

FCC PART 74.861  
EMI MEASUREMENT AND TEST REPORT  
For

IXT SYSTEMS INTERNATIONAL LTD

24A Lan Se Hai Yun Ju, 1st Street, Shi Xia North, Fu Tian District, Shenzhen, China

FCC ID: OG7-WM173

June 21, 2012

This Report Concerns: Original Report	Equipment Type: Wireless Microphone
Test Engineer:	Eric Li <i>Eric Li</i>
Report No.:	BST12060020Y-1ER-3
Receive EUT Date/Test Date:	June 9, 2012/ June 10-20, 2012
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## 1. GENERAL INFORMATION

### 1.1. Report information

1.1.1. This report is not a certificate of quality; it only applies to the sample of the specific product/equipment given at the time of its testing. The results are not used to indicate or imply that they are application to the similar items. In addition, such results must not be used to indicate or imply that BST approves recommends or endorses the manufacture, supplier or use of such product/equipment, or that BST in any way guarantees the later performance of the product/equipment.

1.1.2. The sample/s mentioned in this report is/are supplied by Applicant, BST therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture or any information supplied.

Additional copies of the report are available to the Applicant at an additional fee. No third part can obtain a copy of this report through BST, unless the applicant has authorized BST in writing to do so.

#### Test Facility -

The test site used to collect the radiated data is located on the address of Shenzhen Certification Technology Service Co., Ltd (FCC Registered Test Site Number: 197647) on 2F, Building B, East Area of Nanchang Second Industrial Zone, Gushu 2nd Road, Bao'an District, shenzhen 518126, China  
The Test Site is constructed and calibrated to meet the FCC requirements.

### 1.2. Measurement Uncertainty

Available upon request.

## 2. PRODUCT DESCRIPTION

### 2.1. EUT Description

Description : Wireless Microphone  
Applicant : IXT SYSTEMS INTERNATIONAL LTD  
24A Lan Se Hai Yun Ju, 1st Street, Shi Xia North, Fu Tian  
District, Shenzhen, China  
Model Number : WM173, WM340, WM175, WM176, WM177, WM178  
Trade Name : EMERSON / IXT / DOK / KARAOKE USA

### Additional Information

Frequency Range : 181.7-215.8 MHz  
Power Supply : DC 9V (Powered by one 6F22 battery)  
Necessary Bandwidth: :  $2M+2DK = 2 \times 60\text{kHz} + 2 \times 20\text{kHz} \times 1.0 = 160\text{ kHz}$   
Transmitter Antenna : Integrated antenna

### 2.2. Block Diagram of EUT Configuration



### 2.3. Support Equipment List

1.	--	----
2.	--	-----
3.	--	-----

### 2.4. Test Conditions

Temperature: 20~25

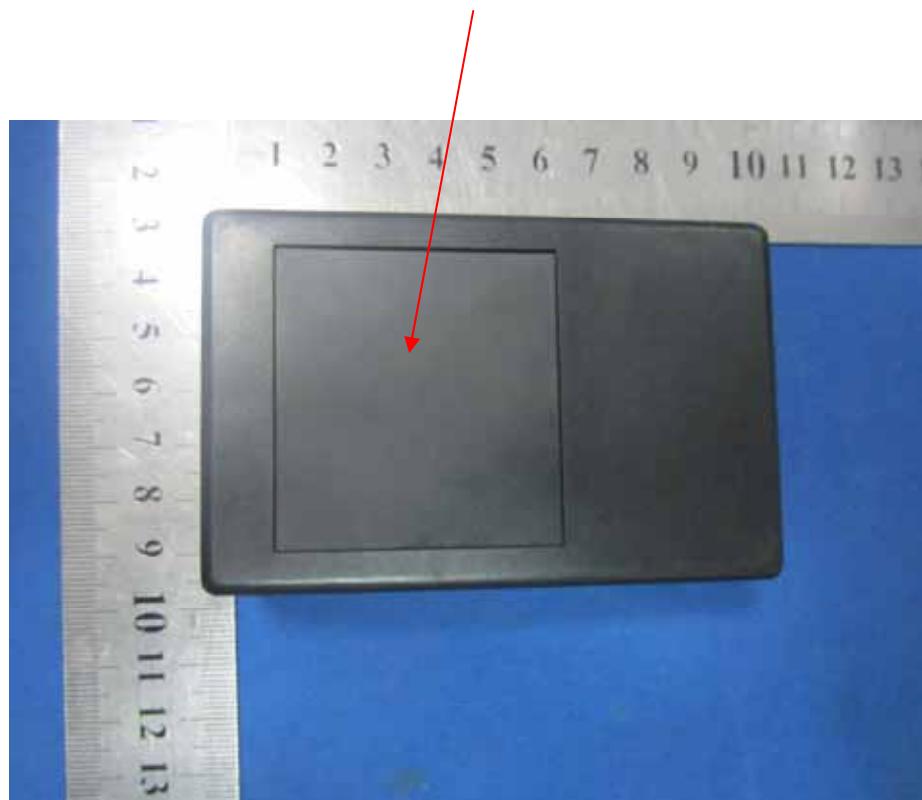
Relative Humidity: 55~63 %

### 3. FCC ID LABEL

FCC ID: OG7-WM173

**Label Location on EUT**

**EUT View/ FCC ID Label Location**



#### 4. TEST RESULTS SUMMARY

Test Items	Test Standards	Test Results
Carrier Radiated Power	74.861(e)(1)(i) 174–216 MHz — 50 mW	Pass
Modulation Deviation	74.861 (e) (3) Within 75kHz	Pass
Frequency Stability	74.861 (e) (4) <0.005% 50 ppm	Pass
Operating Bandwidth	74.861 (e) (5) Within 200kHz	Pass
Unwanted Radiation	74.861 (e) (6) within the mask	Pass
Radiated Spurious Emission	74.861 (d) (3) $< 43+10\lg P(W)$ dB	Pass

Remark: "N/A" means "Not applicable."

#### Modifications

No modification was made.

## 5. TEST EQUIPMENT USED

Equipment/Facilities	Manufacturer	Model #	serial no.	Last Calibrated	Calibrated until
Cable	Resenberger	N/A	NO.1	Mar 10 , 2012	Mar 10 , 2013
Cable	SCHWARZBECK	N/A	NO.2	Mar 10 , 2012	Mar 10 , 2013
Cable	SCHWARZBECK	N/A	NO.3	Mar 10 , 2012	Mar 10 , 2013
LISN	Rohde & Schwarz	ESH3-Z5	100305	Mar 10 , 2012	Mar 10 , 2013
50 Coaxial Switch	ANRITSU CORP	MP59B	6200283933	Mar 10 , 2012	Mar 10 , 2013
EMI Test Receiver	Rohde & Schwarz	ESP13	100180	Oct.11,2011	Oct.11,2012
Spectrum Analyzer	Rohde & Schwarz	FSP40	100273	Sep.10,2011	Sep.10,2012
3m Semi-Anechoic Chamber	Albatross Projects	9mx6mx6m	N/A	Feb.20,2012	Feb.20,2013
Signal Generator	FLUKE	PM5418 + Y/C	LO747012	Feb.20,2012	Feb.20,2013
Signal Generator	FLUKE	PM5418TX	LO738007	Feb.20,2012	Feb.20,2013
Loop Antenna	SCHWARZBECK	FMZB1516	113	Jan.30,2012	Jan.30,2013
Trilog-Super Broadband Antenna	SCHWARZBECK	VULB9161	9161-4079	Sep.22,2011	Sep.22,2012
Broad-Band Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-564	Sep.22,2011	Sep.22,2012
Ultra Broadband Antenna	Rohde & Schwarz	HL-562	100110	June.15,2012	June.15,2013
AMN	Rohde & Schwarz	ESH3-Z5	100196	Oct.11,2011	Oct.11,2012
AMN	Rohde & Schwarz	ESH3-Z5	100197	Oct.11,2011	Oct.11,2012
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	N/A	N/A	N/A
Power Meter	Rohde & Schwarz	NRVD	100041	Feb.20,2012	Feb.20,2013
EMI Test Receiver	Rohde & Schwarz	ESCS30	100003	Feb.20,2012	Feb.20,2013
Coaxial Cable with N-connectors	SCHWARZBECK	AK9515H	95549	Sep.22,2011	Sep.22,2012
Radio Communication Test Set	Rohde & Schwarz	CMS 54	846621/024	Feb.20,2012	Feb.20,2013
Modulation Analyzer	Hewlett-Packard	8901B	2303A00362	Feb.20,2012	Feb.20,2013
Absorbing clamp	Rohde & Schwarz	MDS-21	N/A	Oct.11,2011	Oct.11,2012

## 6. TEST RESULTS

### 6.1. E.U.T. Operation Condition

Operating Environment:

Temperature: 20.0 ° C~25 ° C

Humidity: 56 ~68% RH

Atmospheric Pressure: 980~1012 mbar

EUT Operation: Test the EUT in transmitting mode.

### 6.2. Test Procedure & Measurement Data

#### 6.2.1. Carrier Radiated Power & Radiated Spurious Emissions

Test Requirement: FCC CFR 47 Part 74.861 e) 1) & d) 3)

Test Method: EIA/TIA 603-C-2004 section 2.2,

FCC CFR 47 Part 2.1047 & 1053

Test Date: June 19, 2012

Measurement Distance: 3m (Semi-Anechoic Chamber)

#### Test Requirement:

- (d) For low power auxiliary stations operating in the bands other than those allocated for TV broadcasting, the following technical requirements are imposed.
- (3) The occupied bandwidth shall not be greater than that necessary for satisfactory transmission and, in any event, an emission appearing on any discrete frequency outside the authorized band shall be attenuated, at least,  $43+10 \log_{10}$  (mean output power, in watts) dB below the mean output power of the transmitting unit.
- (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 output 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

### Test Procedure:

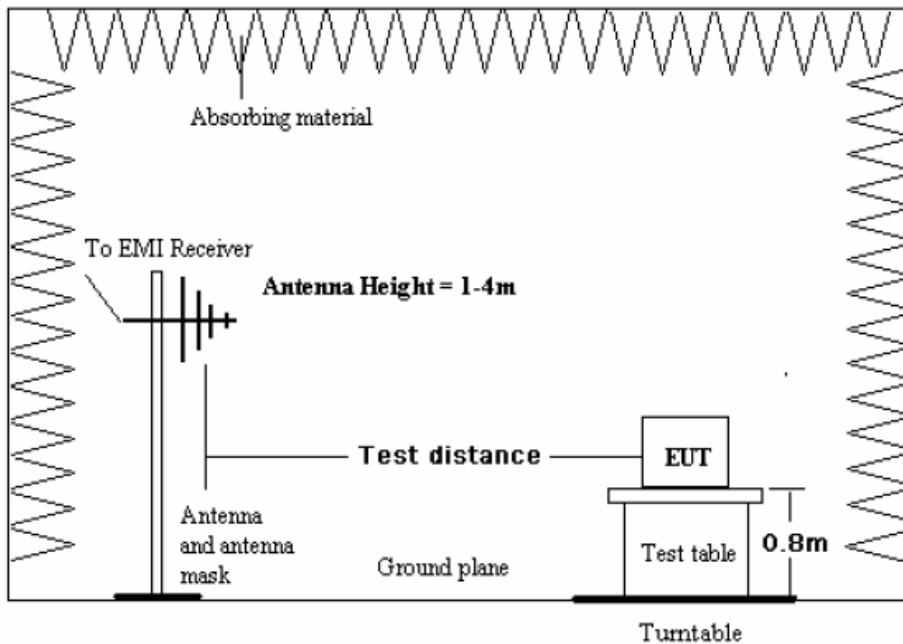
The procedure used was EIA/TIA 603-C-2004. The receive was scanned from 9kHz to 7.0GHz. When an emission was found, the table was rotated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes.

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

$$\text{Final Test Level} = \text{Receiver Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Peramplifier Factor}$$

An initial pre-scan was performed in the 3m chamber using the spectrum analyser 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 Result:****Carrier Radiated Power**

Carrier Frequency (MHz)	Factual Level dBm (mW)	Limit in 74.861 e) 1)
181.700	-5.0 dBm(i.e. 0.32 mW)	17 dBm (i.e. 50 mW)
197.100	-5.5 dBm(i.e. 0.29 mW)	17 dBm (i.e. 50 mW)
215.800	-5.6 dBm(i.e. 0.28 mW)	17 dBm (i.e. 50 mW)

**Radiated spurious emissions:**

Spurious Emission Frequency (MHz)	Factual Level Horizontal (dBm)	Factual Level Vertical (dBm)	Limits (dBm)	Min. Margin (dB)
Test mode: TX 181.700 MHz				
362.200	-43.7	-45.6	-13.0	30.7
543.300	<-43.0	<-43.0	-13.0	NA
724.400	<-43.0	<-43.0	-13.0	NA
Test mode: TX 197.100 MHz				
394.200	-43.2	-46.1	-13.0	30.2
591.300	<-43.0	<-43.0	-13.0	NA
788.400	<-43.0	<-43.0	-13.0	NA
Test mode: TX 215.800 MHz				
431.600	-43.5	-45.4	-13.0	30.5
647.400	<-43.0	<-43.0	-13.0	NA
863.200	<-43.0	<-43.0	-13.0	NA

The peak emission of other frequency in rang from 30MHz up to 10 times carrier were 25dB lower than the limit, hence no data was recorded in the report.

NA: Not applicable, since the level is over 30dB lower than the limit.

**TEST RESULTS: The unit does meet the FCC requirements.**

### 6.2.2.Occupied Bandwidth

Test Requirement: FCC CFR 47 Part 74.e) 5) & 6)  
Test Method: FCC CFR 47 Part 2.1049  
Test Date: June 19, 2012

#### Test Requirement:

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

(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:

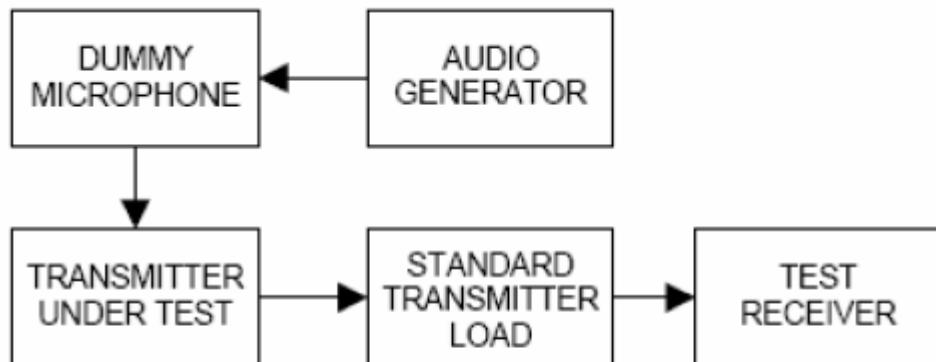
(i) On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25dB;

(ii) On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35dB;

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

#### Test Procedure

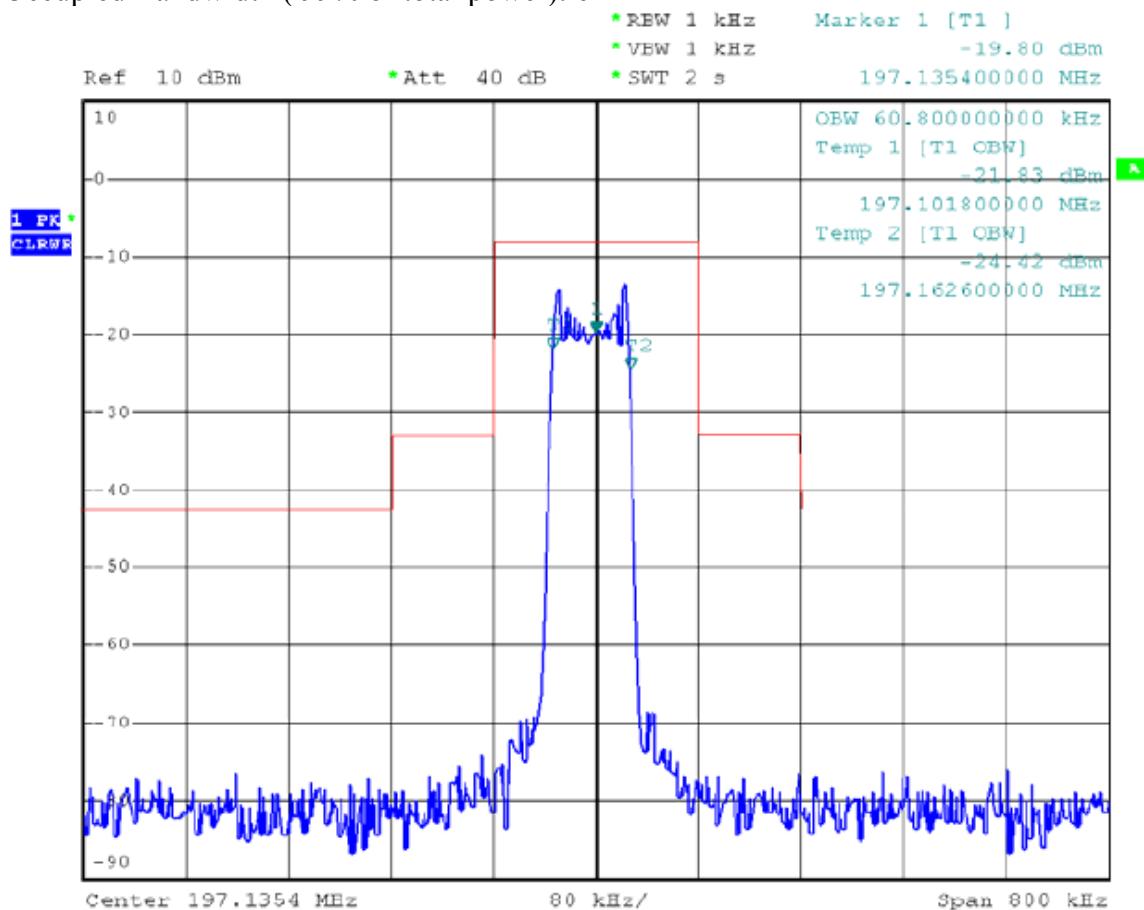
Input 2500Hz signal to the microphone, find the 50% rated deviation, add the level 16dB, test this status the 99% occupied bandwidth and record it.



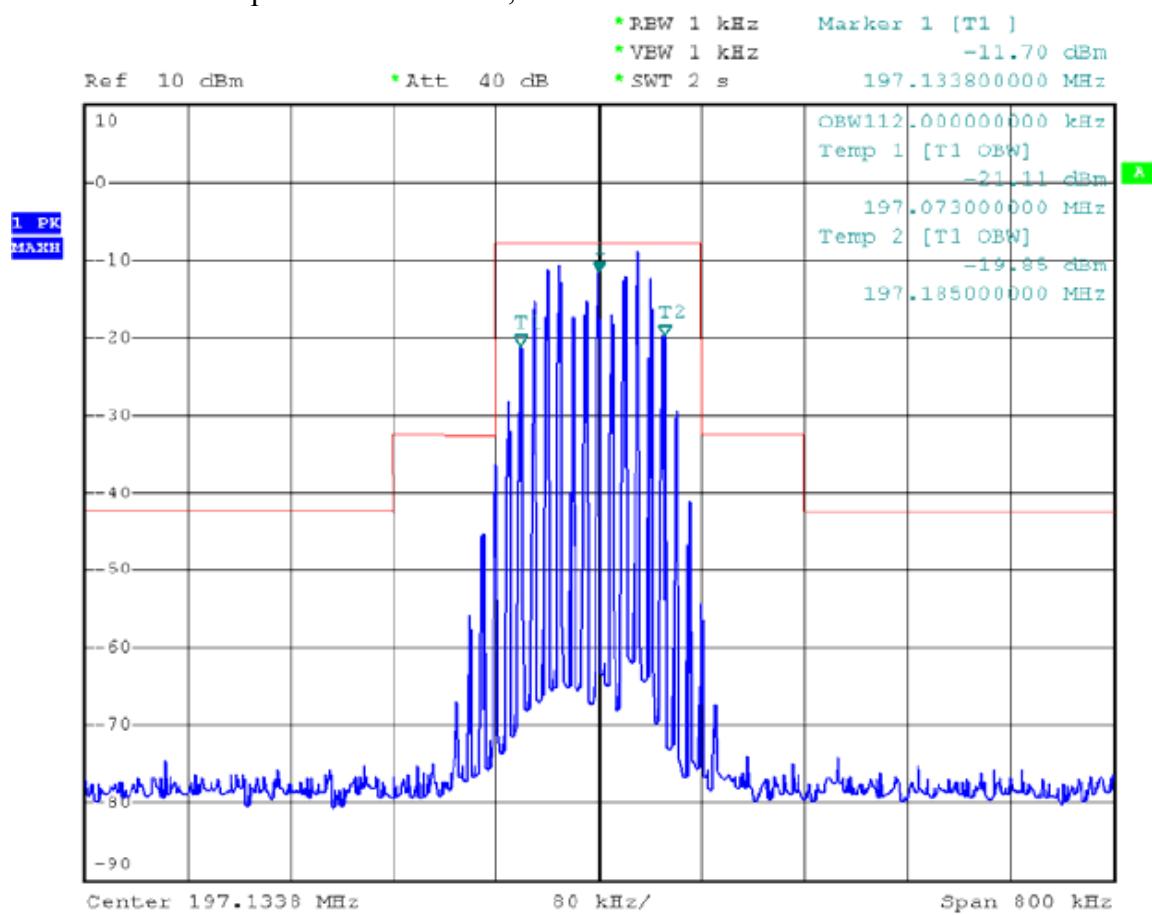
**Test Result: The unit does meet the FCC requirements.**

The graph as below, represents the emissions take for this device.

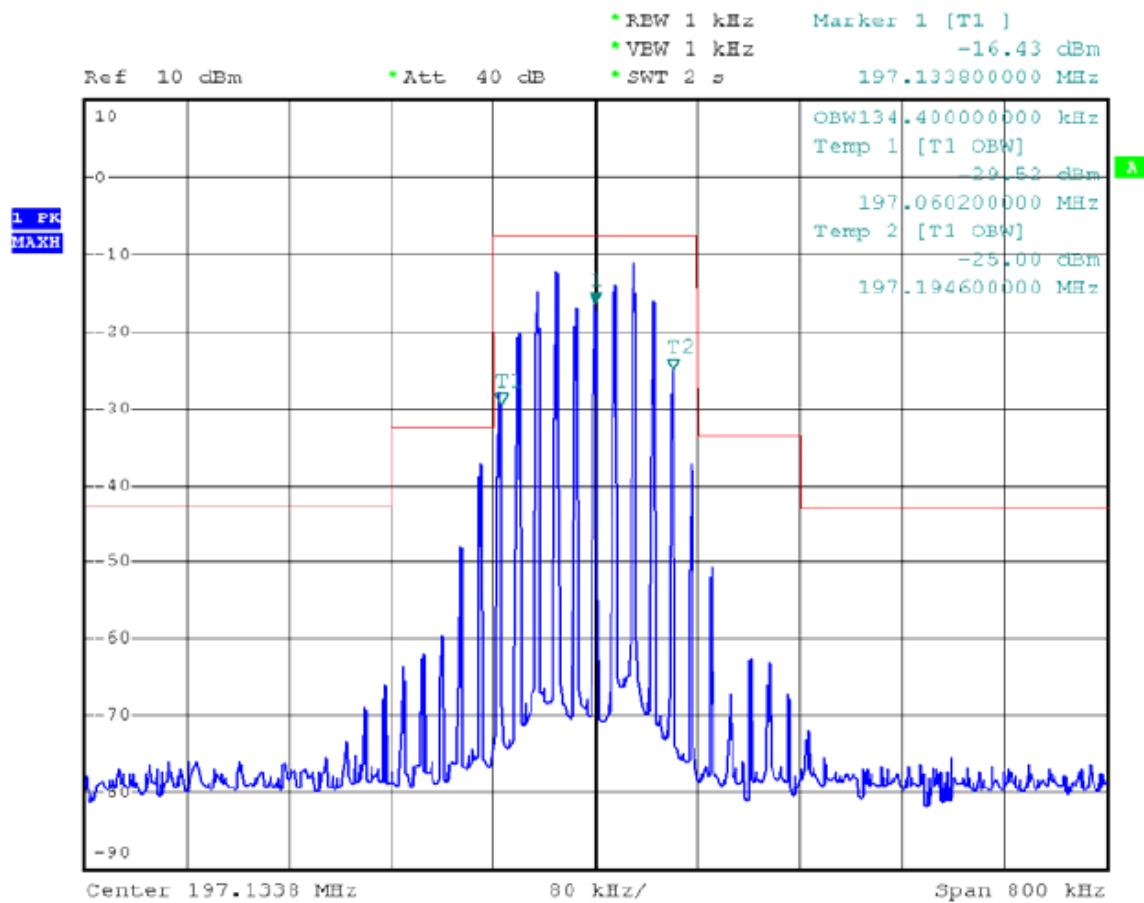
Occupied Bandwidth ( 99% of total power): 61 kHz



## Emission Mask: input with 10 kHz AF, 50% modulation + 16dB



Emission Mask: input with 15 kHz AF, 50% modulation + 16dB



### 6.2.3.Frequency Stability

Test Requirement: FCC CFR 47 Part 74.e) 4)  
Test Method: FCC CFR 47 Part 2.1055  
Test Date: June 19, 2012  
Requirements: +/-50 ppm  
(e) For low power auxiliary stations operating in the bands allocated for TV broadcasting, the following technical requirements apply:  
(4) The frequency tolerance of the transmitter shall be 0.005 percent.

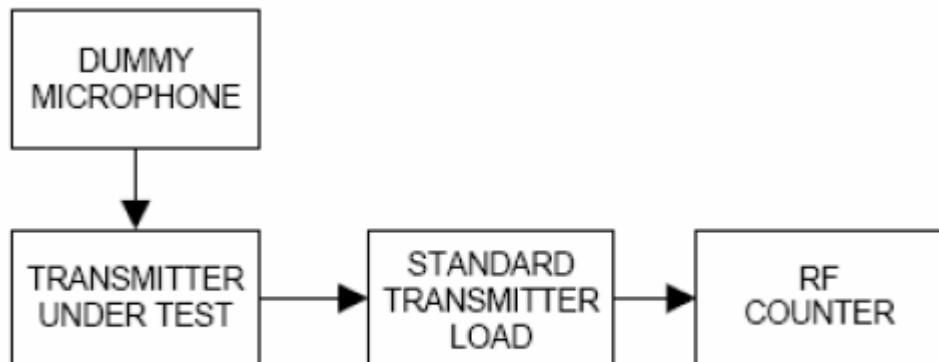
#### Test Procedure:

##### Frequency stability versus Environmental Temperature

The equipment under test was connected to an external DC power supply and the RF output was connected to a frequency counter via feed through attenuators. The EUT was placed inside the temperature chamber. After the temperature stabilized for approximately 20 minutes, the frequency of the output signal was recorded from the counter.

##### Frequency Stability versus Input Voltage

At room temperature ( $25\pm5^{\circ}\text{C}$ ), an external variable DC power supply was connected to the EUT. The frequency of the transmitter was measured for 115%, 100% and 85% of the nominal operating input voltage. For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.



**Test Result:**

Assigned Frequency: 197.100 MHz		
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed Total emission within Max +/- 9.86 kHz (kHz)
50	9.0	+3.8
40	9.0	+3.2
30	9.0	+2.6
20	9.0	+2.2
10	9.0	+1.8
0	9.0	+1.4
-10	9.0	-0.9
-20	9.0	-1.6
-30	9.0	-2.4
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed Total emission within Max +/- 9.86 kHz (kHz)
25	9	+2.3
25	10.4	+3.3
25	7.7	-1.4
25	6.8	-2.7

Battery end point: 6.8Vdc

**The results: The unit does meet the FCC requirements.**

#### 6.2.4.Modulation Characteristics

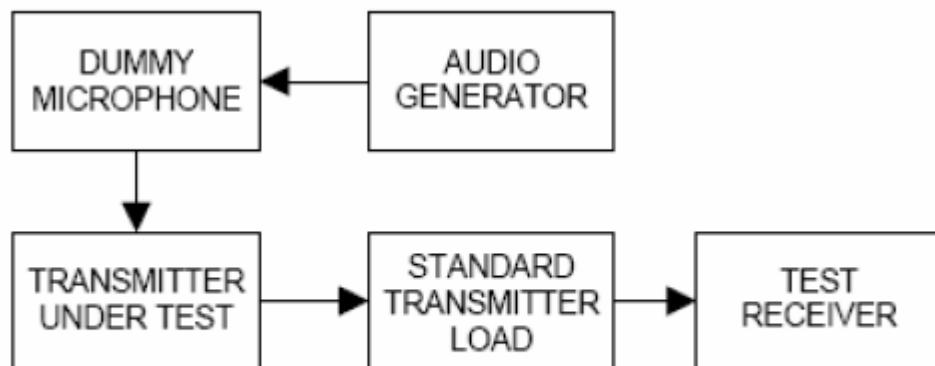
Test Requirement: FCC CFR 47 Part 74.e) 3)  
Test Method: FCC CFR 47 Part 2.1047  
Test Date: April 6, 2012  
Requirements:  
(e) For low power auxiliary stations operating in the bands allocated for TV broadcasting, the following technical requirements apply:  
(3) Any form of modulation may be used. A maximum deviation of  $\pm 75$  kHz is permitted when frequency modulation is employed.

#### Test Procedure:

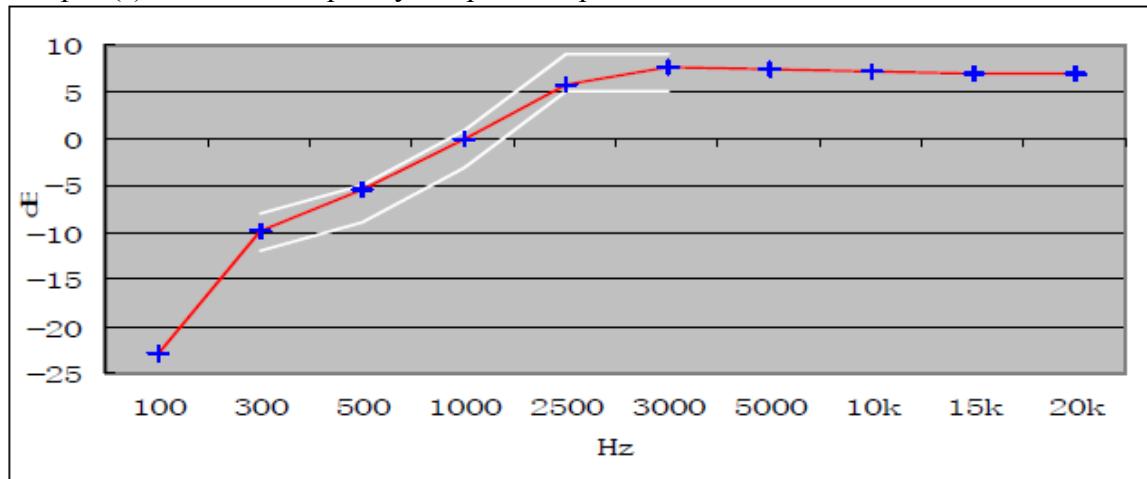
##### Audio Frequency Response

The RF output of the transceiver was connected to the input of FSP 30 with FM deviation module through sufficient attenuation so as not to overload the meter or distort the reading. An audio signal generator was connected to the audio input of microphone.

The audio signal input level was adjusted to obtain 20% of the maximum rated system deviation at 1 kHz, and recorded as DEV REF . With the audio signal generator level unchanged, set the generator frequency between 100 to 5000 Hz. The transmitter deviations (DEV FREQ ) were measured and the audio frequency response was calculated as  $20\log_{10} [\text{DEV FREQ} / \text{DEV REF}]$



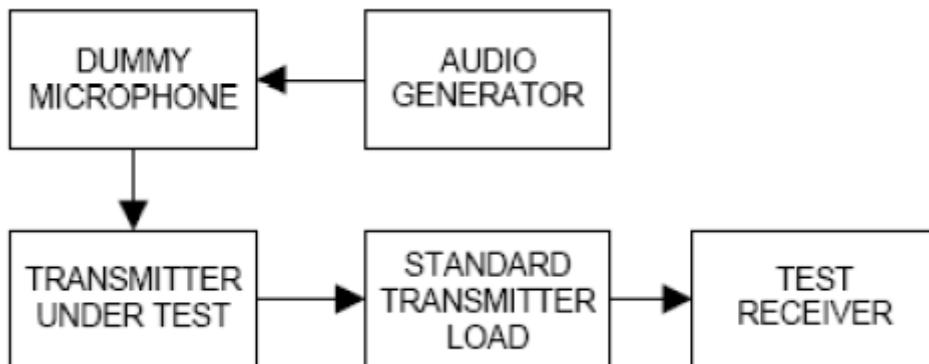
The plot(s) of Audio Frequency Response is presented hereinafter as reference.



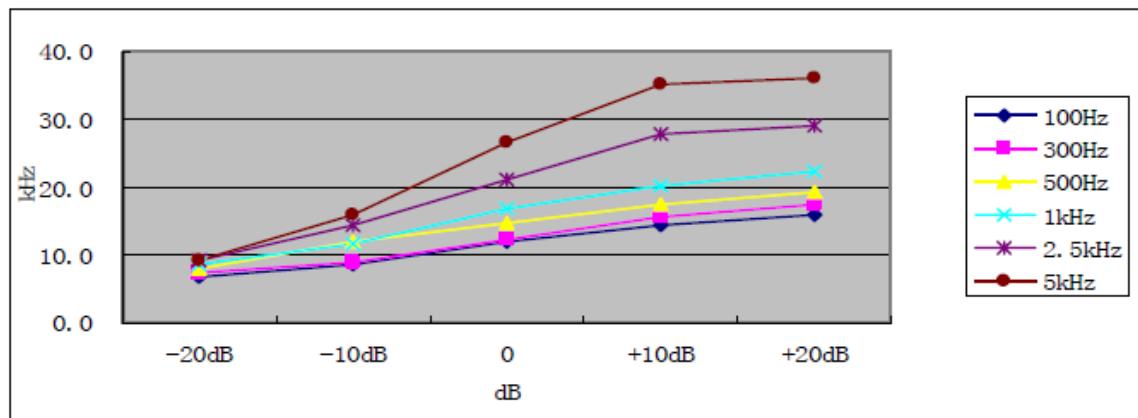
0dB=10mV at 1kHz (20% of the maximum rated system deviation).

### Modulation Limiting

- Adjust the transmitter per the manufacturer's procedure for full rated system deviation.
- 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.
- 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.
- 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).
- Measure both the instantaneous and steady-state deviation at and after the time of increasing the audio input level.
- With the level from the audio frequency generator held constant at the level obtained in step e), slowly vary the audio frequency from 100 to 5000 Hz and observe the steady-state deviation. Record the maximum deviation.



Test at five different modulating frequencies (100Hz, 300Hz, 500Hz, 1KHz, 2.5kHz, 5kHz), the output level of the audio generator was varied up to 1V and the FM deviation level was recorded.



**Test Result: The unit does meet the FCC requirements.**