

TECHNICAL REPORT



ISO/IEC17025 Accredited Lab.

Report No: FCC/IC 1309018  
File reference No: 2013-10-10

Applicant: Serene Innovations, Inc

Product: Wireless TV Speaker

Model No: TV-SB

Trademark: Serene

Test Standards: FCC Part 15 Subpart C, Paragraph 15.247  
RSS-210 Issue 8

Test result: It is herewith confirmed and found to comply with the requirements set up by ANSI C63.4, FCC Part 15 Subpart C, Paragraph 15.247 regulations and RSS-210 Issue 8 for the evaluation of electromagnetic compatibility

Approved By

*Jack Chung*

Jack Chung  
Manager

Dated: October 10, 2013

**Results appearing herein relate only to the sample tested**

**The technical reports is issued errors and omissions exempt and is subject to withdrawal at**

**SHENZHEN TIMEWAY TECHNOLOGY CONSULTING CO., LTD**

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### **Special Statement:**

The testing quality ability of our laboratory meet with “Quality Law of People’s Republic of China” Clause 19.

The testing quality system of our laboratory meet with ISO/IEC-17025 requirements, which is approved by CNAL. This approval result is accepted by MRA of APLAC.

Our test facility is recognized, certified, or accredited by the following organizations:

#### **CNAL-LAB Code: L2292**

The EMC Laboratory has been assessed and in compliance with CNAL/AC01:2002 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:1999 General Requirements) for the Competence of testing Laboratories.

#### **FCC-Registration No.: 899988**

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 899988.

#### **IC- Registration No.: IC5205A-02**

The EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration IC No.: 5205A-02.



Test Report Conclusion

Content

<b>1.0</b>	<b>General Details</b> .....	4
1.1	Test Lab Details.....	4
1.2	Applicant Details.....	4
1.3	Description of EUT .....	4
1.4	Submitted Sample.....	5
1.5	Test Duration.....	5
1.6	Test Uncertainty.....	5
1.7	Test By.....	5
<b>2.0</b>	<b>List of Measurement Equipment</b> .....	6
<b>3.0</b>	<b>Technical Details</b> .....	8
3.1	Summary of Test Results.....	8
3.2	Test Standards.....	8
<b>4.0</b>	<b>EUT Modification</b> .....	8
<b>5.0</b>	<b>Power Line Conducted Emission Test</b> .....	9
5.1	Schematics of the Test.....	9
5.2	Test Method and Test Procedure.....	9
5.3	Configuration of the EUT.....	9
<b>5.4</b>	<b>EUT Operating Condition</b> .....	10
<b>5.5</b>	<b>Conducted Emission Limit</b> .....	10
<b>5.6</b>	<b>Test Result</b> .....	10
<b>6.0</b>	<b>Radiated Emission test</b> .....	15
6.1	Test Method and Test Procedure.....	15
6.2	Configuration of the EUT.....	15
6.3	EUT Operation Condition.....	15
6.4	Radiated Emission Limit.....	16
7.0	6dB and 99%Bandwidth Measurement.....	28
8.0	Maximum Peak Output Power.....	37
9.0	Power Spectral Density Measurement.....	44
10.0	Out of Band Measurement.....	44
11.0	Antenna Requirement.....	47
12.0	FCC/IC ID Label.....	48
13.0	Photo of Test Setup and EUT View.....	49

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## 1.0 General Details

### 1.1 Test Lab Details

Name : SHENZHEN TIMEWAY TECHNOLOGY CONSULTING CO., LTD  
Address: 5/F,Block 4, Anhua Industrial Zone.,No.8 TaiRan Rd.CheGongMiao,FuTian District,  
Shenzhen,CHINA.  
Telephone: (755) 83448688  
Fax: (755) 83442996  
Site on File with the Federal Communications Commission – United States  
Registration Number: 899988  
For 3m & 10 m OATS  
Site Listed with Industry Canada of Ottawa, Canada  
Registration Number: IC: 5205A-01  
For 3m & 10 m OATS

### 1.2 Applicant Details

Applicant: Serene Innovations, Inc  
Address: 14731 Carmenita Road, Norwalk, Ca. 90650 U.S.A  
Telephone: 0755-61173686  
Fax: 0755-61113800

### 1.3 Description of EUT

Product: Wireless TV Speaker  
Manufacturer: Shenzhen Transtar Electronics Co., LTD  
Address: Yulv Gaolinda Industry Zone, Gongming Town, Guangming New District,  
Shenzhen, Guangdong, China 518132  
Brand Name: Serene  
Model Number: TV-SB  
Additional Model Number: N/A

Power Adapter 1: WRP2U-090150C Input: 100-240Vac, 50/60Hz, 0.4A max; Output: 9V, 1.5A  
Power Adapter 2: HB18-090150SPA Input: AC100-240V, 50/60Hz, 0.5A; Output: DC9V, 1500mA  
Type of Modulation: GFSK  
Frequency range: 2403-2478MHz;  
Channel Spacing: 1MHz  
Channel Number: 76 Channels  
Antenna: Integral Antenna with maximum gain 0dBi  
Test mode: Test at 2403MHz, 2439MHz, 2478MHz with 1kHz audio input

### 1.4 Submitted Sample: 2 Samples

### 1.5 Test Duration

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2013-09-05 to 2013-10-10

1.6 Test Uncertainty

Conducted Emissions Uncertainty =3.6dB

Radiated Emissions Uncertainty =4.7dB

1.7 Test Engineer

A handwritten signature in black ink that reads 'Terry Tang'.

The sample tested by \_\_\_\_\_

Print Name: Terry Tang

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<b>2.0 Test Equipments</b>					
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	ROHDE&SCHWARZ	ESPI 3	100379	2013-08-23	2014-08-22
TWO Line-V-NETW	ROHDE&SCHWARZ	EZH3-Z5	100294	2013-08-23	2014-08-22
TWO Line-V-NETW	ROHDE&SCHWARZ	EZH3-Z5	100253	2013-08-23	2014-08-22
Ultra Broadband ANT	ROHDE&SCHWARZ	HL562	100157	2013-08-25	2014-08-24
ESDV Test Receiver	ROHDE&SCHWARZ	ESDV	100008	2013-08-23	2014-08-22
Impuls-Begrenzer	ROHDE&SCHWARZ	ESH3-Z2	100281	2013-08-24	2014-08-23
System Controller	CT	SC100	-	--	--
Printer	EPSON	PHOTO EX3	CFNH234850	--	--
Computer	IBM	8434	1S8434KCE99BLXL O*	-	-
Loop Antenna	EMCO	6502	00042960	2013-08-23	2014-08-22
ESPI Test Receiver	ROHDE&SCHWARZ	ESI26	838786/013	2013-08-23	2014-08-22
3m OATS	--	--	N/A	2013-08-22	2014-08-21
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170265	2013-08-24	2014-08-23
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-631	2013-08-24	2014-08-23
Power meter	Anritsu	ML2487A	6K00003613	2013-08-24	2014-08-23
Power sensor	Anritsu	MA2491A	32263	2013-08-24	2014-08-23
Bilog Antenna	Schwarebeck	VULB9163	9163/340	2013-08-21	2014-08-20
LISN	AFJ	LS16C	10010947251	2013-08-21	2014-08-20
LISN (Three Phase)	Schwarebeck	NSLK 8126	8126453	2013-08-23	2014-08-22
9*6*6 Anechoic	--	--	N/A	2013-08-22	2014-08-21
EMI Test Receiver	RS	ESCS30	100139	2013-08-23	2014-08-22
LISN	AFJ	LS16C	10010947251	2013-08-23	2014-08-22
LISN (Three Phase)	Schwarebeck	NSLK 8126	8126453	2013-08-23	2014-08-22

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2.1 Auxiliary Equipment

Name	Model No.	Serial No.	Manufacturer	Cable	FCC ID/DOC
Mobile Phone	Galaxy S4	--	SUMMANG	--	FCC ID

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**3.0 Technical Details**

**3.1 Summary of test results**

<b>The EUT has been tested according to the following specifications:</b>			
<b>Standard</b>	<b>Test Type</b>	<b>Result</b>	<b>Notes</b>
<b>FCC Part 15, Paragraph 15.107 &amp; 15.207 &amp; RSS-210 Issue 8</b>	<b>Conducted Emission Test</b>	<b>PASS</b>	<b>Complies</b>
<b>FCC Part 15 Subpart C Paragraph 15.247(a)(2) Limit &amp; RSS-210 Issue 8</b>	<b>Spectrum bandwidth of a Orthogonal Frequency Division Multiplex System Limit: 6dB bandwidth&gt;500kHz</b>	<b>PASS</b>	<b>Complies</b>
<b>FCC Part 15, Paragraph 15.247(b) &amp; RSS-210 Issue 8</b>	<b>Maximum peak output power Limit: max. 30dBm</b>	<b>PASS</b>	<b>Complies</b>
<b>FCC Part 15, Paragraph 15.109,15.205 &amp; 15.209 &amp; RSS-210 Issue 8</b>	<b>Transmitter Radiated Emission Limit: Table 15.209</b>	<b>PASS</b>	<b>Complies</b>
<b>FCC Part 15, Paragraph 15.247(e) &amp; RSS-210 Issue 8</b>	<b>Power Spectral Density Limit: max. 8dBm</b>	<b>PASS</b>	<b>Complies</b>
<b>FCC Part 15, Paragraph 15.247(d) &amp; RSS-210 Issue 8</b>	<b>Out of Band Emission and Restricted Band Radiation Limit: 20dB less than peak value of fundamental frequency Restricted band limit: Table 15.209</b>	<b>PASS</b>	<b>Complies</b>

**3.2 Test Standards**

**FCC Part 15 Subpart & Subpart C, Paragraph 15.247 & RSS-210 Issue 8**

**4.0 EUT Modification**

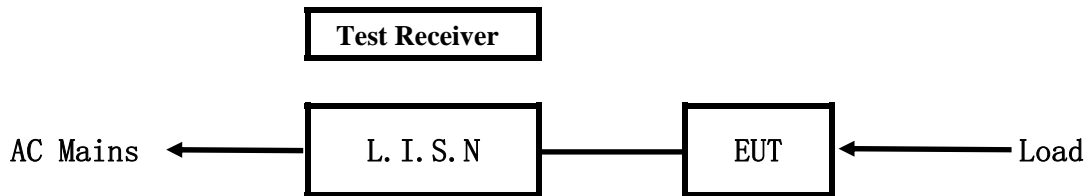
**No modification by Shenzhen Timeway Technology Consulting Co., Ltd**

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**5. Power Line Conducted Emission Test**

5.1 Schematics of the test



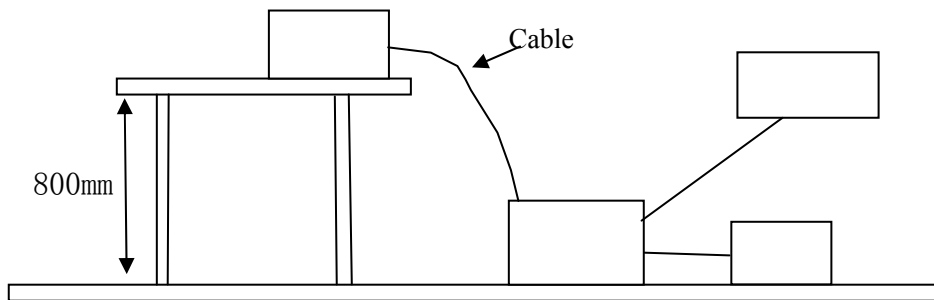
EUT: Equipment Under Test

5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.4-2003. The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.4 –2003.

Test Voltage: 120V~, 60Hz

Block diagram of Test setup



5.3 Configuration of The EUT

The EUT was configured according to ANSI C63.4-2003. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

A. EUT

Device	Manufacturer	Model	IC
Wireless TV Speaker	Shenzhen Transtar Electronics Co., LTD	TV-SB	IC: 7181A-TVSB, FCC ID: Z33-TVSB

B. Internal Device

Device	Manufacturer	Model	FCC ID/DOC
N/A			

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C. Peripherals

Device	Manufacturer	Model	FCC ID/DOC	Cable
N/A				

5.4 EUT Operating Condition

Operating condition is according to ANSI C63.4 -2003.

A Setup the EUT and simulators as shown on follow

B Enable AF signal and confirm EUT active to normal condition

5.5 Power line conducted Emission Limit according to Paragraph 15.207 and 15.107 and RSS-210

Frequency (MHz)	Class A Limits (dB $\mu$ V)		Class B Limits (dB $\mu$ V)	
	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level
0.15 ~ 0.50	79.0	66.0	66.0~56.0*	56.0~46.0*
0.50 ~ 5.00	73.0	60.0	56.0	46.0
5.00 ~ 30.00	73.0	60.0	60.0	50.0

- Notes:
- \*Decreasing linearly with logarithm of frequency.
  - The tighter limit shall apply at the transition frequencies

5.6 Test Results

The frequency spectrum from 0.15MHz to 30MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9kHz.



**A: Conducted Emission on Live Terminal (150kHz to 30MHz)**

**EUT Operating Environment**

Temperature: 26°C Humidity: 65%RH Atmospheric Pressure: 101 Kpa

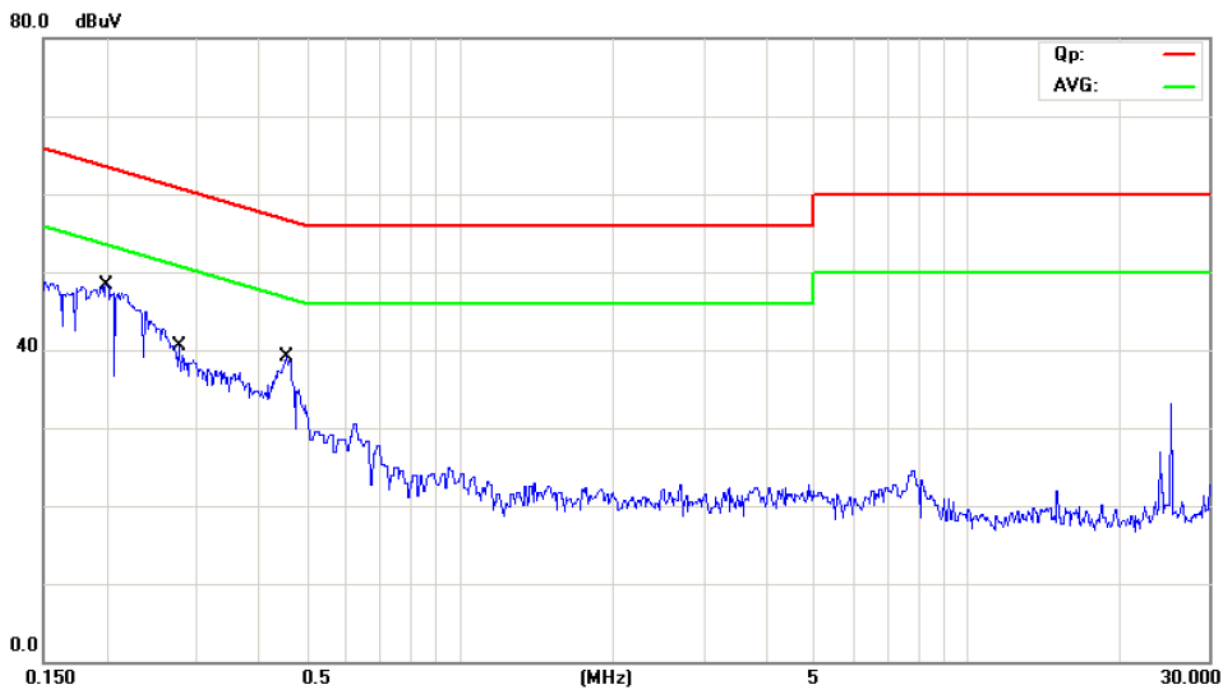
**Power Supply Model: WRP2U-090150C**

**EUT set Condition: Keep Transmitting**

**Equipment Level: Class B**

**Results: PASS**

Please refer to following diagram for individual



Frequency (MHz)	Line	Reading(dBμV)		Limit(dBμV)	
		Quasi-peak	Average	Quasi-peak	Average
0.198	Live	45.95	23.75	63.68	53.68
0.454	Live	35.52	21.72	56.79	46.79
0.278	Live	37.94	22.54	60.86	50.86

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**B: Conducted Emission on Neutral Terminal (150kHz to 30MHz)**

**EUT Operating Environment**

Temperature: 26°C Humidity: 65%RH Atmospheric Pressure: 101 Kpa

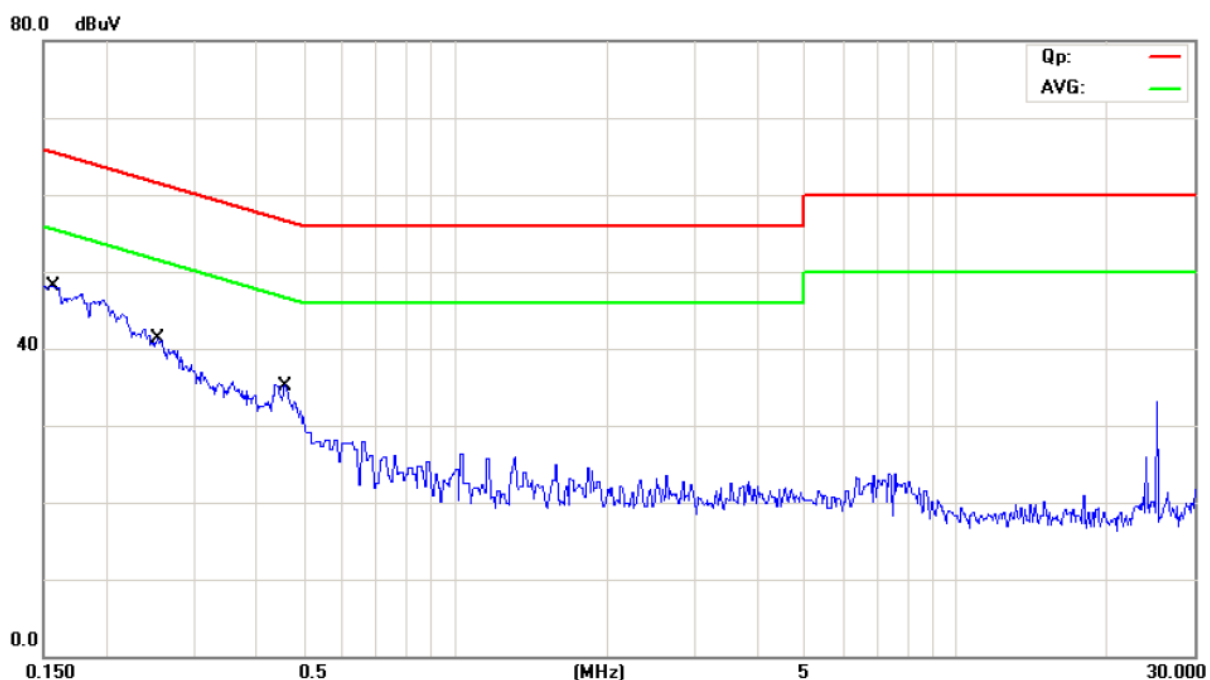
**Power Supply Model: WRP2U-090150C**

**EUT set Condition: Keep Transmitting**

**Equipment Level: Class B**

**Results: Pass**

Please refer to following diagram for individual



Frequency (MHz)	Line	Reading(dBµV)		Limit(dBµV)	
		Quasi-peak	Average	Quasi-peak	Average
0.156	Neutral	46.91	25.51	65.64	55.64
0.251	Neutral	36.81	23.11	61.72	51.72
0.456	Neutral	32.12	20.92	56.76	46.76

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**C: Conducted Emission on Live Terminal (150kHz to 30MHz)**

**EUT Operating Environment**

Temperature: 26°C Humidity: 65%RH Atmospheric Pressure: 101 Kpa

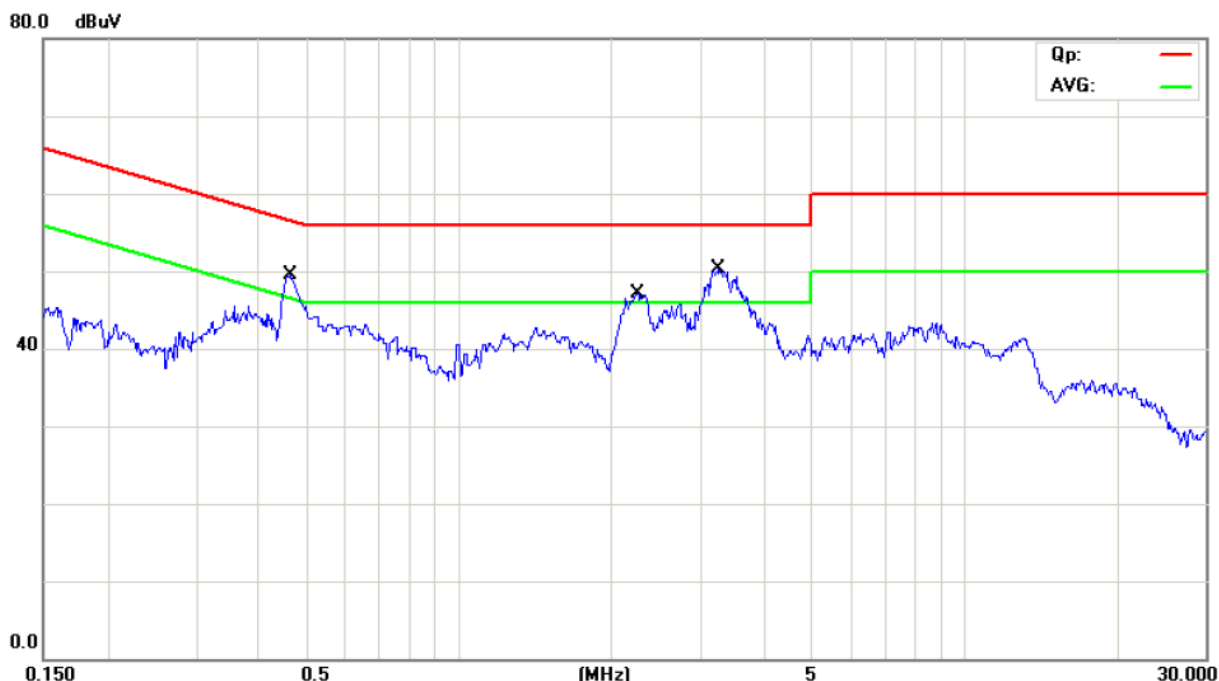
**Power Supply Model: HB18-090150OSPA**

**EUT set Condition: Keep Transmitting**

**Equipment Level: Class B**

**Results: PASS**

Please refer to following diagram for individual



Frequency (MHz)	Line	Reading(dBμV)		Limit(dBμV)	
		Quasi-peak	Average	Quasi-peak	Average
0.459	Live	47.33	34.13	56.71	46.71
2.253	Live	48.10	39.60	56.00	46.00
3.256	Live	50.00	41.40	56.00	46.00

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**D: Conducted Emission on Neutral Terminal (150kHz to 30MHz)**

**EUT Operating Environment**

Temperature: 26°C Humidity: 65%RH Atmospheric Pressure: 101 Kpa

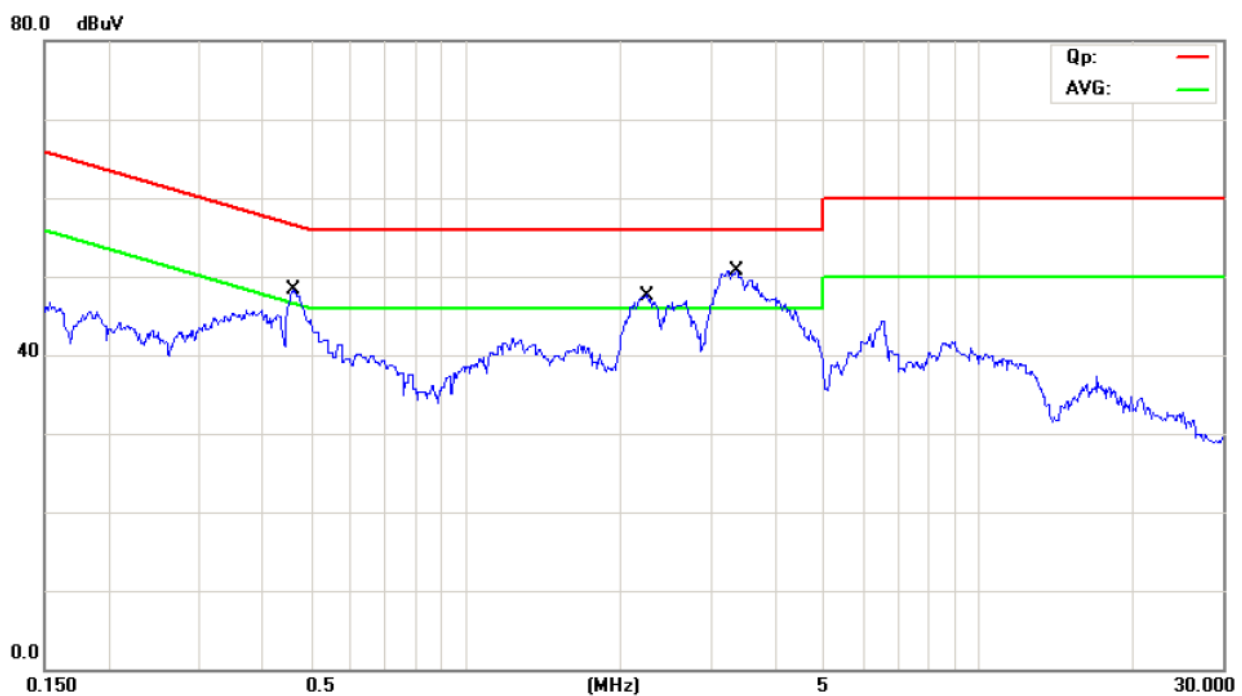
**Power Supply Model: HB18-090150SPA**

**EUT set Condition: Keep Transmitting**

**Equipment Level: Class B**

**Results: Pass**

Please refer to following diagram for individual



Frequency (MHz)	Line	Reading(dBµV)		Limit(dBµV)	
		Quasi-peak	Average	Quasi-peak	Average
0.459	Neutral	46.13	29.13	56.71	46.71
2.239	Neutral	49.60	40.00	56.00	46.00
3.373	Neutral	51.35	41.05	56.00	46.00

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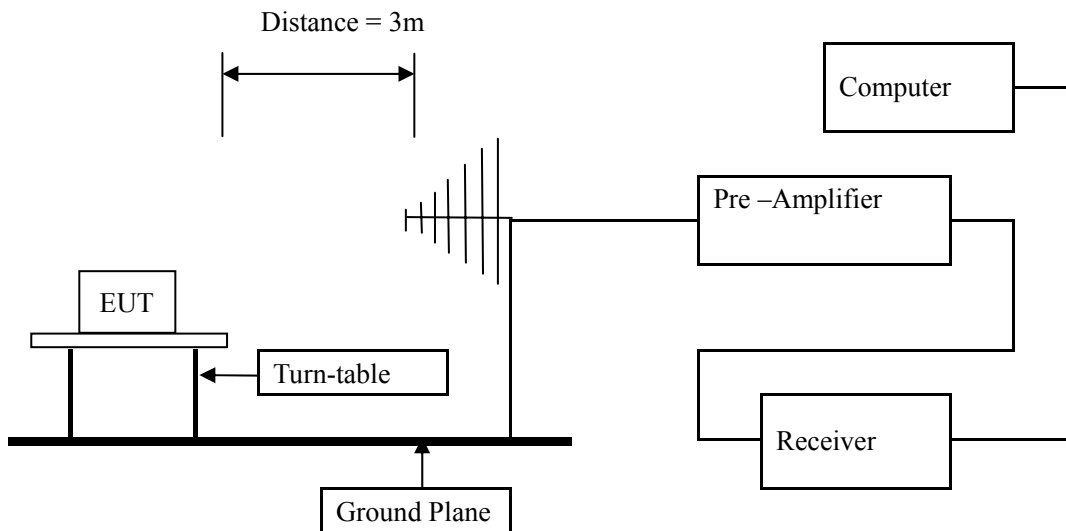
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## 6 Radiated Emission Test

### 6.1 Test Method and test Procedure:

- (1) The EUT was tested according to ANSI C63.4 –2003. The radiated test was performed at Timeway Laboratory. This site is on file with the FCC laboratory division, Registration No.899988
- (2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.4-2003.
- (3) The frequency spectrum from 30 MHz to 25 GHz was investigated. All readings from 30 MHz to 1 GHz are Quasi-peak values with a resolution bandwidth of 120 kHz. For measurement above 1GHz, peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK detector. Measurements were made at 3 meters.
- (4) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
- (5) Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a “QP” in the data table.
- (6) The antenna polarization : Vertical polarization and Horizontal polarization.

#### Block diagram of Test setup



### 6.2 Configuration of The EUT

Same as section 5.3 of this report

### 6.3 EUT Operating Condition

Same as section 5.4 of this report.

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6.4 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

**Frequencies in restricted band are complied to limit on Paragraph 15.209 and 15.109 and RSS-210**

Frequency Range (MHz)	Distance (m)	Field strength (dB $\mu$ V/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

- Note:
1. RF Voltage (dBuV) = 20 log RF Voltage (uV)
  2. In the Above Table, the higher limit applies at the band edges.
  3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT
  4. For radiated emissions above 1GHz, only the worse case was recorded.





**Test result**

**General Radiated Emission Data and Harmonics Radiated Emission Data**

**Radiated Emission In Horizontal/ In Vertical (30MHz----1000MHz)**

**Power Supply Model:** WRP2U-090150C

**EUT set Condition:** Keep Transmitting

**Results:** Pass

Frequency (MHz)	Level@3m (dB $\mu$ V/m)	Antenna Polarity	Limit@3m (dB $\mu$ V/m)
208.920	26.15	H	43.50
430.080	30.50	H	46.00
712.680	36.40	H	46.00
72.000	25.06	V	40.00
135.160	27.33	V	43.50

The report refers only to the sample tested and does not apply to the bulk.

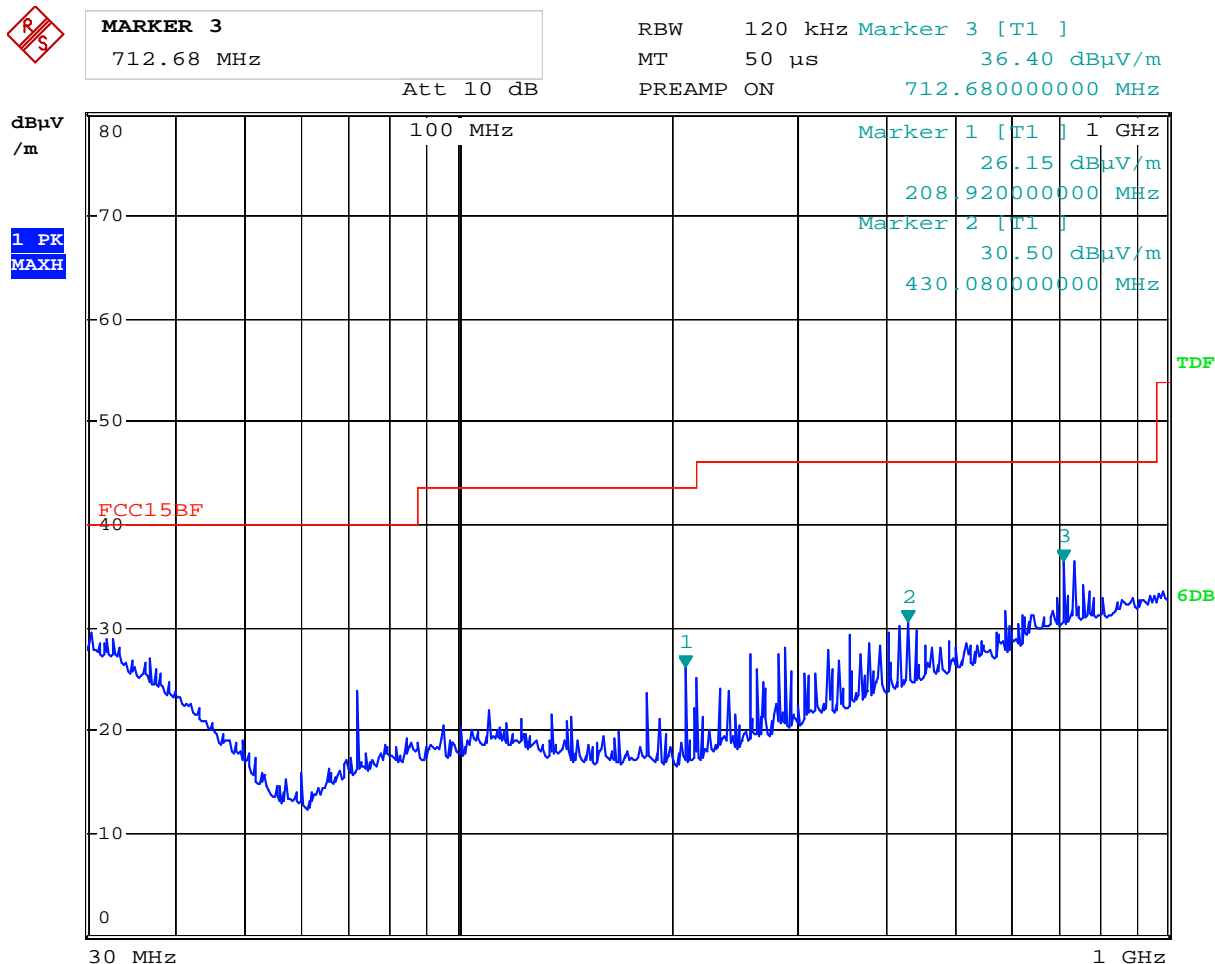
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Test Figure:

H

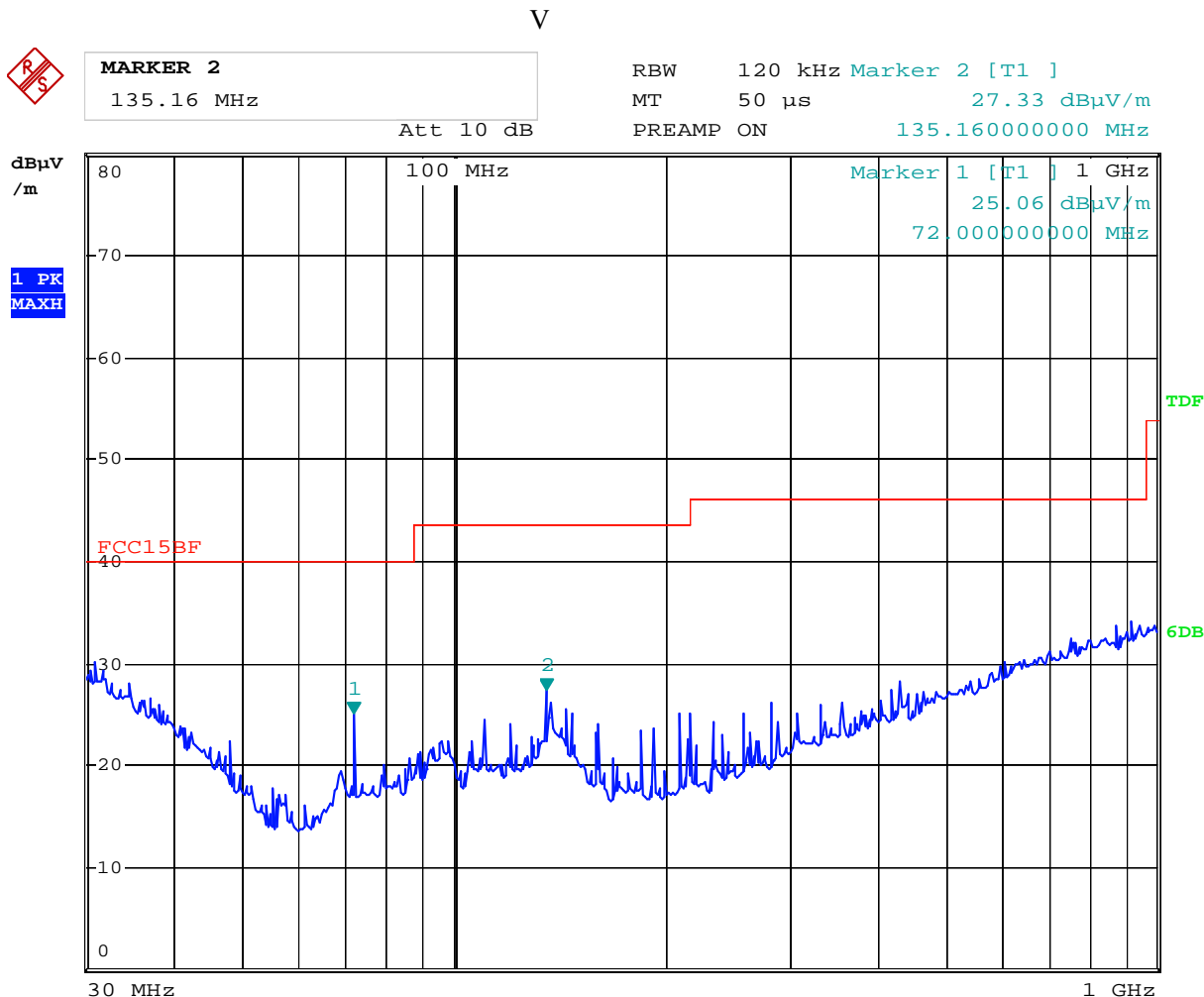


Date: 6.SEP.2013 11:40:11

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Test Figure:



Date: 6.SEP.2013 11:41:59

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**Test result**

**General Radiated Emission Data and Harmonics Radiated Emission Data**

**Radiated Emission In Horizontal/ In Vertical (30MHz----1000MHz)**

**Power Supply Model:** HB18-090150SPA  
**EUT set Condition:** Keep Transmitting  
**Results:** Pass

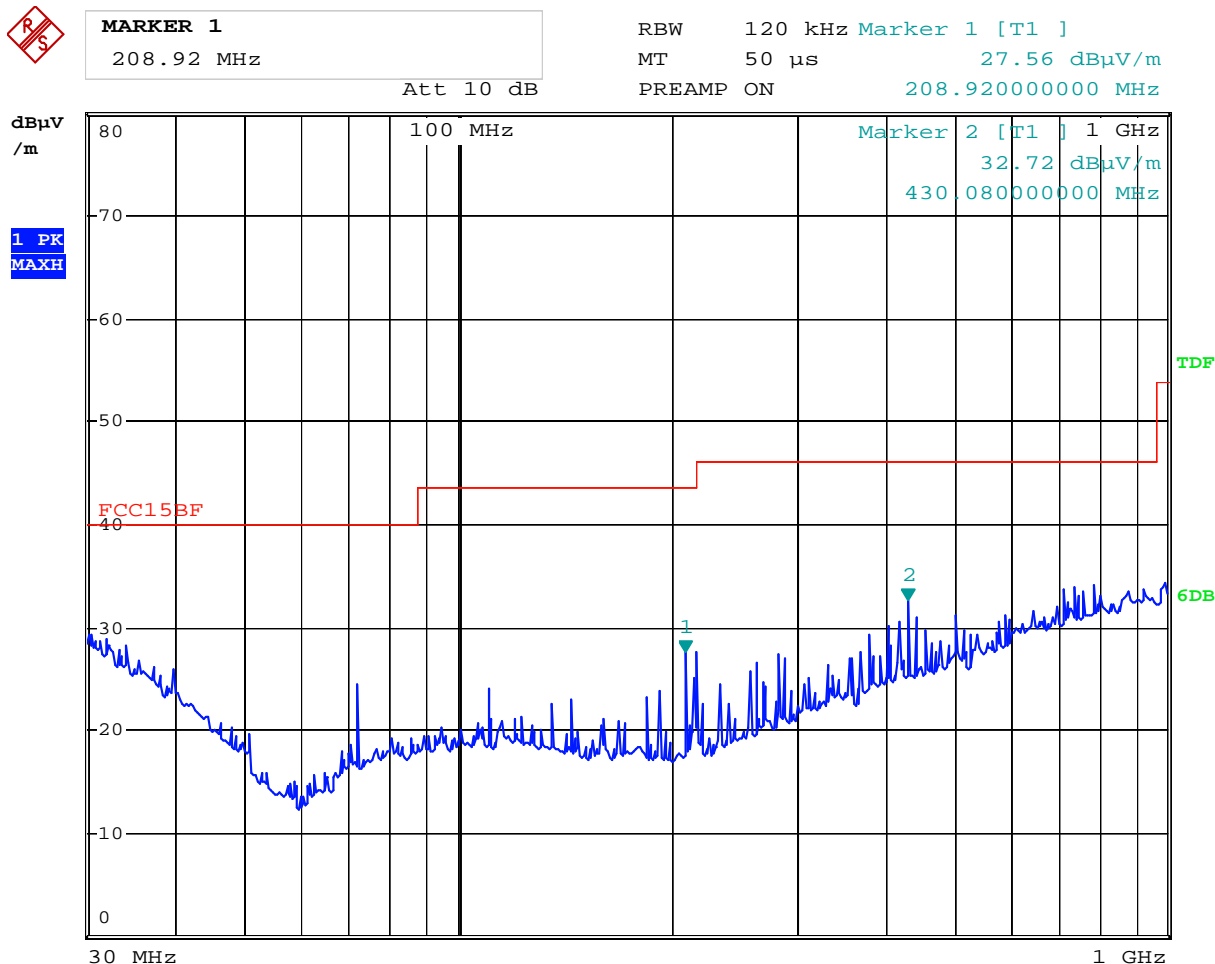
Frequency (MHz)	Level@3m (dB $\mu$ V/m)	Antenna Polarity	Limit@3m (dB $\mu$ V/m)
208.920	27.56	H	43.50
430.080	32.72	H	46.00
72.000	31.12	V	40.00
114.040	27.89	V	43.50

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Test Figure:

H

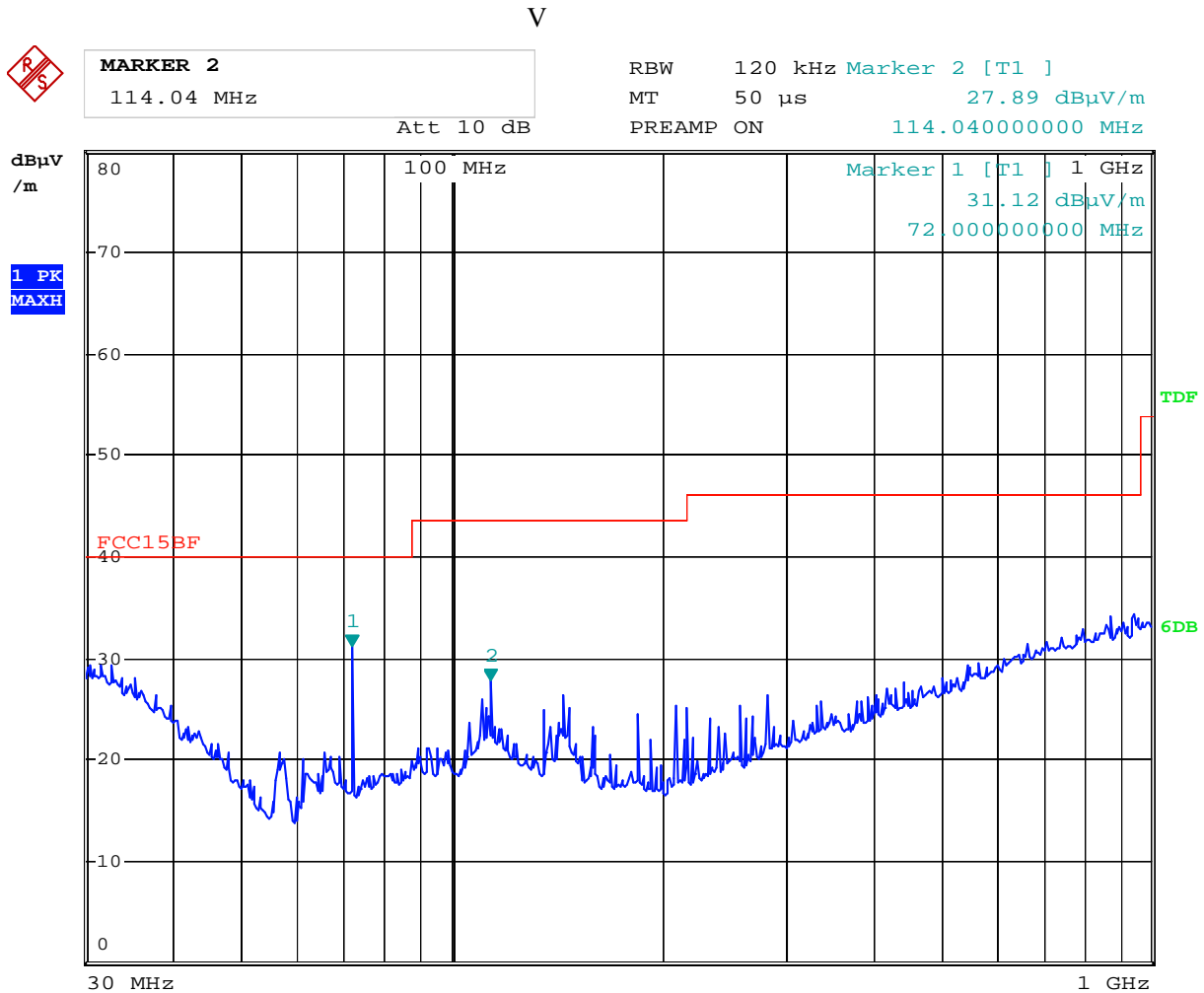


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Test Figure:



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**Operation Mode: Transmitting under Low Channel (2403MHz)**

Frequency (MHz)	Level@3m (dB $\mu$ V/m)	Antenna Polarity	Limit@3m (dB $\mu$ V/m)
2403.00	98.48 (PK)	H	Fundamental Frequency
2403.00	98.58 (PK)	V	
4806.00	48.31 (PK)	H	74(Peak)/ 54(AV)
4806.00	47.73 (PK)	V	74(Peak)/ 54(AV)
7209	--	H/V	74(Peak)/ 54(AV)
9612	--	H/V	74(Peak)/ 54(AV)
12015	--	H/V	74(Peak)/ 54(AV)
14418	--	H/V	74(Peak)/ 54(AV)
16821	--	H/V	74(Peak)/ 54(AV)
19224	--	H/V	74(Peak)/ 54(AV)
21627	--	H/V	74(Peak)/ 54(AV)
24030	--	H/V	74(Peak)/ 54(AV)

- Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit  
2. Remark "---" means that the emissions level is too low to be measured

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**Operation Mode: Transmitting under Middle Channel (2439MHz)**

Frequency (MHz)	Level@3m (dB $\mu$ V/m)	Antenna Polarity	Limit@3m (dB $\mu$ V/m)
2439.00	97.78 (PK)	H	Fundamental Frequency
2439.00	97.52 (PK)	V	
4878	48.23 (PK)	H	74(Peak)/ 54(AV)
4878	49.04 (PK)	V	74(Peak)/ 54(AV)
7317	--	H/V	74(Peak)/ 54(AV)
9756	--	H/V	74(Peak)/ 54(AV)
12195	--	H/V	74(Peak)/ 54(AV)
14634	--	H/V	74(Peak)/ 54(AV)
17073	--	H/V	74(Peak)/ 54(AV)
19512	--	H/V	74(Peak)/ 54(AV)
21951	--	H/V	74(Peak)/ 54(AV)
24390	--	H/V	74(Peak)/ 54(AV)

- Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit  
2. Remark "---" means that the emissions level is too low to be measured

**Operation Mode: Transmitting under High Channel (2478MHz)**

Frequency (MHz)	Level@3m (dB $\mu$ V/m)	Antenna Polarity	Limit@3m (dB $\mu$ V/m)
2478.00	99.06 (PK)	H	Fundamental Frequency
2478.00	99.07 (PK)	V	
4956	47.39 (PK)	H	74(Peak)/ 54(AV)
4956	47.19 (PK)	V	74(Peak)/ 54(AV)
7434	--	H/V	74(Peak)/ 54(AV)
9912	--	H/V	74(Peak)/ 54(AV)
12390	--	H/V	74(Peak)/ 54(AV)
14868	--	H/V	74(Peak)/ 54(AV)
17346	--	H/V	74(Peak)/ 54(AV)
19824	--	H/V	74(Peak)/ 54(AV)
22302	--	H/V	74(Peak)/ 54(AV)
24780	--	H/V	74(Peak)/ 54(AV)

- Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit  
2. Remark "---" means that the emissions level is too low to be measured

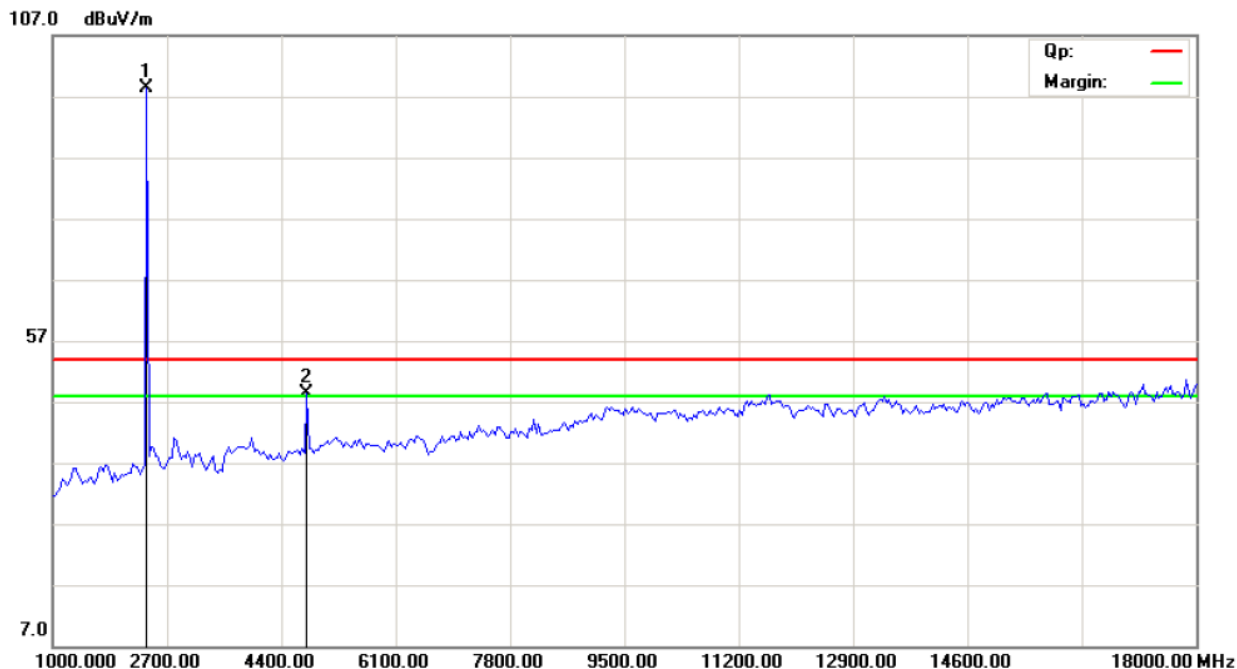
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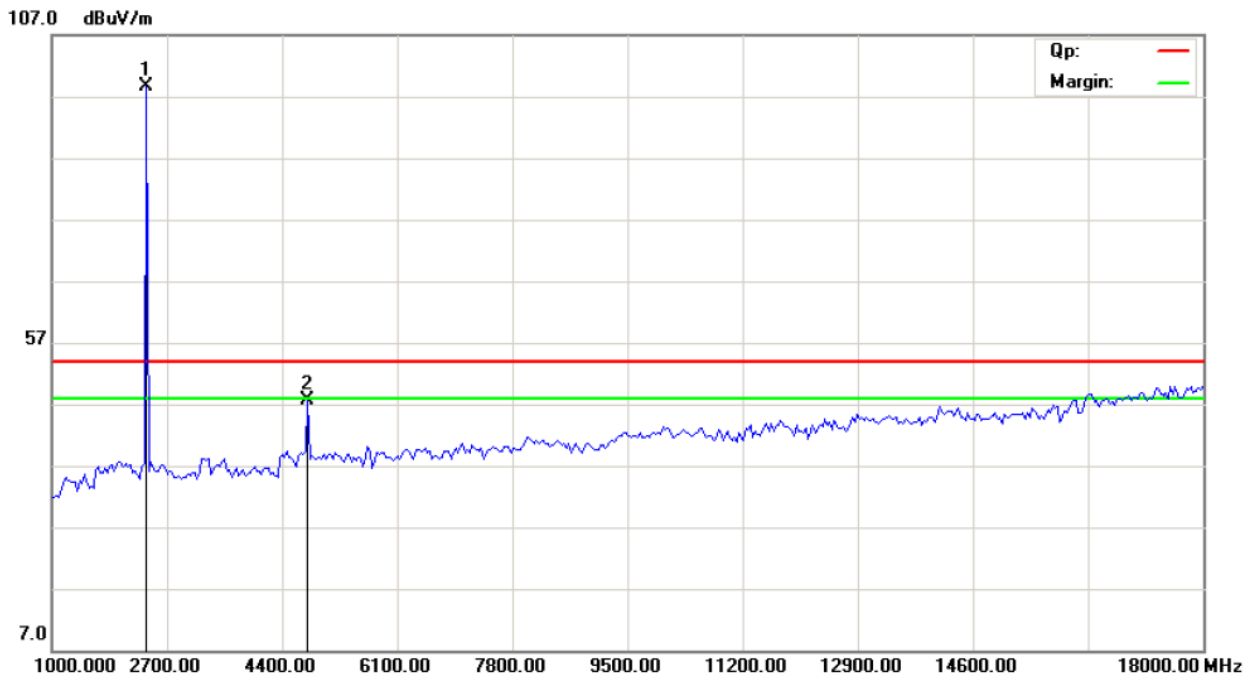


Please refer to the following test plots for details:

**Low Channel: Horizontal**



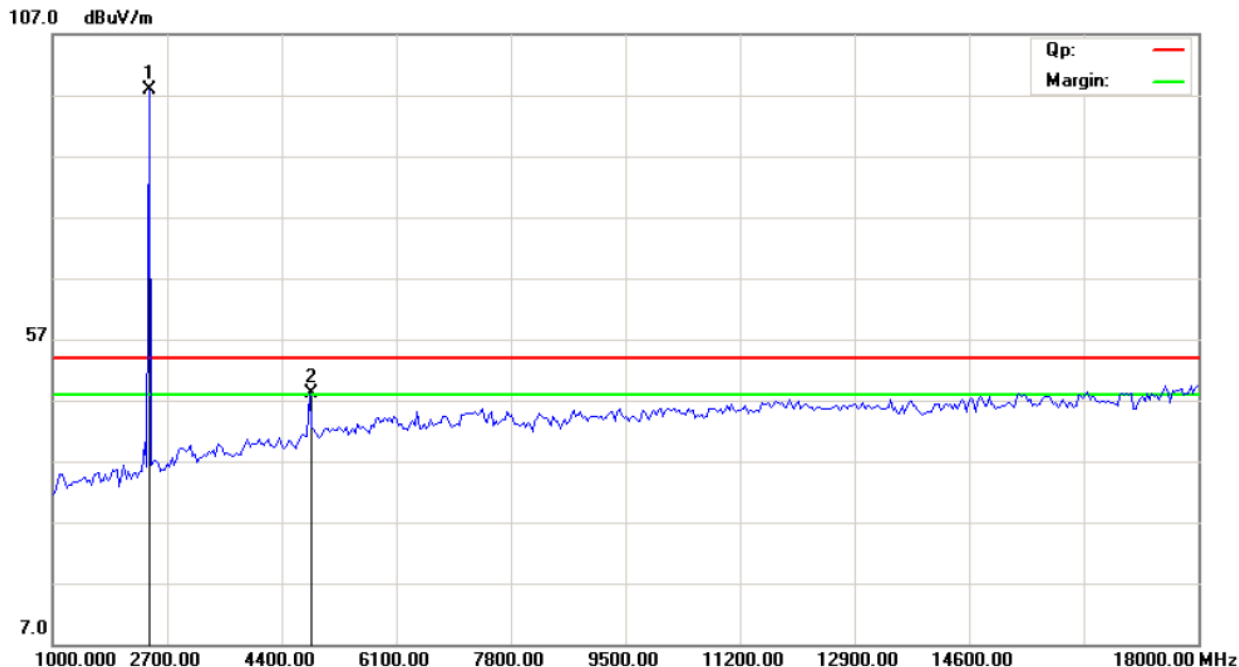
**Low Channel : Vertical**



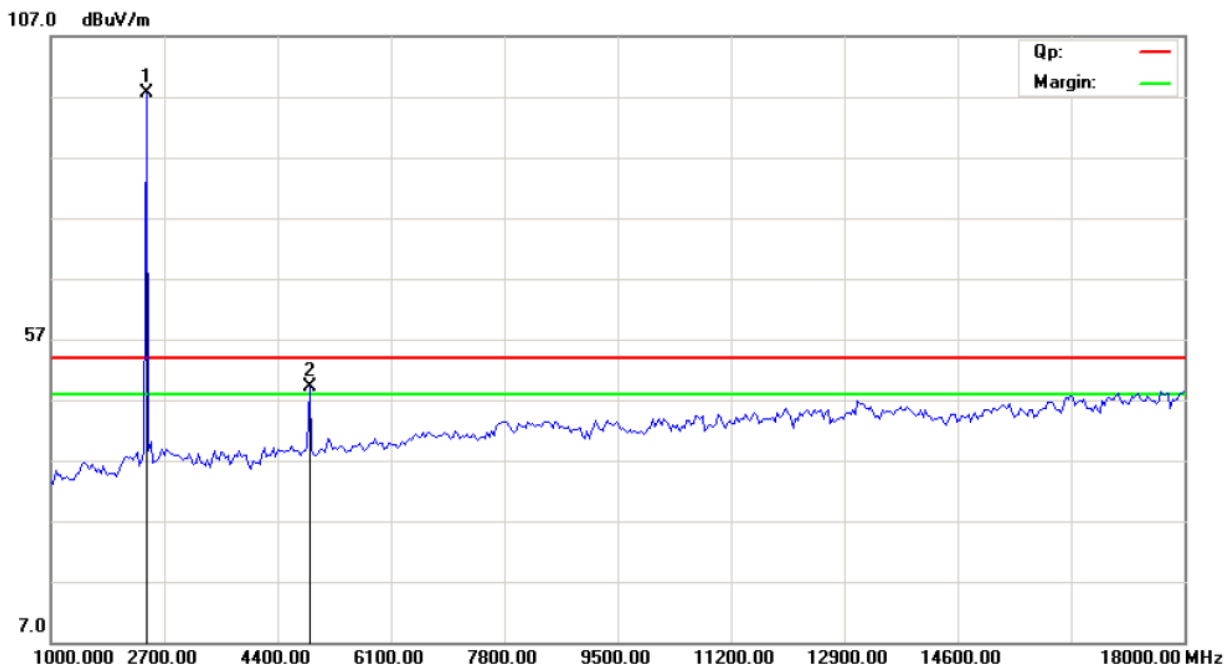
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Middle Channel : Horizontal



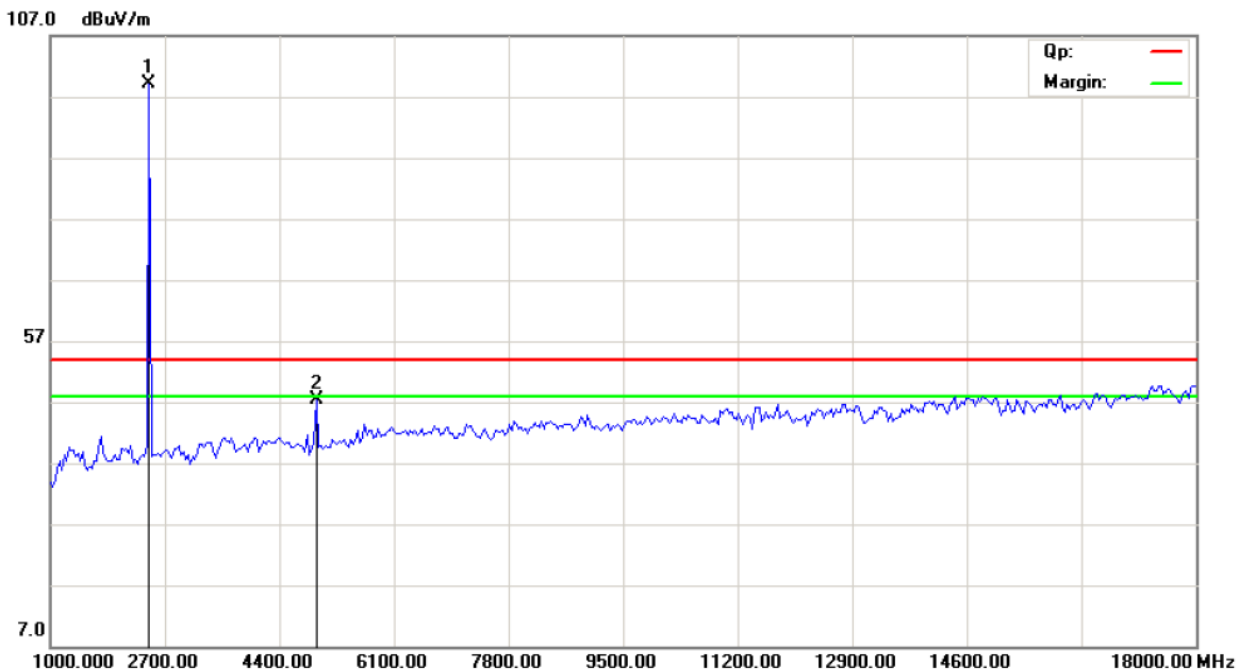
Middle Channel : Vertical



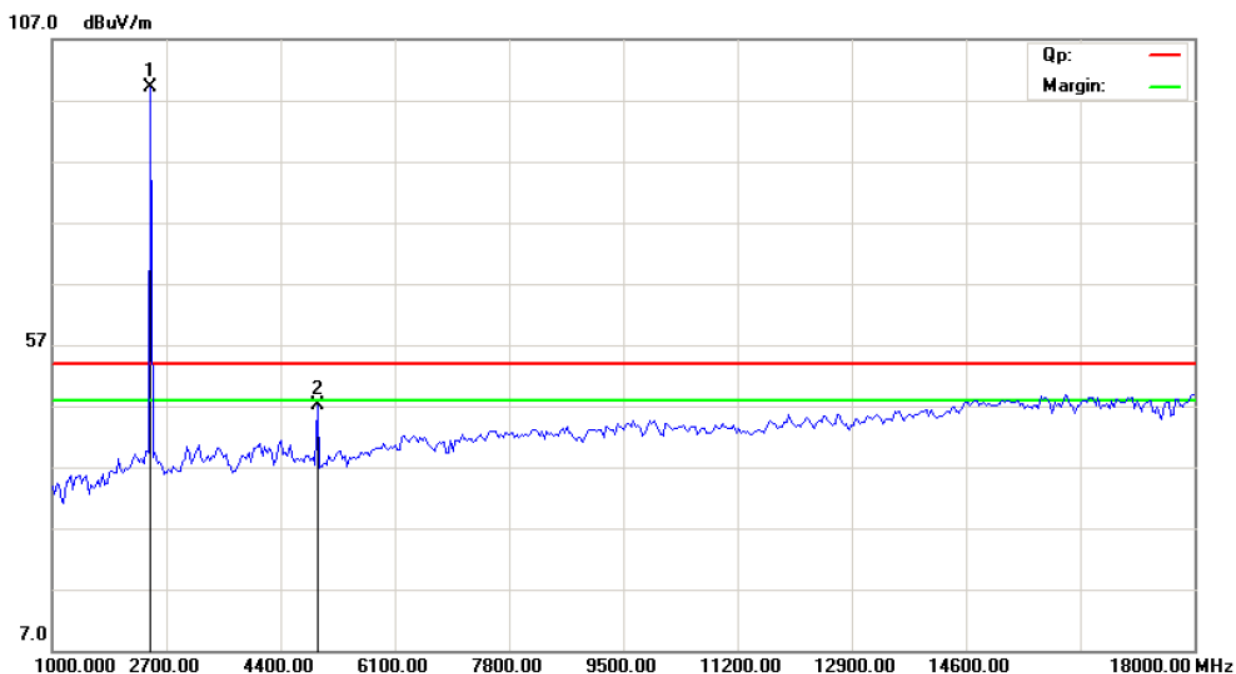
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**High Channel : Horizontal**



**High Channel : Vertical**

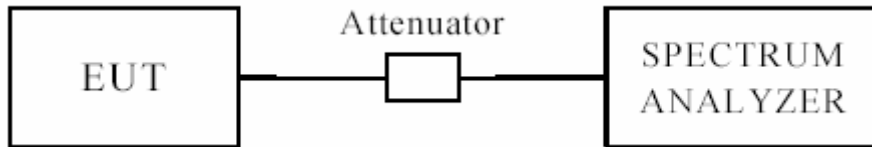


Note: For radiated Emissions from 18-25GHz, it is only the floor noise.

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## 7.0 6dB and 99% Bandwidth Measurement

### 7.1 Test Setup



### 7.2 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is >500 kHz

### 7.3 Test Procedure

1. Set resolution bandwidth (RBW) = 100 kHz
2. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

### 7.4 Test Result

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**6dB Occupied Bandwidth**

EUT	Wireless TV Speaker		Model	TV-SB
Mode	Keep Transmitting		Input Voltage	AC 120V
Temperature	24 deg. C,		Humidity	56% RH
Channel	Channel Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass/ Fail
Low	2403	1.440	0.5	Pass
Middle	2439	1.190	0.5	Pass
High	2478	1.050	0.5	Pass

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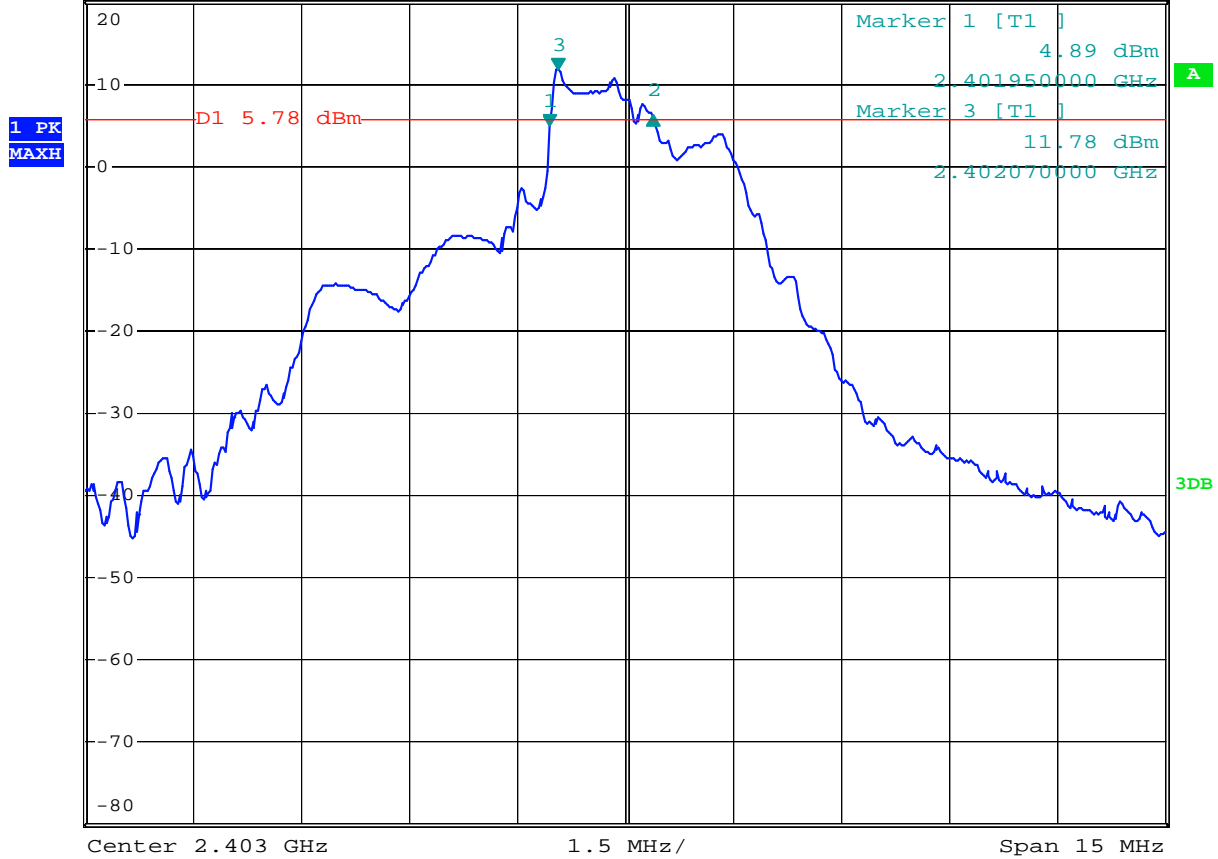


1. Condition: Low Channel



**DELTA MARKER 2**  
 1.44 MHz  
 Ref 20 dBm \*Att 30 dB

\*RBW 100 kHz Delta 2 [T1 ]  
 \*VBW 300 kHz 1.36 dB  
 SWT 2.5 ms 1.440000000 MHz

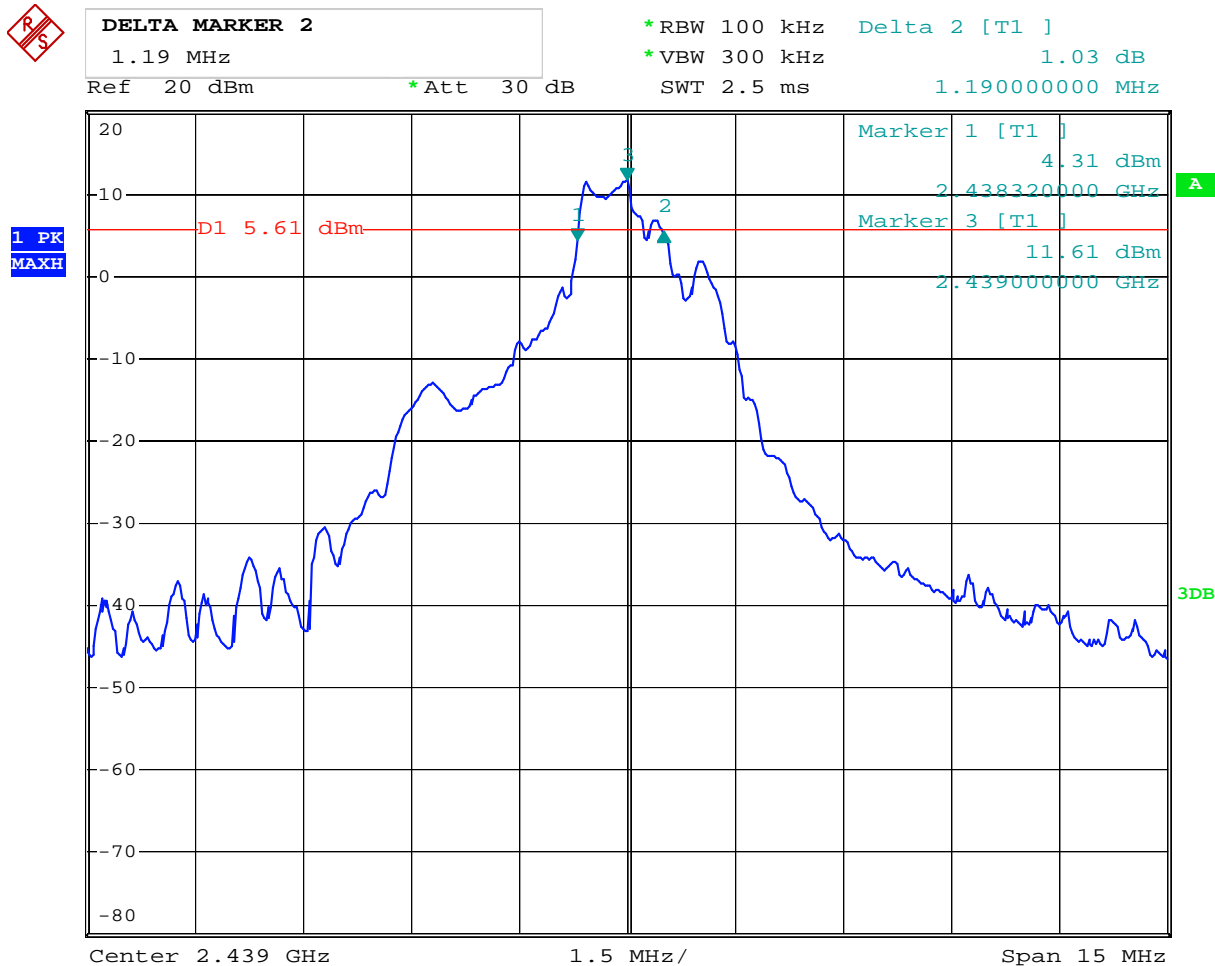


Date: 23.SEP.2013 12:32:25

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2. Condition: Middle Channel

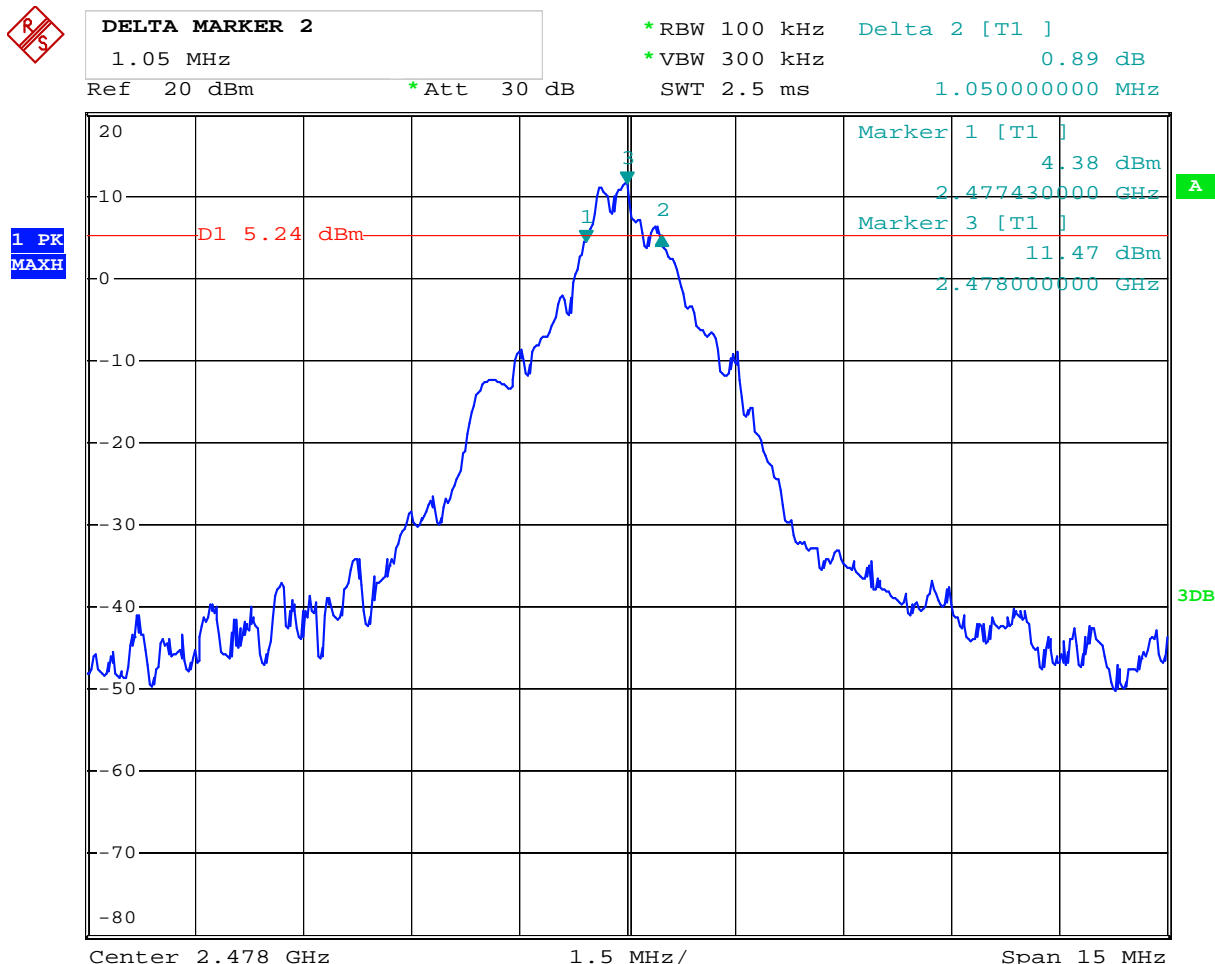


Date: 23.SEP.2013 12:41:05

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3. Condition: High Channel



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**99% Occupied Bandwidth**

EUT	Wireless TV Speaker		Model	TV-SB
Mode	Keep Transmitting		Input Voltage	AC 120V
Temperature	24 deg. C,		Humidity	56% RH
Channel	Channel Frequency (MHz)	99% Bandwidth (MHz)	Minimum Limit (MHz)	Pass/ Fail
Low	2403	4.280	--	Pass
Middle	2439	3.040	--	Pass
High	2478	2.720	--	Pass

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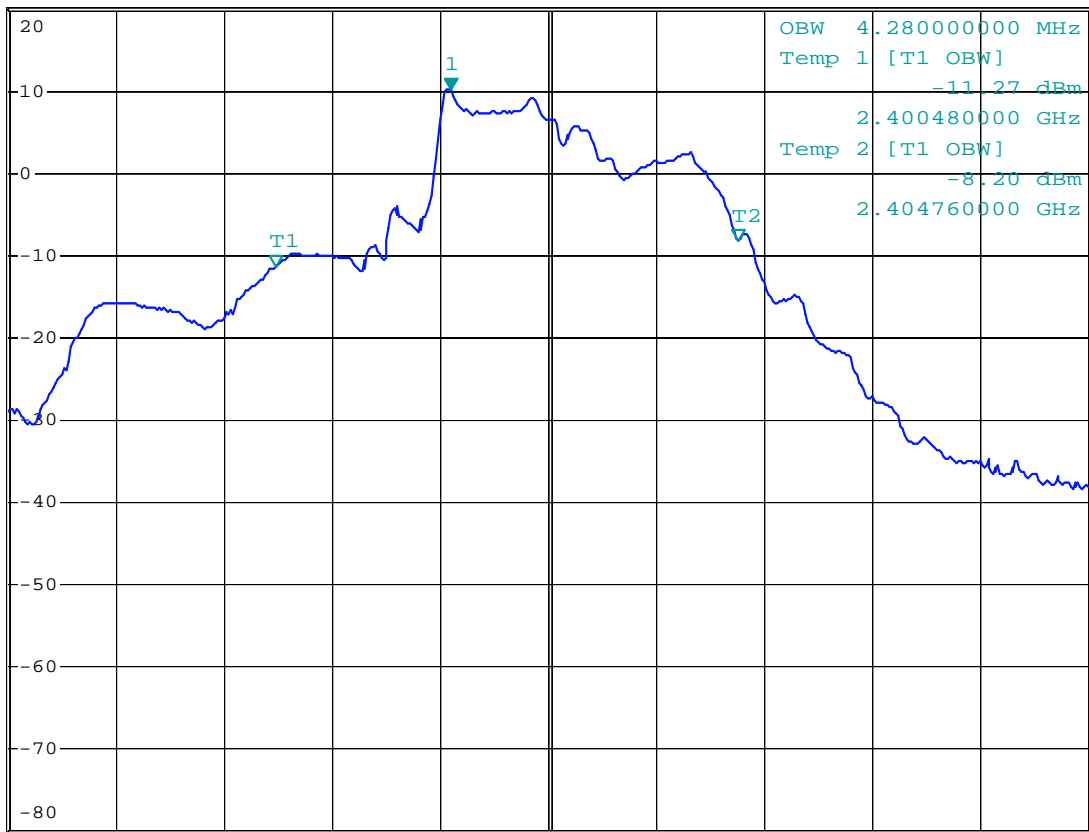


1. Condition: Low Channel



**MARKER 1**  
 2.4021 GHz  
 Ref 20 dBm \*Att 30 dB

\*RBW 100 kHz Marker 1 [T1 ]  
 \*VBW 300 kHz 10.16 dBm  
 SWT 2.5 ms 2.402100000 GHz



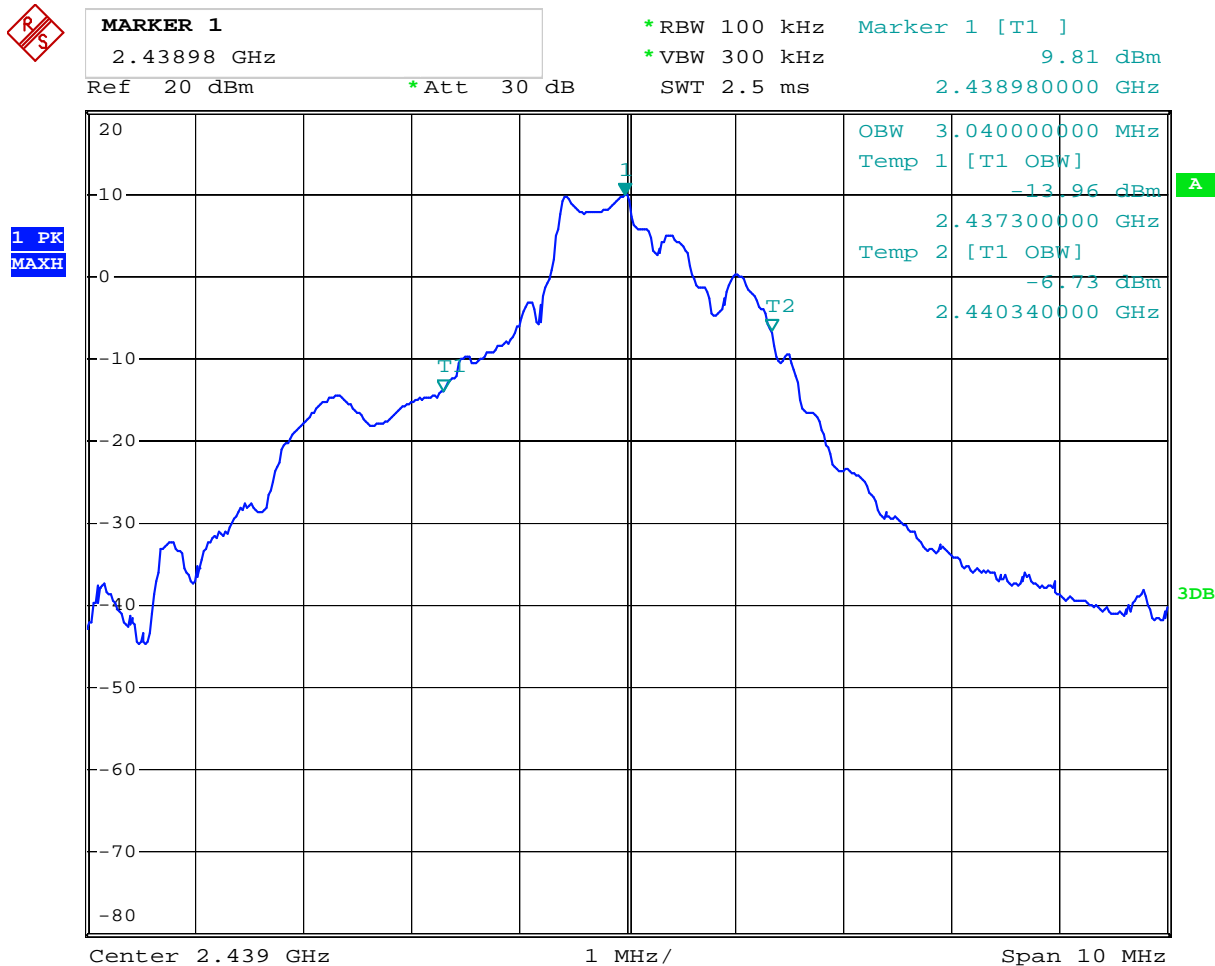
Center 2.403 GHz 1 MHz/ Span 10 MHz

Date: 9.OCT.2013 11:32:03

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2. Condition: Middle Channel

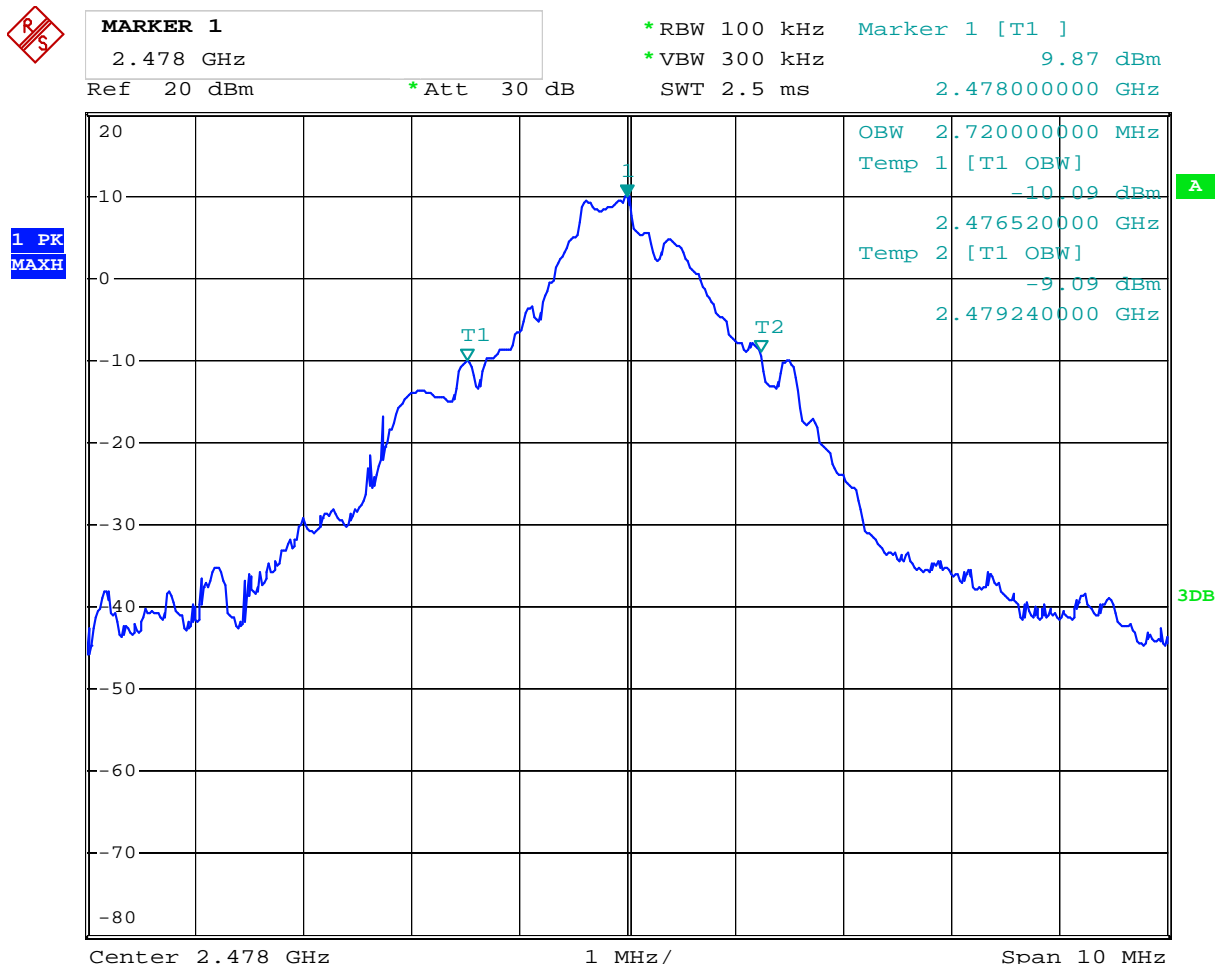


Date: 9.OCT.2013 11:33:51

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3. Condition: High Channel

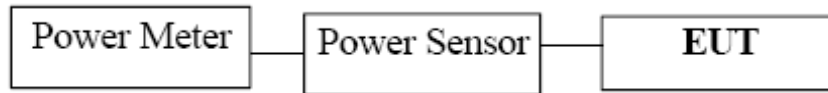


Date: 9.OCT.2013 11:35:03

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## 8. Maximum Peak Output Power

### 8.1 Test Setup



### 8.2 Limits of Maximum Peak Output Power

The Maximum Peak Output Power Measurement is 30dBm.

### 8.3 Test Procedure

The RF power output was measured with a Power meter connected to the RF Antenna connector ( conducted measurement ) while EUT was operating in transmit mode at the appropriate centre frequency.

**Note: the peak power was measured**

The report refers only to the sample tested and does not apply to the bulk.

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#### 8.4 Test Results

EUT	Wireless TV Speaker		Model	TV-SB
Mode	Keep Transmitting		Input Voltage	AC120V
Temperature	24 deg. C,		Humidity	56% RH
Channel	Channel Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Pass/ Fail
Low	2403	<b>13.19</b>	30	Pass
Middle	2439	12.40	30	Pass
High	2478	11.94	30	Pass

Note: 1. the result basic equation calculation as follow:

$$\text{Peak Power Output} = \text{Peak Power Reading} + \text{Cable loss} + \text{Attenuator}$$

2. Worse case was recorded

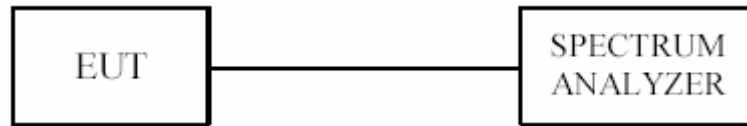
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## 9. Power Spectral Density Measurement

### 9.1 Test Setup



### 9.2 Limits of Power Spectral Density Measurement

The Maximum Power Spectral Density Measurement is 8dBm.

### 9.3 Test Procedure

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW = 10 kHz.
3. Set the VBW  $\geq$  30 kHz.
4. Set the span to 1.5 times the DTS channel bandwidth.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.
11. The resulting peak PSD level must be  $\leq$  8 dBm.

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**9.4 Test Result**

EUT	Wireless TV Speaker		Model	TV-SB
Mode	Keep Transmitting		Input Voltage	AC 120V
Temperature	24 deg. C,		Humidity	56% RH
Channel	Channel Frequency (MHz)	Final RF Power Level (dBm)	Maximum Limit (dBm)	Pass/ Fail
Low	2403	2.95	8	Pass
Middle	2439	2.20	8	Pass
High	2478	1.88	8	Pass

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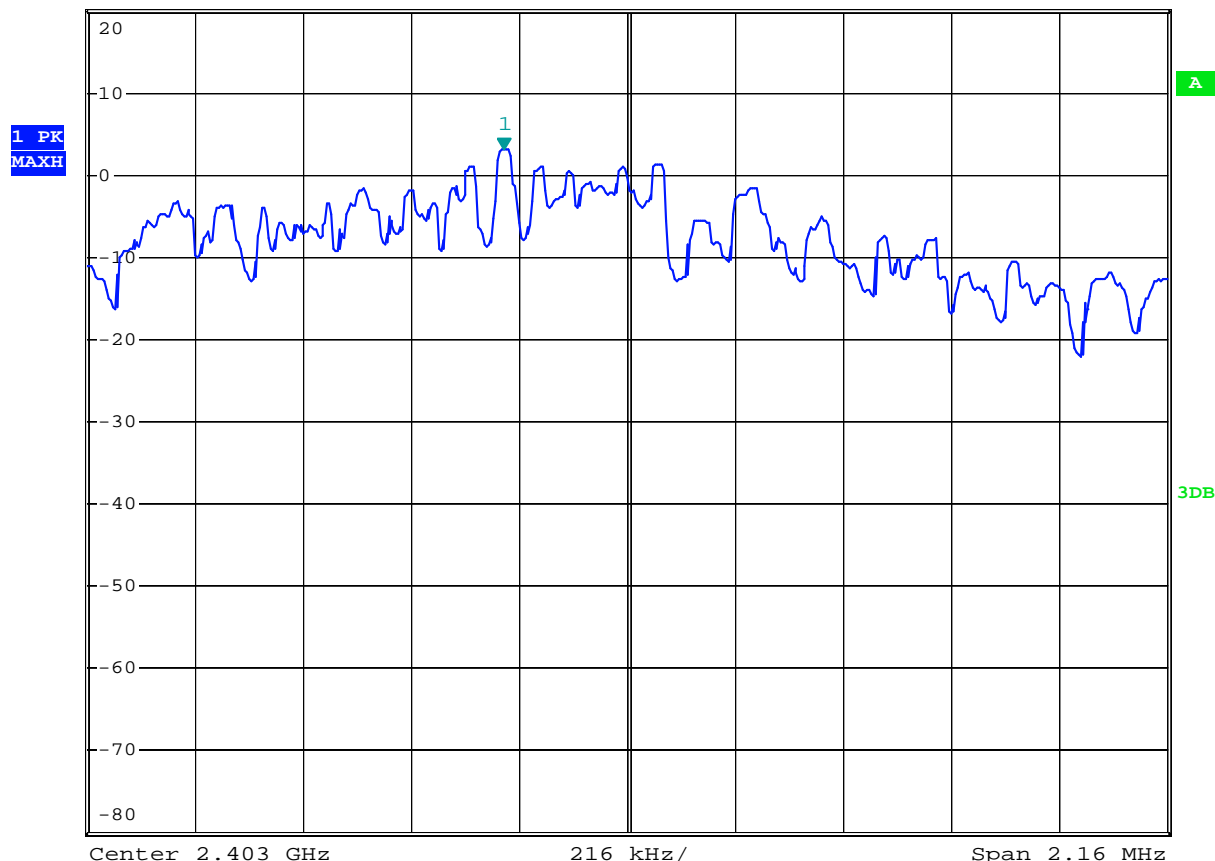
### 9.5 Photo of Power Spectral Density Measurement

#### 1. Condition: Low Channel



**MARKER 1**  
2.40275376 GHz  
Ref 20 dBm \* Att 30 dB

\* RBW 10 kHz    Marker 1 [T1 ]  
\* VBW 30 kHz    2.95 dBm  
SWT 25 ms    2.402753760 GHz

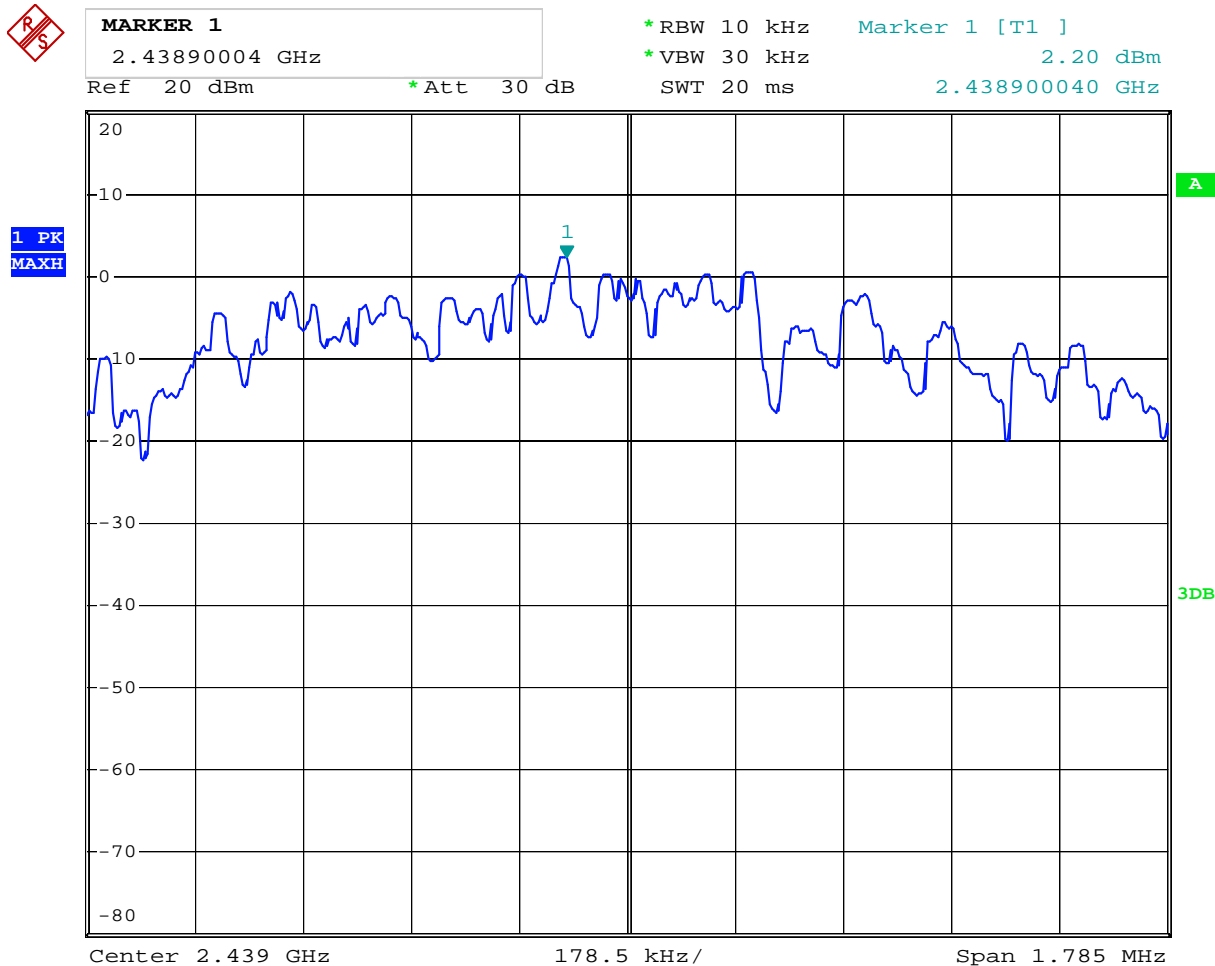


Date: 23.SEP.2013 12:46:28

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### 2. Condition: Middle Channel

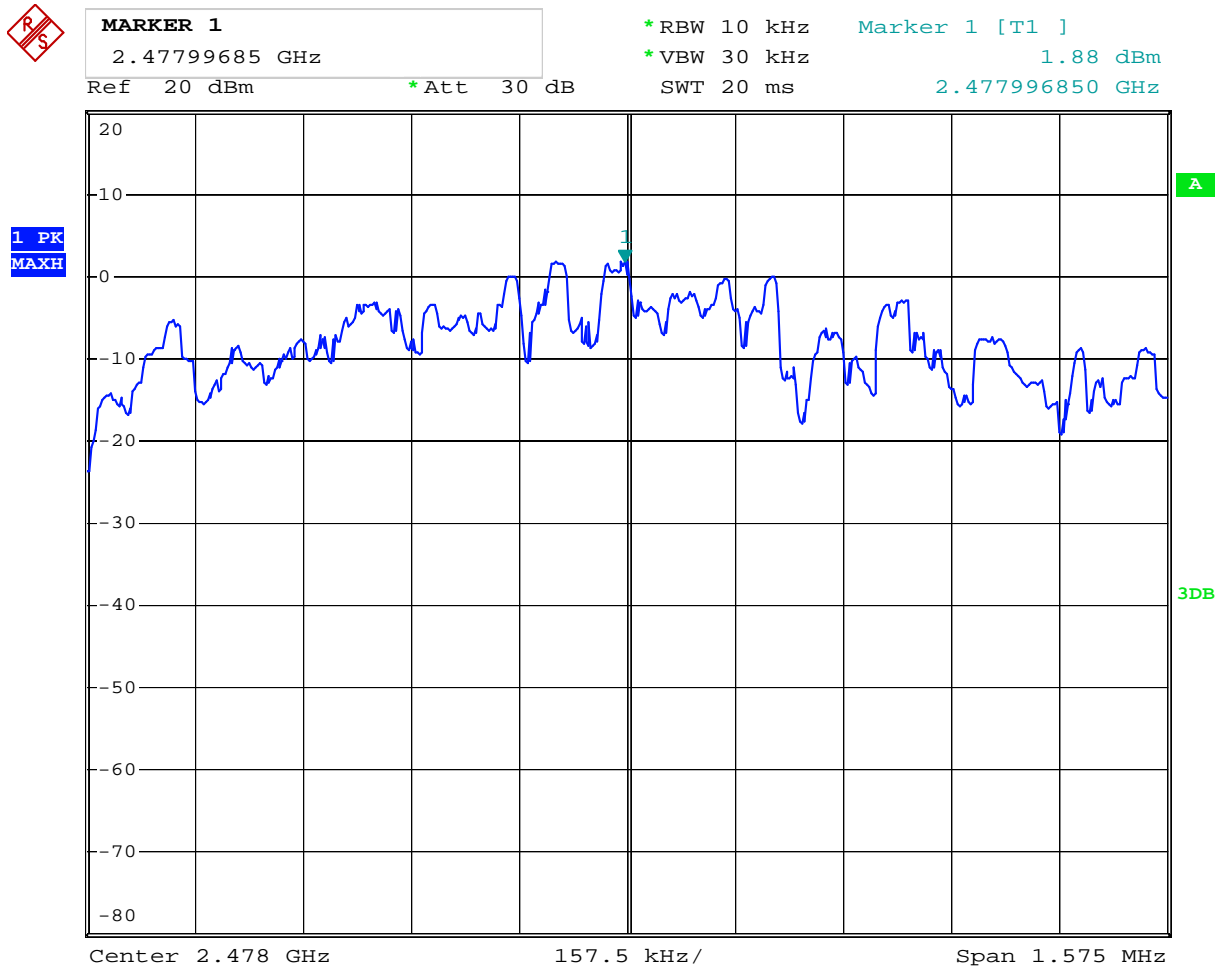


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### 3. Condition: High Channel

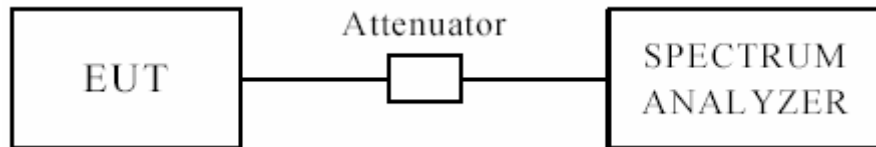


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## 10 Out of Band Measurement

### 10.1 Test Setup for band edge



**The restricted band requirement based on radiated emission test; please see the clause 6 for the test setup**

### 10.2 Limits of Out of Band Emissions Measurement

1. Below  $-20\text{dB}$  of the highest emission level of operating band (in 100kHz Resolution Bandwidth).
2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

### 10.3 Test Procedure

For signals in the restricted bands above and below the 2.4-2.483GHz allocated band a measurement was made of radiated emission test.( Peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK detector)

For bandage test, the spectrum set as follows: RBW=VBW=100 kHz. A conducted measurement used

### 10.4 Test Result

Please see next pages

Note: For band-edge measurement, the frequency from 30MHz-25GHz was tested. And It met the FCC rule.

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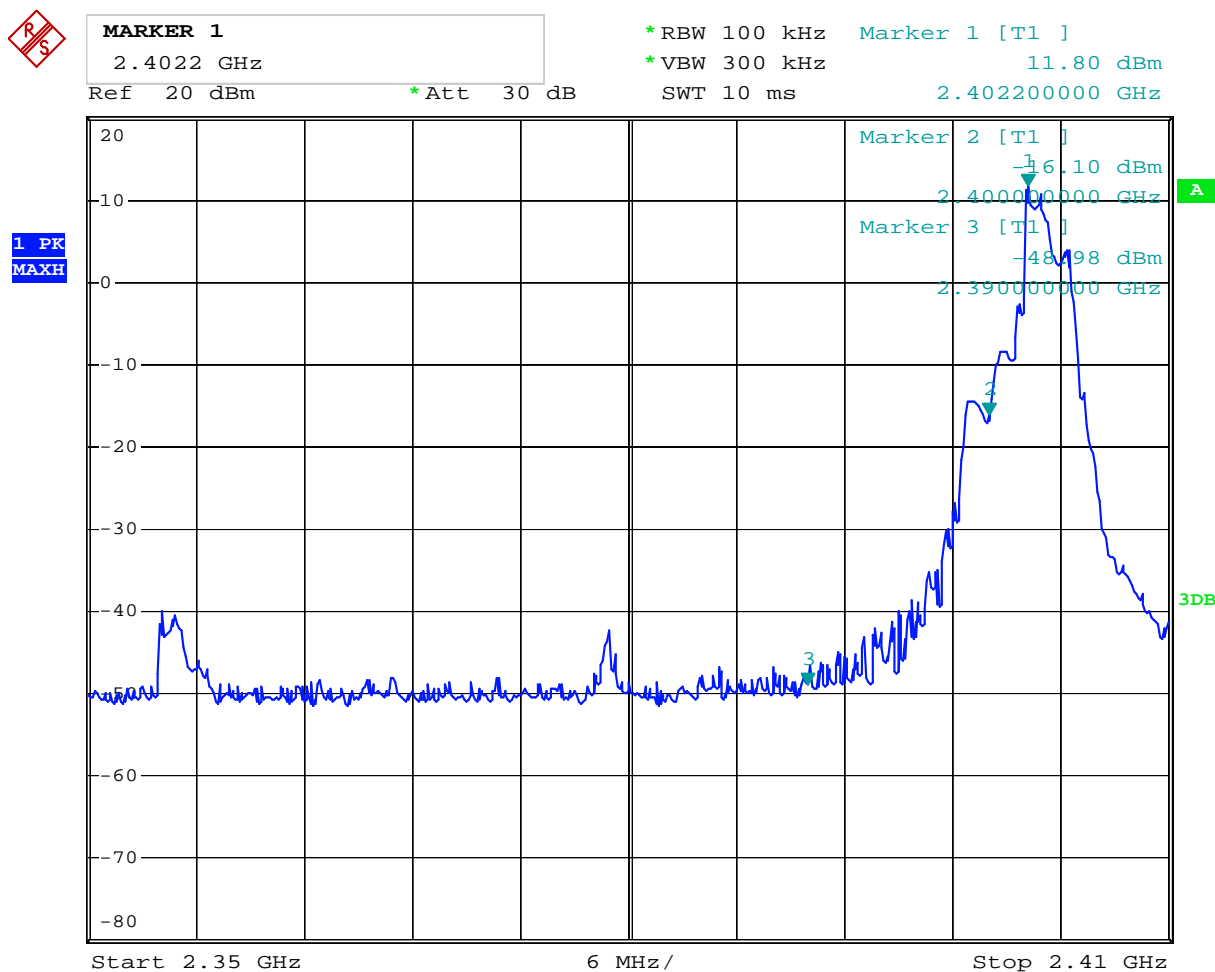


Test Mode: Low Channel

**10.4 Band-edge and Restricted band Measurement**

EUT	Wireless TV Speaker		Model	TV-SB
Mode	Keeping Transmitting		Input Voltage	AC 120V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
2390	PK (dBμV/m)	42.72	Limit	74(dBμV/m)
	AV (dBμV/m)	--		54(dBμV/m)

**Test Figure:**



Date: 23.SEP.2013 12:33:59

Note: The Max. FS in Restrict Band are measured in conventional method.

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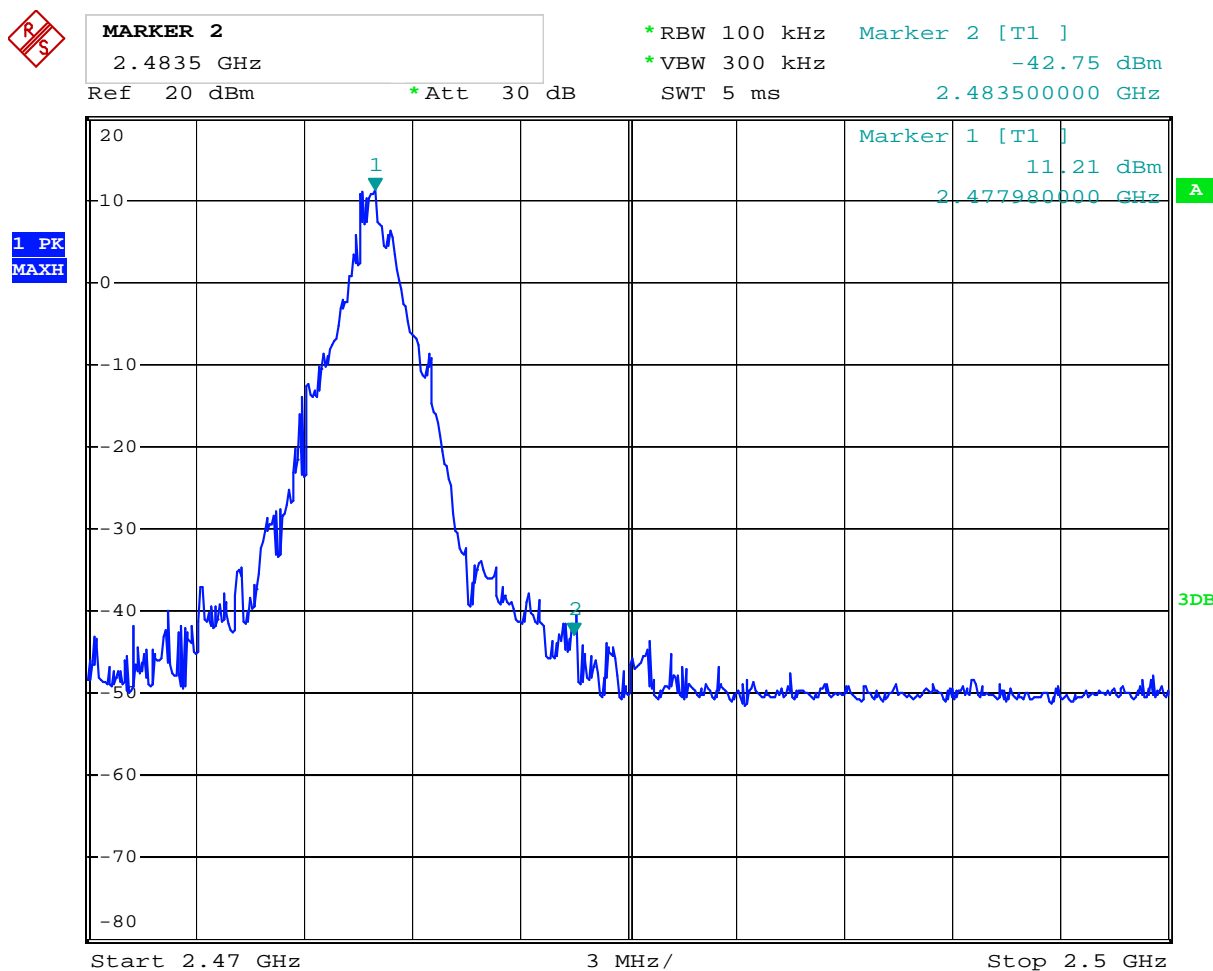


Test Mode: High Channel

10.4 Band-edge and Restricted band Measurement

EUT	Wireless TV Speaker		Model	TV-SB
Mode	Keeping Transmitting		Input Voltage	AC 120V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
2483.5	PK (dBμV/m)	43.69	Limit	74(dBμV/m)
	AV (dBμV/m)	--		54(dBμV/m)

Test Figure:



Date: 23.SEP.2013 12:51:55

Note: The Max. FS in Restrict Band are measured in conventional method.

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## **11.0 Antenna Requirement**

### **11.1 Standard Applicable**

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitter antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### **11.2 Antenna Connected construction**

Integral antenna used. The maximum Gain of the antennas is 0dBi.

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## 12.0 FCC/IC Label

**IC: 7181A-TVSB, FCC ID: Z33-TVSB**

**This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.**

### Mark Location:



FCC and IC Label Location

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### 13.0 Photo of testing

Conducted Emission Test Setup:

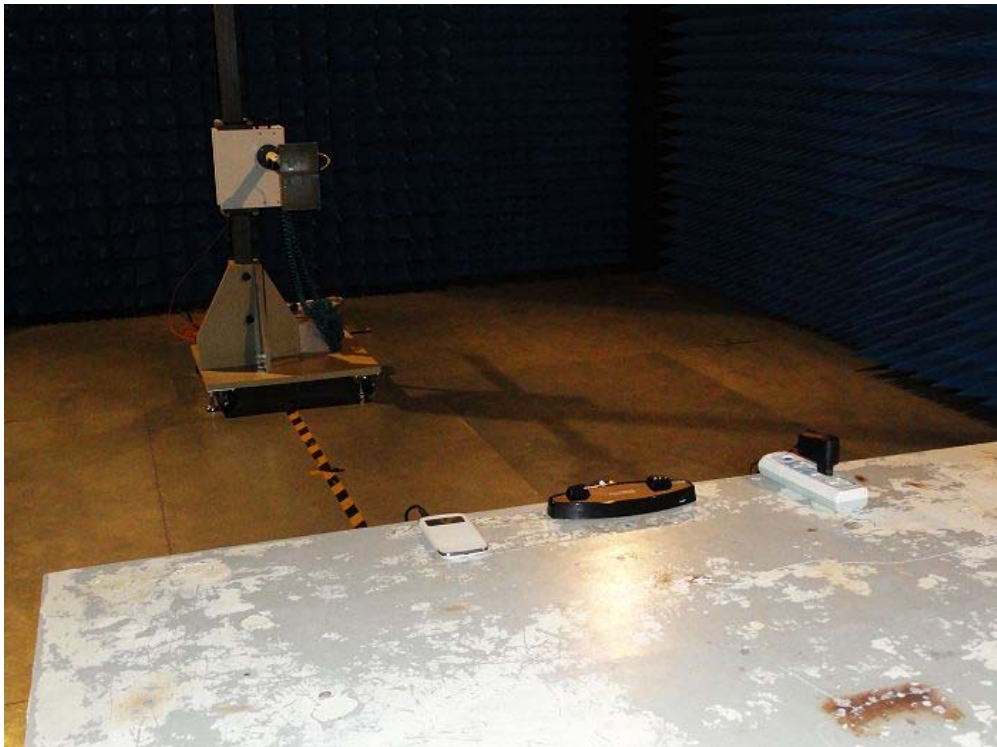


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Radiated Emission Test Setup:



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## Photographs – EUT

Outside view



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Outside view



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Power Supply Mode 1



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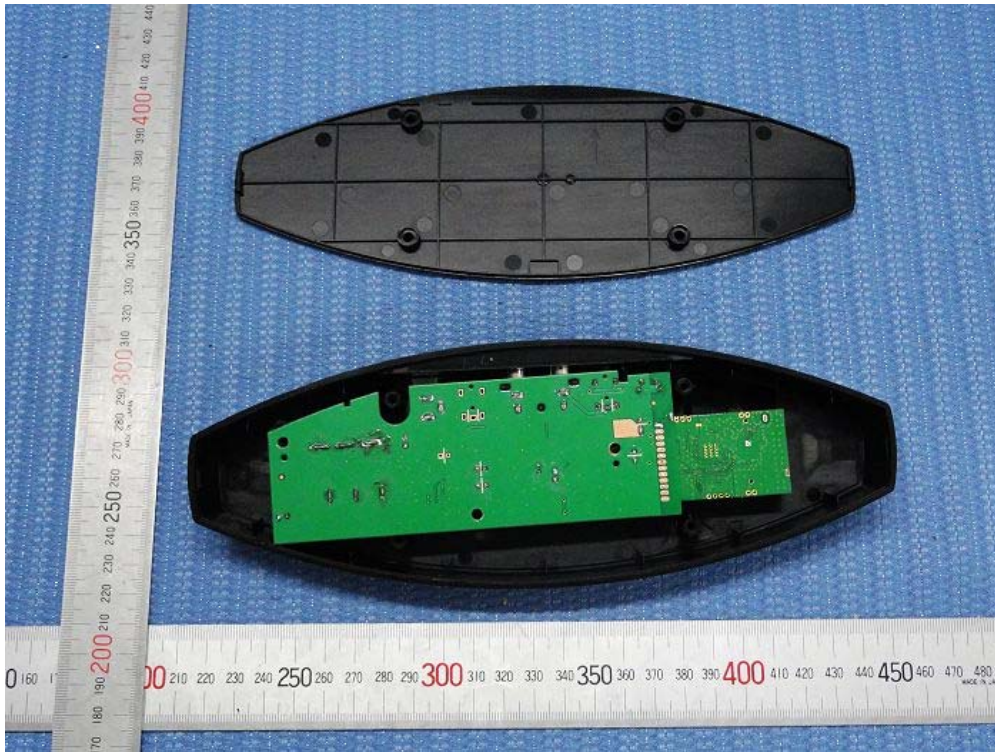
Power Supply Mode 2



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Inside view



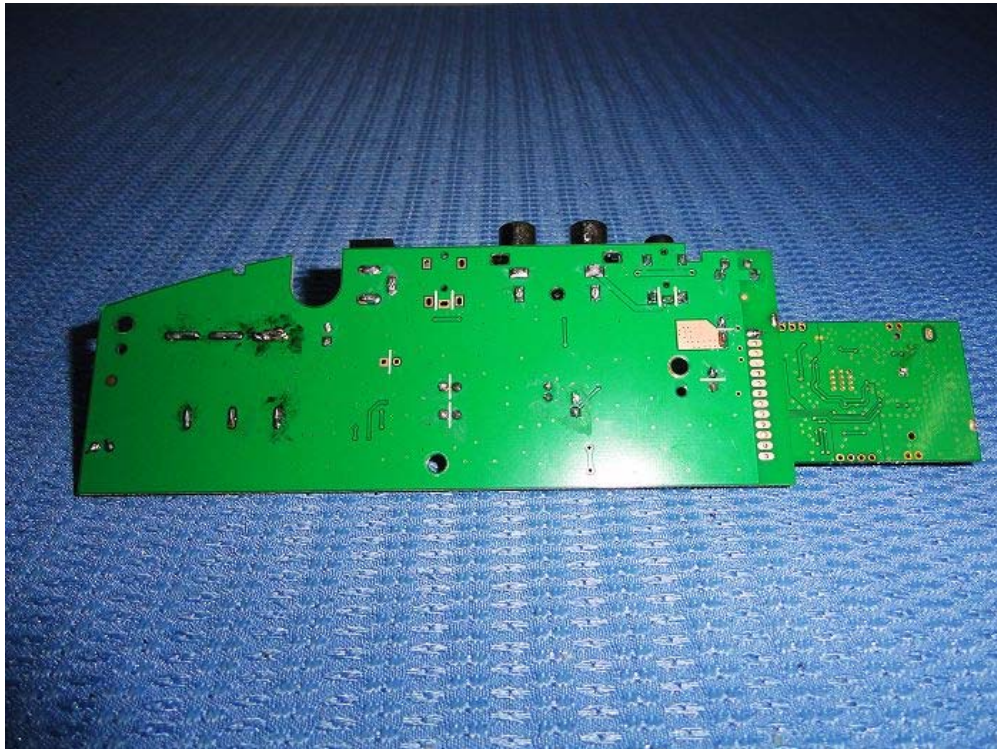
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Inside view



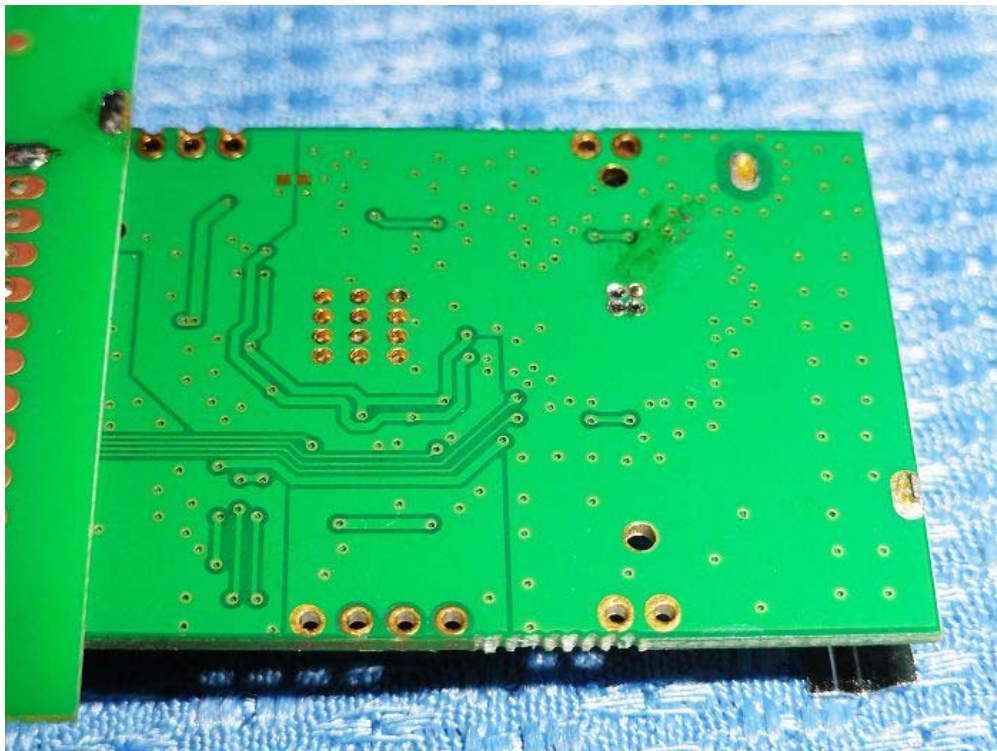
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Inside view



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