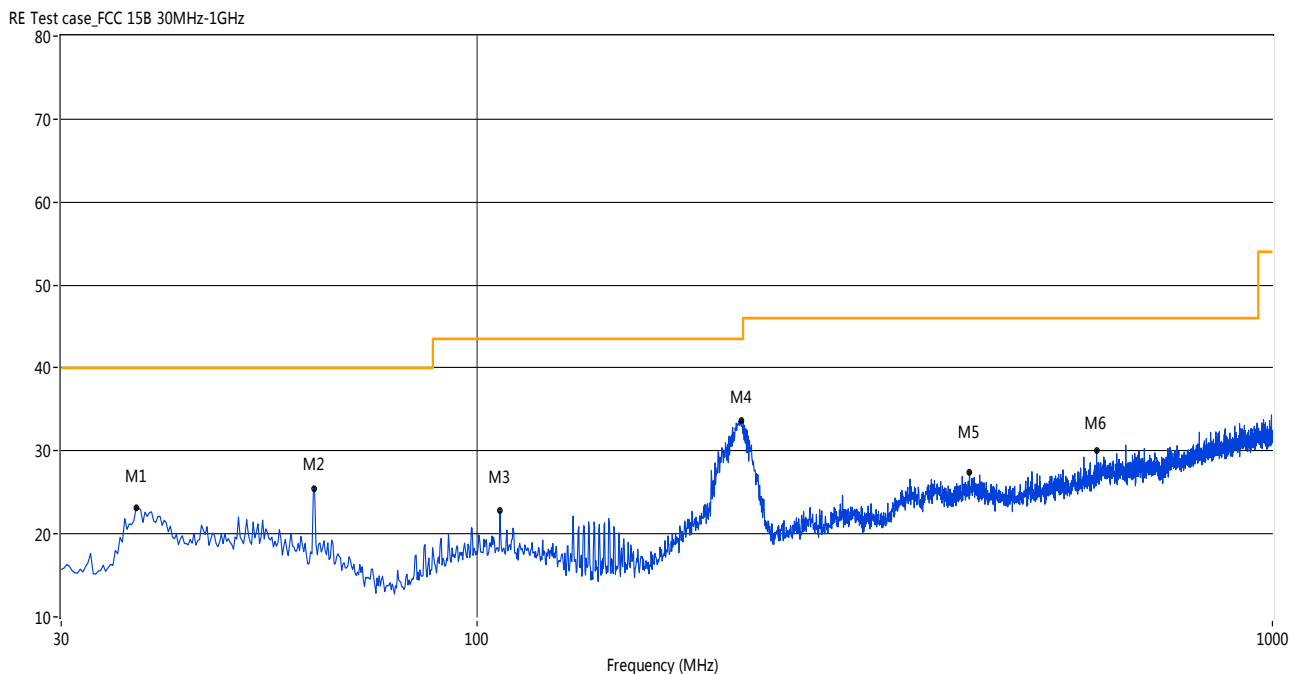
Note 1: The symbol of "--" in the table which means not application.

Note 2: For the test data above 1 GHz, 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 (Audio(AC) Test Mode)

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

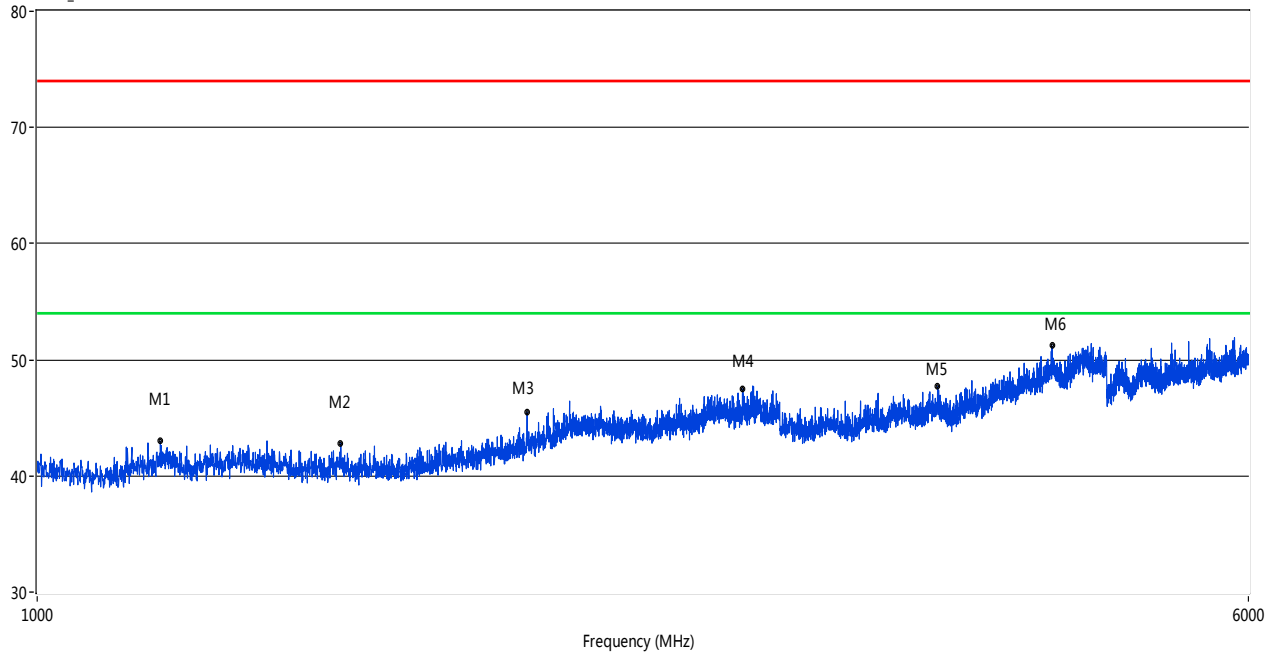
#### A.1.1 Test Antenna Vertical, 30 MHz – 1 GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	37.27	23.16	-20.47	40.0	16.84	Peak	125.00	100	Vertical	Pass
2	62.49	25.47	-20.42	40.0	14.53	Peak	281.10	100	Vertical	Pass
3	106.85	22.77	-20.23	43.5	20.73	Peak	69.30	100	Vertical	Pass
4	214.98	33.66	-20.05	43.5	9.84	Peak	114.20	100	Vertical	Pass
5	416.21	27.45	-14.69	46.0	18.55	Peak	219.90	100	Vertical	Pass
6	601.19	29.98	-10.74	46.0	16.02	Peak	342.80	100	Vertical	Pass

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

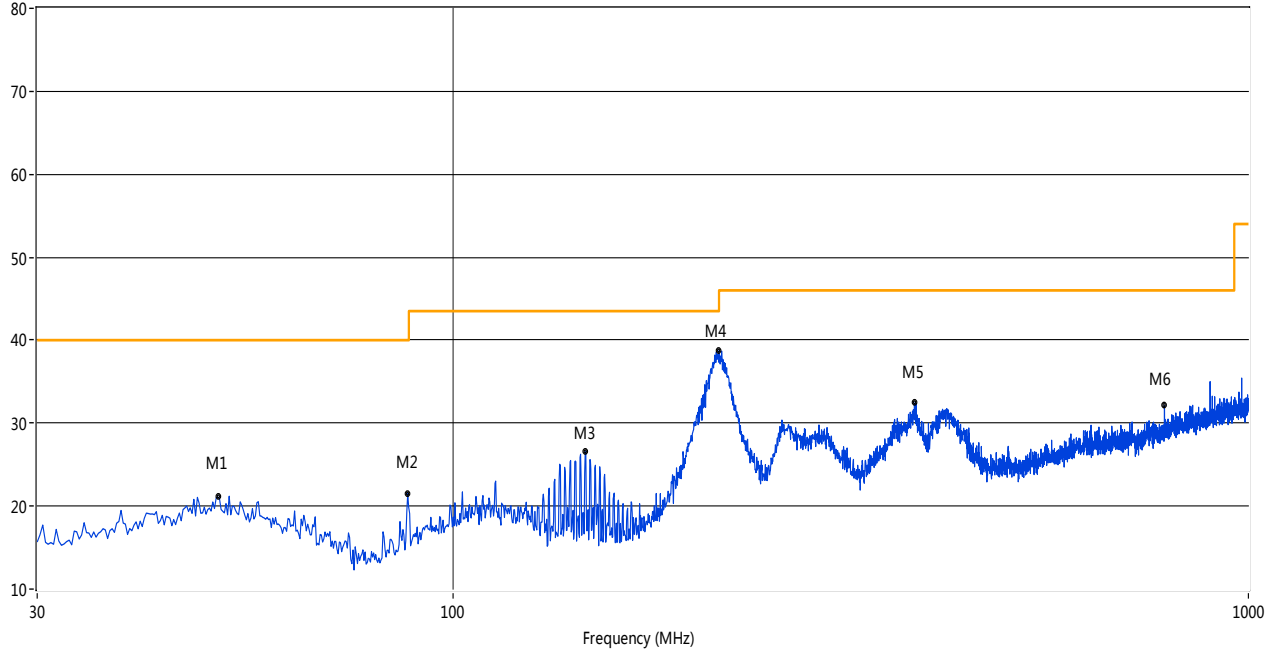
RE Test case\_FCC 15B 1GHz-6GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1199.95	42.99	-5.31	74.0	31.01	Peak	180.50	100	Vertical	Pass
2	1566.86	42.84	-4.04	74.0	31.16	Peak	148.40	100	Vertical	Pass
3	2064.23	45.50	-1.90	74.0	28.50	Peak	188.60	100	Vertical	Pass
4	2840.04	47.50	1.86	74.0	26.50	Peak	0.60	100	Vertical	Pass
5	3788.80	47.72	10.75	74.0	26.28	Peak	85.10	100	Vertical	Pass
6	4486.88	51.19	12.67	74.0	22.81	Peak	337.40	100	Vertical	Pass

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

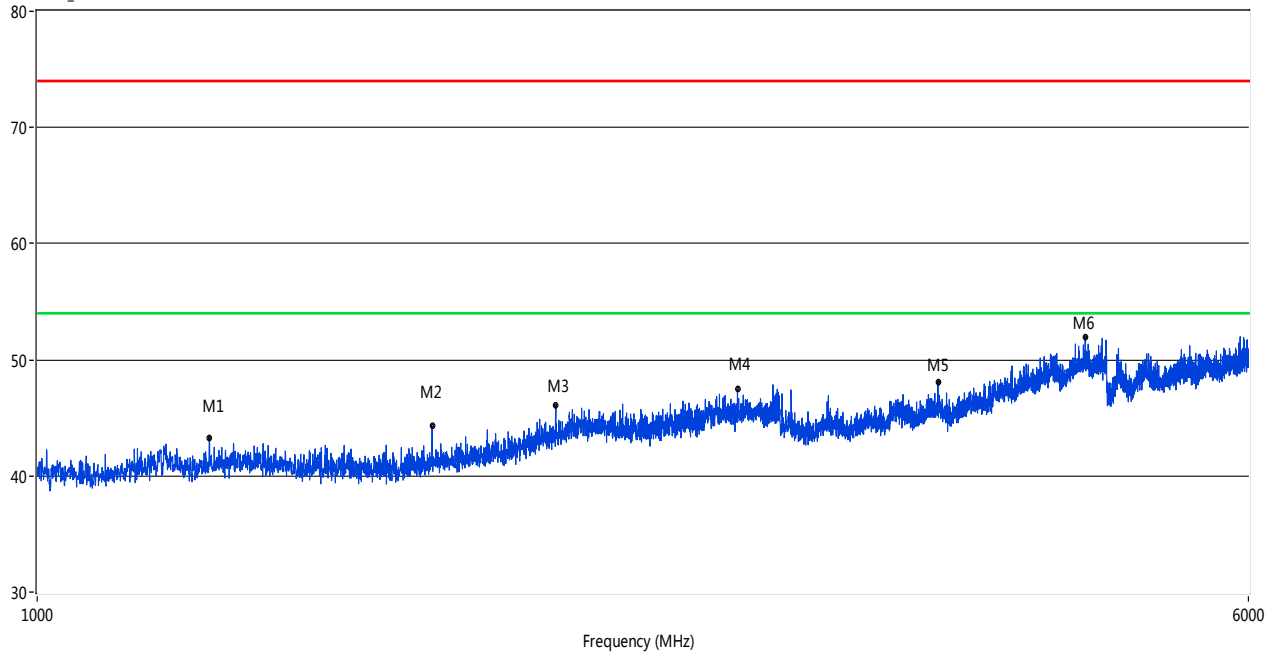
RE Test case\_FCC 15B 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	50.61	21.10	-18.67	40.0	18.90	Peak	156.40	100	Horizontal	Pass
2	87.70	21.52	-22.53	40.0	18.48	Peak	200.70	100	Horizontal	Pass
3	146.61	26.59	-23.52	43.5	16.91	Peak	4.40	100	Horizontal	Pass
4	215.71	38.71	-20.07	43.5	4.79	Peak	316.80	100	Horizontal	Pass
5	380.32	32.43	-15.67	46.0	13.57	Peak	161.90	100	Horizontal	Pass
6	784.23	32.10	-7.73	46.0	13.90	Peak	300.30	100	Horizontal	Pass

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

RE Test case\_FCC 15B 1GHz-6GHz



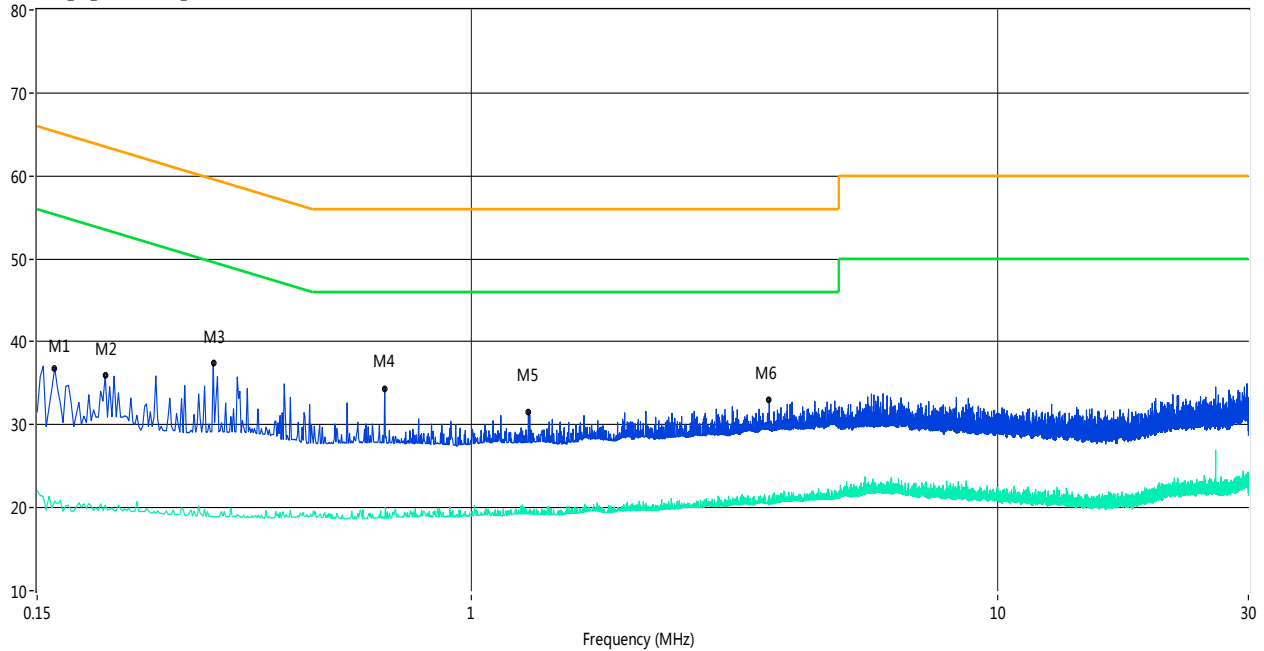
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1289.93	43.29	-4.79	74.0	30.71	Peak	123.90	100	Horizontal	Pass
2	1793.80	44.26	-3.72	74.0	29.74	Peak	112.60	100	Horizontal	Pass
3	2153.71	46.10	-1.00	74.0	27.90	Peak	266.90	100	Horizontal	Pass
4	2817.55	47.45	2.16	74.0	26.55	Peak	12.00	100	Horizontal	Pass
5	3790.30	48.13	10.78	74.0	25.87	Peak	127.50	100	Horizontal	Pass
6	4713.32	51.98	13.47	74.0	22.02	Peak	60.40	100	Horizontal	Pass

## A.2 Conducted Emission

### Test Data and Plots (Audio(AC) Test Mode)

#### A.2.1 L Phase

CE Test case\_CE\_FCC PART 15\_Class B

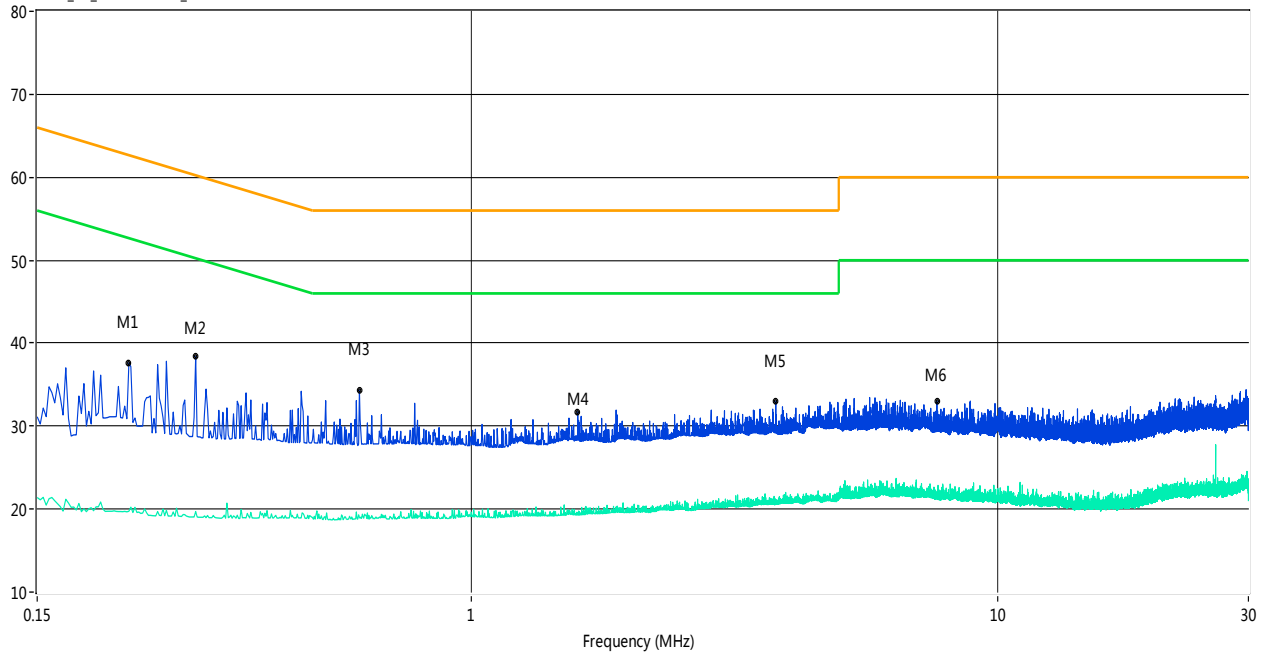


No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.16	36.9	13.00	65.7	28.80	Peak	L Line	Pass
1**	0.16	20.8	13.00	55.7	34.90	AV	L Line	Pass
2	0.20	35.9	13.00	64.5	28.60	Peak	L Line	Pass
2**	0.20	20.3	13.00	54.5	34.20	AV	L Line	Pass
3	0.32	37.4	13.00	61.0	23.60	Peak	L Line	Pass
3**	0.32	18.9	13.00	51.0	32.10	AV	L Line	Pass
4	0.69	34.3	13.00	56.0	21.70	Peak	L Line	Pass
4**	0.69	18.7	13.00	46.0	27.30	AV	L Line	Pass
5	1.29	31.5	13.00	56.0	24.50	Peak	L Line	Pass
5**	1.29	19.6	13.00	46.0	26.40	AV	L Line	Pass
6	3.69	33.0	13.00	56.0	23.00	Peak	L Line	Pass
6**	3.69	21.5	13.00	46.0	24.50	AV	L Line	Pass



## A.2.2 N Phase

CE Test case\_CE\_FCC PART 15\_ Class B



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.22	37.6	13.00	63.9	26.30	Peak	N Line	Pass
1**	0.22	19.7	13.00	53.9	34.20	AV	N Line	Pass
2	0.30	38.4	13.00	61.7	23.30	Peak	N Line	Pass
2**	0.30	19.7	13.00	51.7	32.00	AV	N Line	Pass
3	0.61	34.3	13.00	56.0	21.70	Peak	N Line	Pass
3**	0.61	19.0	13.00	46.0	27.00	AV	N Line	Pass
4	1.60	31.7	13.00	56.0	24.30	Peak	N Line	Pass
4**	1.60	19.3	13.00	46.0	26.70	AV	N Line	Pass
5	3.80	33.0	13.00	56.0	23.00	Peak	N Line	Pass
5**	3.80	20.9	13.00	46.0	25.10	AV	N Line	Pass
6	7.68	33.1	13.00	60.0	26.90	Peak	N Line	Pass
6**	7.68	21.3	13.00	50.0	28.70	AV	N Line	Pass

--END OF REPORT--