



# FCC/IC Radio Test Report

**FCC ID: OT9SB250123601**  
**IC: 10588A-SB250123601**

This report concerns (check one) :  Original Grant  Class II Change

**Issued Date** : Sep. 07, 2012  
**Project No.** : 1208C137  
**Equipment** : Sound Bar Speaker(2.1CH)  
**Model Name** : SB-250  
**Applicant** : FORE SHOT Industrial corporation  
**Address** : No.7-1,Mincyuan Rd, Dayuan Shiang, Taoyuan County 337,Taiwan(R.O.C)

**Tested by:**

Neutron Engineering Inc. EMC Laboratory

**Date of Receipt:** Aug. 17, 2012

**Date of Test:**

Aug. 17, 2012 ~ Sep. 06, 2012

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## Declaration

**Neutron** represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with the standards traceable to National Measurement Laboratory (**NML**) of **CHINA**, or National Institute of Standards and Technology (**NIST**) of **U.S.A**.

**Neutron**'s reports apply only to the specific samples tested under conditions. It is manufacturer's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **Neutron** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **Neutron** issued reports.

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## Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.



Table of Contents	Page
<b>1 . CERTIFICATION</b>	<b>6</b>
<b>2 . SUMMARY OF TEST RESULTS</b>	<b>7</b>
<b>2.1 TEST FACILITY</b>	<b>8</b>
<b>2.2 MEASUREMENT UNCERTAINTY</b>	<b>8</b>
<b>3 . GENERAL INFORMATION</b>	<b>9</b>
<b>3.1 GENERAL DESCRIPTION OF EUT</b>	<b>9</b>
<b>3.2 DESCRIPTION OF TEST MODES</b>	<b>11</b>
<b>3.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING</b>	<b>11</b>
<b>3.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED</b>	<b>12</b>
<b>3.5 DESCRIPTION OF SUPPORT UNITS</b>	<b>13</b>
<b>4 . EMC EMISSION TEST</b>	<b>14</b>
<b>4.1 CONDUCTED EMISSION MEASUREMENT</b>	<b>14</b>
<b>4.1.1 POWER LINE CONDUCTED EMISSION LIMITS</b>	<b>14</b>
<b>4.1.2 MEASUREMENT INSTRUMENTS LIST AND SETTING</b>	<b>14</b>
<b>4.1.3 TEST PROCEDURE</b>	<b>15</b>
<b>4.1.4 DEVIATION FROM TEST STANDARD</b>	<b>15</b>
<b>4.1.5 TEST SETUP</b>	<b>15</b>
<b>4.1.6 EUT OPERATING CONDITIONS</b>	<b>15</b>
<b>4.1.7 TEST RESULTS</b>	<b>16</b>
<b>4.2 RADIATED EMISSION MEASUREMENT</b>	<b>24</b>
<b>4.2.1 RADIATED EMISSION LIMITS</b>	<b>24</b>
<b>4.2.2 MEASUREMENT INSTRUMENTS LIST ANS SETTING</b>	<b>25</b>
<b>4.2.3 TEST PROCEDURE</b>	<b>26</b>
<b>4.2.4 DEVIATION FROM TEST STANDARD</b>	<b>26</b>
<b>4.2.5 TEST SETUP</b>	<b>27</b>
<b>4.2.6 EUT OPERATING CONDITIONS</b>	<b>28</b>
<b>4.2.7 TEST RESULTS (BELOW 30MHZ)</b>	<b>29</b>
<b>4.2.8 TEST RESULTS (BETWEEN30 – 1000 MHZ)</b>	<b>30</b>
<b>4.2.9 TEST RESULTS (ABOVE 1000 MHZ)</b>	<b>34</b>
<b>5 . NUMBER OF HOPPING CHANNEL</b>	<b>48</b>
<b>5.1 APPLIED PROCEDURES / LIMIT</b>	<b>48</b>
<b>5.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING</b>	<b>48</b>
<b>5.1.2 TEST PROCEDURE</b>	<b>48</b>
<b>5.1.3 DEVIATION FROM STANDARD</b>	<b>48</b>
<b>5.1.4 TEST SETUP</b>	<b>48</b>
<b>5.1.5 EUT OPERATION CONDITIONS</b>	<b>48</b>
<b>5.1.6 TEST RESULTS</b>	<b>49</b>



Table of Contents	Page
<b>6 . AVERAGE TIME OF OCCUPANCY</b>	<b>50</b>
<b>6.1 APPLIED PROCEDURES / LIMIT</b>	<b>50</b>
<b>6.1.1 MEASUREMENT INSTRUMENTS LIST</b>	50
<b>6.1.2 TEST PROCEDURE</b>	50
<b>6.1.3. TEST SETUP LAYOUT</b>	50
<b>6.1.4. TEST DEVIATION</b>	50
<b>6.1.5. EUT OPERATION DURING TEST</b>	50
<b>6.1.6. TEST RESULTS</b>	51
<b>7 . HOPPING CHANNEL SEPARATION MEASUREMENT</b>	<b>53</b>
<b>7.1 APPLIED PROCEDURES / LIMIT</b>	<b>53</b>
<b>7.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING</b>	53
<b>7.1.2 TEST PROCEDURE</b>	53
<b>7.1.3 DEVIATION FROM STANDARD</b>	53
<b>7.1.4 TEST SETUP</b>	53
<b>7.1.5 EUT OPERATION CONDITIONS</b>	53
<b>7.1.6 TEST RESULTS</b>	54
<b>8 . BANDWIDTH TEST</b>	<b>56</b>
<b>8.1 APPLIED PROCEDURES / LIMIT</b>	<b>56</b>
<b>8.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING</b>	56
<b>8.1.2 TEST PROCEDURE</b>	56
<b>8.1.3 DEVIATION FROM STANDARD</b>	56
<b>8.1.4 TEST SETUP</b>	56
<b>8.1.5 EUT OPERATION CONDITIONS</b>	56
<b>8.1.6 TEST RESULTS</b>	57
<b>9 . PEAK OUTPUT POWER TEST</b>	<b>60</b>
<b>9.1 APPLIED PROCEDURES / LIMIT</b>	<b>60</b>
<b>9.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING</b>	60
<b>9.1.2 TEST PROCEDURE</b>	60
<b>9.1.3 DEVIATION FROM STANDARD</b>	60
<b>9.1.4 TEST SETUP</b>	60
<b>9.1.5 EUT OPERATION CONDITIONS</b>	60
<b>9.1.6 TEST RESULTS</b>	61
<b>10 . ANTENNA CONDUCTED SPURIOUS EMISSION</b>	<b>63</b>
<b>10.1 APPLIED PROCEDURES / LIMIT</b>	<b>63</b>
<b>10.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING</b>	63
<b>10.1.2 TEST PROCEDURE</b>	63
<b>10.1.3 DEVIATION FROM STANDARD</b>	63
<b>10.1.4 TEST SETUP</b>	63
<b>10.1.5 EUT OPERATION CONDITIONS</b>	63
<b>10.1.6 TEST RESULTS</b>	64



**Table of Contents**

	<b>Page</b>
<b>11 . EUT TEST PHOTO</b>	<b>70</b>



## 1. CERTIFICATION

Equipment : Sound Bar Speaker(2.1CH)  
Brand Name : FORE SHOT  
Model Name : SB-250  
Applicant : FORE SHOT Industrial corporation  
Factory : FORE TECH Optical(ZHONG SHAN)CO.,LTD.  
Address : No.8, Zhiye Road Torch Development Zone, Zhong Shan City, Guangdong China  
Date of Test : Aug. 17, 2012 ~ Sep. 06, 2012  
Test Item : ENGINEERING SAMPLE  
Standards : FCC Part15, Subpart C(15.247) / ANSI C63.4 : 2009  
FCC Public Notice DA 00-705, March 30, 2000.  
Canada RSS-210:2010

The above equipment has been tested and found compliance with the requirement of the relative standards by Neutron Engineering Inc. EMC Laboratory.

The test data, data evaluation, and equipment configuration contained in our test report (Ref No. NEI-FICP-1-1208C137) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of NVLAP and TAF according to the ISO-17025 quality assessment standard and technical standard(s).



## 2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

<b>APPLIED STANDARD: 47 CFR Part 15, Subpart C; Canada RSS-210:2010</b>				
Standard Section		Test Item	Judgment	Remark
RSS-210	47 CFR Part 15			
RSS-GEN 7.2.2	15.207	Conducted Emission	PASS	
RSS-210 Annex 8 (A8.1d)	15.247(d)	Antenna conducted Spurious Emission	PASS	
RSS-210 Annex 8 (A8.1d)	15.247 (a)(1)	Hopping Channel Separation	PASS	
RSS-210 Annex 8 (A8.1)	15.247 (a)(2)	20dB Bandwidth	PASS	
RSS-210 Annex 8 (A8.1b)	15.247 (b)(1)	Peak Output Power	PASS	
RSS-210 Annex 8 (A8.1a)	15.247(d) 15.209	Radiated Spurious Emission	PASS	
RSS-210 Annex 8 (A8.4(2))	15.247 (a)(1)(iii)	Number of Hopping Frequency	PASS	
RSS-210 Annex 8 (A8.5)	15.247 (a)(1)(iii)	Dwell Time	PASS	
RSS-Gen 7.2.3	15.205	Restricted Bands	PASS	
RSS-210 Annex 8 (A8.5)	15.203	Antenna Requirement	PASS	

**NOTE:**

(1)" N/A" denotes test is not applicable in this test report

(2) According to FCC Public Notice DA 00-705, March 30, 2000.



## 2.1 TEST FACILITY

The test facilities used to collect the test data in this report is **DG-C02/DG-CB03** at the location of No.3,Jinshagang 1st Road, ShiXia, Dalang Town, Dong Guan, China.523792

Neutron's test firm number for FCC 319330

Neutron's test firm number for IC 4428B-1

## 2.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

The reported uncertainty of measurement  $y \pm U$  , where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2** , providing a level of confidence of approximately **95 %** .

A. Conducted Measurement :

Test Site	Method	Measurement Frequency Range	U , (dB)	NOTE
DG-C02	CISPR	150 KHz ~ 30MHz	1.94	

B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	Ant. H / V	U , (dB)	NOTE
DG-CB03	CISPR	30MHz ~ 200MHz	V	3.82	
		30MHz ~ 200MHz	H	3.60	
		200MHz ~ 1,000MHz	V	3.86	
		200MHz ~ 1,000MHz	H	3.94	
		1GHz~18GHz	V	3.12	
		1GHz~18GHz	H	3.68	



### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

Equipment	Sound Bar Speaker(2.1CH)														
Brand Name	FORE SHOT														
Model Name	SB-250														
Model Difference	N/A														
Product Description	<p>The EUT is a Sound Bar Speaker(2.1CH).</p> <table border="1"><tr><td>Operation Frequency:</td><td>2403~2478MHz</td></tr><tr><td>Modulation Technology:</td><td>FHSS</td></tr><tr><td>Bit Rate of Transmitter:</td><td>3Mbps</td></tr><tr><td>Number Of Channel</td><td>26 CH, Please see note 2. (Page 10)</td></tr><tr><td>Antenna Designation:</td><td>Please see note 3. (Page 10)</td></tr><tr><td>Antenna Gain(Peak)</td><td>Please see note 3. (Page 10)</td></tr><tr><td>Output Power:</td><td>7.05dBm (Max)</td></tr></table> <p>Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.</p>	Operation Frequency:	2403~2478MHz	Modulation Technology:	FHSS	Bit Rate of Transmitter:	3Mbps	Number Of Channel	26 CH, Please see note 2. (Page 10)	Antenna Designation:	Please see note 3. (Page 10)	Antenna Gain(Peak)	Please see note 3. (Page 10)	Output Power:	7.05dBm (Max)
Operation Frequency:	2403~2478MHz														
Modulation Technology:	FHSS														
Bit Rate of Transmitter:	3Mbps														
Number Of Channel	26 CH, Please see note 2. (Page 10)														
Antenna Designation:	Please see note 3. (Page 10)														
Antenna Gain(Peak)	Please see note 3. (Page 10)														
Output Power:	7.05dBm (Max)														
Power Source	AC mains~														
Power Rating	I/P AC 100-240V~50/60Hz														
Connecting I/O Port(s)	Please refer to the User's Manual														

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.



2.

<b>Frequency Channel</b>			
Channel	Frequency (MHz)	Channel	Frequency (MHz)
<b>01</b>	<b>2403</b>	14	2442
02	2406	15	2445
03	2409	16	2448
04	2412	17	2451
05	2415	18	2454
06	2418	19	2457
07	2421	20	2460
18	2424	21	2463
09	2427	22	2466
10	2430	23	2469
11	2433	24	2472
12	2436	25	2475
<b>13</b>	<b>2439</b>	<b>26</b>	<b>2478</b>

3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	<b>PSA</b>	RFANT5220110A0T	Chip Antenna	N/A	2.66



## 3.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	TX Mode <b>NOTE (1)</b>
Mode 2	RX Mode <b>NOTE (1)</b>
Mode 3	AUX IN with Wireless
Mode 4	TV IN with Wireless

The EUT system operated these modes were found to be the worst case during the pre-scanning test as following:

For Conducted Emission	
Final Test Mode	Description
Mode 3	AUX IN with Wireless
Mode 4	TV IN with Wireless

For Radiated Emission	
Final Test Mode	Description
Mode 1	TX Mode <b>NOTE (1)</b>
Mode 2	RX Mode <b>NOTE (1)</b>

### Note:

- (1) The measurements are performed at the high, middle, low available channels.

## 3.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

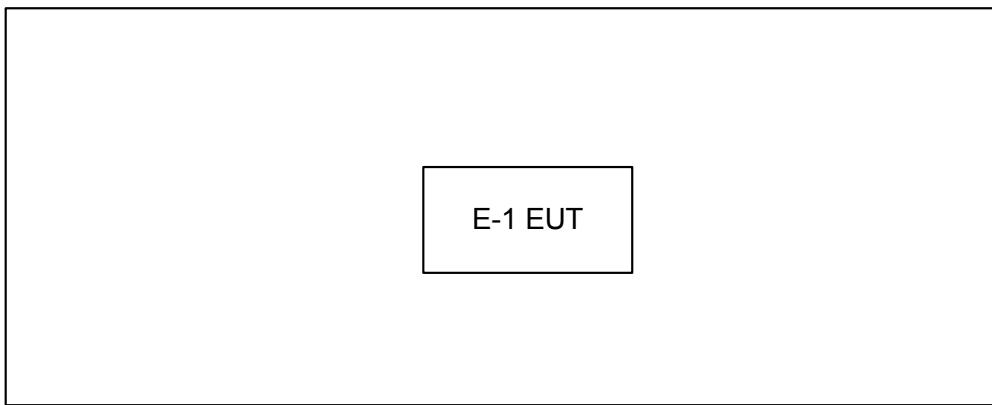
During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of FHSS

Test software Version	JX5812 MTK V2-ASCENDTEK V0.2		
Frequency	2403MHz	2439MHz	2478MHz
Parameters-3Mbps	N/A	N/A	N/A



**3.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED**

**Radiated :**





### 3.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID/IC	Series No.	Note
E-1	Sound Bar Speaker(2.1CH)	FORE SHOT	SB-250	OT9SB250123601/ 10588A-SB250123601	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note
-	-	-	-	-

Note:

- (1) For detachable type I/O cable should be specified the length in m in『Length』column.



## 4. EMC EMISSION TEST

### 4.1 CONDUCTED EMISSION MEASUREMENT

#### 4.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)		Standard
	Quasi-peak	Average	Quasi-peak	Average	
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	CISPR
0.50 -5.0	73.00	60.00	56.00	46.00	CISPR
5.0 -30.0	73.00	60.00	60.00	50.00	CISPR

0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	73.00	60.00	56.00	46.00	FCC
5.0 -30.0	73.00	60.00	60.00	50.00	FCC

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " \* " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

### 4.1.2 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	LISN	EMCO	3816/2	00052765	May.04.2013
2	LISN	R&S	ENV216	100087	May.04.2013
3	Test Cable	N/A	C_17	N/A	Mar.28.2013
4	EMI TEST RECEIVER	R&S	ESCS30	826547/022	May.04.2013
5	50Ω Terminator	SHX	TF2-3G-A	08122902	May.04.2013

Remark: "N/A" denotes no model name, serial no. or calibration specified.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz



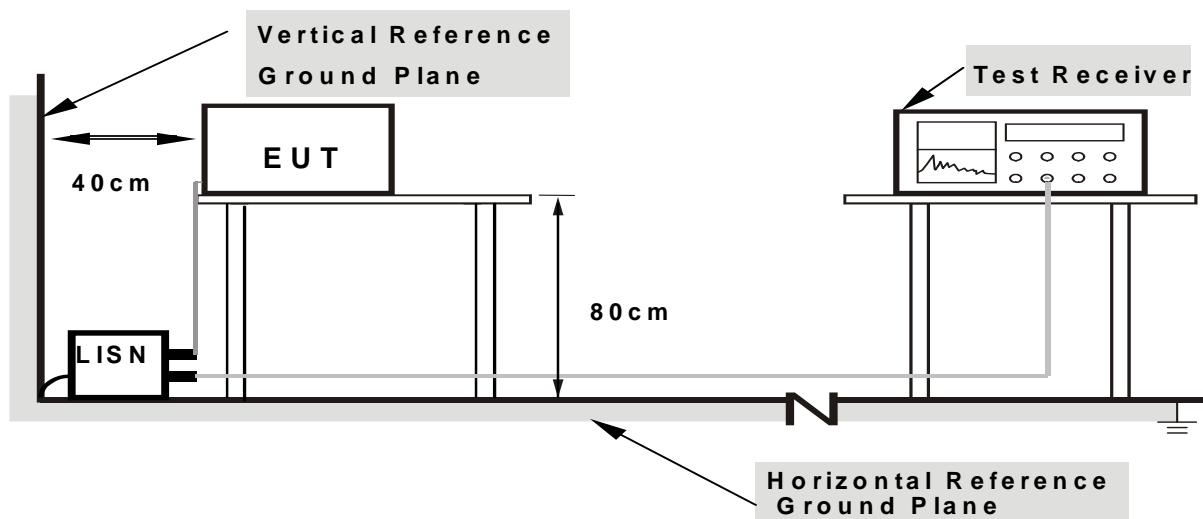
### 4.1.3 TEST PROCEDURE

- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation

### 4.1.5 TEST SETUP



Note: 1. Support units were connected to second LISN.

2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

### 4.1.6 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

The EUT is continued Transmitter/Receive data or Hopping on mode.



#### 4.1.7 TEST RESULTS

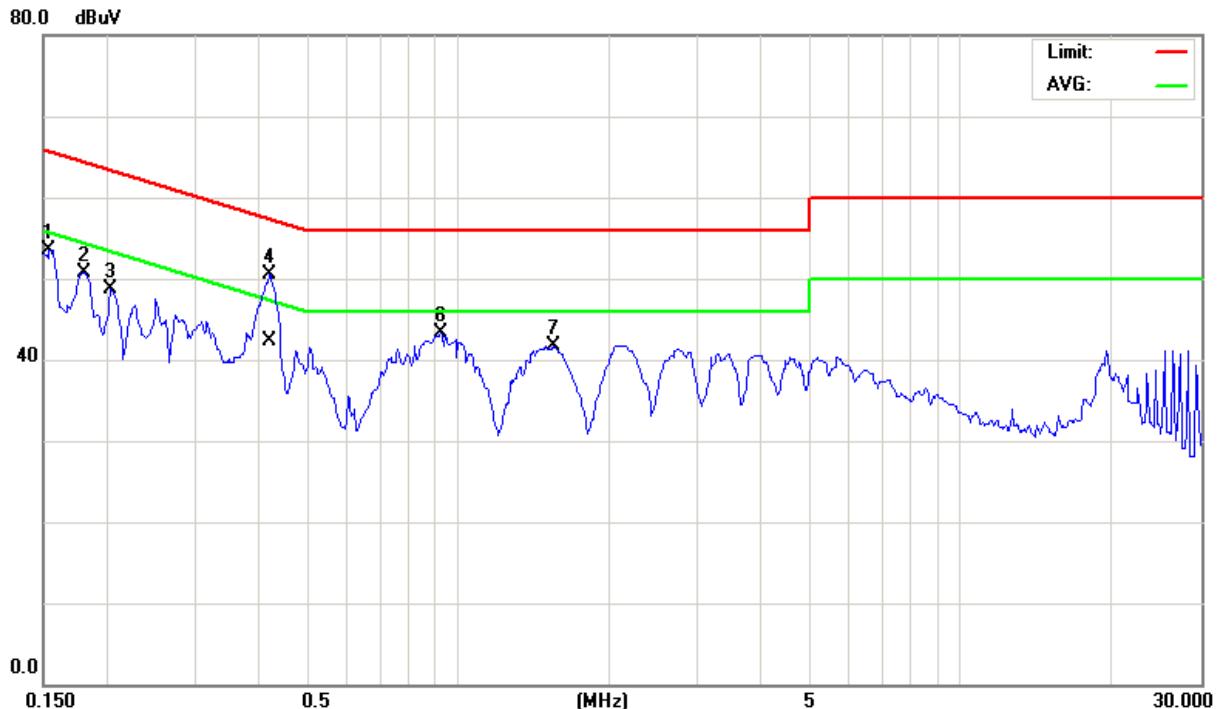
EUT :	Sound Bar Speaker(2.1CH)	Model Name :	SB-250
Temperature :	25 °C	Relative Humidity :	60 %
Pressure :	1009 hPa	Test Power :	AC 120V/60Hz
Test Mode :	AUX IN with Wireless-TX Sample		

Freq. (MHz)	Terminal L/N	Measured(dBuV)		Limits(dBuV)		Margin (dB)	Note
		QP-Mode	AV-Mode	QP-Mode	AV-Mode		
0.15	Line	53.51	*	65.78	55.78	-12.27	(QP)
0.18	Line	50.69	*	64.44	54.44	-13.75	(QP)
0.20	Line	48.61	*	63.42	53.42	-14.81	(QP)
0.42	Line	50.48	42.25	57.38	47.38	-5.13	(AV)
0.92	Line	43.29	*	56.00	46.00	-12.71	(QP)
1.55	Line	41.62	*	56.00	46.00	-14.38	(QP)

##### Remark

(1) All readings are QP Mode value unless otherwise stated AVG in column of Note. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform. In this case, a “ \* ” marked in AVG Mode column of Interference Voltage Measured.

(2) Measuring frequency range from 150KHz to 30MHz.



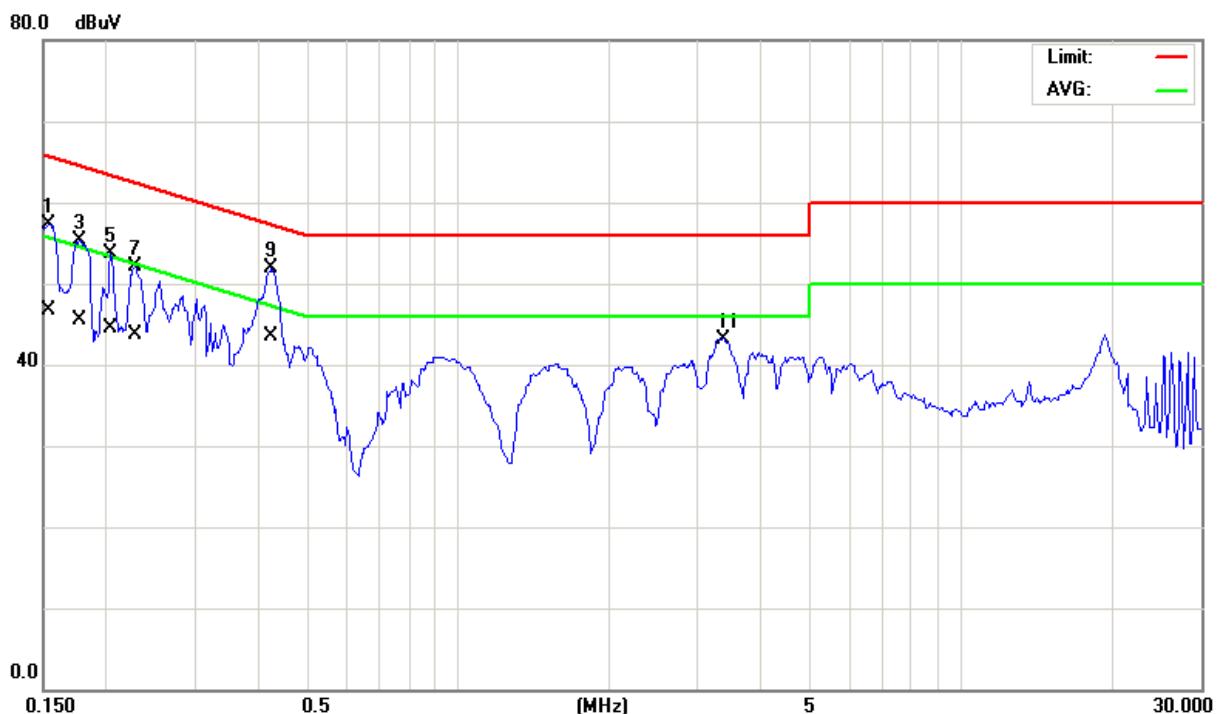


EUT :	Sound Bar Speaker(2.1CH)	Model Name :	SB-250
Temperature :	25 °C	Relative Humidity :	60 %
Pressure :	1009 hPa	Test Power :	AC 120V/60Hz
Test Mode :	AUX IN with Wireless-TX Sample		

Freq. (MHz)	Terminal L/N	Measured(dBuV)		Limits(dBuV)		Margin (dB)	Note
		QP-Mode	AV-Mode	QP-Mode	AV-Mode		
0.15	Neutral	57.32	46.75	65.78	55.78	-8.46	(QP)
0.18	Neutral	55.26	45.60	64.61	54.61	-9.01	(AV)
0.20	Neutral	53.63	44.53	63.42	53.42	-8.89	(AV)
0.23	Neutral	52.17	43.66	62.52	52.52	-8.86	(AV)
0.43	Neutral	51.84	43.53	57.31	47.31	-3.78	(AV)
3.38	Neutral	43.20	*	56.00	46.00	-12.80	(QP)

## Remark

- (1) All readings are QP Mode value unless otherwise stated AVG in column of «Note». If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform. In this case, a “\*” marked in AVG Mode column of Interference Voltage Measured.
- (2) Measuring frequency range from 150KHz to 30MHz.



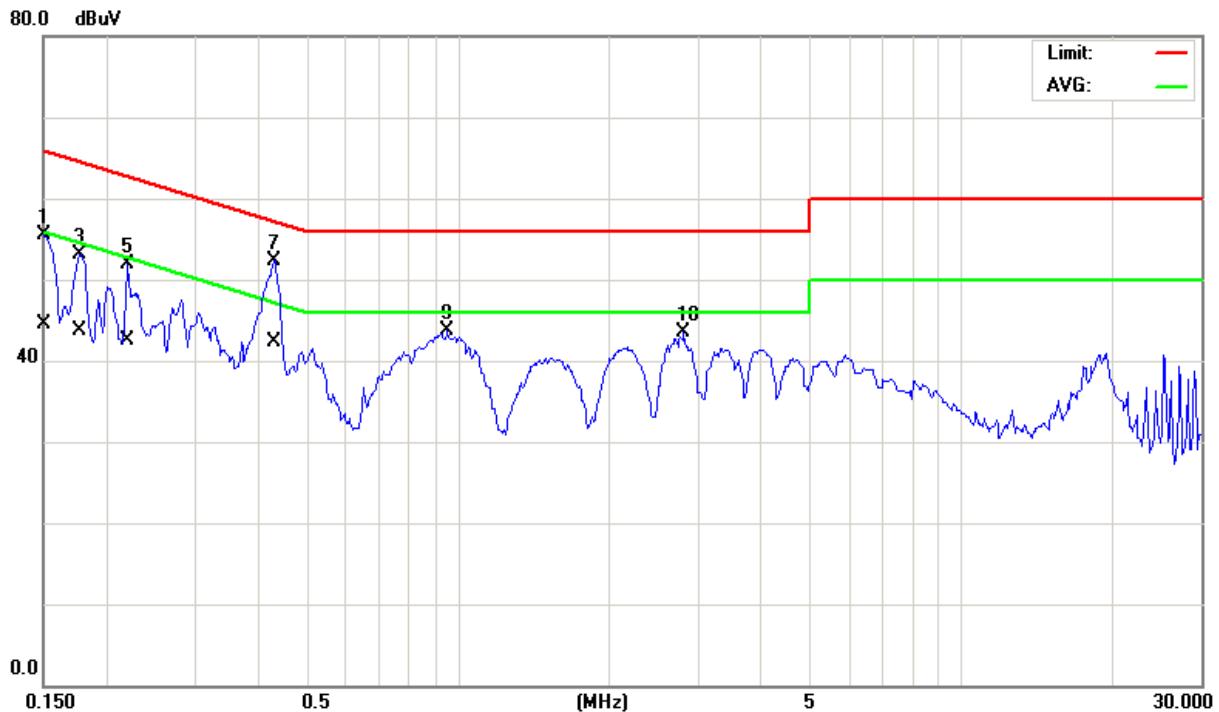


EUT :	Sound Bar Speaker(2.1CH)	Model Name :	SB-250
Temperature :	25 °C	Relative Humidity :	60 %
Pressure :	1009 hPa	Test Power :	AC 120V/60Hz
Test Mode :	TV IN with Wireless-TX Sample		

Freq. (MHz)	Terminal L/N	Measured(dBuV)		Limits(dBuV)		Margin (dB)	Note
		QP-Mode	AV-Mode	QP-Mode	AV-Mode		
0.15	Line	55.57	44.47	66.00	56.00	-10.43	(QP)
0.18	Line	53.19	43.70	64.61	54.61	-10.91	(AV)
0.22	Line	51.93	42.44	62.81	52.81	-10.37	(AV)
0.43	Line	52.34	42.38	57.23	47.23	-4.85	(AV)
0.95	Line	43.74	*	56.00	46.00	-12.26	(QP)
2.81	Line	43.46	*	56.00	46.00	-12.54	(QP)

## Remark

- (1) All readings are QP Mode value unless otherwise stated AVG in column of Note. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform. In this case, a " \* " marked in AVG Mode column of Interference Voltage Measured.
- (2) Measuring frequency range from 150KHz to 30MHz.





EUT :	Sound Bar Speaker(2.1CH)	Model Name :	SB-250
Temperature :	25 °C	Relative Humidity :	60 %
Pressure :	1009 hPa	Test Power :	AC 120V/60Hz
Test Mode :	TV IN with Wireless-TX Sample		

Freq. (MHz)	Terminal L/N	Measured(dBuV)		Limits(dBuV)		Margin (dB)	Note
		QP-Mode	AV-Mode	QP-Mode	AV-Mode		
0.15	Neutral	56.16	45.33	65.78	55.78	-9.62	(QP)
0.18	Neutral	55.68	44.87	64.61	54.61	-8.93	(QP)
0.20	Neutral	52.53	44.07	63.42	53.42	-9.35	(AV)
0.25	Neutral	51.95	41.36	61.84	51.84	-9.89	(QP)
0.43	Neutral	52.40	42.61	57.23	47.23	-4.62	(AV)
19.43	Neutral	45.19	*	60.00	50.00	-14.81	(QP)

### Remark

- (1) All readings are QP Mode value unless otherwise stated AVG in column of『Note』. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform. In this case, a “\*” marked in AVG Mode column of Interference Voltage Measured.
- (2) Measuring frequency range from 150KHz to 30MHz.



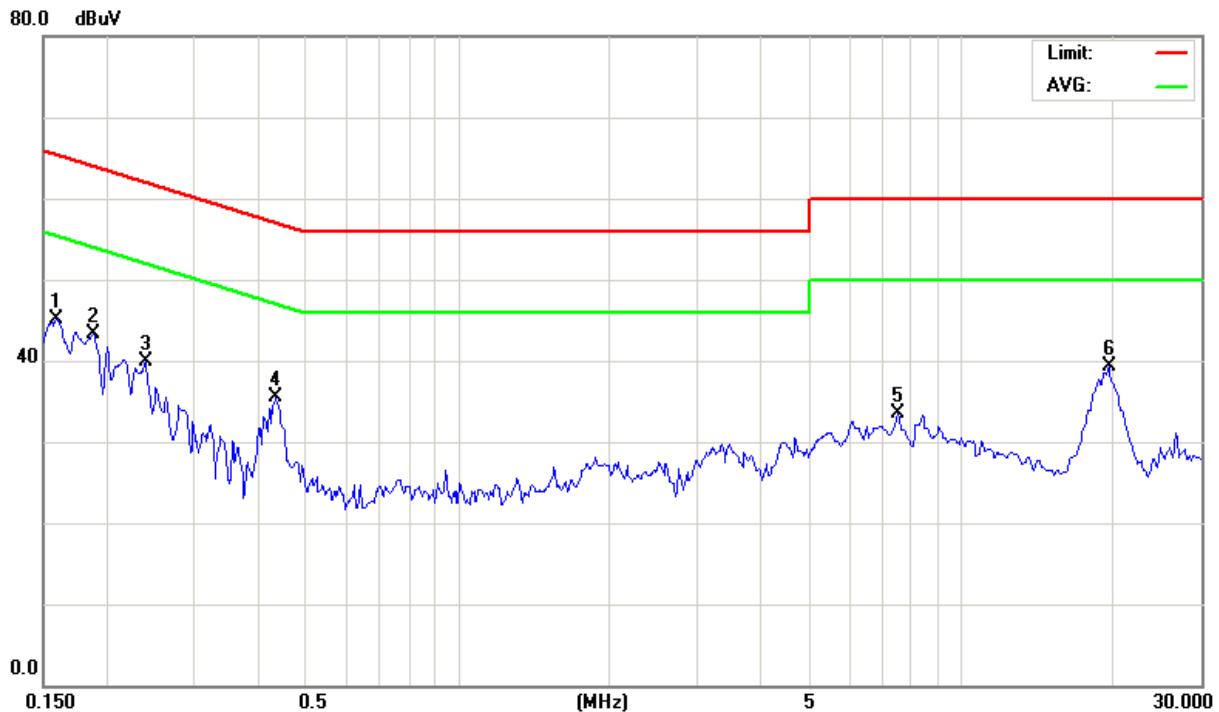


EUT :	Sound Bar Speaker(2.1CH)	Model Name :	SB-250
Temperature :	25 °C	Relative Humidity :	60 %
Pressure :	1009 hPa	Test Power :	AC 120V/60Hz
Test Mode :	AUX IN with Wireless-RX Sample		

Freq. (MHz)	Terminal L/N	Measured(dBuV)		Limits(dBuV)		Margin (dB)	Note
		QP-Mode	AV-Mode	QP-Mode	AV-Mode		
0.16	Line	45.19	*	65.52	55.52	-20.33	(QP)
0.19	Line	43.23	*	64.08	54.08	-20.85	(QP)
0.24	Line	39.83	*	62.10	52.10	-22.27	(QP)
0.44	Line	35.42	*	57.16	47.16	-21.74	(QP)
7.52	Line	33.44	*	60.00	50.00	-26.56	(QP)
19.64	Line	39.32	*	60.00	50.00	-20.68	(QP)

**Remark**

- (1) All readings are QP Mode value unless otherwise stated AVG in column of Note. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform. In this case, a “\*” marked in AVG Mode column of Interference Voltage Measured.
- (2) Measuring frequency range from 150KHz to 30MHz.



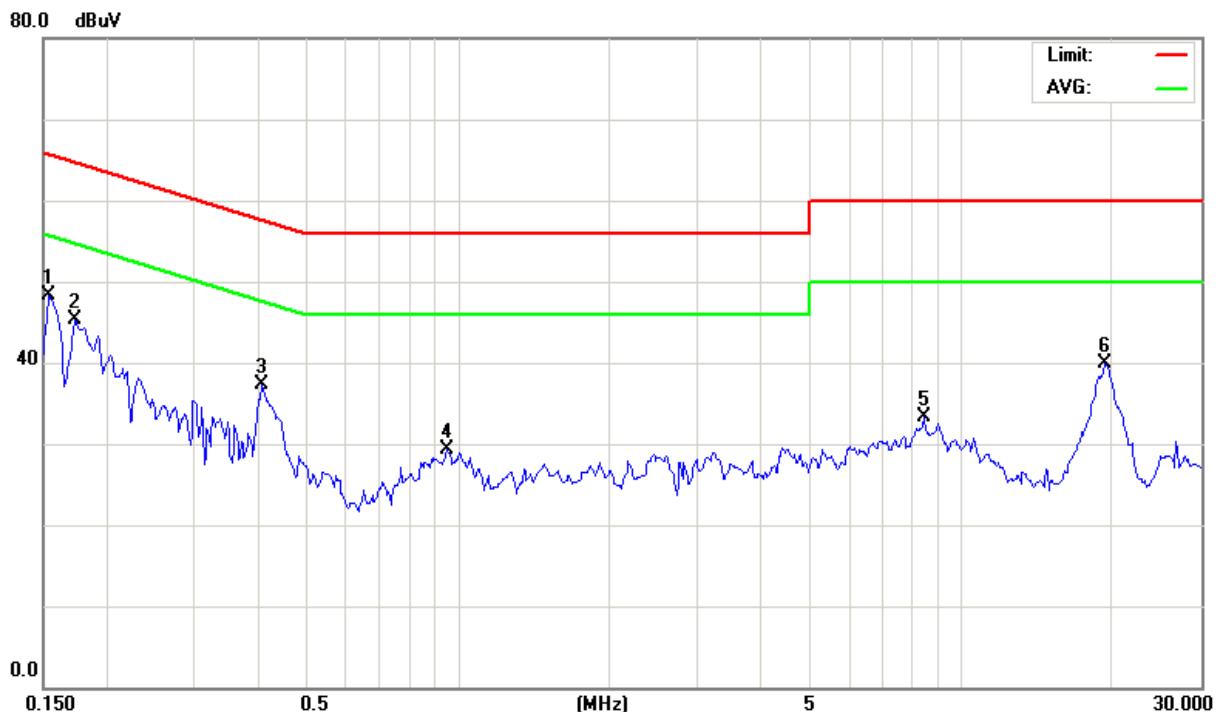


EUT :	Sound Bar Speaker(2.1CH)	Model Name :	SB-250
Temperature :	25 °C	Relative Humidity :	60 %
Pressure :	1009 hPa	Test Power :	AC 120V/60Hz
Test Mode :	AUX IN with Wireless-RX Sample		

Freq. (MHz)	Terminal L/N	Measured(dBuV)		Limits(dBuV)		Margin (dB)	Note
		QP-Mode	AV-Mode	QP-Mode	AV-Mode		
0.15	Neutral	48.36	*	65.78	55.78	-17.42	(QP)
0.17	Neutral	45.23	*	64.80	54.80	-19.57	(QP)
0.41	Neutral	37.34	*	57.70	47.70	-20.36	(QP)
0.95	Neutral	29.35	*	56.00	46.00	-26.65	(QP)
8.41	Neutral	33.25	*	60.00	50.00	-26.75	(QP)
19.27	Neutral	40.00	*	60.00	50.00	-20.00	(QP)

### Remark

- (1) All readings are QP Mode value unless otherwise stated AVG in column of «Note». If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform. In this case, a “\*” marked in AVG Mode column of Interference Voltage Measured.
- (2) Measuring frequency range from 150KHz to 30MHz.



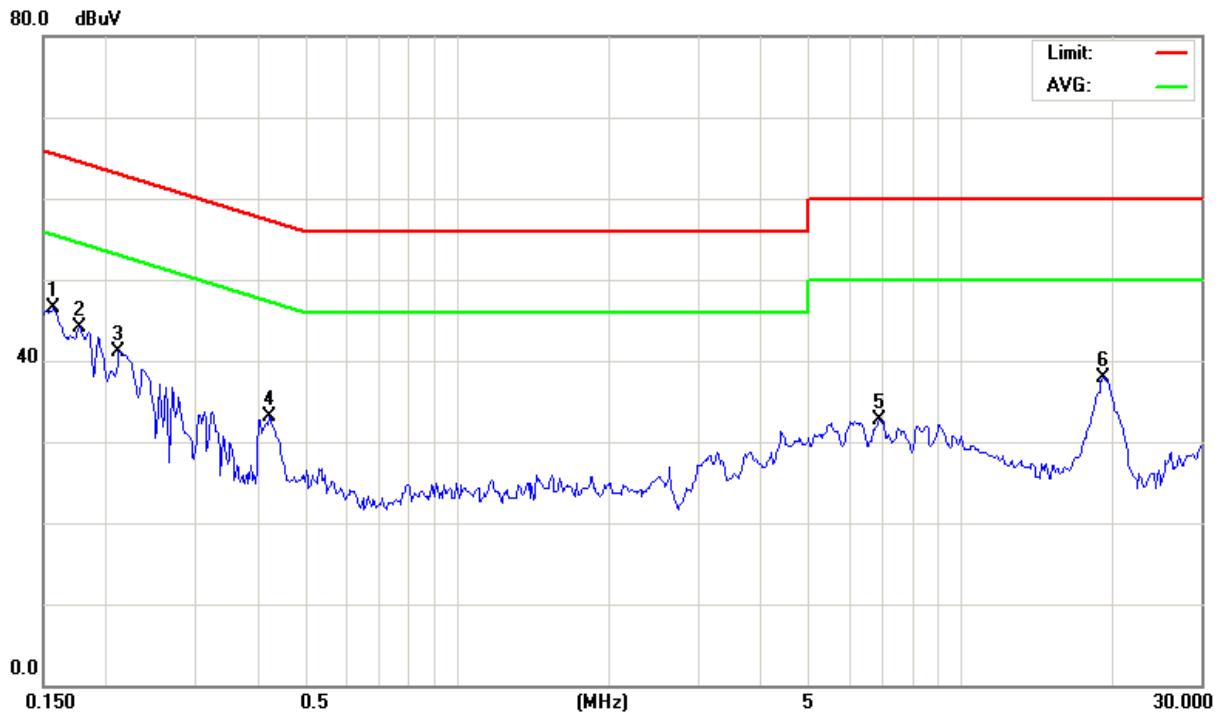


EUT :	Sound Bar Speaker(2.1CH)	Model Name :	SB-250
Temperature :	25 °C	Relative Humidity :	60 %
Pressure :	1009 hPa	Test Power :	AC 120V/60Hz
Test Mode :	TV IN with Wireless-RX Sample		

Freq. (MHz)	Terminal L/N	Measured(dBuV)		Limits(dBuV)		Margin (dB)	Note
		QP-Mode	AV-Mode	QP-Mode	AV-Mode		
0.16	Line	46.49	*	65.58	55.58	-19.09	(QP)
0.18	Line	44.17	*	64.61	54.61	-20.44	(QP)
0.21	Line	41.13	*	63.11	53.11	-21.98	(QP)
0.42	Line	33.02	*	57.38	47.38	-24.36	(QP)
6.88	Line	32.71	*	60.00	50.00	-27.29	(QP)
19.12	Line	37.91	*	60.00	50.00	-22.09	(QP)

## Remark

- (1) All readings are QP Mode value unless otherwise stated AVG in column of Note. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform. In this case, a “\*” marked in AVG Mode column of Interference Voltage Measured.
- (2) Measuring frequency range from 150KHz to 30MHz.



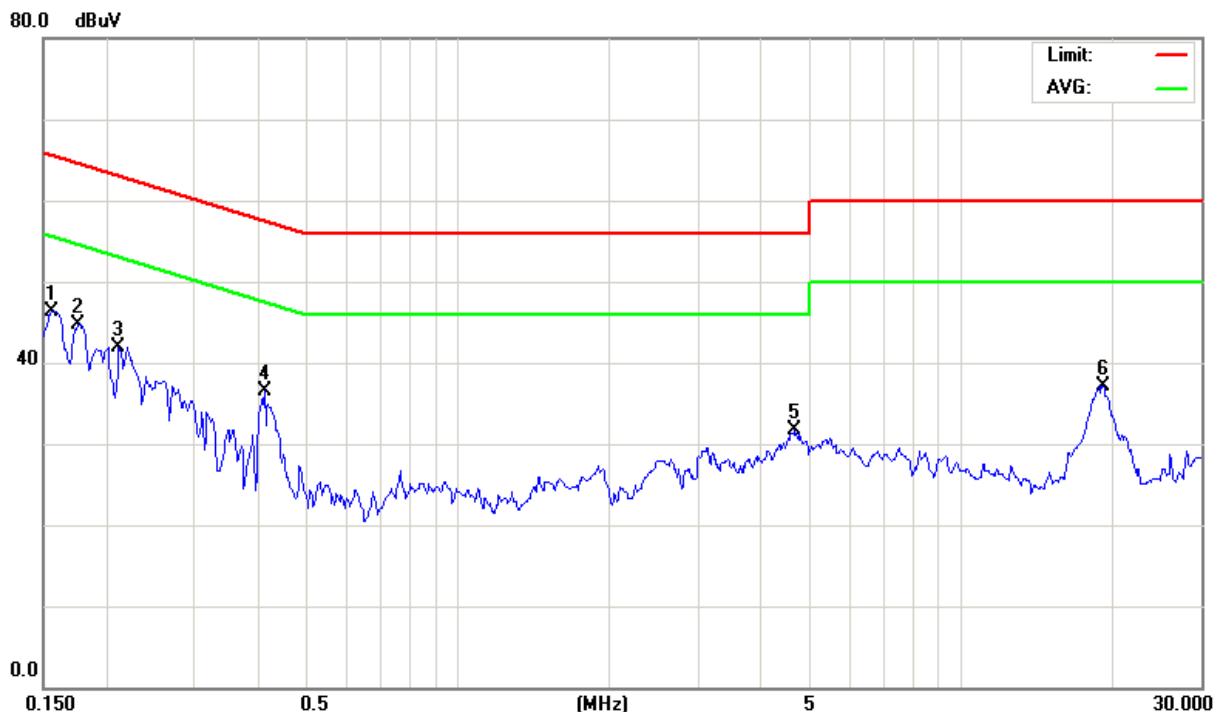


EUT :	Sound Bar Speaker(2.1CH)	Model Name :	SB-250
Temperature :	25 °C	Relative Humidity :	60 %
Pressure :	1009 hPa	Test Power :	AC 120V/60Hz
Test Mode :	TV IN with Wireless-RX Sample		

Freq. (MHz)	Terminal L/N	Measured(dBuV)		Limits(dBuV)		Margin (dB)	Note
		QP-Mode	AV-Mode	QP-Mode	AV-Mode		
0.16	Neutral	46.32	*	65.70	55.70	-19.38	(QP)
0.18	Neutral	44.66	*	64.68	54.68	-20.02	(QP)
0.21	Neutral	41.97	*	63.11	53.11	-21.14	(QP)
0.41	Neutral	36.48	*	57.59	47.59	-21.11	(QP)
4.67	Neutral	31.73	*	56.00	46.00	-24.27	(QP)
19.20	Neutral	37.14	*	60.00	50.00	-22.86	(QP)

**Remark**

- (1) All readings are QP Mode value unless otherwise stated AVG in column of **Note**. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform. In this case, a “ \* ” marked in AVG Mode column of Interference Voltage Measured .
- (2) Measuring frequency range from 150KHz to 30MHz.





## 4.2 RADIATED EMISSION MEASUREMENT

### 4.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
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

### LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	(dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

### FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5 <sup>th</sup> harmonic of the highest frequency or 40 GHz, whichever is lower

**4.2.2 MEASUREMENT INSTRUMENTS LIST AND SETTING**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarbeck	VULB9160	9160-3232	May.25.2013
2	Amplifier	HP	8447D	2944A09673	May.04.2013
3	Test Receiver	R&S	ESCI	100382	May.04.2013
4	Test Cable	N/A	C-01_CB03	N/A	Jul.01.2013
5	Antenna	ETS	3115	00075789	May.25.2013
6	Amplifier	Agilent	8449B	3008A02274	May.04.2013
7	Spectrum	Agilent	E4408B	US39240143	Nov.25.2012
8	Test Cable	HUBER+SUH NER	C-45	N/A	May.02.2013
9	Controller	CT	SC100	N/A	N/A
10	Active Loop Antenna	R&S	HFH2-Z2	830749/020	May.04.2013
11	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Oct.13.2012
12	Horn Antenna	EMCO	3115	9605-4803	May.25.2013

Remark: "N/A" denotes no model name, serial no. or calibration specified.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~90kHz for PK/AVG detector
Start ~ Stop Frequency	90kHz~110kHz for QP detector
Start ~ Stop Frequency	110kHz~490kHz for PK/AVG detector
Start ~ Stop Frequency	490kHz~30MHz for QP detector
Start ~ Stop Frequency	30MHz~1000MHz for QP detector



#### **4.2.3 TEST PROCEDURE**

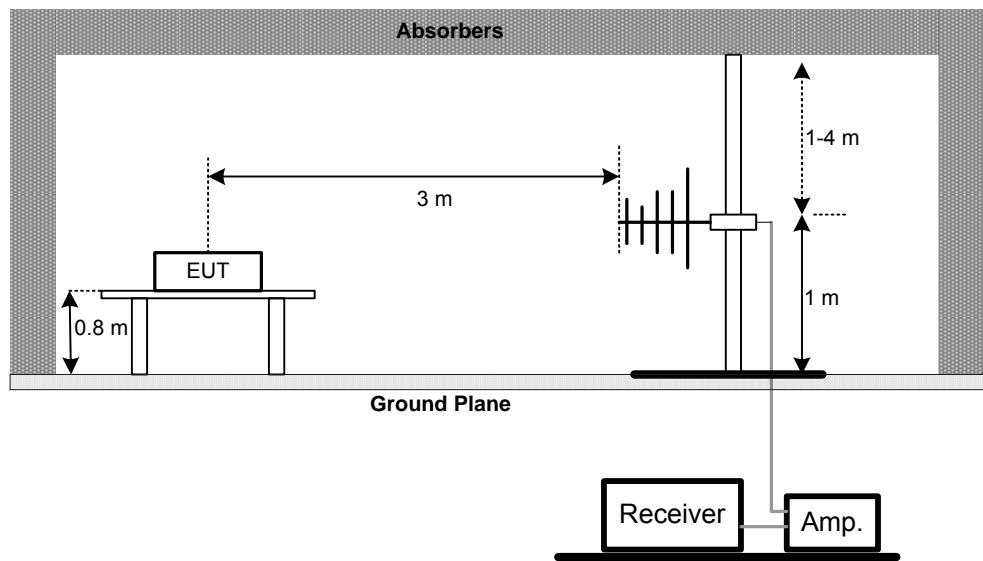
- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)
- c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

#### **4.2.4 DEVIATION FROM TEST STANDARD**

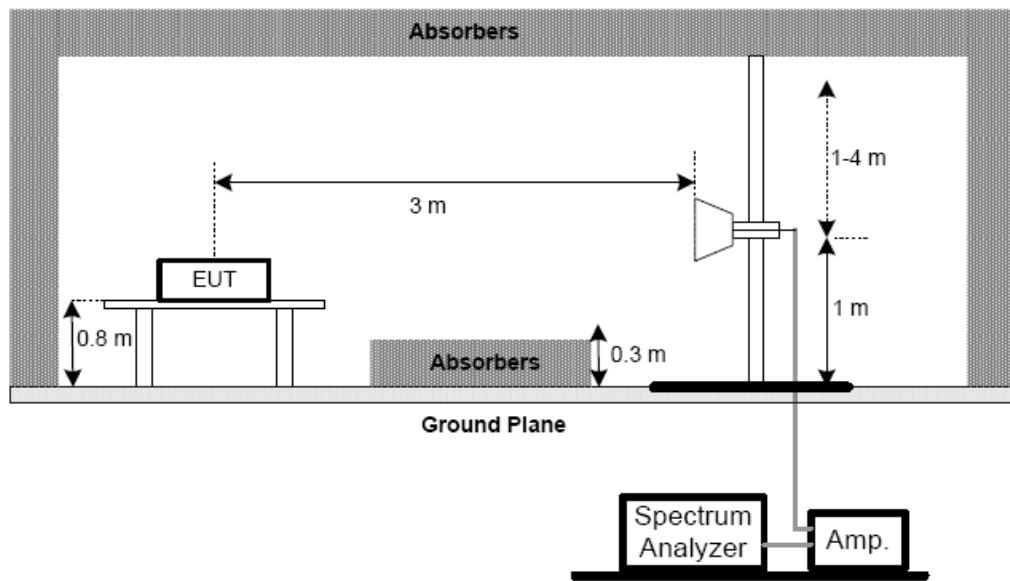
No deviation

#### 4.2.5 TEST SETUP

##### (A) Radiated Emission Test Set-Up Frequency Below 1 GHz

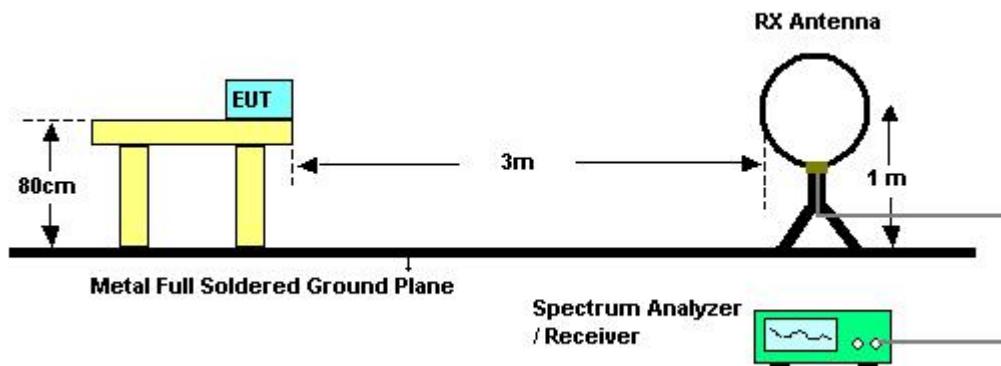


##### (B) Radiated Emission Test Set-Up Frequency Above 1 GHz





(C) For radiated emissions below 30MHz



#### 4.2.6 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

**4.2.7 TEST RESULTS (BELOW 30MHZ)**

EUT :	Sound Bar Speaker(2.1CH)	Model Name :	SB-250
Temperature :	25 °C	Relative Humidity :	58 %
Pressure :	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX Mode		

Freq. (MHz)	Ant. 0°/90°	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
0.0096	0°	27.59	24.30	51.89	127.96	-76.07	AVG
0.0096	0°	31.06	24.30	55.36	147.96	-92.60	PK
0.0142	0°	24.77	24.30	49.07	124.56	-75.49	AVG
0.0142	0°	26.95	24.30	51.25	144.56	-93.31	PK
0.0306	0°	21.53	23.63	45.16	117.90	-72.74	AVG
0.0306	0°	23.10	23.63	46.73	137.90	-91.17	PK
0.0587	0°	19.24	22.23	41.47	112.23	-70.76	AVG
0.0587	0°	23.78	22.23	46.01	132.23	-86.22	PK
0.3625	0°	22.14	20.13	42.27	96.42	-54.15	AVG
0.3625	0°	25.63	20.13	45.76	116.42	-70.66	PK
1.8140	0°	28.47	19.52	47.99	69.54	-21.55	QP

Freq. (MHz)	Ant. 0°/90°	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
0.0098	90°	18.47	24.30	42.77	127.78	-85.01	AVG
0.0098	90°	21.06	24.30	45.36	147.78	-102.42	PK
0.0242	90°	15.72	24.04	39.76	119.95	-80.19	AVG
0.0242	90°	18.46	24.04	42.50	139.95	-97.45	PK
0.0352	90°	20.04	23.34	43.38	116.67	-73.29	AVG
0.0352	90°	23.68	23.34	47.02	136.67	-89.65	PK
0.0709	90°	21.40	21.98	43.38	110.59	-67.21	AVG
0.0709	90°	24.16	21.98	46.14	130.59	-84.45	PK
0.3740	90°	22.38	20.10	42.48	96.15	-53.67	AVG
0.3740	90°	25.17	20.10	45.27	116.15	-70.87	PK
2.3500	90°	24.93	19.29	44.22	69.54	-25.32	QP

**Remark :**

- (1) The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported .
- (2) Distance extrapolation factor =  $40 \log (\text{specific distance} / \text{test distance})$  (dB); °
- (3) Limit line = specific limits (dBuV) + distance extrapolation factor. °

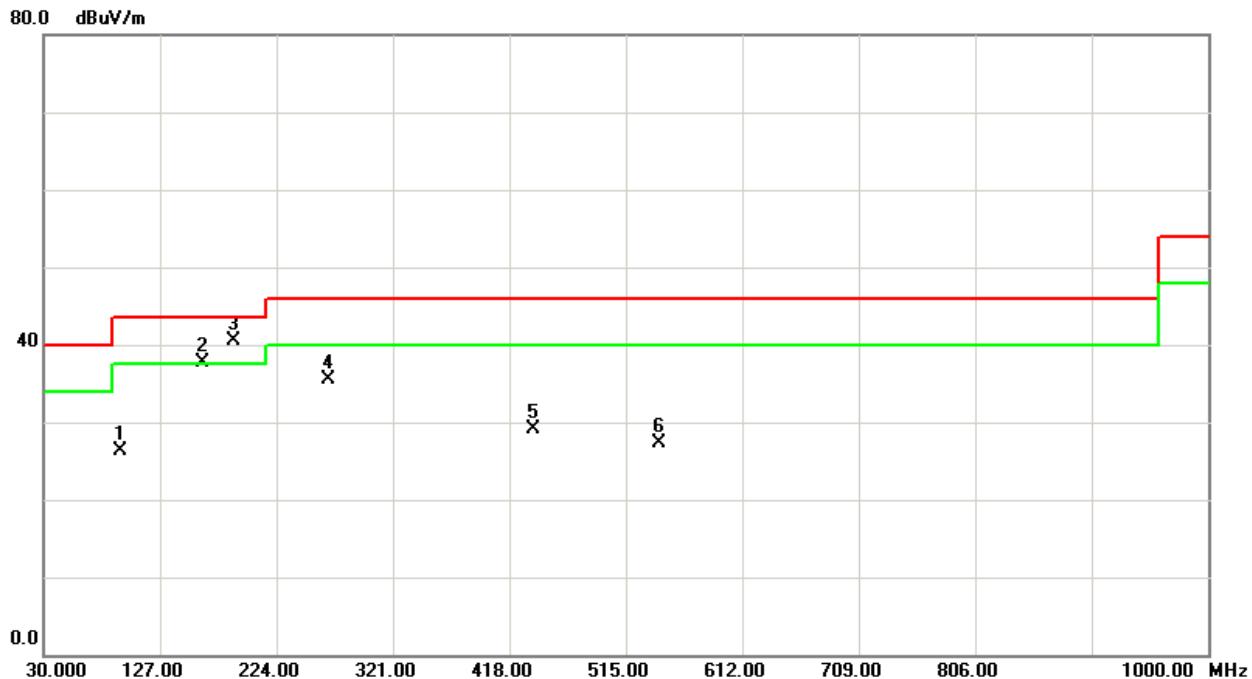
**4.2.8 TEST RESULTS (BETWEEN30 – 1000 MHZ)**

EUT :	Sound Bar Speaker(2.1CH)	Model Name :	SB-250
Temperature :	25 °C	Relative Humidity :	58 %
Pressure :	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX Mode 2403MHz		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
94.02	V	45.07	-18.80	26.27	43.50	- 17.23	
162.89	V	55.55	-17.86	37.69	43.50	- 5.81	
188.11	V	57.62	-17.13	40.49	43.50	- 3.01	
267.65	V	49.47	-13.95	35.52	46.00	- 10.48	
437.40	V	38.26	-9.22	29.04	46.00	- 16.96	
543.13	V	34.06	-6.84	27.22	46.00	- 18.78	

Remark :

- (1) Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Mode or Peak Mode with Detector BW=120KHz ; SPA setting in RBW=120KHz, VBW =120KHz, Swp. Time = 0.3 sec./MHz .
- (2) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform .
- (3) Measuring frequency range from 30MHz to 1000MHz .
- (4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table .



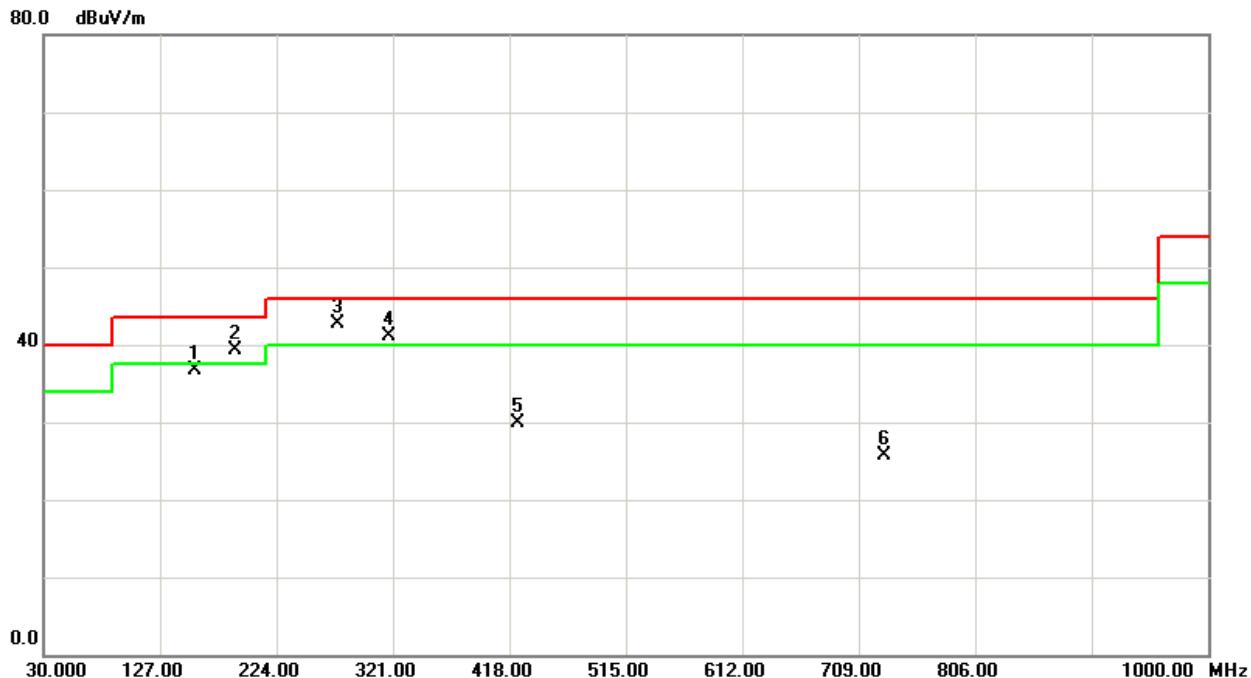


EUT :	Sound Bar Speaker(2.1CH)	Model Name :	SB-250
Temperature :	25 °C	Relative Humidity :	58 %
Pressure :	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX Mode 2403MHz		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
156.10	H	54.57	-17.91	36.66	43.50	- 6.84	
190.05	H	56.34	-17.09	39.25	43.50	- 4.25	
275.41	H	56.23	-13.47	42.76	46.00	- 3.24	
317.12	H	53.47	-12.27	41.20	46.00	- 4.80	
424.79	H	39.22	-9.41	29.81	46.00	- 16.19	
730.34	H	30.13	-4.42	25.71	46.00	- 20.29	

Remark :

- (1) Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Mode or Peak Mode with Detector BW=120KHz ; SPA setting in RBW=120KHz, VBW =120KHz, Swp. Time = 0.3 sec./MHz .
- (2) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform .
- (3) Measuring frequency range from 30MHz to 1000MHz .
- (4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table .



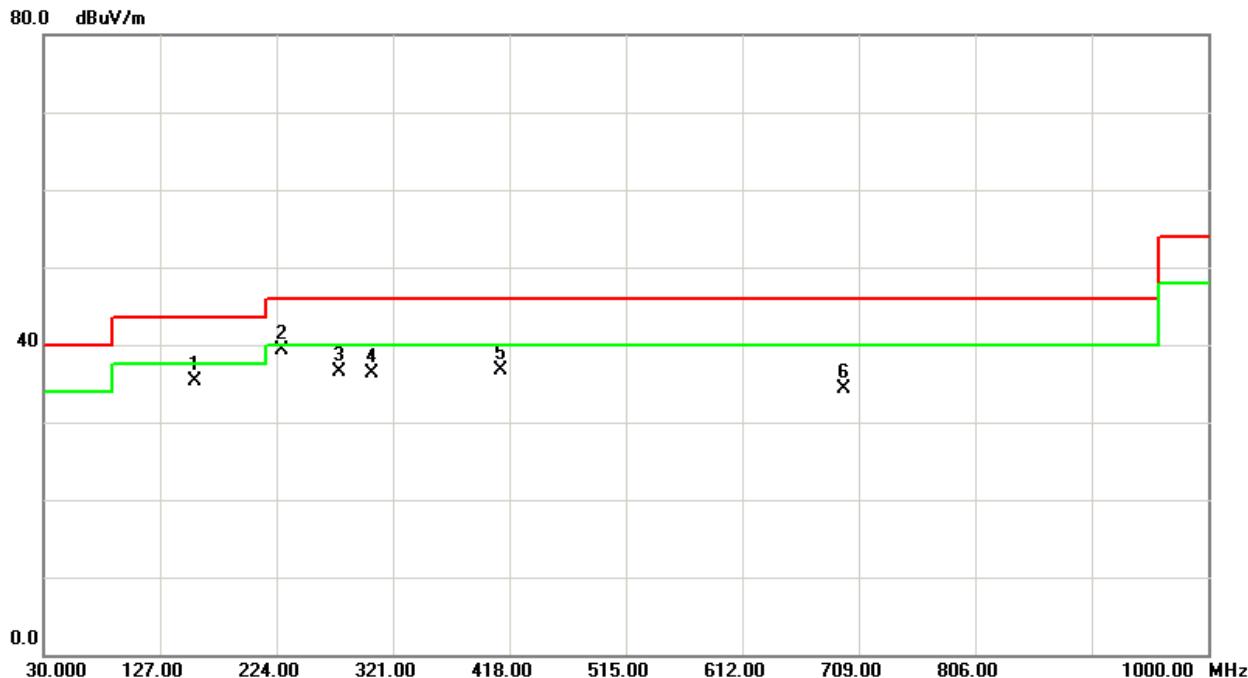


EUT :	Sound Bar Speaker(2.1CH)	Model Name :	SB-250
Temperature :	25 °C	Relative Humidity :	58 %
Pressure :	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	RX Mode 2403MHz		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
156.10	V	53.25	-17.91	35.34	43.50	- 8.16	
228.85	V	55.45	-16.07	39.38	46.00	- 6.62	
276.38	V	49.86	-13.41	36.45	46.00	- 9.55	
303.54	V	48.79	-12.57	36.22	46.00	- 9.78	
411.21	V	46.40	-9.63	36.77	46.00	- 9.23	
696.39	V	38.96	-4.66	34.30	46.00	- 11.70	

Remark :

- (1) Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Mode or Peak Mode with Detector BW=120KHz ; SPA setting in RBW=120KHz, VBW =120KHz, Swp. Time = 0.3 sec./MHz .
- (2) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform .
- (3) Measuring frequency range from 30MHz to 1000MHz .
- (4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table .



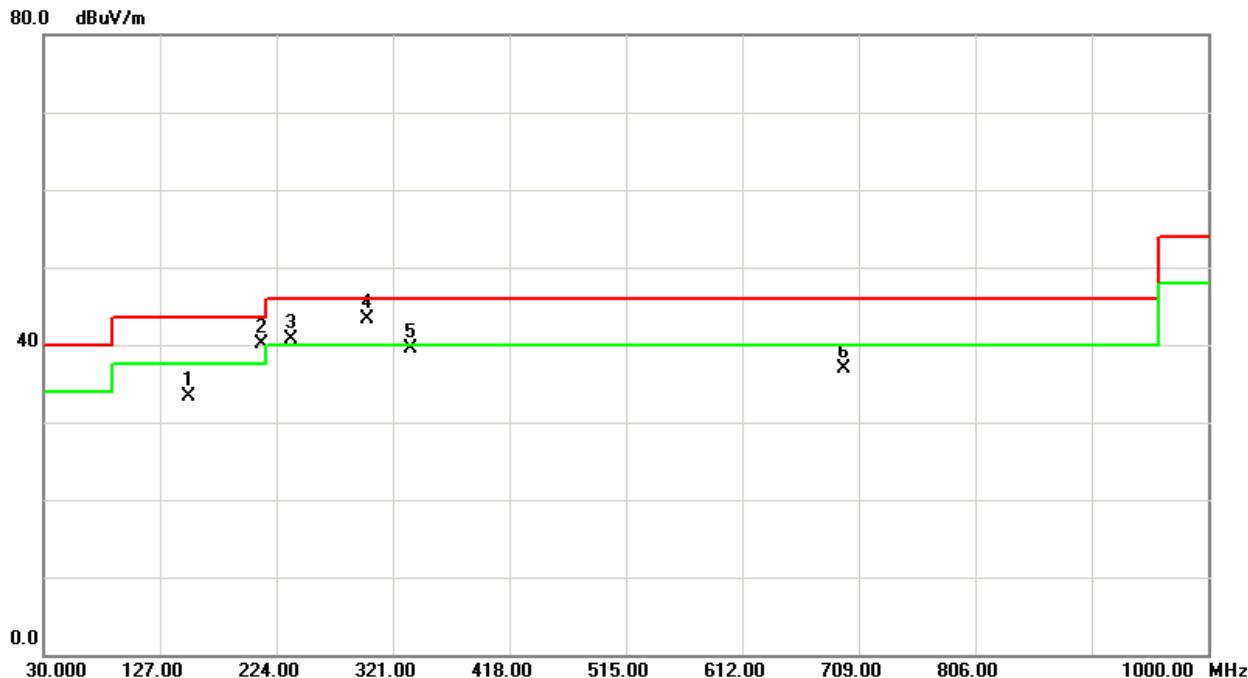


EUT :	Sound Bar Speaker(2.1CH)	Model Name :	SB-250
Temperature :	25 °C	Relative Humidity :	58 %
Pressure :	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	RX Mode 2403MHz		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
151.25	H	51.16	-17.85	33.31	43.50	- 10.19	
211.39	H	56.76	-16.70	40.06	43.50	- 3.44	
236.61	H	56.58	-15.82	40.76	46.00	- 5.24	
299.66	H	55.90	-12.65	43.25	46.00	- 2.75	
335.55	H	51.32	-11.86	39.46	46.00	- 6.54	
696.39	H	41.61	-4.66	36.95	46.00	- 9.05	

Remark :

- (1) Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Mode or Peak Mode with Detector BW=120KHz ; SPA setting in RBW=120KHz, VBW =120KHz, Swp. Time = 0.3 sec./MHz .
- (2) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform .
- (3) Measuring frequency range from 30MHz to 1000MHz .
- (4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table .



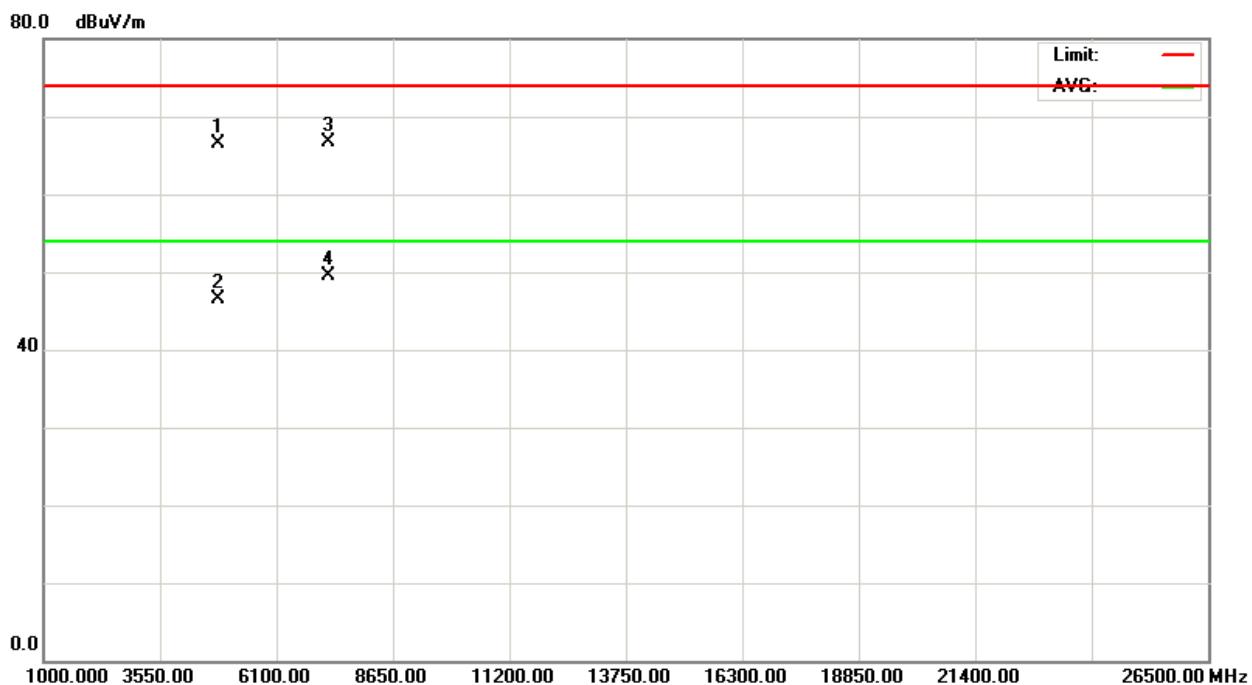
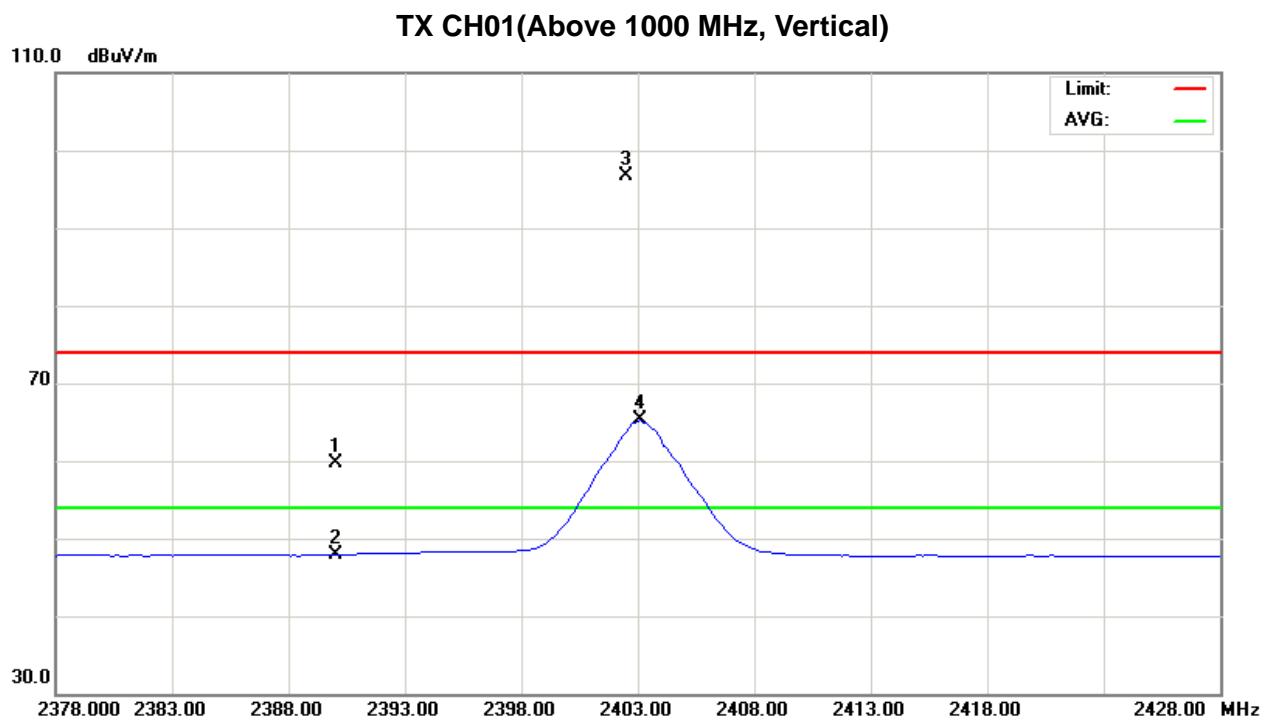
**4.2.9 TEST RESULTS (ABOVE 1000 MHZ)**

EUT :	Sound Bar Speaker(2.1CH)			Model Name :		SB-250	
Temperature :	25 °C			Relative Humidity :		58 %	
Pressure :	1010 hPa			Test Voltage :		AC 120V/60Hz	
Test Mode :	TX 2403MHz – CH01						

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Margin		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
2390.00	V	27.46	15.57	32.30	59.76	47.87	74.00	54.00	-14.24	-6.13	X/E
<b>2402.50</b>	<b>V</b>	<b>64.51</b>	<b>32.95</b>	<b>32.27</b>	<b>96.78</b>	<b>65.22</b>					<b>X/F</b>
4806.23	V	66.46	46.36	0.14	66.60	46.50	74.00	54.00	-7.40	-7.50	X/H
7208.63	V	61.99	44.70	4.76	66.75	49.46	74.00	54.00	-7.25	-4.54	X/H

**Remark :**

- (1) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform .
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency . "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission .
- (4) Data of measurement within this frequency range shown " \* " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis :  
"X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand
- (7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna



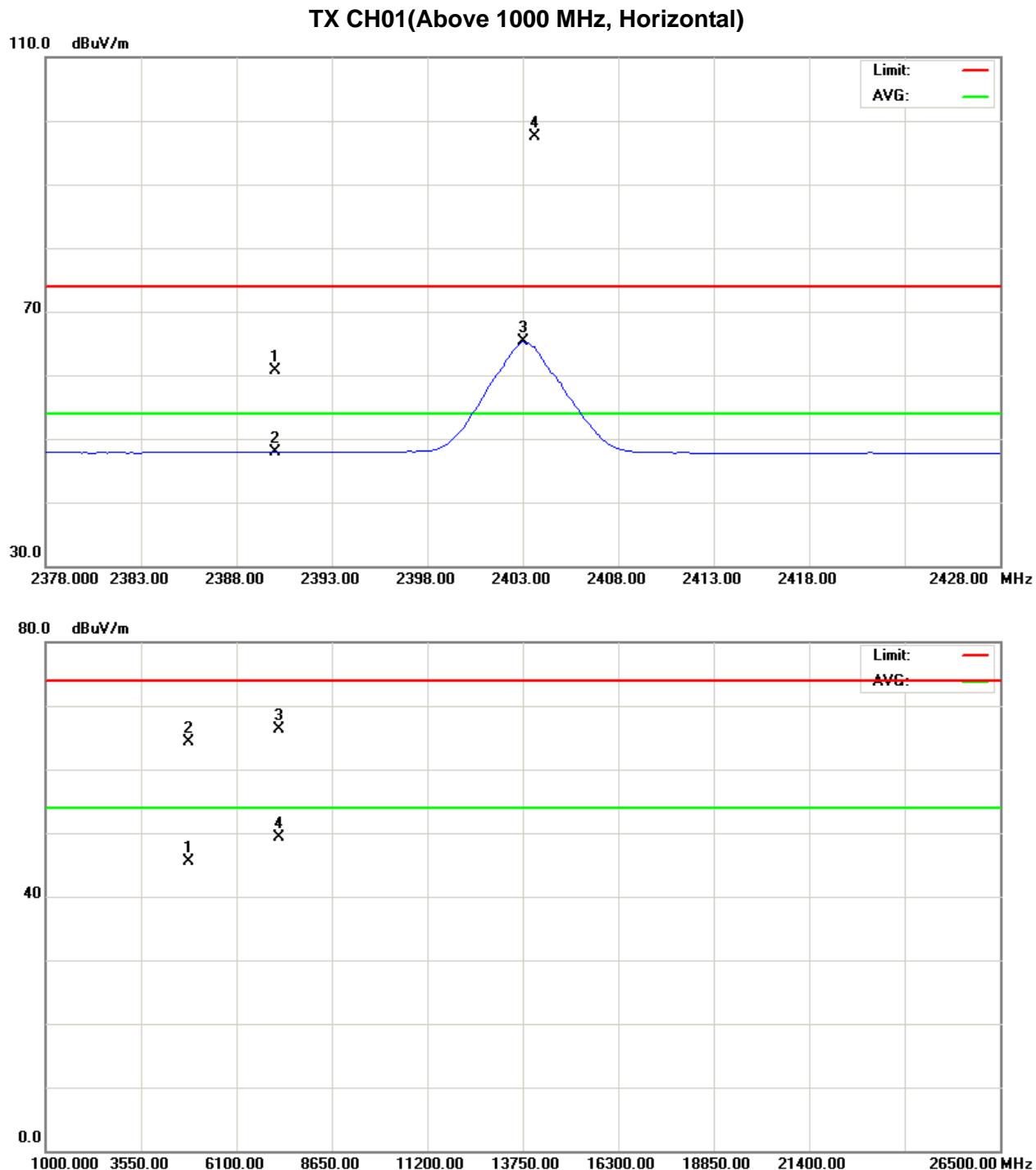


EUT :	Sound Bar Speaker(2.1CH)	Model Name :	SB-250
Temperature :	25 °C	Relative Humidity :	58 %
Pressure :	1010hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX 2403MHz – CH01		

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Margin		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
2390.00	H	28.36	15.54	32.30	60.66	47.84	74.00	54.00	-13.34	-6.16	X/E
<b>2403.63</b>	<b>H</b>	<b>65.32</b>	<b>32.99</b>	<b>32.26</b>	<b>97.58</b>	<b>65.25</b>					<b>X/F</b>
4807.20	H	64.25	45.27	0.15	64.40	45.42	74.00	54.00	-9.60	-8.58	X/H
7209.38	H	61.57	44.49	4.76	66.33	49.25	74.00	54.00	-7.67	-4.75	X/H

**Remark :**

- (1) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform .
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency . "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission .
- (4) Data of measurement within this frequency range shown " \* " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis :
  - "X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand
- (7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna





EUT :	Sound Bar Speaker(2.1CH)	Model Name :	SB-250
Temperature :	25 °C	Relative Humidity :	58 %
Pressure :	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX 2439MHz -CH13		

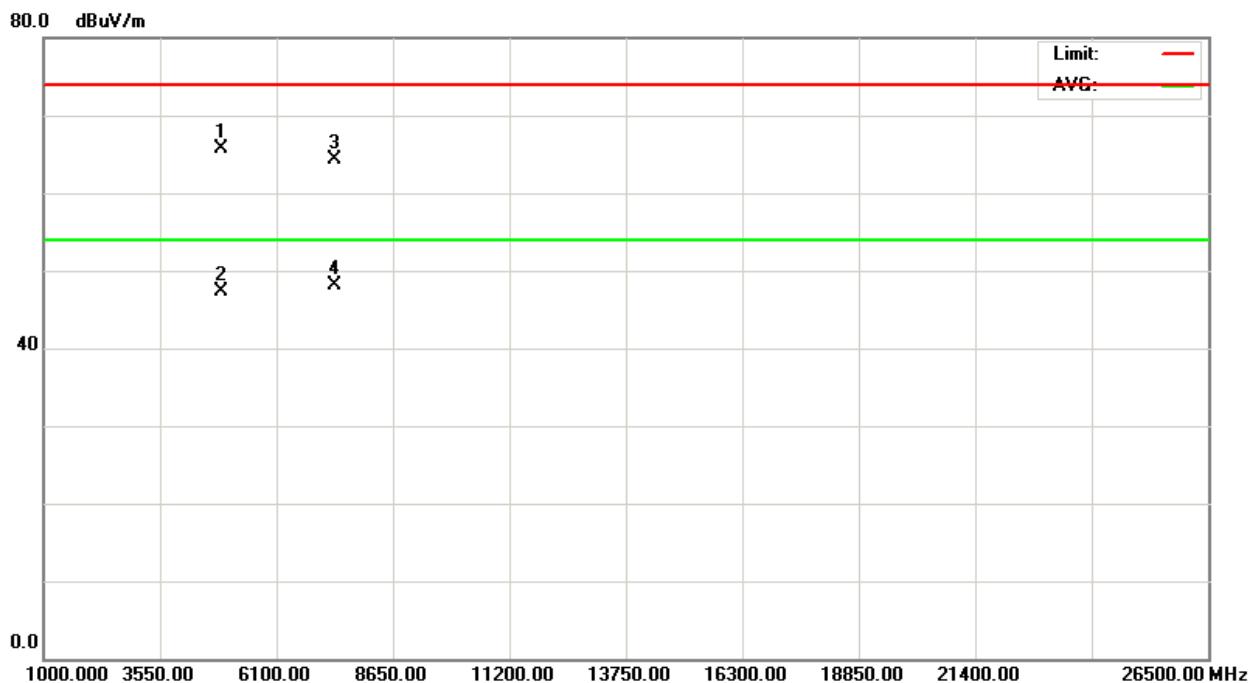
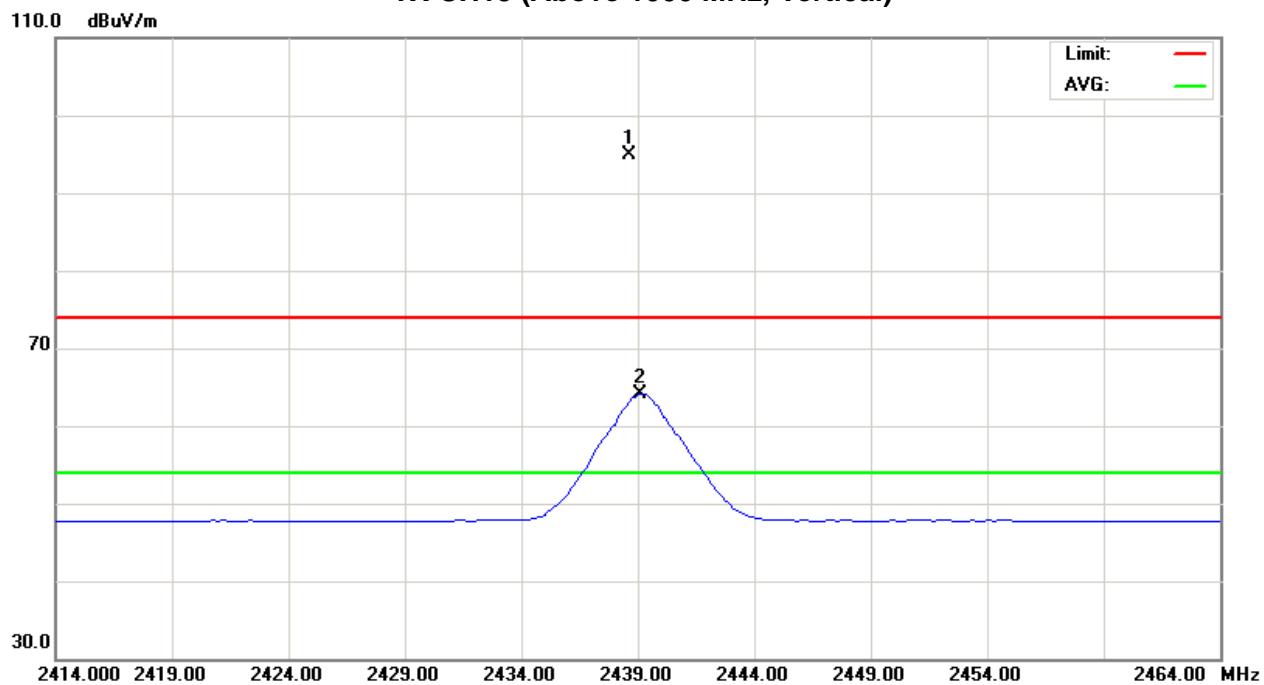
Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF		Act.		Limit		Margin		Note
		Peak (dBuV)	AV (dBuV)	CF(dB)	(dBuV/m)							
2438.63	V	62.68	31.91	32.25	94.93	64.16						X/F
4878.50	V	65.38	46.87	0.39	65.77	47.26	74.00	54.00	-8.23	-6.74		X/H
7317.28	V	59.45	43.28	4.77	64.22	48.05	74.00	54.00	-9.78	-5.95		X/H

Remark :

- (1) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform .
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency . "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission .
- (4) Data of measurement within this frequency range shown " \* " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis :  
"X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand
- (7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna



**TX CH13 (Above 1000 MHz, Vertical)**



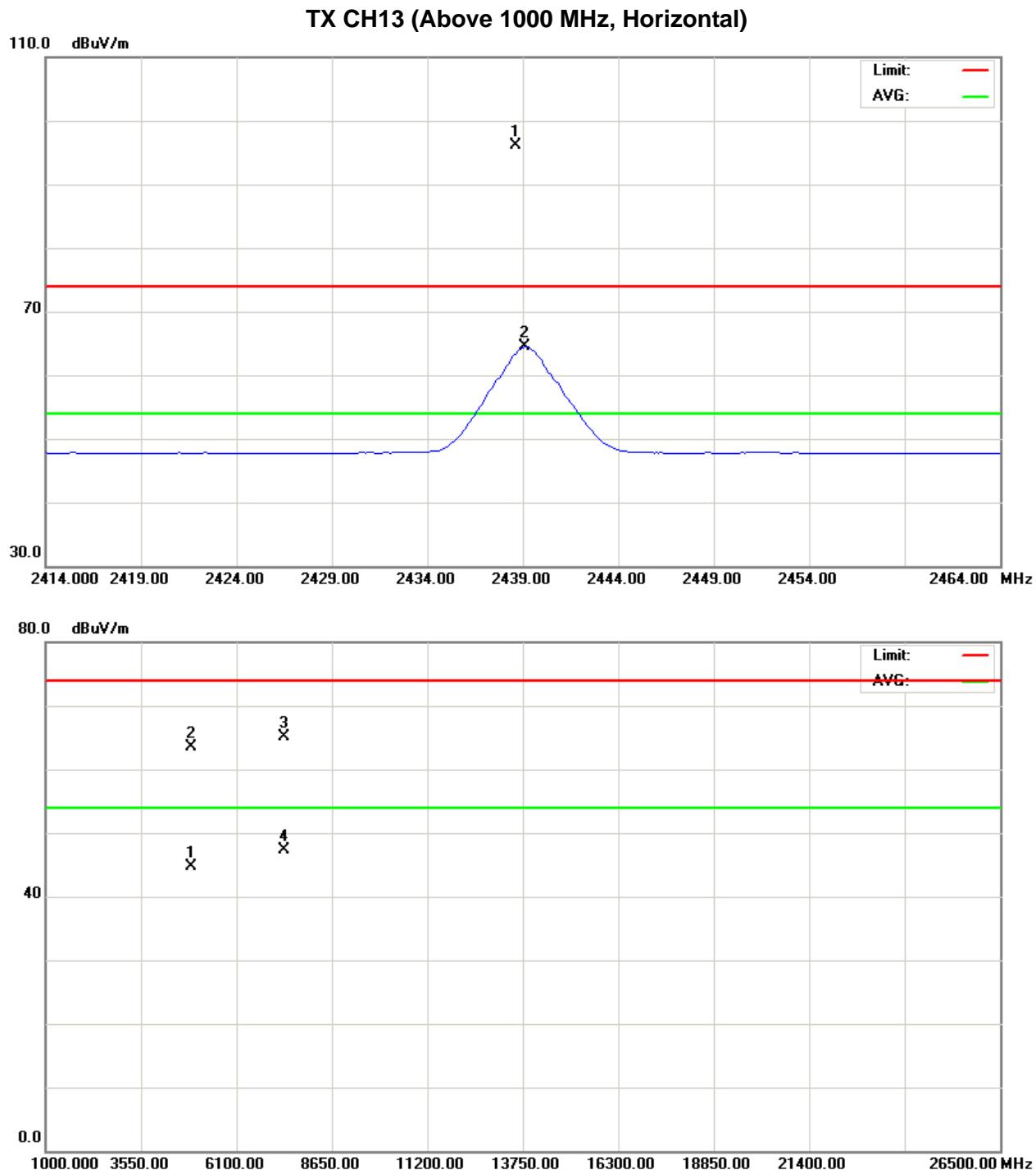


EUT :	Sound Bar Speaker(2.1CH)	Model Name :	SB-250
Temperature :	25 °C	Relative Humidity :	58 %
Pressure :	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX 2439MHz -CH13		

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF		Act.		Limit		Margin		Note
		Peak (dBuV)	AV (dBuV)	CF(dB)	(dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
2438.63	H	63.77	32.22	32.25	96.02	64.47						X/F
4879.32	H	63.06	44.25	0.39	63.45	44.64	74.00	54.00	-10.55	-9.36		X/H
7317.01	V	60.30	42.47	4.77	65.07	47.24	74.00	54.00	-8.93	-6.76		X/H

**Remark :**

- (1) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform .
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency . "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission .
- (4) Data of measurement within this frequency range shown " \* " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis :  
"X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand
- (7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna





EUT :	Sound Bar Speaker(2.1CH)	Model Name :	SB-250
Temperature :	25 °C	Relative Humidity :	58 %
Pressure :	1010hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX 2478MHz -CH26		

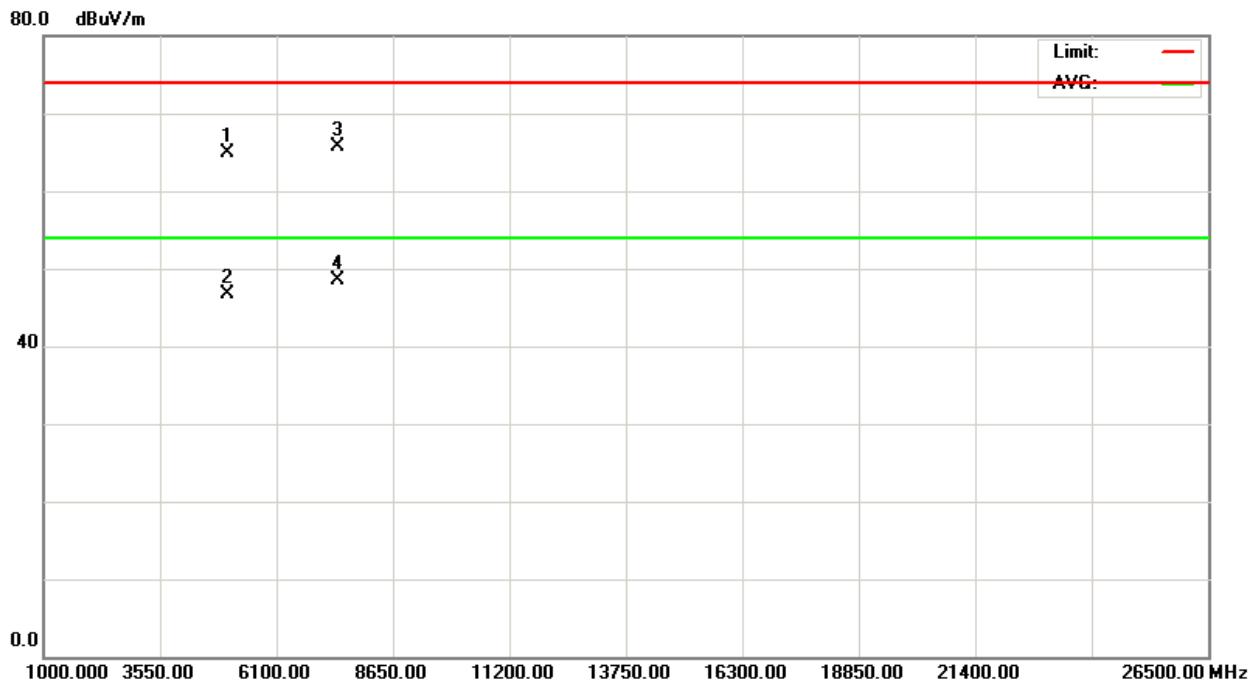
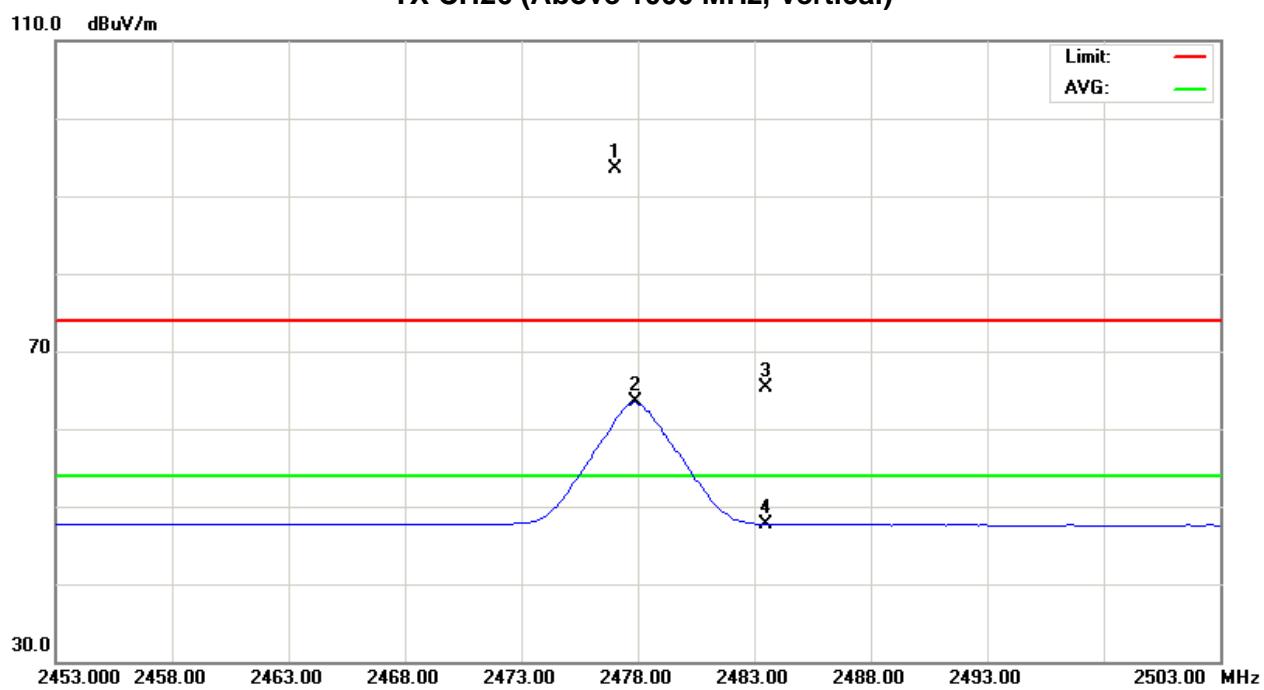
Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Margin		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
2477.00	V	61.29	31.23	32.19	93.48	63.42					X/F
2483.50	V	33.04	15.53	32.18	65.22	47.71	74.00	54.00	-8.78	-6.29	X/E
4956.11	V	64.27	45.95	0.65	64.92	46.60	74.00	54.00	-9.08	-7.40	X/H
7434.05	V	61.02	43.65	4.77	65.79	48.42	74.00	54.00	-8.21	-5.58	X/H

**Remark :**

- (1) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform .
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency . "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission .
- (4) Data of measurement within this frequency range shown " \* " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis :  
"X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand
- (7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna



**TX CH26 (Above 1000 MHz, Vertical)**



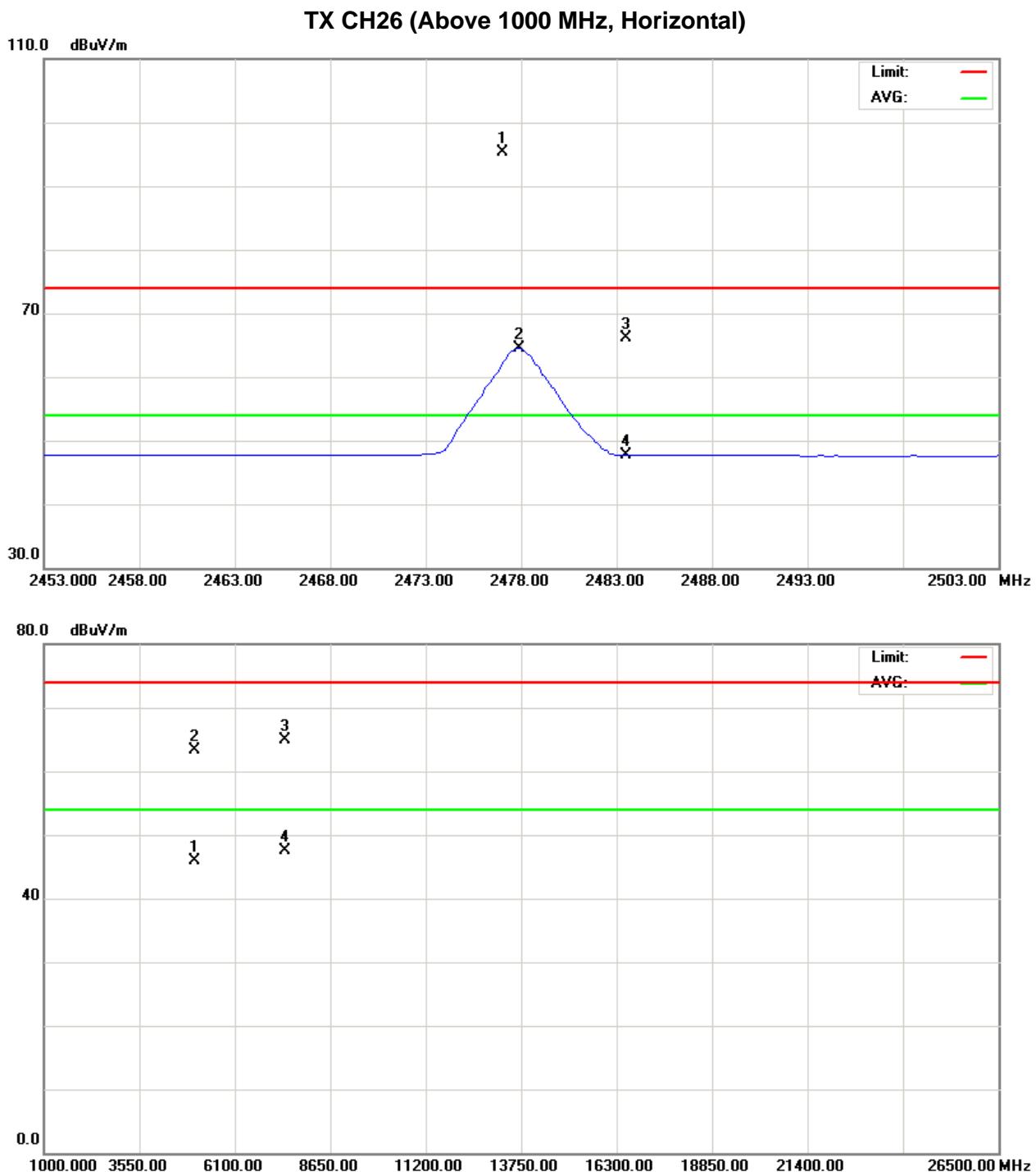


EUT :	Sound Bar Speaker(2.1CH)	Model Name :	SB-250
Temperature :	25 °C	Relative Humidity :	58 %
Pressure :	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX 2478MHz -CH26		

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Margin		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
2477.00	H	63.21	32.30	32.19	95.40	64.49					X/F
2483.50	H	33.90	15.47	32.18	66.08	47.65	74.00	54.00	-7.92	-6.35	X/E
4956.41	H	62.55	45.25	0.65	63.20	45.90	74.00	54.00	-10.80	-8.10	X/H
7434.14	H	60.13	42.64	4.77	64.90	47.41	74.00	54.00	-9.10	-6.59	X/H

**Remark :**

- (1) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform .
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency . "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission .
- (4) Data of measurement within this frequency range shown " \* " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis :  
"X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand
- (7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna



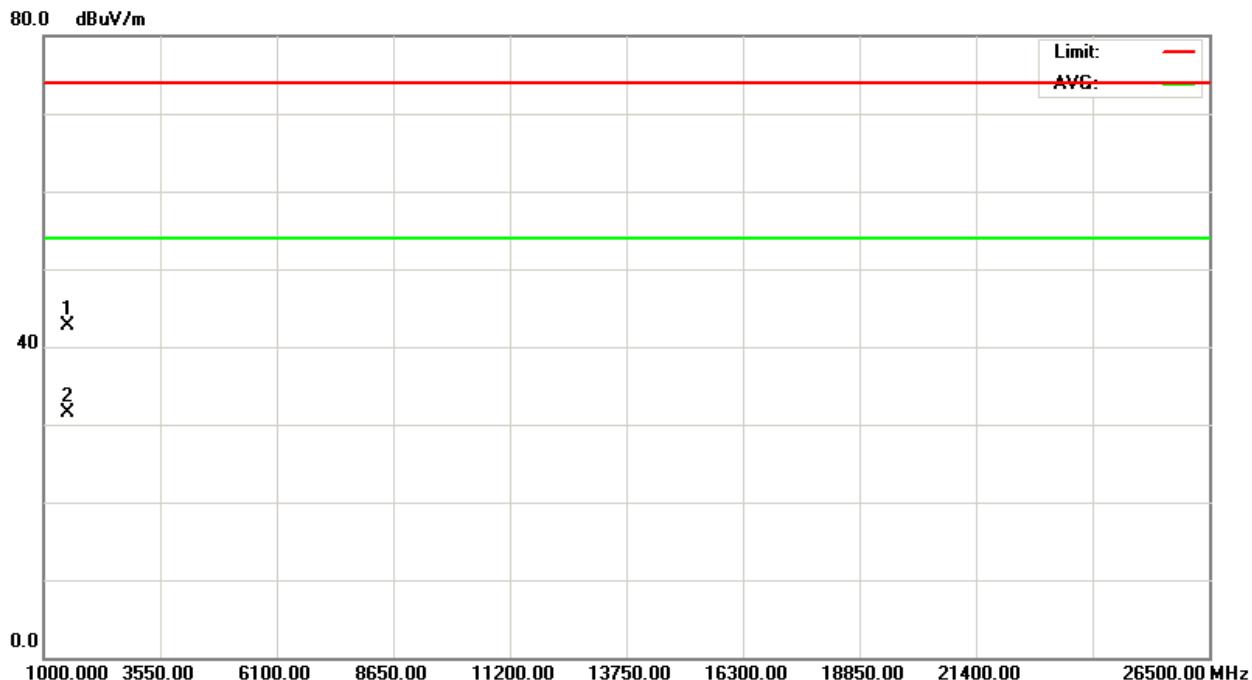


EUT :	Sound Bar Speaker(2.1CH)	Model Name :	SB-250
Temperature :	25 °C	Relative Humidity :	58 %
Pressure :	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	RX Mode		

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Margin		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
1500.00	V	48.96	37.62	-6.21	42.75	31.41	74.00	54.00	-31.25	-22.59	X/H

Remark :

- (1) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform .
- (2) Measuring frequency range from 1000MHz to 6000MHz or the 10th harmonic of highest fundamental frequency . "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission .
- (4) Data of measurement within this frequency range shown " \* " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis :  
"X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand



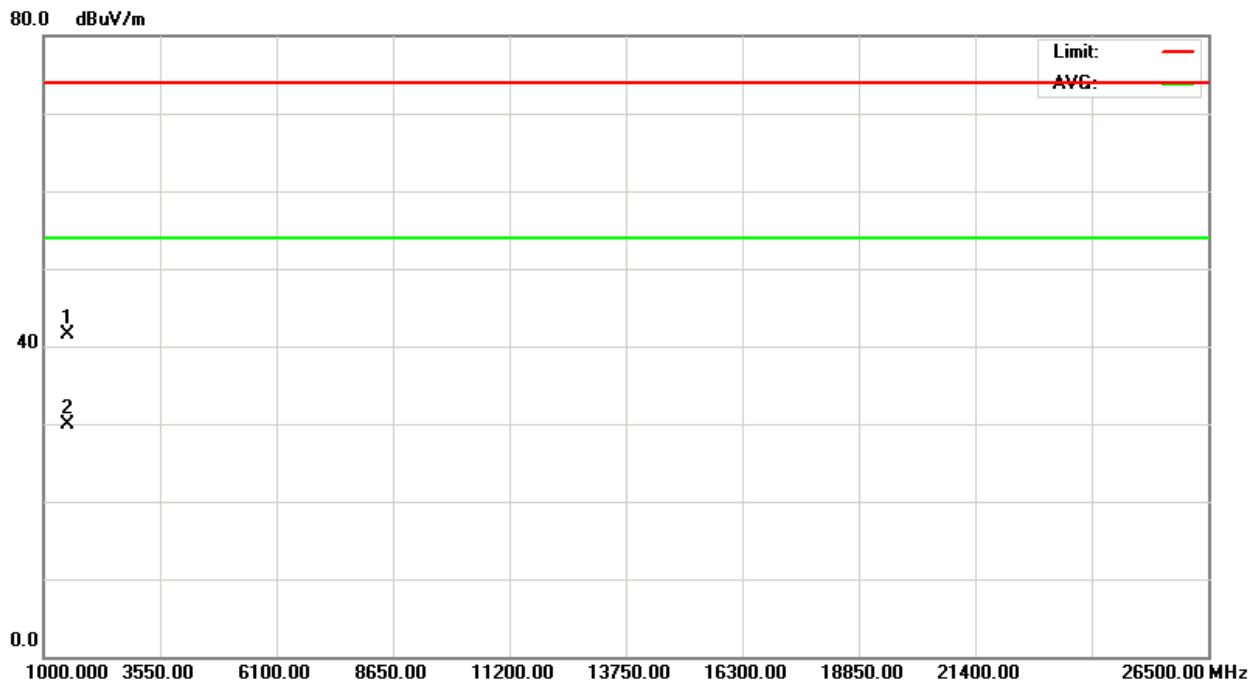


EUT :	Sound Bar Speaker(2.1CH)	Model Name :	SB-250
Temperature :	25 °C	Relative Humidity :	58 %
Pressure :	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	RX Mode		

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Margin		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
1489.93	H	47.85	36.17	-6.27	41.58	29.90	74.00	54.00	-32.42	-24.10	X/H

## Remark :

- (1) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform .
- (2) Measuring frequency range from 1000MHz to 6000MHz or the 10th harmonic of highest fundamental frequency . "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission .
- (4) Data of measurement within this frequency range shown " \* " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis :  
"X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand





## 5. NUMBER OF HOPPING CHANNEL

### 5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C			
Section	Test Item	Frequency Range (MHz)	Result
15.247 (a)(1)(iii)	Number of Hopping Channel	2400-2483.5	PASS

#### 5.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov.25.2012

Remark: "N/A" denotes no model name, serial no. or calibration specified.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> Operating Frequency Range
RB	100 kHz
VB	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

#### 5.1.2 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 100KHz, VBW=100KHz, Sweep time = Auto.

#### 5.1.3 DEVIATION FROM STANDARD

No deviation.

#### 5.1.4 TEST SETUP



#### 5.1.5 EUT OPERATION CONDITIONS

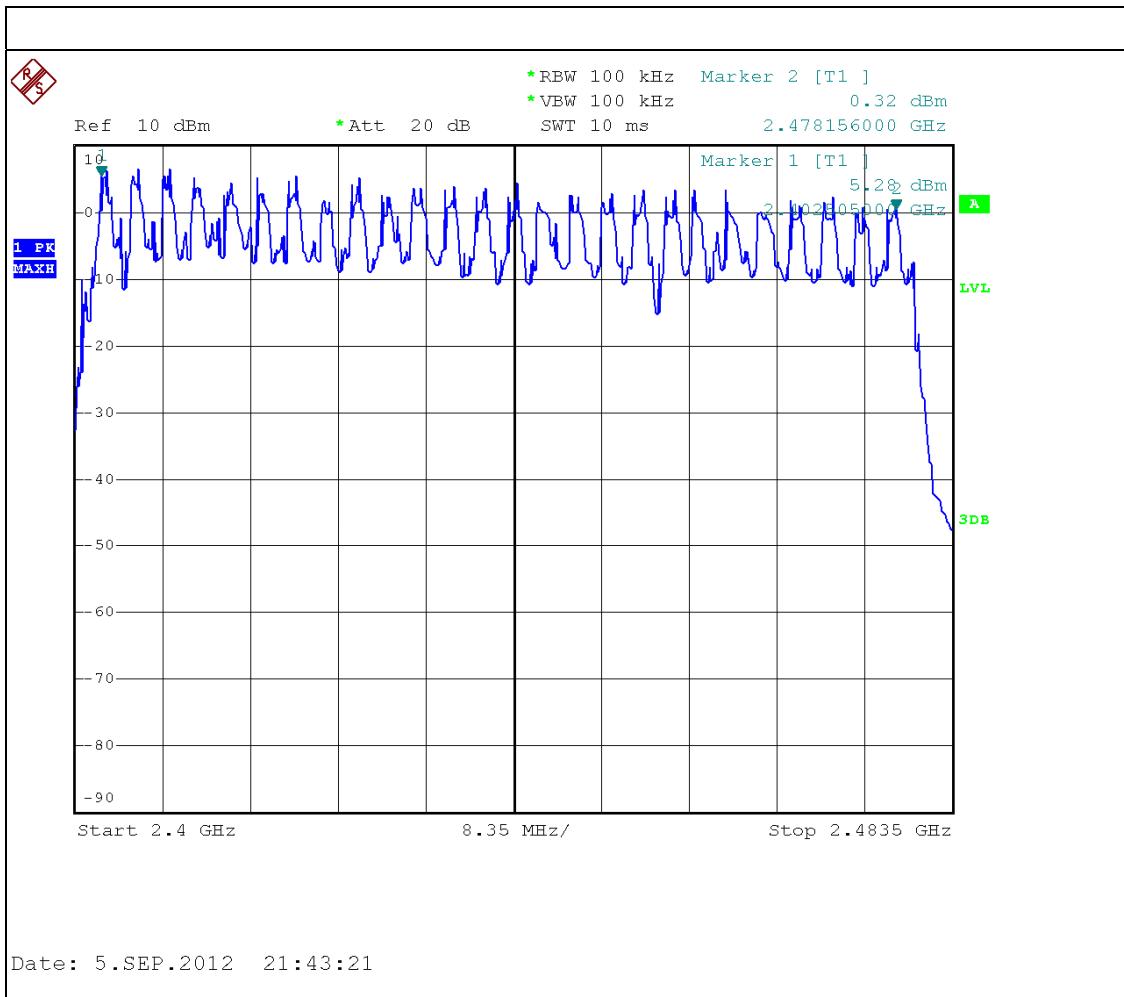
The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.



## 5.1.6 TEST RESULTS

EUT :	Sound Bar Speaker(2.1CH)	Model Name :	SB-250
Temperature :	25 °C	Relative Humidity :	58 %
Pressure :	1009 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	Hopping Mode		

Number of Hopping Channel	26
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## 6. AVERAGE TIME OF OCCUPANCY

### 6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (a)(1)(iii)	Average Time of Occupancy	0.4sec	2400-2483.5	PASS

#### 6.1.1 MEASUREMENT INSTRUMENTS LIST

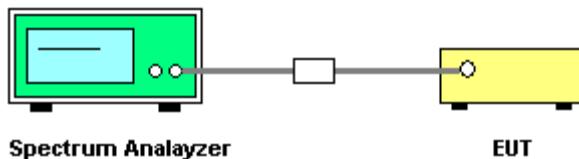
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov.25.2012

Remark: "N/A" denotes no model name, serial no. or calibration specified.

#### 6.1.2 TEST PROCEDURE

- a. The transmitter output (antenna port) was connected to the spectrum analyzer
- b. Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
- c. Use a video trigger with the trigger level set to enable triggering only on full pulses.
- d. Sweep Time is more than once pulse time.
- e. Set the center frequency on any frequency would be measure and set the frequency span to zero span.
- f. Measure the maximum time duration of one single pulse.
- g. Set the EUT for packet transmitting.
- h. Measure the maximum time duration of one single pulse.
- i. Dwell time = [spreading rate/16] x duty-cycle x 0.4 seconds

#### 6.1.3. TEST SETUP LAYOUT



#### 6.1.4. TEST DEVIATION

There is no deviation with the original standard.

#### 6.1.5. EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting/Hopping mode.



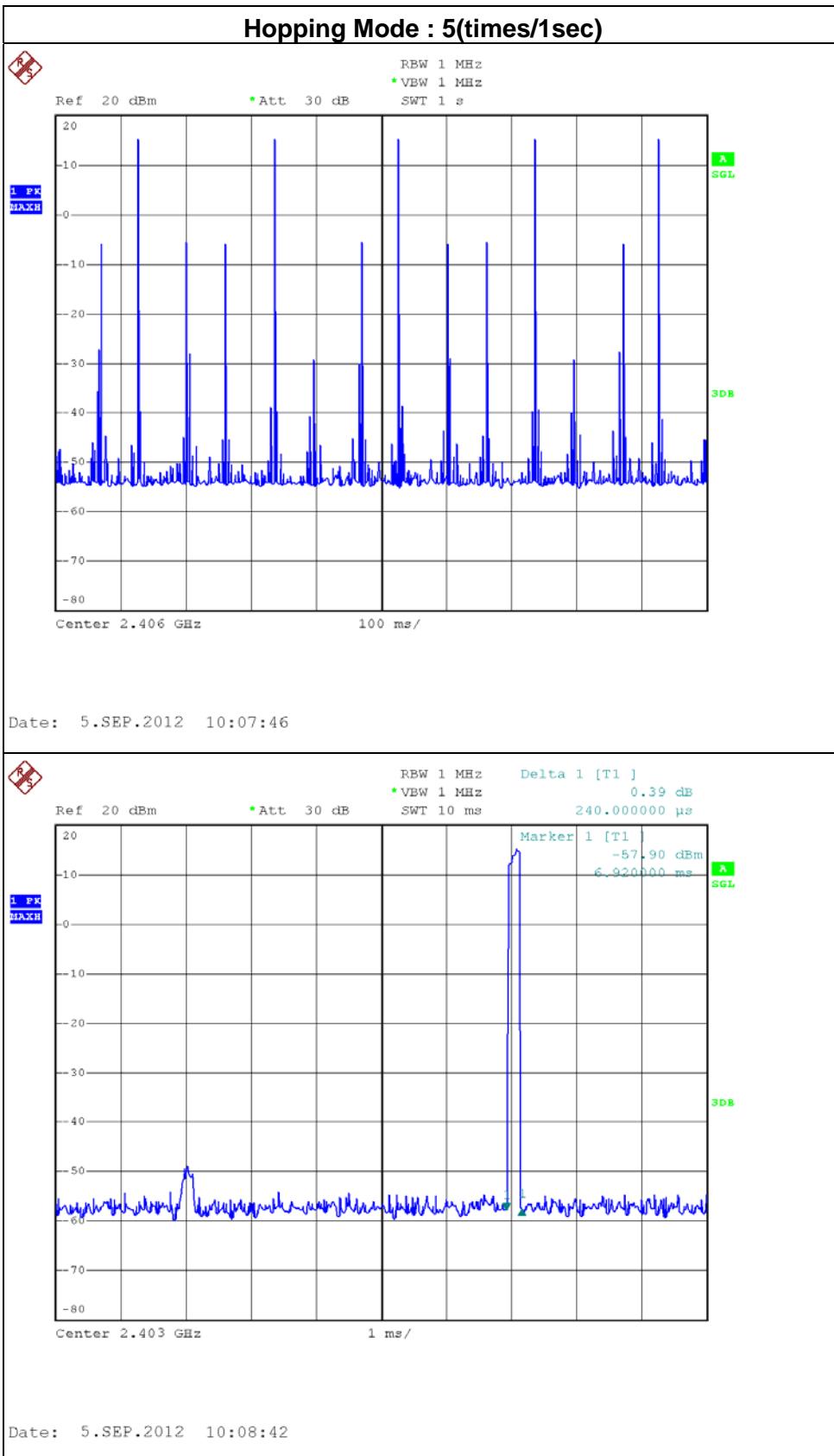
## 6.1.6. TEST RESULTS

EUT :	Sound Bar Speaker(2.1CH)	Model Name :	SB-250
Temperature :	25 °C	Relative Humidity :	58 %
Pressure :	1009 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	Hopping Mode		

Mode	Number of transmission in a 10.4 (26Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
2402 MHz	(5/1) *10.4=52 times <b>Note1</b>	0.24	12.48	400

**Note1:** 13 times of occupied channels per 1 second

	Results
Measured cycle (sec)	26 CH*0.4=10.4
The total number of frequency-hopping per second	((5/1)*26)=130
The number of occupied channels per second	130/26=5(number/sec)
occupied time for each channel(1)	0.24ms
The total number of channels occupied within one cycle (2)	(5/1) *10.4=52 times
The average time of occupancy within one cycle(1)*(2)	12.48msec
LIMIT (msec)	400msec





## 7. HOPPING CHANNEL SEPARATION MEASUREMENT

### 7.1 APPLIED PROCEDURES / LIMIT

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

#### 7.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov.25.2012

Remark: "N/A" denotes no model name, serial no. or calibration specified.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	30 kHz
VB	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

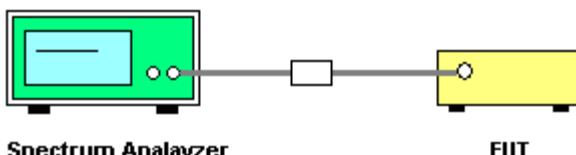
#### 7.1.2 TEST PROCEDURE

- The EUT must have its hopping function enabled
- Span = wide enough to capture the peaks of two adjacent channels  
Resolution (or IF) Bandwidth (RBW)  $\geq$  1% of the span  
Video (or Average) Bandwidth (VBW)  $\geq$  RBW  
Sweep = auto  
Detector function = peak  
Trace = max hold

#### 7.1.3 DEVIATION FROM STANDARD

No deviation.

#### 7.1.4 TEST SETUP



#### 7.1.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in hopping mode.



## 7.1.6 TEST RESULTS

EUT :	Sound Bar Speaker(2.1CH)	Model Name :	SB-250
Temperature :	25 °C	Relative Humidity :	58 %
Pressure :	1009 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	CH01 / CH13 /CH26		

Frequency	Ch. Separation (MHz)	20dB Bandwidth (MHz)	Result
2403MHz	3.03	2.40	Complies
2439MHz	2.99	2.44	Complies
2478MHz	3.01	3.22	Complies

Ch. Separation Limits: >20dB bandwidth or >2/3 of 20dB bandwidth







## 8. BANDWIDTH TEST

### 8.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (a)(2)	Bandwidth	<= 1 MHz (20dB bandwidth)	2400-2483.5	PASS

#### 8.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov.25.2012

Remark: "N/A" denotes no model name, serial no. or calibration specified.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	30 kHz (20dB Bandwidth) / 30 kHz (Channel Separation)
VB	100 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

#### 8.1.2 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 30KHz, VBW=100KHz, Sweep time = Auto.

#### 8.1.3 DEVIATION FROM STANDARD

No deviation.

#### 8.1.4 TEST SETUP



#### 8.1.5 EUT OPERATION CONDITIONS

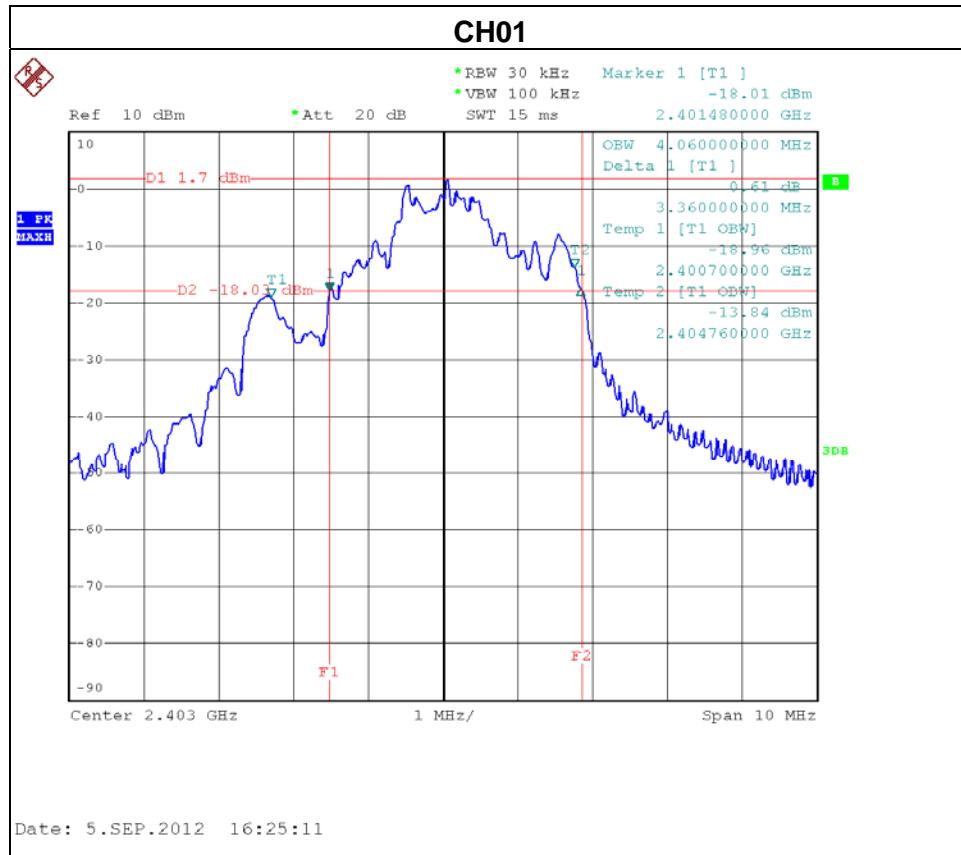
The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

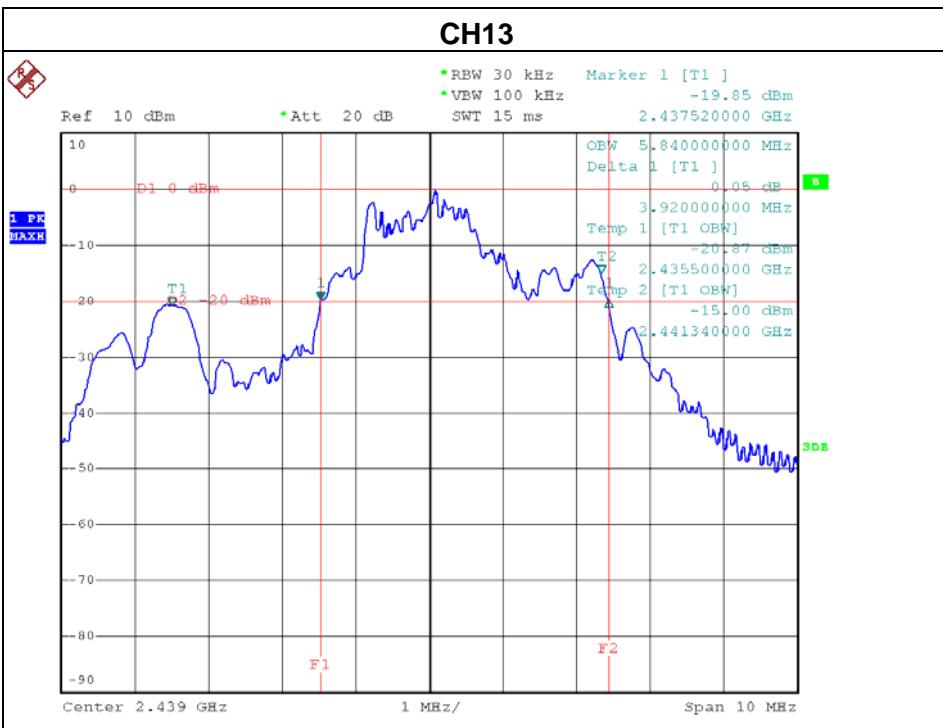


## 8.1.6 TEST RESULTS

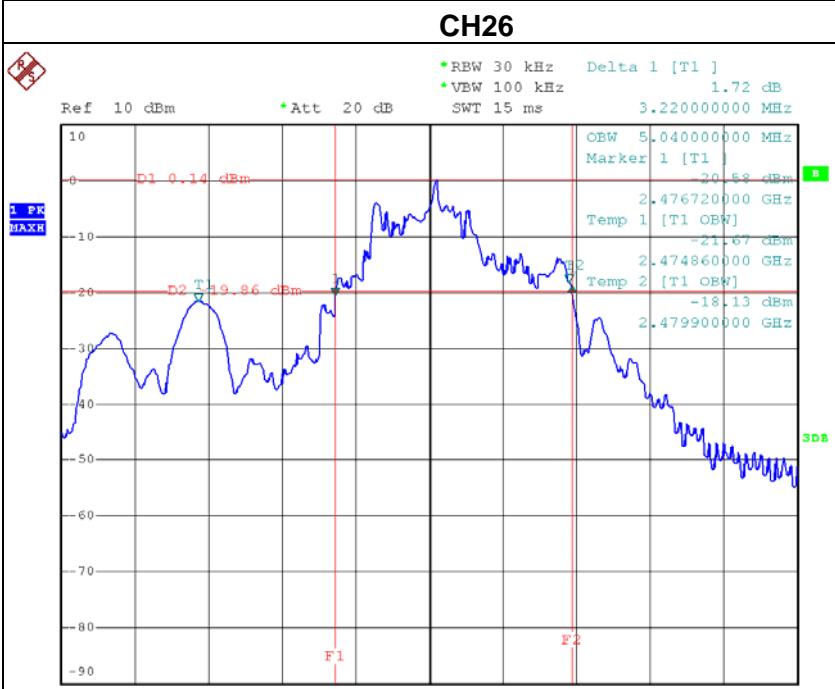
EUT :	Sound Bar Speaker(2.1CH)	Model Name :	SB-250
Temperature :	25 °C	Relative Humidity :	58 %
Pressure :	1009 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	CH01 / CH13 /CH26		

Frequency (MHz)	20dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Channel Separation (MHz)	Result
2403	2.40	4.06	<= 1MHz	PASS
2439	2.44	5.84	<= 1MHz	PASS
2478	3.22	3.22	<= 1MHz	PASS





Date: 5.SEP.2012 16:33:39



Date: 5.SEP.2012 16:15:31



## DESIGNATION OF EMISSIONS (INCLUDING NECESSARY BANDWIDTH AND CLASSIFICATION)

Description of Emission	Formula	Calculation	Bandwidth	Designation of Emission
Frequency shift keying is used to modulate a carrier with a digital bit stream.	$B_n = 2DK + B$ $K = 1$ (typically)	A system is digitally modulated at a rate of 1 megabit per second. The carrier is frequency shift keyed and 2 signalling states are used. D is the peak frequency deviation.	$B_n = 2DK + B$ $B = R / (\log_2 2)$ = $1000 \ 000 / 1$ = 1000 kilobaud $D = 2 \times 10^6 \text{ Hz}$ Bandwidth = 5 MHz	5M00F1WCN



## 9. PEAK OUTPUT POWER TEST

### 9.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (b)(1)	Peak Output Power	0.125 watt or 21dBm	2400-2483.5	PASS

#### 9.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov.25.2012

Remark: "N/A" denotes no model name, serial no. or calibration specified.

#### 9.1.2 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 3MHz, VBW= 3MHz, Sweep time = Auto.

#### 9.1.3 DEVIATION FROM STANDARD

No deviation.

#### 9.1.4 TEST SETUP



#### 9.1.5 EUT OPERATION CONDITIONS

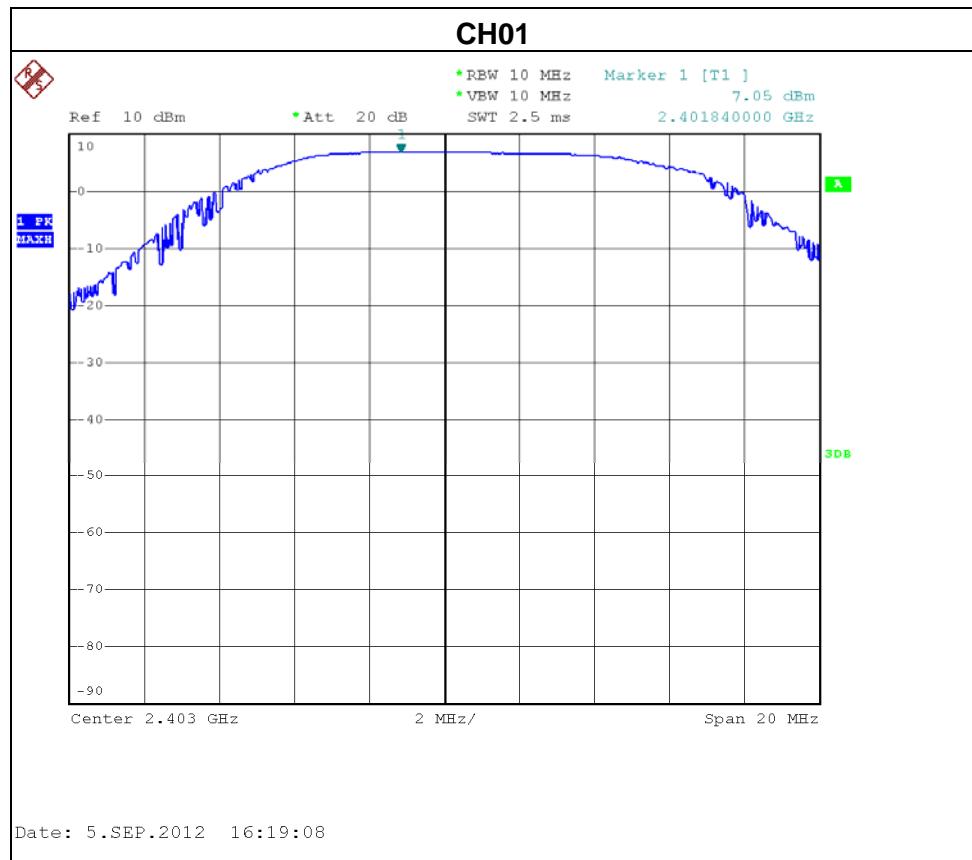
The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

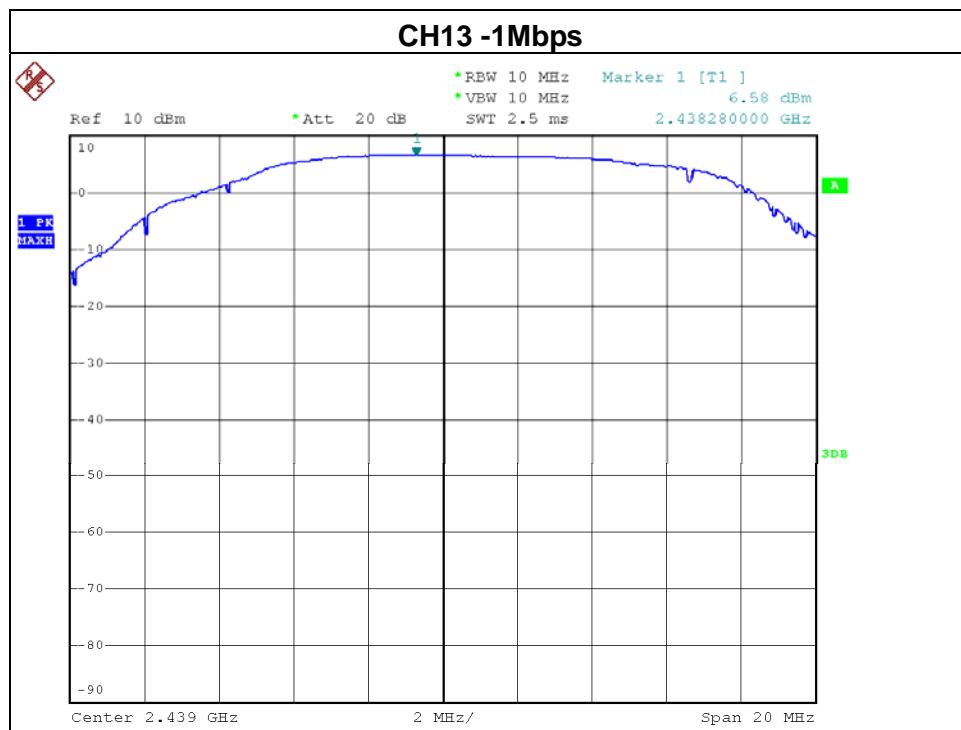


## 9.1.6 TEST RESULTS

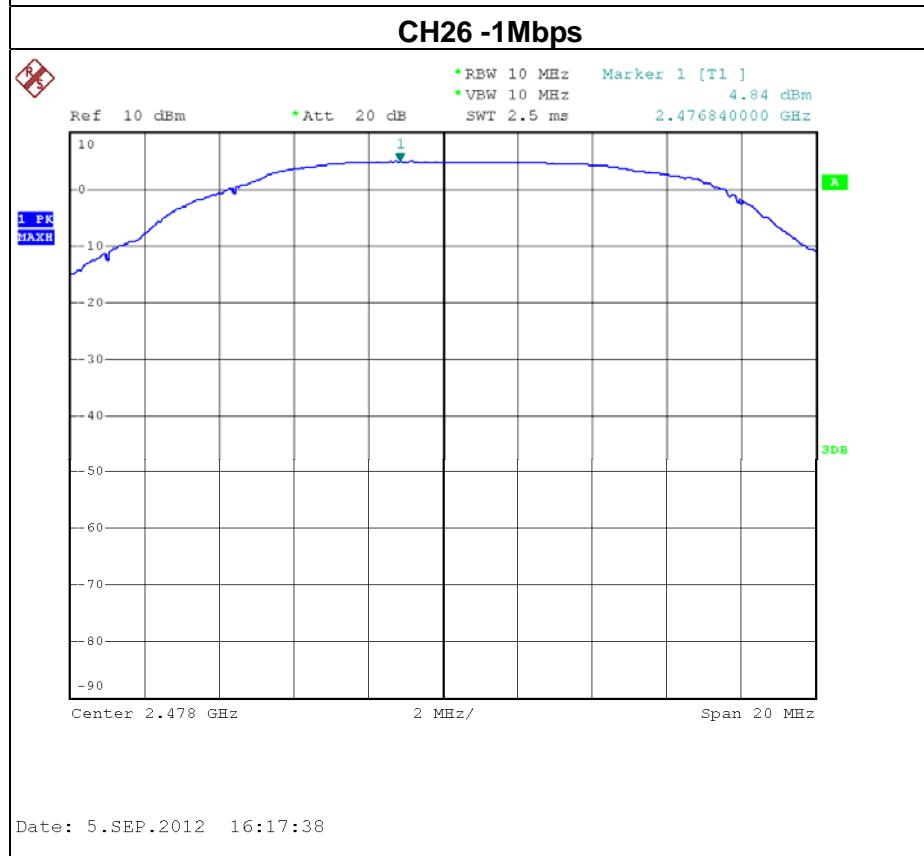
EUT :	Sound Bar Speaker(2.1CH)	Model Name :	SB-250
Temperature :	25 °C	Relative Humidity :	58 %
Pressure :	1009 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	CH01/ CH13 /CH26		

Test Channel	Frequency (MHz)	Peak Output Power (dBm)	LIMIT (dBm)	LIMIT (W)
CH01	2403	7.05	21	0.125
CH13	2439	6.58	21	0.125
CH26	2478	4.84	21	0.125





Date: 5.SEP.2012 16:32:18



Date: 5.SEP.2012 16:17:38



## 10. ANTENNA CONDUCTED SPURIOUS EMISSION

### 10.1 APPLIED PROCEDURES / LIMIT

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
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

#### 10.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov.25.2012

Remark: "N/A" denotes no model name, serial no. or calibration specified.

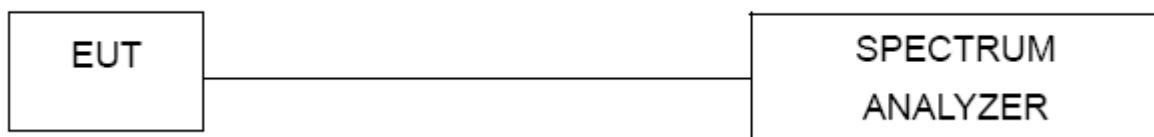
#### 10.1.2 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 100KHz, VBW=100KHz, Sweep time = Auto.

#### 10.1.3 DEVIATION FROM STANDARD

No deviation.

#### 10.1.4 TEST SETUP



#### 10.1.5 EUT OPERATION CONDITIONS

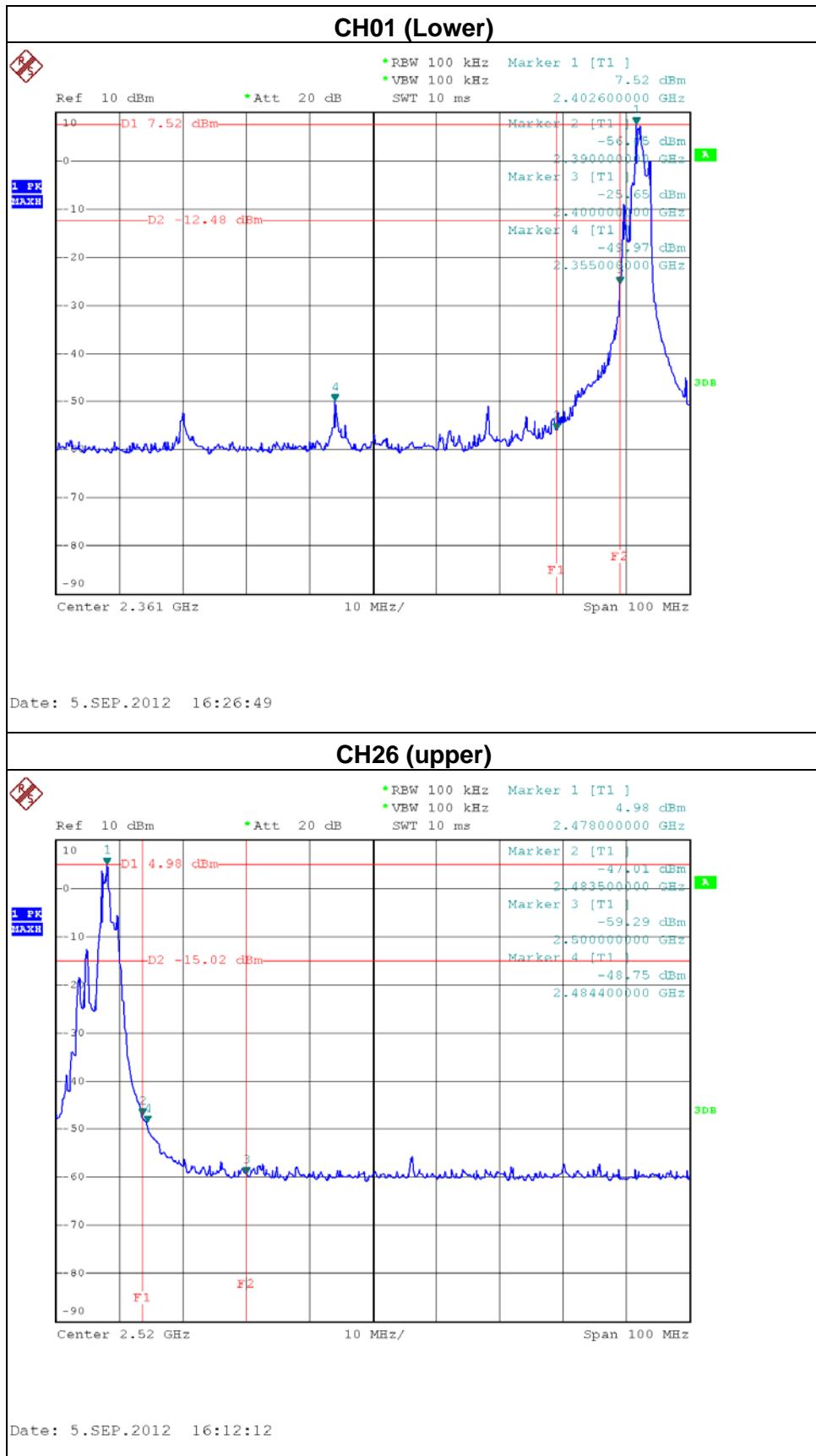
The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

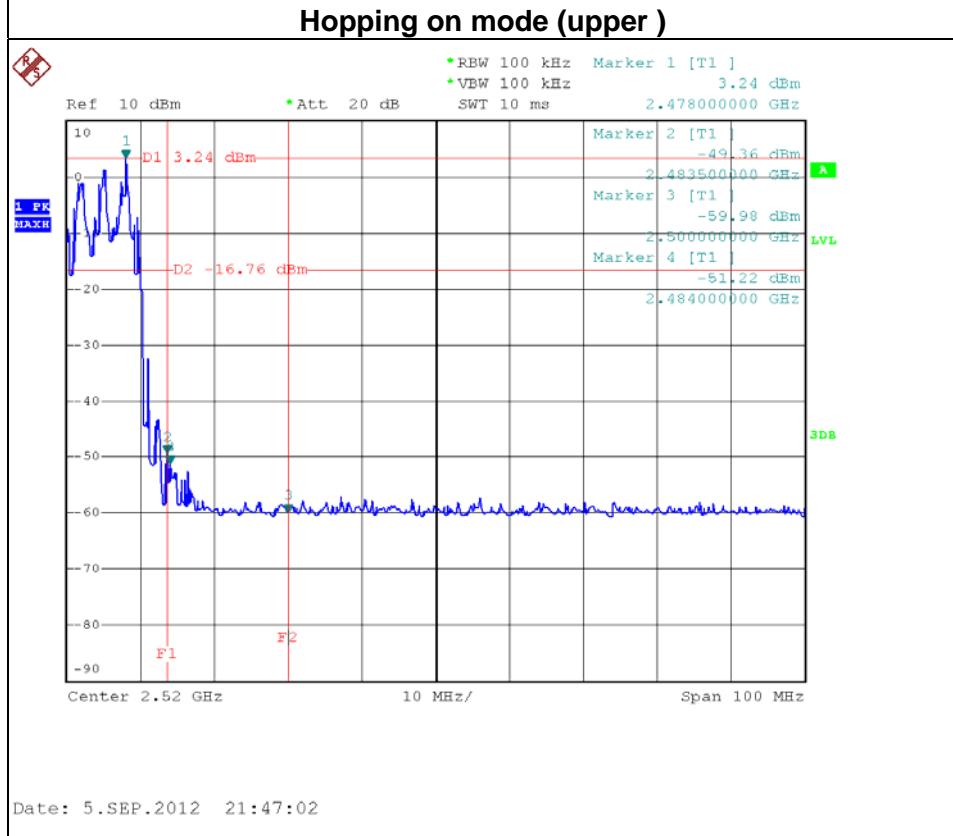
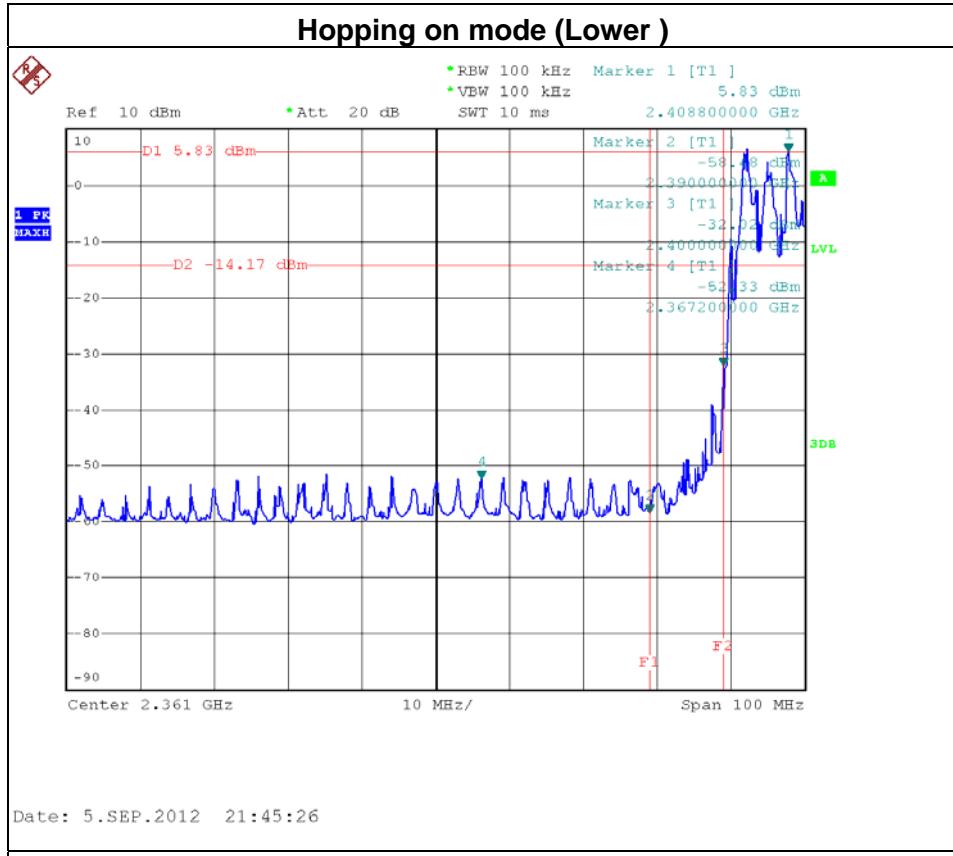


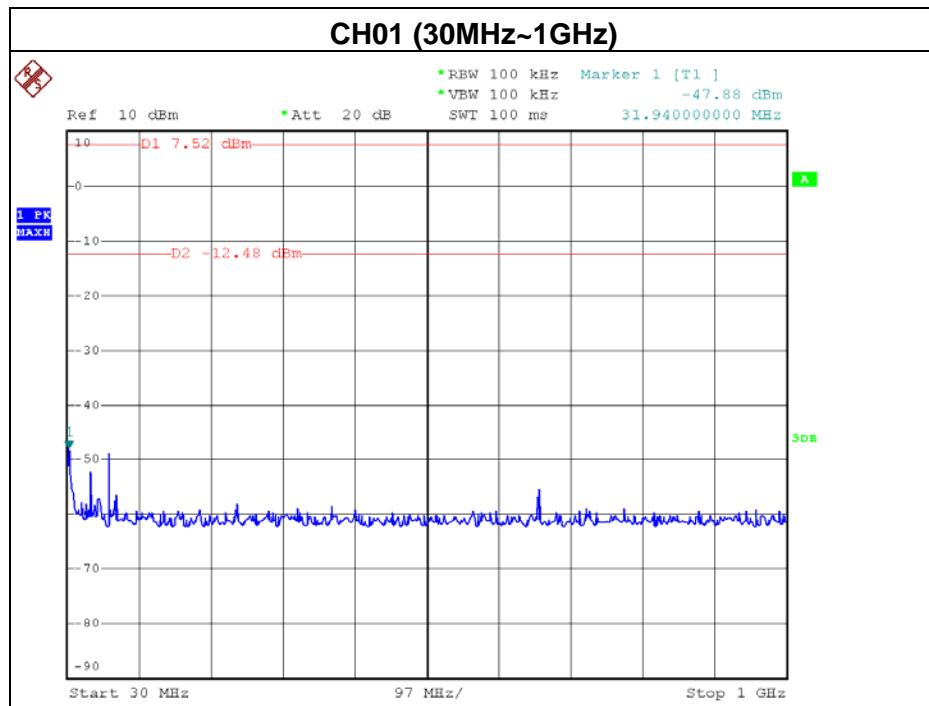
#### 10.1.6 TEST RESULTS

EUT :	Sound Bar Speaker(2.1CH)	Model Name :	SB-250
Temperature :	25 °C	Relative Humidity :	58 %
Pressure :	1009 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	CH01 / CH13/ CH26 & Hopping on mode		

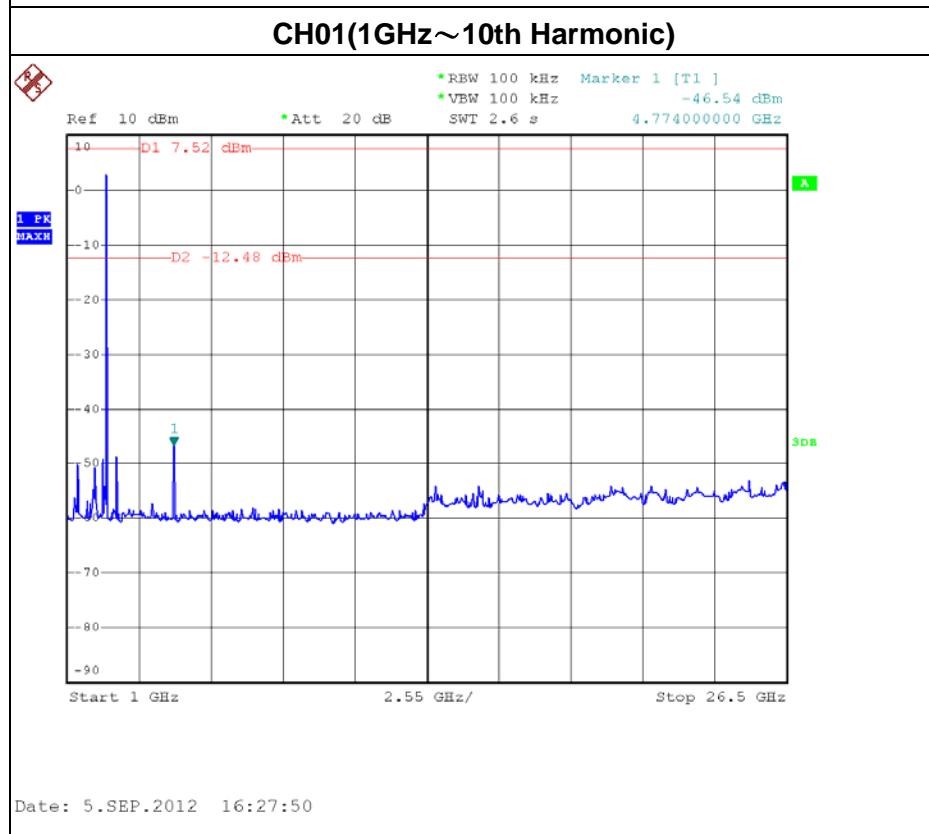
The max. radio frequency power in any 100kHz bandwidth within the frequency band		The max. radio frequency power in any 100 kHz bandwidth within the frequency band.	
FREQUENCY(MHz)	POWER(dBm)	FREQUENCY(MHz)	POWER(dBm)
2400.00	-25.65	2483.50	-47.01
Result			
In any 100kHz bandwidth outside the frequency band, the radio frequency power is at least 20dB below that in the 100kHz bandwidth within the band that contains the highest lever of the desired power.			



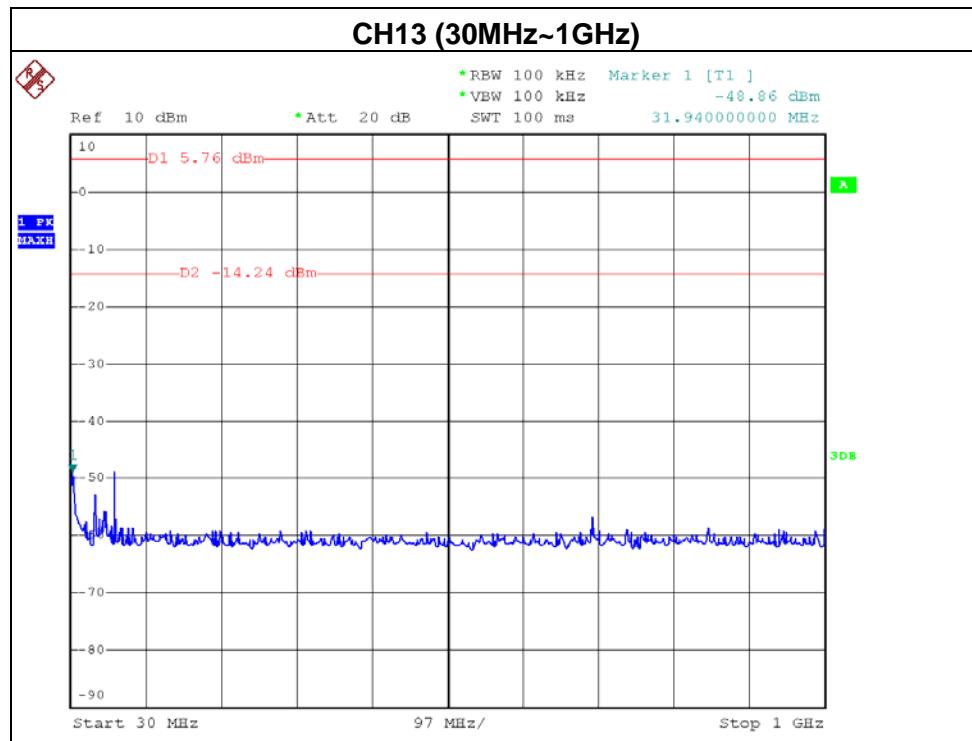




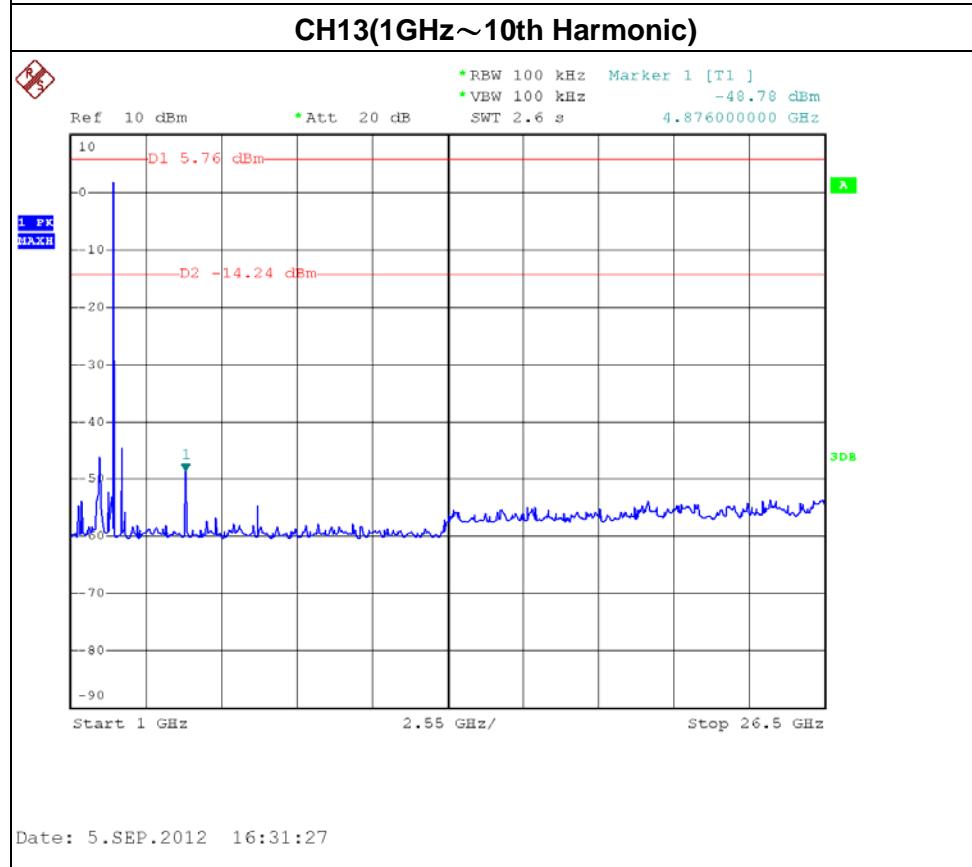
Date: 5.SEP.2012 16:27:08



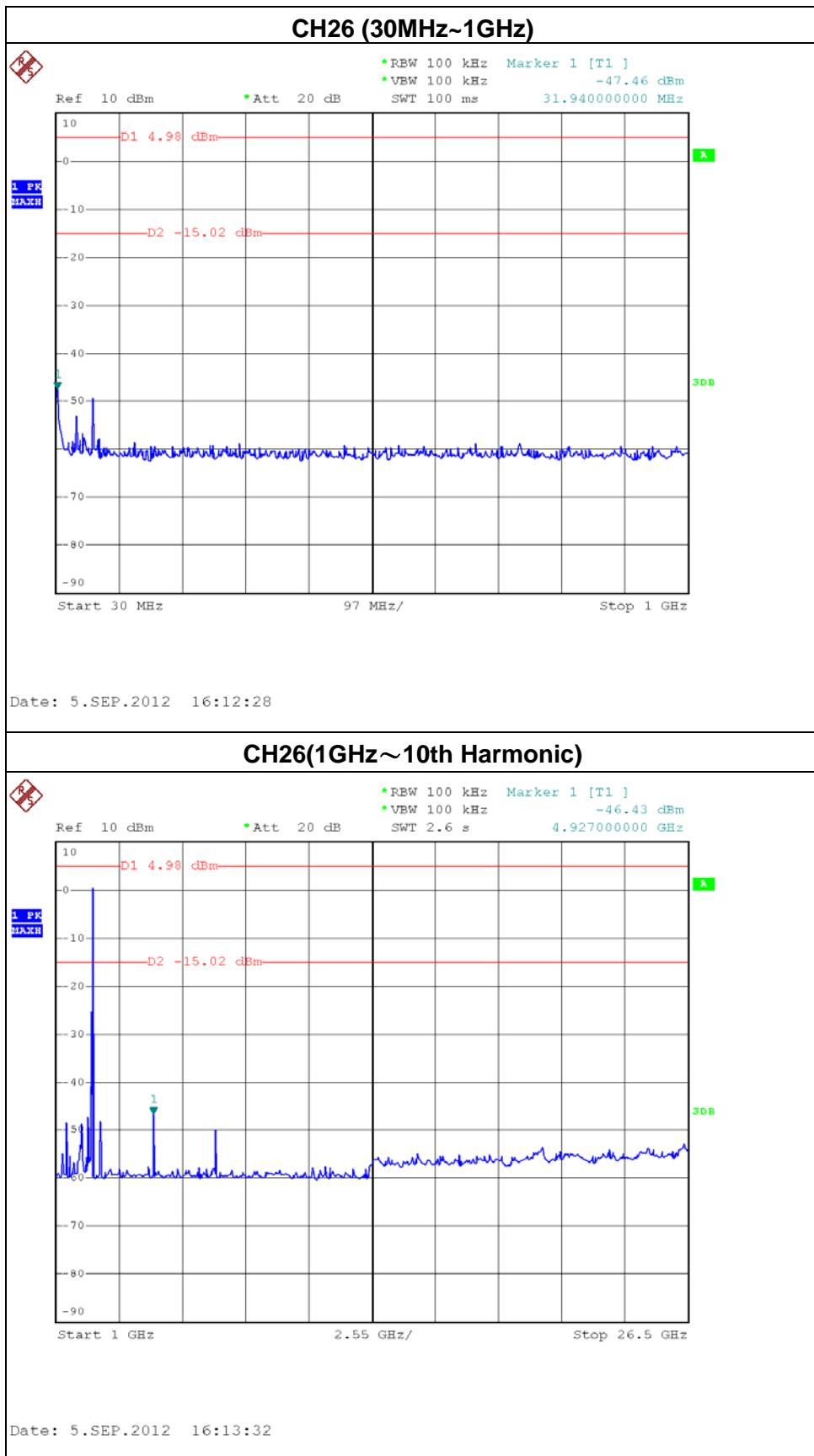
Date: 5.SEP.2012 16:27:50



Date: 5.SEP.2012 16:30:35



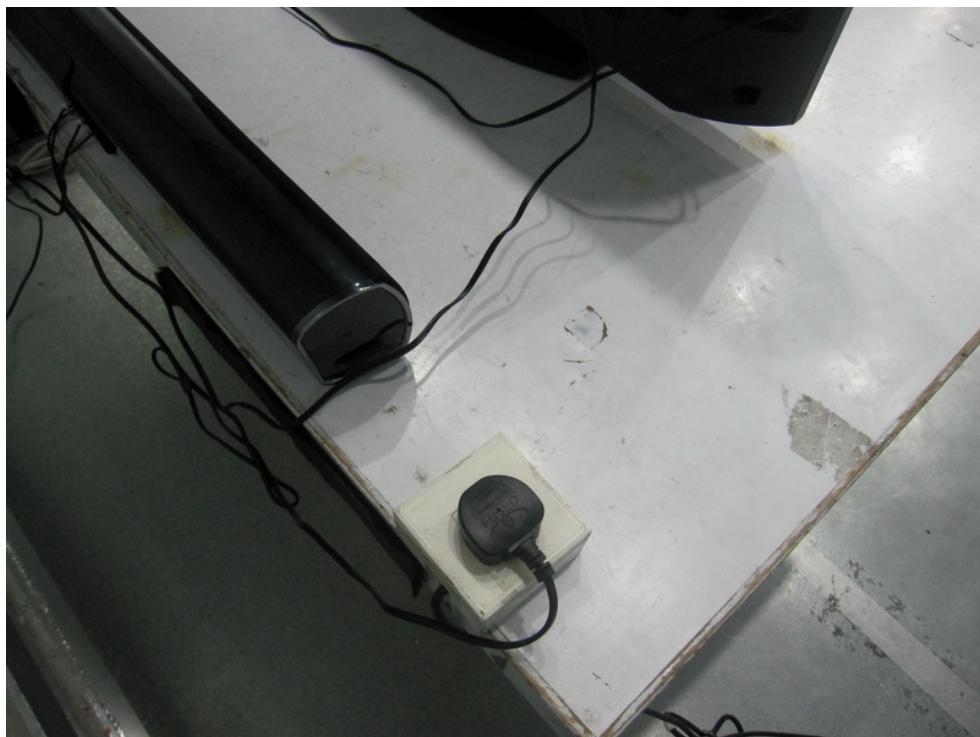
Date: 5.SEP.2012 16:31:27





**11. EUT TEST PHOTO**

**Conducted Measurement Photos  
AUX IN/TV IN with Wireless – TX Simple**





**Conducted Measurement Photos  
AUX IN/TV IN with Wireless – RX Simple**



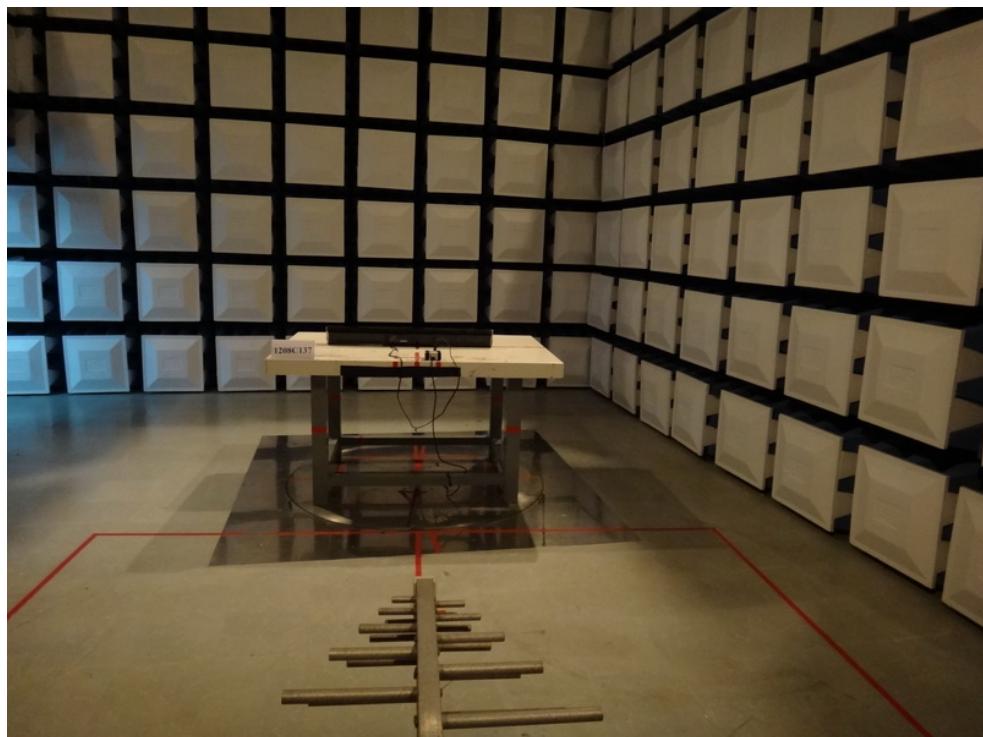
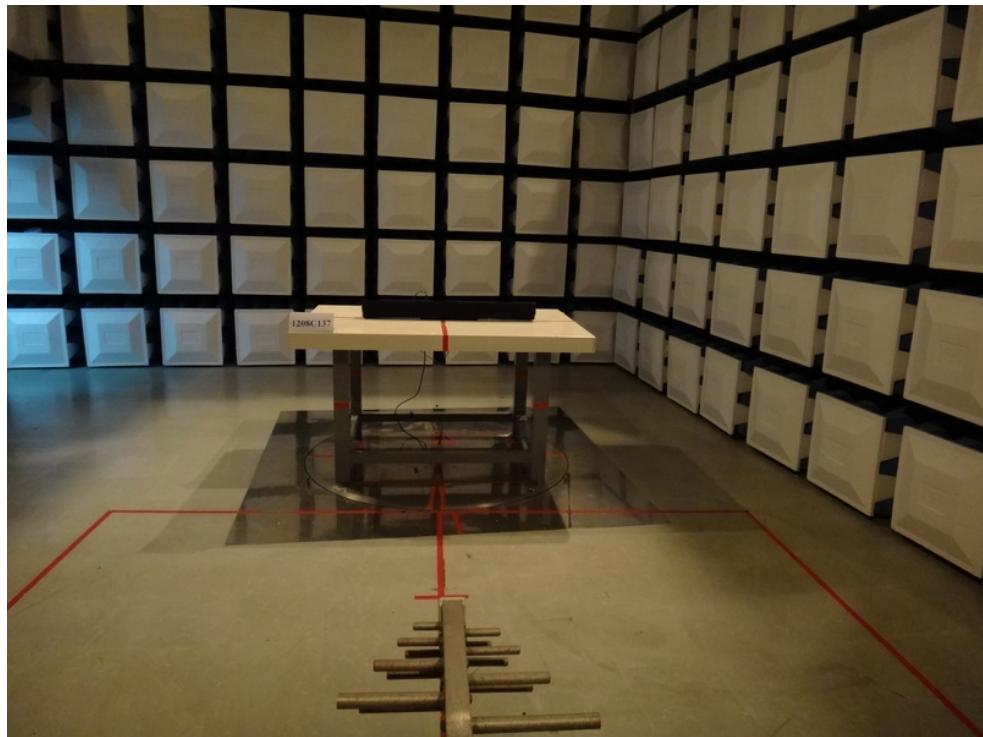


**Radiated Measurement Photos  
9K-30MHz**





**Radiated Measurement Photos  
30MHz-1GHz**





**Radiated Measurement Photos  
Above 1GHz**

