

FCC TEST REPORT  
for  
ROLDY INC

AMPLIFIER OF ACTIVE SPEAKER BOX

Model No.: KAL-215MIC, KAL-212MIC, SPY-1100MIC, SPY-1300MIC,  
KAL-2100MIC, SPY-900MIC, KAL1600MIC, SPY-1650MIC

Prepared for : ROLDY INC  
Address : 16330 NW 48th Ave, Miami, Florida 33014, United States

Prepared By : Shenzhen Anbotek Compliance Laboratory Limited  
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Report Number : R011501117E  
Date of Test : Jan. 08~ 26, 2015  
Date of Report : Jan. 26, 2015

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## TEST REPORT

Applicant : ROLDY INC  
Manufacturer : NINGBO HYSOUND ELECTRONIC CO., LIMITED  
EUT : AMPLIFIER OF ACTIVE SPEAKER BOX  
Model No. : KAL-215MIC, KAL-212MIC, SPY-1100MIC, SPY-1300MIC,  
KAL-2100MIC, SPY-900MIC, KAL1600MIC, SPY-1650MIC  
Serial No. : N/A  
Trade Mark : KALO/SPYN  
Rating : DC 3V

Measurement Procedure Used:

FCC Title 47 CFR Part 74 Subpart H, Paragraph 74.861e

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 74 Subpart H requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Test : Jan. 08~ 26, 2015

Prepared by : Kebo Zhang  
(Tested Engineer / Kebo Zhang)

Reviewer : Amy Ding  
(Project Manager / Amy Ding)

Approved & Authorized Signer : Tom Chen  
(Manager / Tom Chen)

## 1. GENERAL INFORMATION

### 1.1. Description of Device (EUT)

EUT	: AMPLIFIER OF ACTIVE SPEAKER BOX
Model Number	: KAL-215MIC, KAL-212MIC, SPY-1100MIC, SPY-1300MIC, KAL-2100MIC, SPY-900MIC, KAL1600MIC, SPY-1650MIC (Note: All samples are the same except the model number and colour, so we prepare “KAL-215MIC” for EMC test only.)
Test Power Supply	: DC 3V
Frequency	: 178MHz, 198MHz
No. of Channels	(Only two channels)
Antenna Specification	: 2
Applicant	: Integrated: 0dBi
Address	: ROLDY INC : 16330 NW 48th Ave, Miami, Florida 33014, United States
Manufacturer	: NINGBO HYSOUND ELECTRONIC CO., LIMITED
Address	: No.189, Dongxin Road, Dongqiao Industrial Park , Dongqiao Town, Yinzhou Section, Ningbo City, China
Factory	: NINGBO HYSOUND ELECTRONIC CO., LIMITED
Address	: No.189, Dongxin Road, Dongqiao Industrial Park , Dongqiao Town, Yinzhou Section, Ningbo City, China
Date of receipt	: Jan. 08, 2015
Date of Test	: Jan. 08~ 26, 2015

## 1.2. Auxiliary Equipment Used during Test

Audio Signal Generator : M/N: TAG-101  
S/N: 20030759  
Manufacturer: U-TEK

## 1.3. Description of Test Facility

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

### **CNAS - LAB Code: L3503**

Shenzhen Anbotek Compliance Laboratory Limited., Laboratory has been assessed and in compliance with CNAS/CL01: 2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of Testing Laboratories.

### **FCC-Registration No.: 752021**

Shenzhen Anbotek Compliance Laboratory Limited, 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 752021, July 10, 2013.

### **IC-Registration No.: 8058A-1**

Shenzhen Anbotek Compliance Laboratory Limited., 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 8058A-1, February 22, 2013.

### **Test Location**

All Emissions tests were performed at

Shenzhen Anbotek Compliance Laboratory Limited. at 1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road, Nanshan District, Shenzhen, Guangdong, China

## 1.4. Measurement Uncertainty

Radiation Uncertainty :  $Ur = 4.3\text{dB}$

Conduction Uncertainty :  $Uc = 3.4\text{dB}$

## 2. Transmitter Output Power

### 2.1. Requirements

Test Standard: FCC Part 74.861(e)(1)

(e) For low power auxiliary stations operating in the bands allocated for TV broadcasting, the following technical requirements apply:

(1) The power of the measured unmodulated carrier power at the out-put of the transmitter power amplifier (antenna input power) may not exceed the following:

(i) 54–72, 76–88, and 174–216 MHz bands—50 mW

(ii) 470–608 and 614–698 MHz bands—250 mW

### 2.2. Test Setup



#### Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analysis	Agilent	E4407B	US39390582	Aug. 08, 2014	1 Year
2.	Preamplifier	Instruments corporation	EMC011830	980100	Aug. 08, 2014	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Apr. 22, 2014	1 Year
4.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Apr. 04, 2014	1 Year
5.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB9163-289	Apr. 24, 2014	1 Year
6.	Pre-amplifier	SONOMA	310N	186860	Aug. 08, 2014	1 Year
7.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

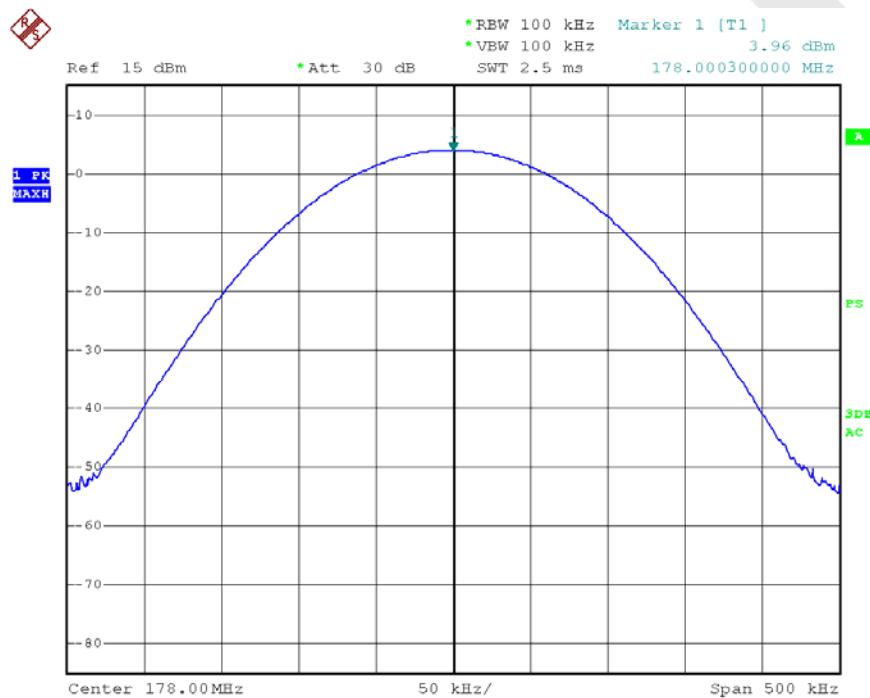
### 2.3. Test Results

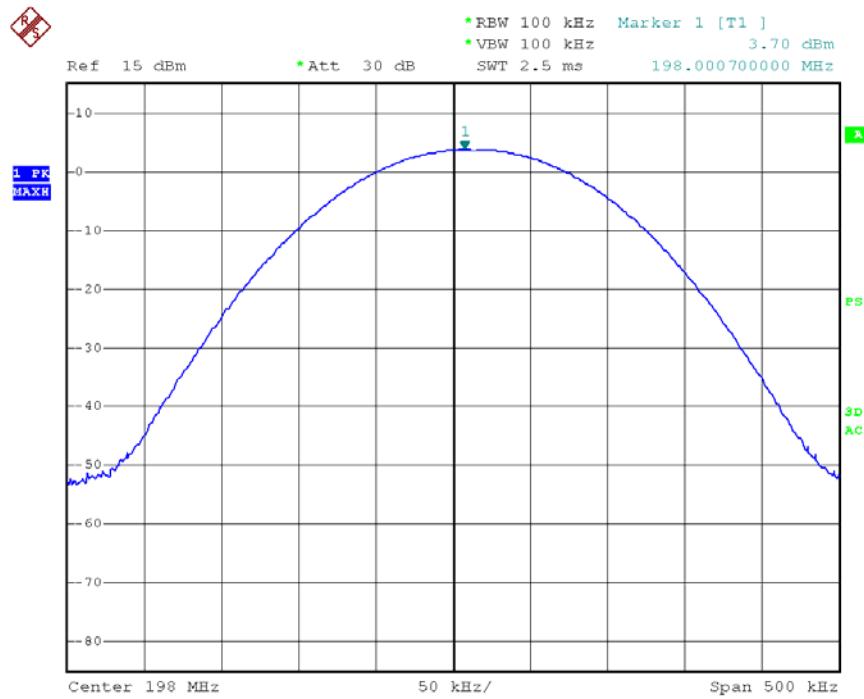
PASS.

Please refer the following pages.

**Data:**

Channel	Channel Frequency	Peak Output Power		Limit
	(MHz)	(dBm)	(mW)	(mW)
Channel 1	178MHz	3.96	2.49	50
Channel 2	198MHz	3.70	2.35	50





### 3. Spurious Radiation Emissions

#### 3.1. Requirements

Test Standard: FCC Part 74.861(e)(6)(iii)

The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

- (i) On any frequency removed from the operating frequency by more than 50 percent up to and including 100 per-cent of the authorized bandwidth: at least 25 dB;
- (ii) On any frequency removed from the operating frequency by more than 100 percent up to and including 250 per-cent of the authorized bandwidth: at least 35 dB;
- (iii) On any frequency removed from the operating frequency by more than 250 percent of the authorized band-width: at least  $43+10\log_{10}(\text{mean output power in watts})$  dB.

#### 3.2. Test Procedure

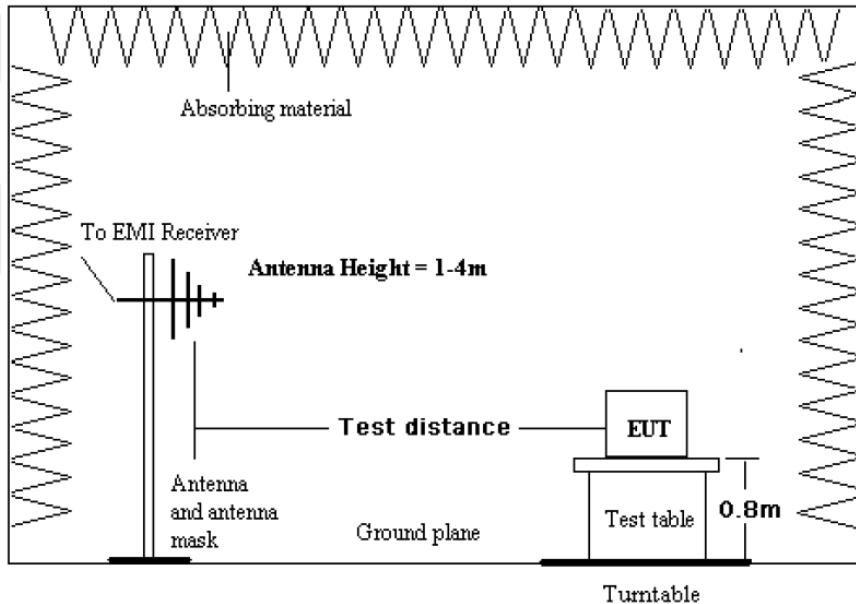
The procedure used was EIA/TIA 603-D:2010. The receiver was scanned from the lowest radio frequency generated in the equipment to the tenth harmonic of the carrier. When an emission was found, the table was rotated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes.

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor

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

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the Carrier Radiated Power and spurious emissions were measured by the substitution.



## Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analysis	Agilent	E4407B	US39390582	Aug. 08, 2014	1 Year
2.	Preamplifier	Instruments corporation	EMC011830	980100	Aug. 08, 2014	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Apr. 22, 2014	1 Year
4.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Apr. 04, 2014	1 Year
5.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Apr. 24, 2014	1 Year
6.	Pre-amplifier	SONOMA	310N	186860	Aug. 08, 2014	1 Year
7.	RF Generator	Rohde & Schwarz	SMB100A-B106	376981	Aug. 08, 2014	1 Year
8.	Audio Analyzer	Hewlett Packard	8903B	1478004	Aug. 08, 2014	1 Year
9.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

## 3.3. Test Results

Pass.

Please refer the following plot.

**Limit Calculation:**

Channel	Output Power		Formula	Attenuation	Absolute Limit
	dBm	mW		(dB)	(dBm)
Channel 1	3.96	2.49	43+10log <sub>10</sub> (P) dB	16.96	-13
Channel 2	3.70	2.35	43+10log <sub>10</sub> (P) dB	16.70	-13

**Test Results of Spurious Radiation Emission:**

**Channel 1:**

Frequency (MHz)	Polarization of Antenna (V/H)	Results (dBm)	Limit (dBm)	Margin (dB)
31.24	H	-67.3	-13	-54.3
92.11	H	-64.9	-13	-51.9
147.85	H	-69.1	-13	-56.1
315.62	H	-67.5	-13	-54.5
351.94	H	-57.9	-13	-44.9
848.79	H	-69.4	-13	-56.4
1422.00	H	-62.8	-13	-49.8
---	---	---	---	---
47.61	V	-73.2	-13	60.2
83.55	V	-65.1	-13	-52.1
135.44	V	-64.6	-13	-51.6
351.05	V	-52.7	-13	-39.7
525.35	V	-48.2	-13	-35.2
700.51	V	-60.6	-13	-47.6
1145.00	V	-57.1	-13	-44.1
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**Channel 2:**

Frequency (MHz)	Polarization of Antenna (V/H)	Results (dBm)	Limit (dBm)	Margin (dB)
49.35	H	-66.3	-13	-53.3
71.63	H	-64.2	-13	-51.2
139.29	H	-68.8	-13	-55.8
376.45	H	-57.3	-13	-44.3
701.44	H	-59.1	-13	-46.1
948.26	H	-55.1	-13	-42.1
1110.35	H	-52.7	-13	-39.7
---	---	---	---	---
47.06	V	-65.6	-13	-52.6
125.03	V	-63.9	-13	-50.9
249.11	V	-48.2	-13	-35.2
376.24	V	-45.9	-13	-32.9
555.03	V	-50.0	-13	-37.0
925.77	V	-48.8	-13	-35.8
1111.00	V	-47.9	-13	-34.9
---	---	---	---	---

## 4. Operating Bandwidth and Emissions Mask

### 4.1. Requirements

Test Standard: FCC Part 74.861(e)(3) & (5), (6)(i)(iii)

(5) The operating bandwidth shall not exceed 200 kHz.

(6) The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

(i) On any frequency removed from the operating frequency by more than 50 percent up to and including 100 per-cent of the authorized bandwidth: at least 25 dB;

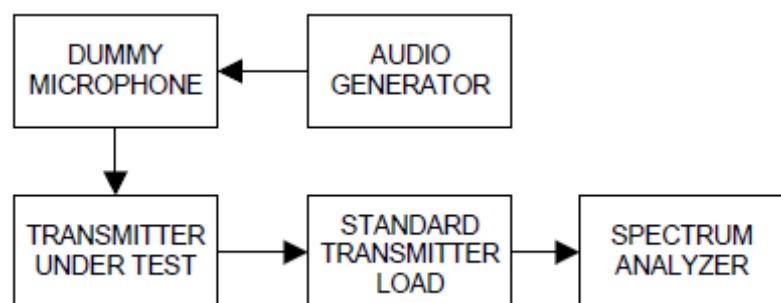
(iii) On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least  $43 + 10\log_{10}(\text{mean output power in watts})$  dB.

### 4.2. Test Setup

#### 1) Operating Bandwidth Test:



#### 2) Emission Mask:



### 4.3. Test Procedure

#### a) Operating Bandwidth:

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as:  
RBW = 3kHz, VBW = 30kHz,  
Detector = Peak  
Trace mode = Max hold.  
Sweep - auto couple.
4. Mark the 99% of peak frequency.
5. Repeat until all the rest channels are investigated.

## b) Emission:

1. Connect the equipment as illustrated.

Use the table 16 to determine the spectrum analyzer resolution bandwidth:

Table 16

Spectrum Analyzer Resolution Bandwidth

Frequency Band (MHz)	Mask for Equipment with Audio Low Pass Filter	Mask for Equipment without Low Pass Filter	Spectrum Analyzer Resolution Bandwidth (Hz)
25-50	B	C	300
72-76	B	C	300
138-174	NTIA	NTIA	300
150-174	B	C	300
150-174	D or E	D or E	100
406-420	NTIA	NTIA	300
421-512	B	C	300
421-512	D or E	D or E	100
806-821/851-866	B or EA	G or EA	300
821-824/866-869	B	H	300
896-901/935-940	I	J	300

2. Adjust the spectrum analyzer for the following settings:

Resolution Bandwidth per the above table.

Video Bandwidth at least 10 times the resolution bandwidth.

Sweep Speed slow enough to maintain measurement calibration.

Detector Mode = Positive Peak.

Span that will allow proper viewing of the test bandwidth

3. Set the center frequency of the spectrum analyzer to the assigned transmitter frequency. Key the transmitter, and set the level of the unmodulated carrier to a full scale reference line. This is the 0 dB reference for the measurement.

4. Modulate the transmitter with a 2500 Hz sine wave at an input level 16 dB greater than that necessary to produce 50% of rated system deviation. The input level shall be established at the frequency of maximum response of the audio modulating circuit.

Transmitters employing digital modulation techniques that bypass the limiter and the audio low-pass filter shall be modulated as specified by the manufacturer.

5. Record the resulting spectrum analyzer presentation of the emission level with an on-line recording device or in a photograph. It is recommended that the emission limit be drawn on the plotted graph or photograph.

The spectrum analyzer presentation is the sideband spectrum.

#### 4.4. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analysis	Agilent	E4407B	US39390582	Aug. 08, 2014	1 Year
2.	Preamplifier	Instruments corporation	EMC011830	980100	Aug. 08, 2014	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Apr. 22, 2014	1 Year
4.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Apr. 04, 2014	1 Year
5.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Apr. 24, 2014	1 Year
6.	Pre-amplifier	SONOMA	310N	186860	Aug. 08, 2014	1 Year
7.	RF Generator	Rohde & Schwarz	SMB100A-B106	376981	Aug. 08, 2014	1 Year
8.	Audio Analyzer	Hewlett Packard	8903B	1478004	Aug. 08, 2014	1 Year
9.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

#### 4.5. Test Results

Pass.

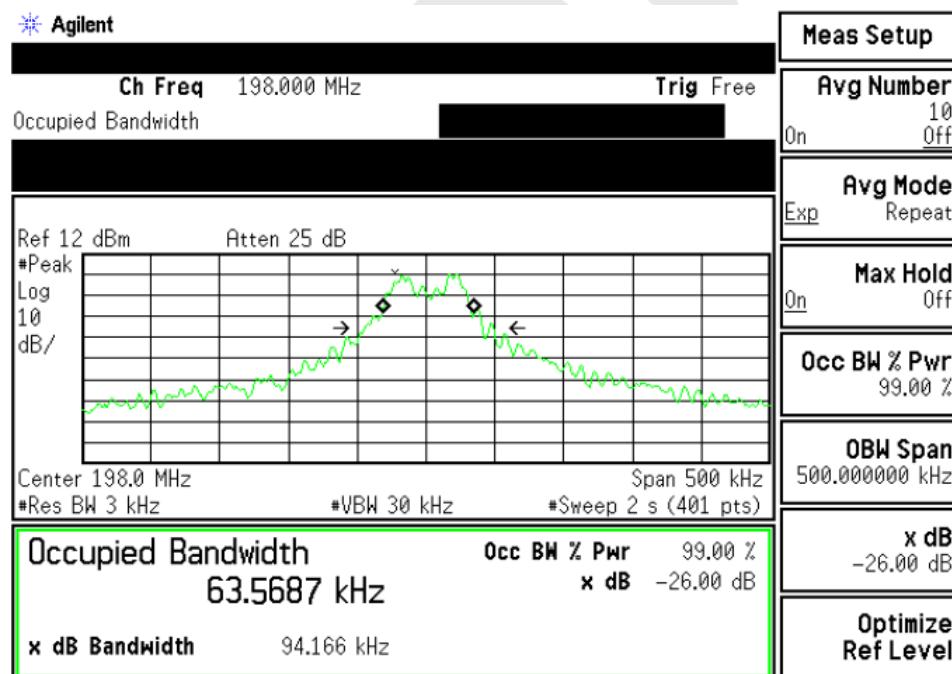
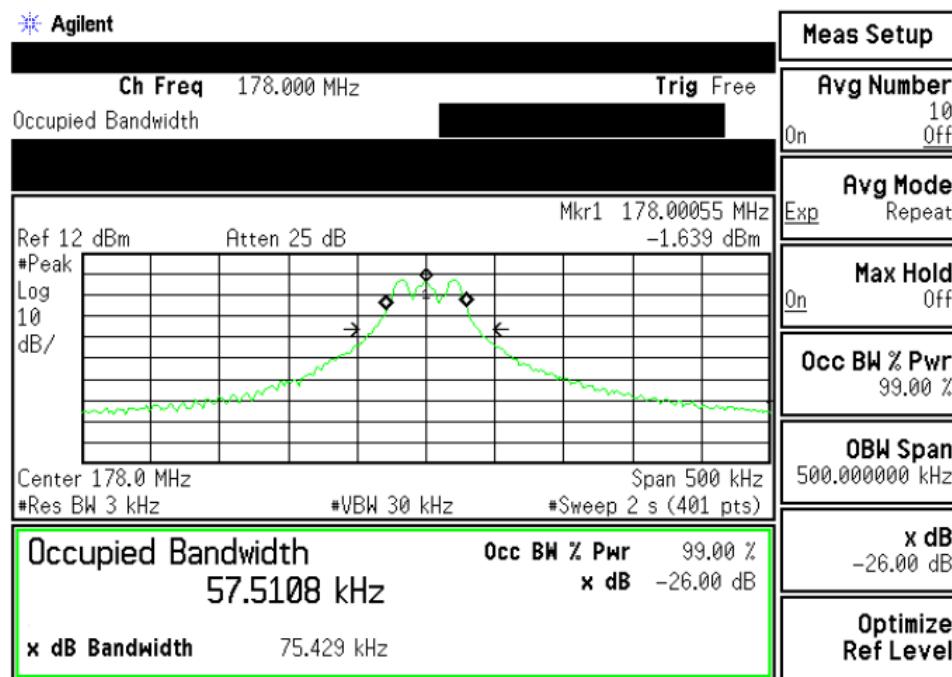
Please refer the following plot.

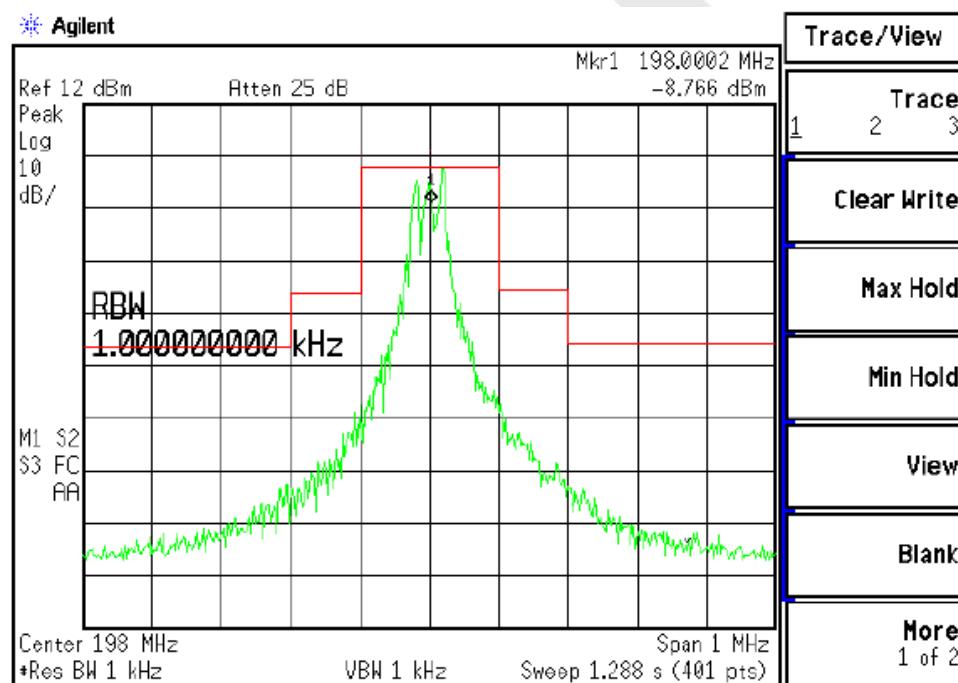
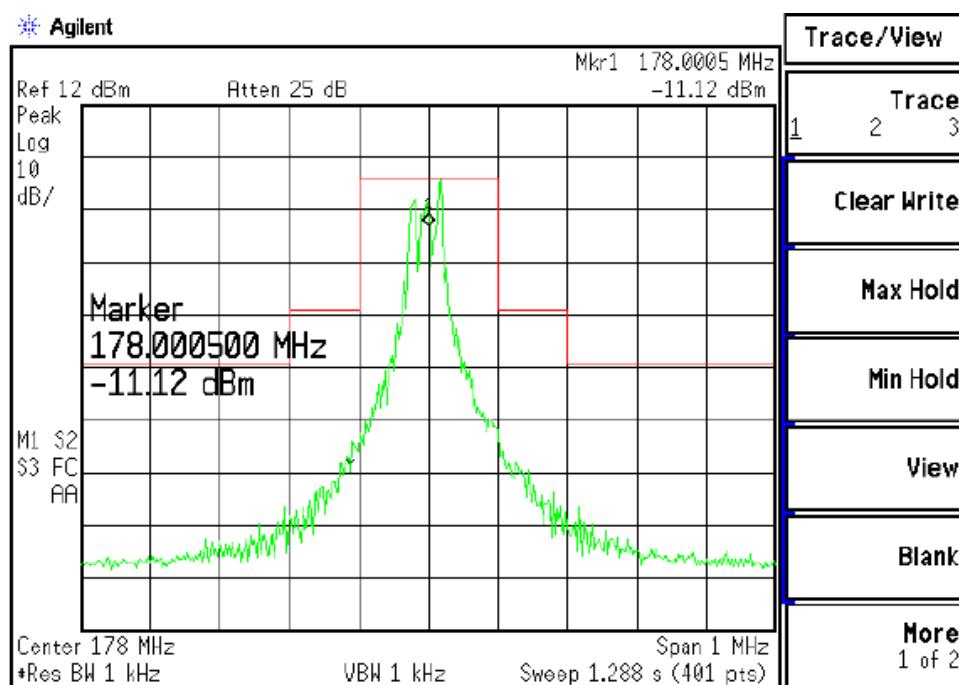
**Test Results of Operating Bandwidth**

Channel	Frequency (MHz)	Results (kHz)	Limits (kHz)
Channel 1	178.00	57.5108	200
Channel 2	198.00	63.5687	200

**Test Results of Emission Mask**

Channel	Frequency (MHz)	Results	Remark
Channel 1	178.00	PASS	Refer to following test plots.
Channel 2	198.00	PASS	Refer to following test plots.





## 5. Frequency Tolerance

### 5.1. Requirements

Test Standard: FCC Part 74.861(e)(4)

(4) The frequency tolerance of the transmitter shall be 0.005 percent.

### 5.2. Test Setup



### 5.3. Test Equipment

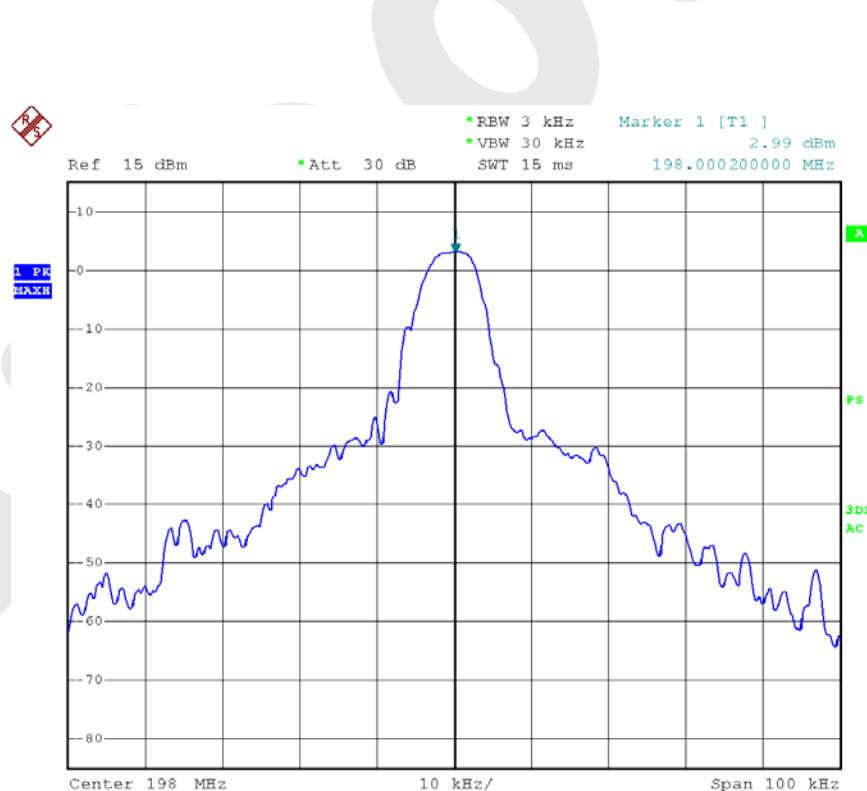
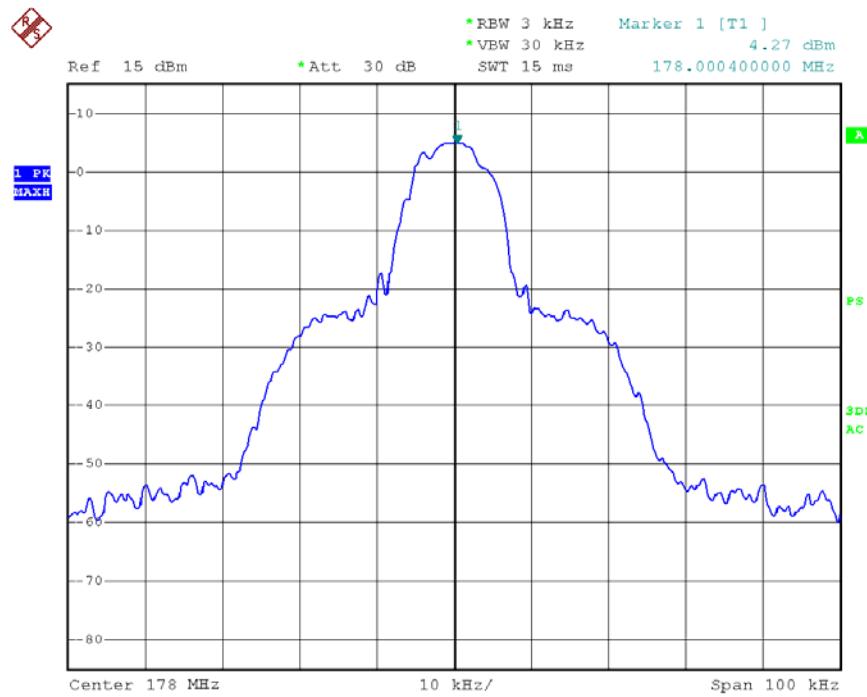
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8.	Audio Analyzer	Hewlett Packard	8903B	1478004	Aug. 08, 2014	1 Year
9.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

### 5.4. Test Results

Pass.

Please refer the following plot.

Test Condition	Power Supply	Channel 1 (178MHz)	Channel 2 (198MHz)
-30°C	DC 3.0	178.0003	198.0003
-20°C	DC 3.0	178.0005	198.0003
-10°C	DC 3.0	178.0002	198.0005
0°C	DC 3.0	178.0003	198.0004
10°C	DC 3.0	178.0001	198.0003
20°C	DC 3.0	178.0004	198.0002
30°C	DC 3.0	178.0001	198.0007
40°C	DC 3.0	178.0002	198.0004
50°C	DC 3.0	178.0005	198.0003
20°C	DC 3.3	178.0003	198.0003
20°C	DC 2.7	178.0004	198.0004
Maximum Frequency Error (MHz)		0.0005	0.0007
Frequency Tolerance		0.00028%	0.00036%
Limit		0.005%	



## 6. Modulation Characteristics

### 6.1. Requirements

Test Standard: FCC Part 74.861(e)(3) & (5), (6)(i)(iii)

(3) Any form of modulation may be used. A maximum deviation of  $\pm 75$  kHz is permitted when frequency modulation is employed.

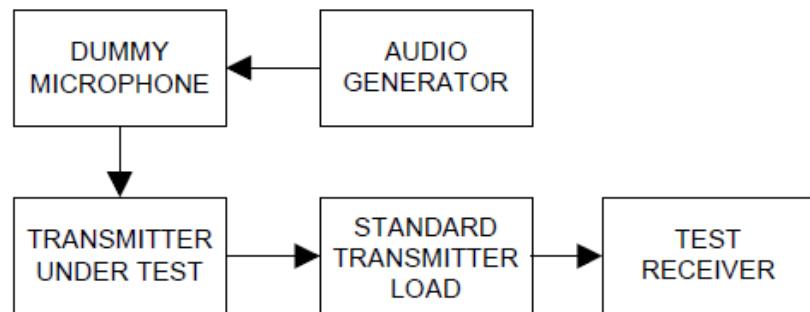
Test Standard: FCC Part 2.1047(a) & (b)

(a) Voice modulated communication equipment. A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be submitted. For equipment required to have an audio low-pass filter, a curve showing the frequency response of the filter, or of all circuitry installed between the modulation limiter and the modulated stage shall be submitted.

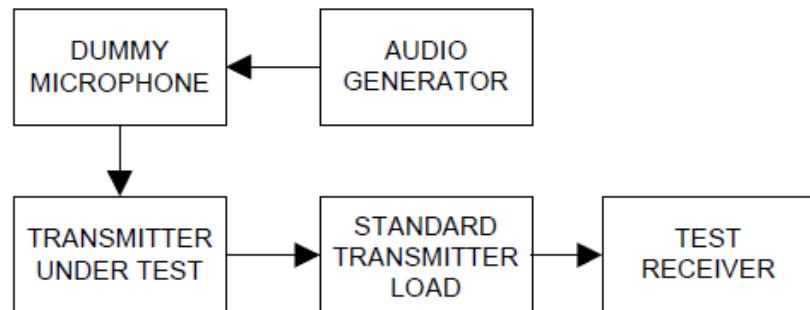
(b) Equipment which employs modulation limiting. A curve or family of curves showing the percentage of modulation versus the modulation input voltage shall be supplied. The information submitted shall be sufficient to show modulation limiting capability throughout the range of modulating frequencies and input modulating signal levels employed.

### 6.2. Test Setup

#### a) Audio Frequency Response



#### b) Modulation Limiting



### 6.3. Test Procedure

#### a) Audio Frequency Response

1. Connect the equipment as illustrated.
2. Set the test receiver to measure peak positive deviation.
- Set the audio bandwidth for  $\leq 50$  Hz to  $\geq 15,000$  Hz.
- Turn the de-emphasis function off.
3. Adjust the transmitter per the manufacturer's procedure for full rated system deviation.
4. Apply a 1000 Hz tone and adjust the audio frequency generator to produce 20% of the rated system deviation.
5. Set the test receiver to measure rms deviation and record the deviation reading as  $DEV_{REF}$ .
6. Set the audio frequency generator to the desired test frequency between 300 Hz and 3000 Hz.
7. Record the test receiver deviation reading as  $DEV_{FREQ}$ .
8. Calculate the audio frequency response at the present frequency as:

$$\text{audio frequency response} = 20 \log_{10} \left( \frac{DEV_{FREQ}}{DEV_{REF}} \right)$$

9. Repeat steps 6 through 8 for all the desired test frequencies.

#### b) Modulation Limiting

1. Connect the equipment as illustrated.
2. Adjust the transmitter per the manufacturer's procedure for full rated system deviation.
3. Set the test receiver to measure peak positive deviation.
- Set the audio bandwidth for  $\leq 0.25$  Hz to  $\geq 15,000$  Hz.
- Turn the de-emphasis function off.
4. Apply a 1000 Hz modulating signal to the transmitter from the audio frequency generator, and adjust the level to obtain 60% of full rated system deviation.
5. Increase the level from the audio frequency generator by 20 dB in one step (rise time between the 10% and 90% points shall be 0.1 second maximum).
6. Measure both the instantaneous and steady-state deviation at and after the time of increasing the audio input level.
7. With the level from the audio frequency generator held constant at the level obtained in step 5, slowly vary the audio frequency from 300 Hz to 3000 Hz and observe the steady-state deviation.
- Record the maximum deviation.
8. Set the test receiver to measure peak negative deviation and repeat steps 4 through 7.
9. The values recorded in steps 7 and 8 are the modulation limiting.

#### 6.4. Test Equipment

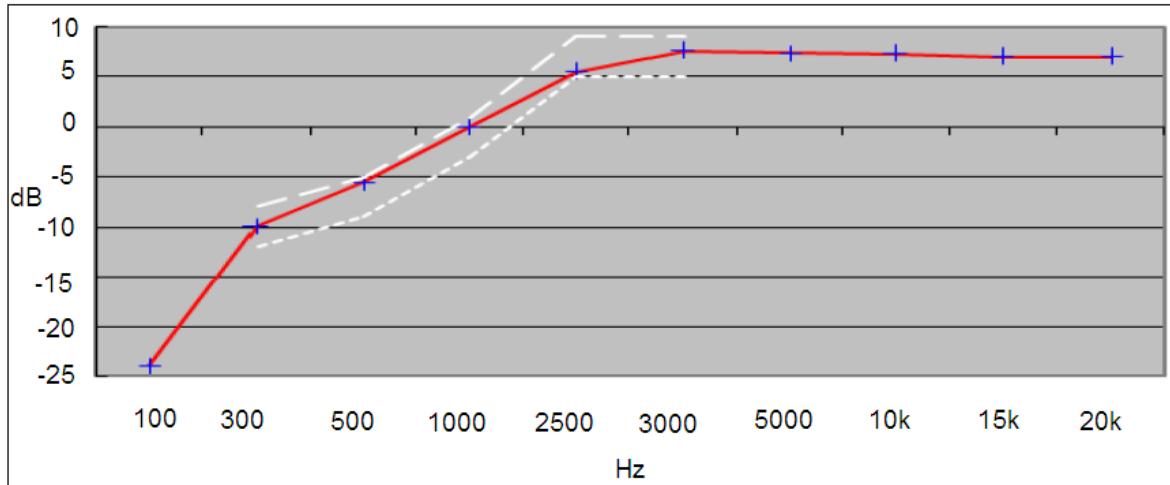
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5.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Apr. 24, 2014	1 Year
6.	Pre-amplifier	SONOMA	310N	186860	Aug. 08, 2014	1 Year
7.	RF Generator	Rohde & Schwarz	SMB100A-B106	376981	Aug. 08, 2014	1 Year
8.	Audio Analyzer	Hewlett Packard	8903B	1478004	Aug. 08, 2014	1 Year
9.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

#### 6.5. Test Results

Pass.

Please refer the following data.

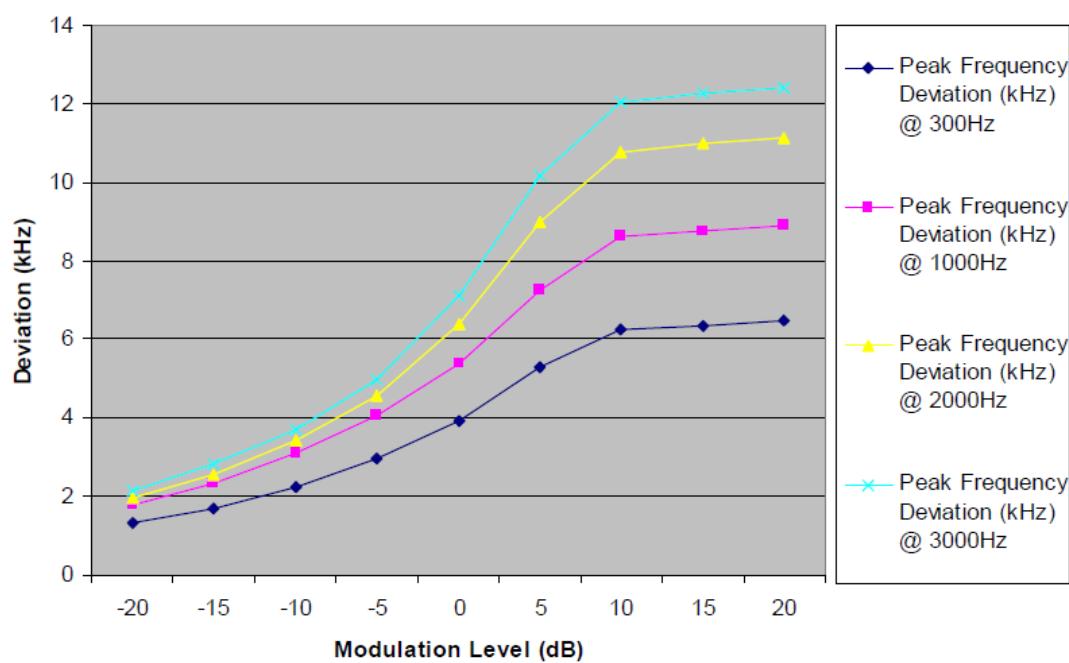
**Audio Frequency Response:**



0dB=10mV at 1kHz (20% of the maximum rated system deviation.)

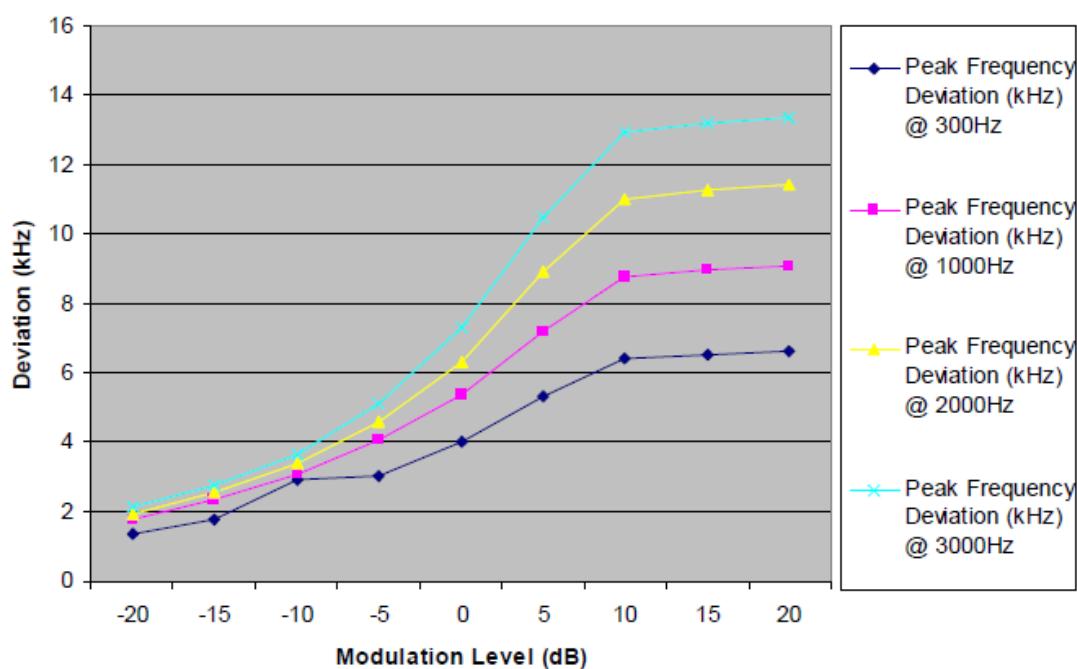
**Modulation Limit: Channel 1**

Modulation Level (dB)	Peak Frequency Deviation (kHz)				Limit (kHz)
	300Hz	1000Hz	2000Hz	3000Hz	
-20	1.31	1.77	1.94	2.15	±75
-15	1.71	2.32	2.56	2.83	±75
-10	2.25	3.08	3.40	3.70	±75
-5	2.97	4.07	4.57	4.95	±75
0	3.94	5.39	6.37	7.11	±75
+5	5.27	7.27	8.98	10.16	±75
+10	6.25	8.60	10.77	12.05	±75
+15	6.36	8.77	10.98	12.28	±75
+20	6.46	8.90	11.12	12.41	±75



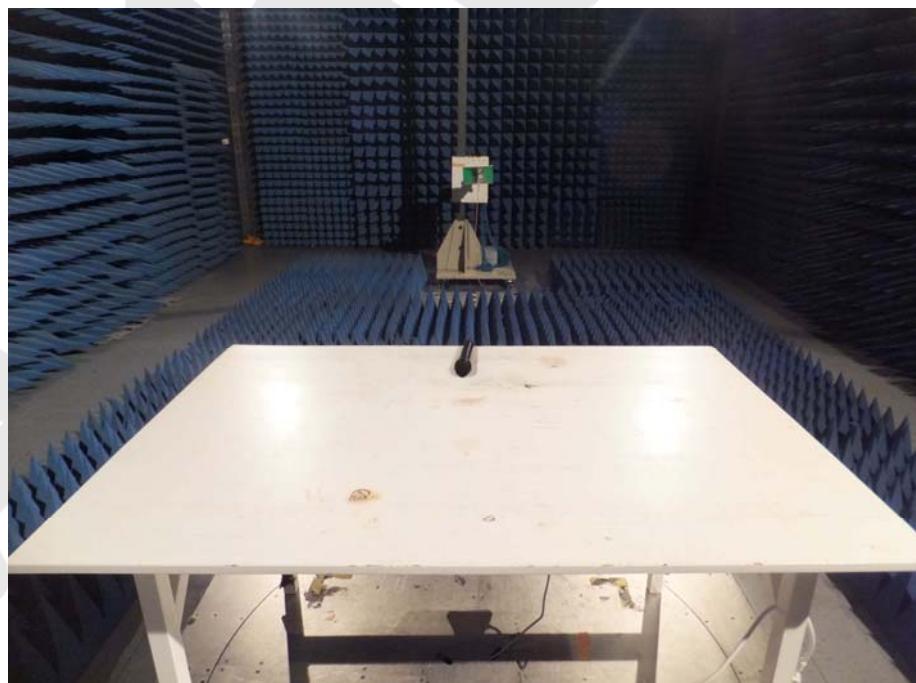
**Modulation Limit: Channel 2**

Modulation Level (dB)	Peak Frequency Deviation (kHz)				Limit (kHz)
	300Hz	1000Hz	2000Hz	3000Hz	
-20	1.33	1.76	1.94	2.12	±75
-15	1.75	2.32	2.53	2.77	±75
-10	2.90	3.07	3.40	3.65	±75
-5	3.00	4.04	4.57	5.10	±75
0	4.00	5.36	6.30	7.30	±75
+5	5.30	7.20	8.90	10.50	±75
+10	6.4	8.75	11.00	12.90	±75
+15	6.53	8.97	11.25	13.16	±75
+20	6.62	9.05	11.42	13.34	±75



## 7. PHOTOGRAPH

### 7.1. Photo of Radiation Emission Test



## APPENDIX I (EXTERNAL PHOTOS)

Figure 1  
The EUT-Front View



Figure 2  
The EUT-Back View



Figure 3  
The EUT-Top View



Figure 4  
The EUT-Bottom View



Figure 5  
The EUT-Left View



Figure 6  
The EUT-Right View



## APPENDIX II (INTERNAL PHOTOS)

Figure 7  
The EUT-Inside View



Figure 8  
PCB of the EUT-Front View

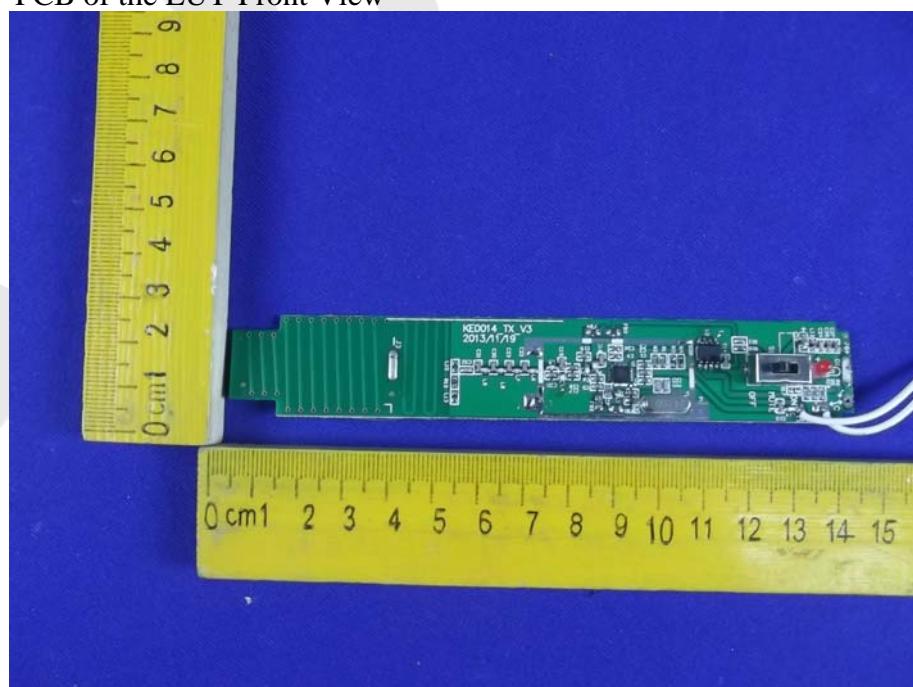


Figure 9  
PCB of the EUT-Back View

