ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 90 & RSS-119 REQUIREMENTS

OF

Two-way Radio

MODEL No.: TC-620U(2)

BRAND NAME: HYT

FOR

FCC ID: R74TC-620U2
IC: 5465A-TC620U2

REPORT NO: LW-SZ003070702E6

ISSUE DATE: 07/07, 2007

Prepared for

SHENZHEN HYT SCIENCE&TECHNOLOGY CO., LTD.
HYT TOWER, SHENZHEN HI-TECH INDUSTRIAL PARK NORTH,
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SHENZHEN, P.R.C.

Prepared by

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d.b.a.

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VERIFICATION OF COMPLIANCE

Applicant:	SHENZHEN HYT SCIENCE&TECHNOLOGY CO., LTD. HYT Tower, Shenzhen Hi-Tech Industrial Park North, Beihuan Rd., Nanshan District, Shenzhen, P.R.C.
Manufacturer	SHENZHEN HYT SCIENCE&TECHNOLOGY CO., LTD. HYT Tower, Shenzhen Hi-Tech Industrial Park North, Beihuan Rd., Nanshan District, Shenzhen, P.R.C.
Product Description:	Two-way Radio
Brand Name:	HYT
Model Number:	TC-620U(2)
Serial Number:	N/A
File Number:	LW-SZ003070702E6
Date of Test:	July 2,2007 ~ July 7, 2007

We hereby certify that:

The above equipment was tested by LONGWAY(SHENZHEN) CERTIFICATION SERVICE CO., LTD. The data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C 63.4:2003 and TIA/EIA 603. The sample tested as described in this report is in compliance with the FCC Rules Part 90 and RSS-119.

The test results of this report relate only to the tested sample identified in this report.

Reviewed and Approved by:

King Chen / Q.A. Manager
LONGWAY(SHENZHEN) CERTIFICATION SERVICE CO., LTD.

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1. GENERAL INFORMATION

1.1 Product Description

The SHENZHEN HYT SCIENCE&TECHNOLOGY CO., LTD., Model: TC-620U(2) (referred to as the EUT in this report). The EUT is a single channel Two-way Radio designed for voice communication. It is designed by way of utilizing the FM modulation achieves the system operating.

A major technical descriptions of EUT is described as following:

A). Frequency Tolerance: 0.000218% (0.00025% for 12.5 KHz) 0.000220% (0.0005% for 25 KHz)
B). Communication Type: Voice/Tone only
C). Modulation: FM
D). Emission type: F3E
E). Emission designator: 11K0F3E (2M+2D, M=3, D=2.5,Necessary Bandwidth =11 KHz for 12.5 KHz)
16K0F3E (2M+2D,M=3, D=5 ,Necessary Bandwidth=16 KHz for 25 KHz)
F). Emission Bandwidth:5.83 KHz (Limit: 11.25 KHz for 12.5 KHz channel separation)
10.48 KHz (Limit: 20 KHz for 25 KHz channel Separation)
G).Peak Frequency Deviation: 1.98 KHz for 12.5 KHz Channel Separation (Limit<±2.5 KHz)
4.36 KHz for 25 KHz Channel Separation (Limit<±5 KHz)
H).Audio Frequency Response: 2.5 KHz (Limit<3.125 KHz)
I). Maximum Transmitter Power: 3.420 W for 12.5 KHz Channel Separation
3.793 W for 25 KHz Channel Separation
J). Output power Modification: Fixed can't be changed
K). Unwanted Radiation:

For 12.5 KHz Channel Separation:

1). At least 30 (Limit 0 dB) On any frequency removed from the center of the authorized bandwidth f_o to 5.625 KHz removed from f_o: Zero dB

2). At least 30~75(Limit 20~70 dB) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in KHz)f_o of more than 5.625 KHz but no more than 12.5 KHz: At least 7.27(fd-2.88 KHz)dB

3). At least 70 (Limit 57 dB) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in KHz) f_o of more than 12.5 KHz: At least 50+10 log(P) dB or 70 dB, which ever is lesser attenuation.

For 25 KHz Channel Separation:

1), At least 30 (Limit 25 dB)On any frequency removed from the assigned frequency by More than 50 percent, but no more than 100 percent of the authorized bandwith: At least 25 dB.

2), At least 70 (Limit 35 dB) On any frequency removed from the assigned frequency by more than 100 percent, but no more than 250 percent of the authorized bandwith: At least 35 dB.

3), At least 80 (Limit 50 dB)On any frequency removed from the assigned frequency by More than 250 percent of the authorized bandwidth: At least 43+10Log (P) dB.

L). Antenna Designation: Detachable
M). Power Supply: DC 7.4 V by battery
N). Battery Endpoint: DC 6.1 V

O). Operating Frequency Range and Channels

Frequency Range: 450 MHz ~ 470MHz

Channel Separation: 12.5 KHz / 25 KHz

Top Channel: 450.1750 MHz
Centre Channel: 460.1750 MHz
Bottom Channel: 469.9550 MHz

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: R74TC-620U2 and IC: 5465A-TC620U2 filing to comply with the FCC Part 90 and RS-119 requirements

1.3 Test Methodology

The radiated emission testing was performed according to the procedures of ANSI C63.4: 2003; TIA/EIA 603 and FCC CFR 47 Rules of 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, and 2.1057.

1.4 Test Facility

The alternate test site of OATS used to collect the radiated data is located on the address of Accurate Technology Co. Ltd. F1, Bldg, A, Changyuan New Meterial Port, Keyuan Rd. Science & Industry Park, Nanshan District, 518057, Shenzhen P.R. China. The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003 and IC requirements in documents RSS 212.

1.5 Special Accessories

Not available for this EUT intended for grant.

1.6 Equipment Modifications

Not available for this EUT intended for grant.

2. System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

2.3 GENERAL TECHNICAL REQUIREMENTS

a), Section 15.207: Conducted Limits
b). Section 90.205: Maximum ERP is dependent upon the station's antenna HAAT and Required service area
c). Section 90.207: Modulation Characteristic
d). Section 90.209: Occupied Bandwidth
e). Section 90.210: Emission Mask
f). Section 90.213: Frequency Tolerance
i). Section 90.214: Transmitter Frequency Behavior

2.4 Configuration of Tested System

Fig. 2-1 Configuration of Tested System

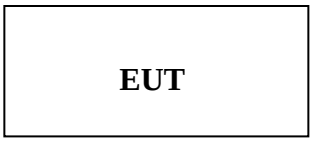


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Identifier	Series No.	Note
E-1	Two-way Radio	HYT	TC-620U(2)	FCC ID: R74TC-620U2 IC: 5465A-TC620U2	N/A	*EUT*

3. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§ 15.207	Conducted Limits	Compliant
§ 90.205	Maximum Transmitter Power	Compliant
§ 90.207	Modulation Characteristic	Compliant
§ 90.209	Occupied Bandwidth	Compliant
§ 90.210	Emission Mask	Compliant
§ 90.213	Frequency Tolerance	Compliant
§ 90.214	Transmitter Frequency Behavior	Compliant

4. DESCRIPTION OF TEST MODES

The EUT (Two-way Radio) has been tested under normal operating condition. Three channels (The top channel, the middle channel and the bottom channel) are chosen for testing at each channel separation (12.5 KHz/ 25 KHz).

5. CONDUCTED LIMITS

5.1 PROVISIONS APPLICABLE

a). For an intentional radiator that is designed to be connected to the public utility (AC) power line, the, the radio frequency voltage that is conducted back onto the AC power line on any frequencies within the band 150 KHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50uH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequencies ranges.

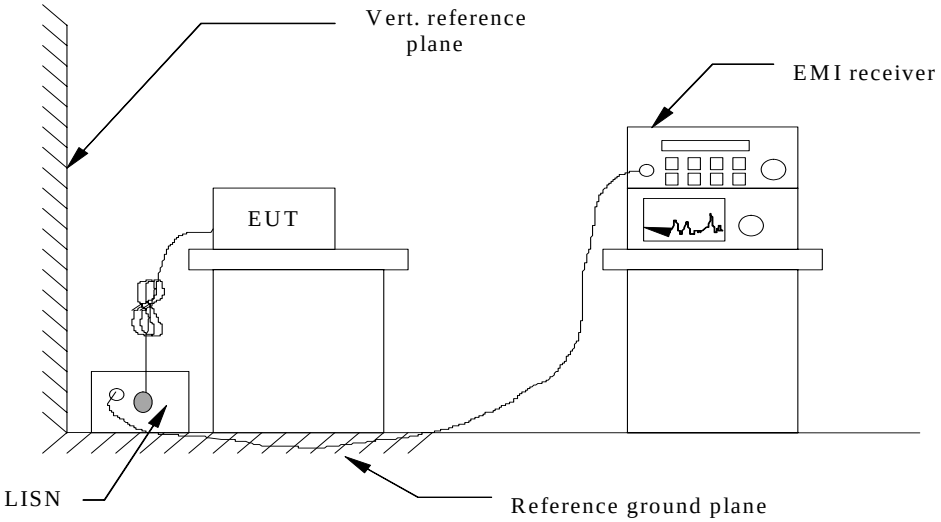
Frequency of Emission (MHz)	Conducted Limit(dBuV)	
	Quasi-Peak	Average
0.15 – 0.5	66 to 56 *	56 to 46 *
0.5 – 5	56	46
5 – 30	60	50

* Decreases with the logarithm of the frequency.

5.2 MEASUREMENT PROCEDURE

1) The equipment was set up as per the test configuration to simulate typical actual usage per the User's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2) Support equipment, if needed, was placed as per ANSI C63.4.
3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
4) The EUT received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5) All support equipments received AC power from a second LISN, if any.
6) The EUT test program was started. Emissions were measured on each current carrying line of The EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7) Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes. During the above scans, the emissions were maximized by cable manipulation.

5.3 TEST SETUP BLOCK DIAGRAM(block diagram of configuration)



5.4 Test equipment used:

Conducted Emission Test Site				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
ARTIFICIAL MAINS	ROHDE&SCHWARZ	ESH2-Z5	100028	11/11/2007
EMI TEST RECEIVER	ROHDE & SCHWARZ	ESCS 30	100038	11/11/2007
PULSE LIMITER	ROHDE&SCHWARZ	ESHSZ2	100044	11/11/2007
EMI TEST SOFTWARE	ROHDE & SCHWARZ	ESK1	NA	N/A

5.5 Test Configuration:

The test configuration of the EUT was EUT+Adapter+Socket.

5.6 TEST RESULT

LINE CONDUCTED EMISSION TEST RESULT

FREQ MHz	PEAK RAW dBuV	Q.P. RAW dBuV	AVG RAW dBuV	Q.P. Limit dBuV	AVG Limit dBuV	Q.P. Margin dB	AVG Margin dB	NOTE
0.574	38.14	---	---	73.00	60.00	---	-21.86	L1
2.339	36.52	---	---	73.00	60.00	---	-23.48	L1
4.985	35.71	---	---	73.00	60.00	---	-24.29	L1
7.014	39.63	---	---	73.00	60.00	---	-20.37	L1
13.268	36.78	---	---	73.00	60.00	---	-23.22	L1
20.227	41.49	---	---	73.00	60.00	---	-18.51	L1
1.012	39.98	---	---	73.00	60.00	---	-20.02	L2
3.579	40.15	---	---	73.00	60.00	---	-19.85	L2
6.262	38.87	---	---	73.00	60.00	---	-21.13	L2
12.799	37.26	---	---	73.00	60.00	---	-22.74	L2
18.542	36.77	---	---	73.00	60.00	---	-23.23	L2
25.384	38.89	---	---	73.00	60.00	---	-21.11	L2

L1 = Line One (Hot side) / L2 = Line Two (Neutral side)

**NOTE: "---" denotes the peak emission level was or more than 2dB below the Average limit, so no re-check anymore.

6. FREQUENCY TOLERANCE

6.1 PROVISIONS APPLICABLE

a). According to FCC Part 2 Section 2.1055(a)(1), the frequency stability shall be measured with variation of ambient temperature from –30℃ to +60℃ centigrade.

b). According to FCC Part 2 Section 2.1055(d)(2), for battery powered equipment, the frequency stability shall be measured with reducing primary supply voltage to the battery operating end point, which is specified by the manufacture.

c). According to FCC Part 90 Section 90.213, the frequency tolerance must be maintained within 0.00025% for 12.5KHz channel separation and 0.0005% for 25KHz channel separation.

6.2 MEASUREMENT PROCEDURE

6.2.1 Frequency stability versus environmental temperature

1. Setup the configuration per figure 1 for frequencies measurement inside an environment chamber, Install new battery in the EUT.

2. Turn on EUT and set SA center frequency to the EUT radiated frequency. Set SA Resolution Bandwidth to 1 KHz and Video Resolution Bandwidth to 1 KHz and Frequency Span to 50KHz.Record this frequency as reference frequency.

3. Set the temperature of chamber to 60℃. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. While maintaining a constant temperature inside the chamber, turn the EUT on and measure the EUT operating frequency.

4. Repeat step 2 with a 10℃ decreased per stage until the lowest temperature -30℃ is measured, record all measured frequencies on each temperature step.

6.2.2 Frequency stability versus input voltage

1. Setup the configuration per figure 1 for frequencies measured at temperature if it is within 15℃ to 25℃. Otherwise, an environment chamber set for a temperature of 20℃ shall be used. The EUT shall be powered by DC 7.4V.

2. Set SA center frequency to the EUT radiated frequency. Set SA Resolution Bandwidth to 1 KHz and Video Resolution Bandwidth to 1KHz. Record this frequency as reference frequency.

3. Supply the EUT primary voltage at the operating end point which is specified by manufacturer and record the frequency.

6.3 TEST SETUP BLOCK DIAGRAM(block diagram of configuration)

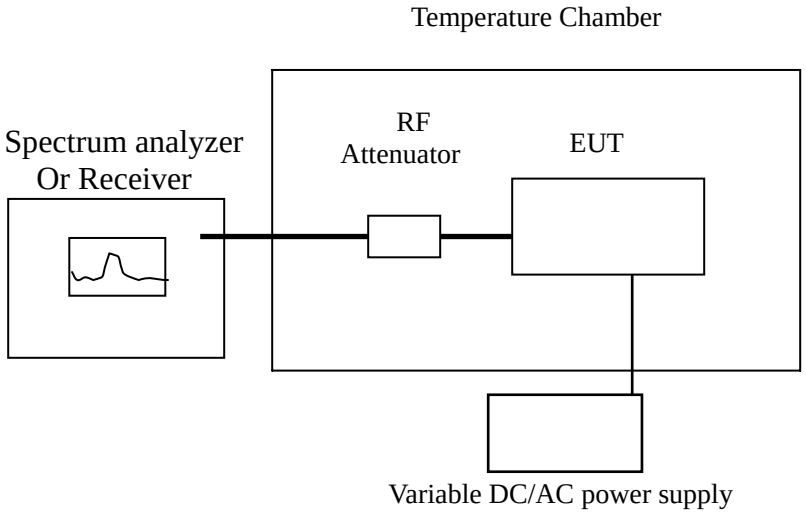


Figure 1

6.4 Test equipment used:

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Receiver	Rohde&Schwarz	ESCS30	100307	11/11/2007
Climate Chamber	ESPEC	EL-10KA	05107008	01/30/2008

6.5 TEST RESULT

a. Frequency stability versus input voltage (battery operation end point voltage is 6.1V)

Measurement Result for Channel Separation of 12.5KHz

Channel	**Reference Frequency (MHz)**	**Frequency Measured at end point voltage**	**Frequency Deviation (%)**	**Limit (%)**
Bottom	450.175	450.1759811	0.000218	0.00025
Middle	460.175	460.1759872	0.000215	0.00025
Top	469.955	469.9559646	0.000206	0.00025

Measurement Result for Channel Separation of 25KHz

Channel	**Reference Frequency (MHz)**	**Frequency Measured at end point voltage**	**Frequency Deviation (%)**	**Limit (%)**
Bottom	450.175	450.1759867	0.000219	0.0005
Middle	460.175	460.1759715	0.000155	0.0005
Top	469.955	469.9559274	0.000197	0.0005

b. Frequency stability versus ambient temperature

Bottom Channel @12.5KHz Channel Separation

Reference Frequency: 450.175000MHz			Limit: ±0.00025%
Environment Temperature (℃)	Power Supply (V)	Frequency deviation measured with time Elapse (10 minutes)	
		(MHz)	%
60	7.4	450.1759671	0.000215
50	7.4	450.1756136	0.000136
40	7.4	450.1755484	0.000122
30	7.4	450.1752613	0.000058
20	7.4	450.1751757	0.000039
10	7.4	450.1750891	0.000020
0	7.4	450.1749836	-0.000004
-10	7.4	450.1748362	-0.000036
-20	7.4	450.1747894	-0.000047
-30	7.4	450.1746015	-0.000089

Middle Channel @12.5KHz Channel Separation

Reference Frequency: 460.175000 MHz			Limit: ±0.00025%
Environment Temperature (℃)	Power Supply (V)	Frequency deviation measured with time Elapse (10 minutes)	
		(MHz)	%
60	7.4	460.1759411	0.000205
50	7.4	460.1758635	0.000188
40	7.4	460.1757625	0.000166
30	7.4	460.1756383	0.000139
20	7.4	460.1755162	0.000112
10	7.4	460.1754205	0.000091
0	7.4	460.1753746	0.000081
-10	7.4	460.1752758	0.000060
-20	7.4	460.1751430	0.000031
-30	7.4	460.1749265	-0.000016

Top Channel @12.5KHz Channel Separation

Reference Frequency: 469.955000 MHz			Limit: ±0.00025%
Environment Temperature (℃)	Power Supply (V)	Frequency deviation measured with time Elapse (10 minutes)	
		(MHz)	%
60	7.4	469.9559861	0.000210
50	7.4	469.9558734	0.000186
40	7.4	469.9557178	0.000153
30	7.4	469.9556853	0.000146
20	7.4	469.9555246	0.000112
10	7.4	469.9554731	0.000101
0	7.4	469.9553526	0.000075
-10	7.4	469.9552691	0.000057
-20	7.4	469.9551750	0.000037
-30	7.4	469.9550911	0.000019

Bottom Channel @ 25KHz Channel Separation

Reference Frequency: 450.175000 MHz			Limit: ±0.0005%
Environment Temperature (℃)	Power Supply (V)	Frequency deviation measured with time Elapse (10 minutes)	
		(MHz)	%
60	7.4	450.1759885	0.000220
50	7.4	450.1759216	0.000205
40	7.4	450.1758836	0.000197
30	7.4	450.1756743	0.000150
20	7.4	450.1754965	0.000110
10	7.4	450.1753182	0.000071
0	7.4	450.1752014	0.000045
-10	7.4	450.1751023	0.000023
-20	7.4	450.1749157	-0.000019
-30	7.4	450.1748726	-0.000028

Middle Channel @25KHz Channel Separation

Reference Frequency: 460.1750000 MHz			Limit: ±0.0005%
Environment Temperature (℃)	Power Supply (V)	Frequency deviation measured with time Elapse (10 minutes)	
		(MHz)	%
60	7.4	460.1759162	0.000199
50	7.4	460.1758056	0.000175
40	7.4	460.1757261	0.000158
30	7.4	460.1756558	0.000143
20	7.4	460.1754916	0.000107
10	7.4	460.1753273	0.000071
0	7.4	460.1752160	0.000047
-10	7.4	460.1751164	0.000025
-20	7.4	460.1750178	0.000004
-30	7.4	460.1749759	-0.000005

Top Channel @ 25KHz Channel Separation

Reference Frequency: 469.955000 MHz			Limit: ±0.0005%
Environment Temperature (℃)	Power Supply (V)	Frequency deviation measured with time Elapse (10 minutes)	
		(MHz)	%
60	7.4	469.9559546	0.000204
50	7.4	469.9558335	0.000178
40	7.4	469.9557654	0.000163
30	7.4	469.9558651	0.000181
20	7.4	469.9557126	0.000152
10	7.4	469.9556073	0.000129
0	7.4	469.9555118	0.000109
-10	7.4	469.9553392	0.000072
-20	7.4	469.9551087	0.000023
-30	7.4	469.9549875	-0.000003

7. EMISSION BANDWIDTH

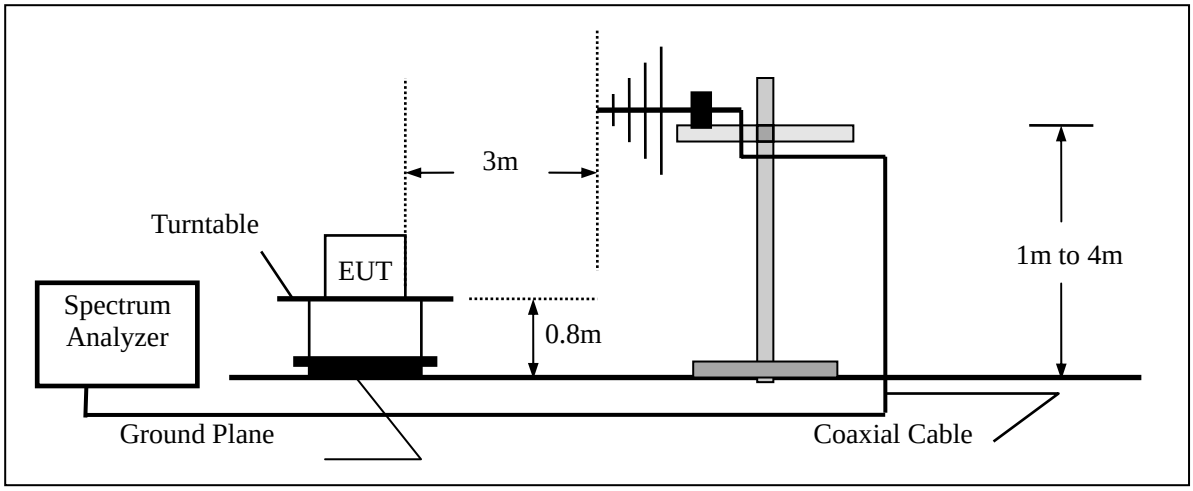
7.1 PROVISIONS APPLICABLE

According to FCC Part 90 Section 90.209: The authorized bandwidth shall be 11.25 KHz for 12.5 KHz and 20 KHz for 25 KHz.

7.2 MEASUREMENT PROCEDURE

1). The EUT was placed on a turn table which is 0.8m above ground plane.
2). The EUT was modulated by 1 KHz Sine wave audio signal to achieve 60% deviation
3). Set SPA Center Frequency = fundamental frequency, RBW=VBW= 300 Hz, Span =50 KHz.
4). Set SPA Max hold. Mark peak, -26dB.

7.3 TEST SETUP BLOCK DIAGRAM (Block Diagram of Configuration)



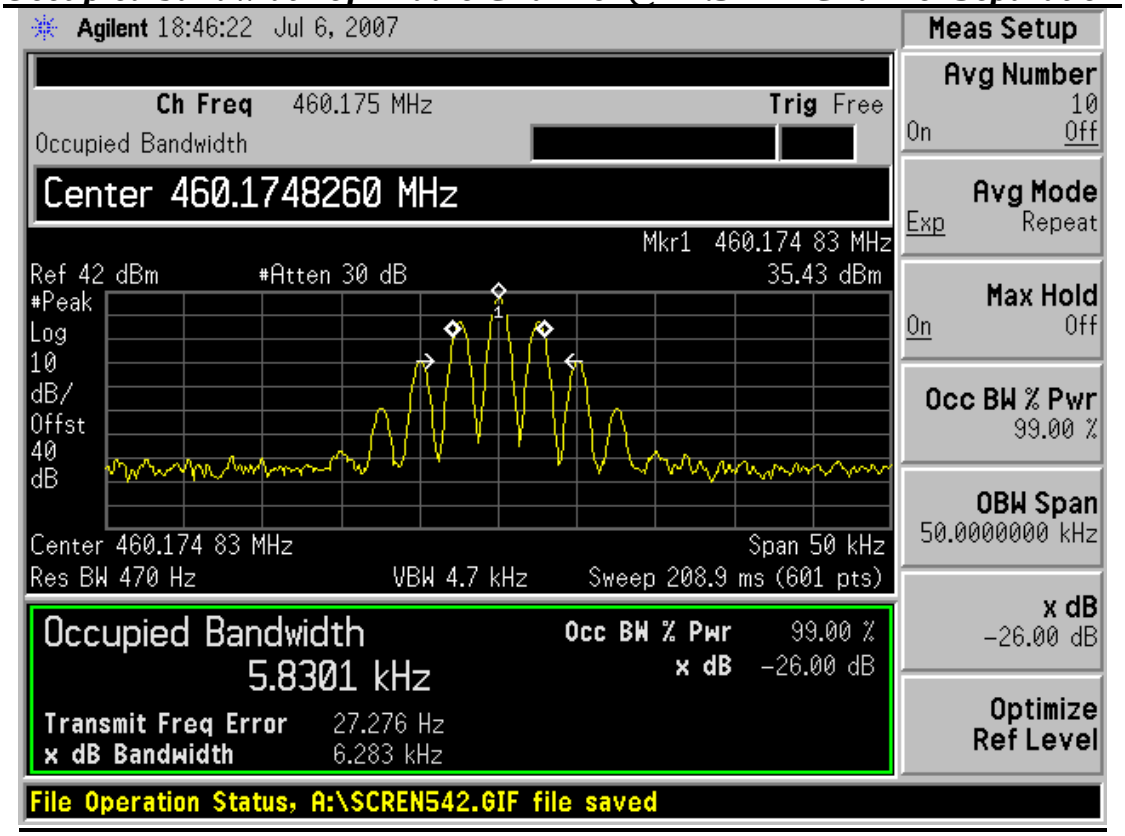
7.4 MEASUREMENT EQUIPMENT USED:

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Receiver	Rohde&Schwarz	ESCS30	100307	11/11/2007
Climate Chamber	ESPEC	EL-10KA	05107008	01/30/2008

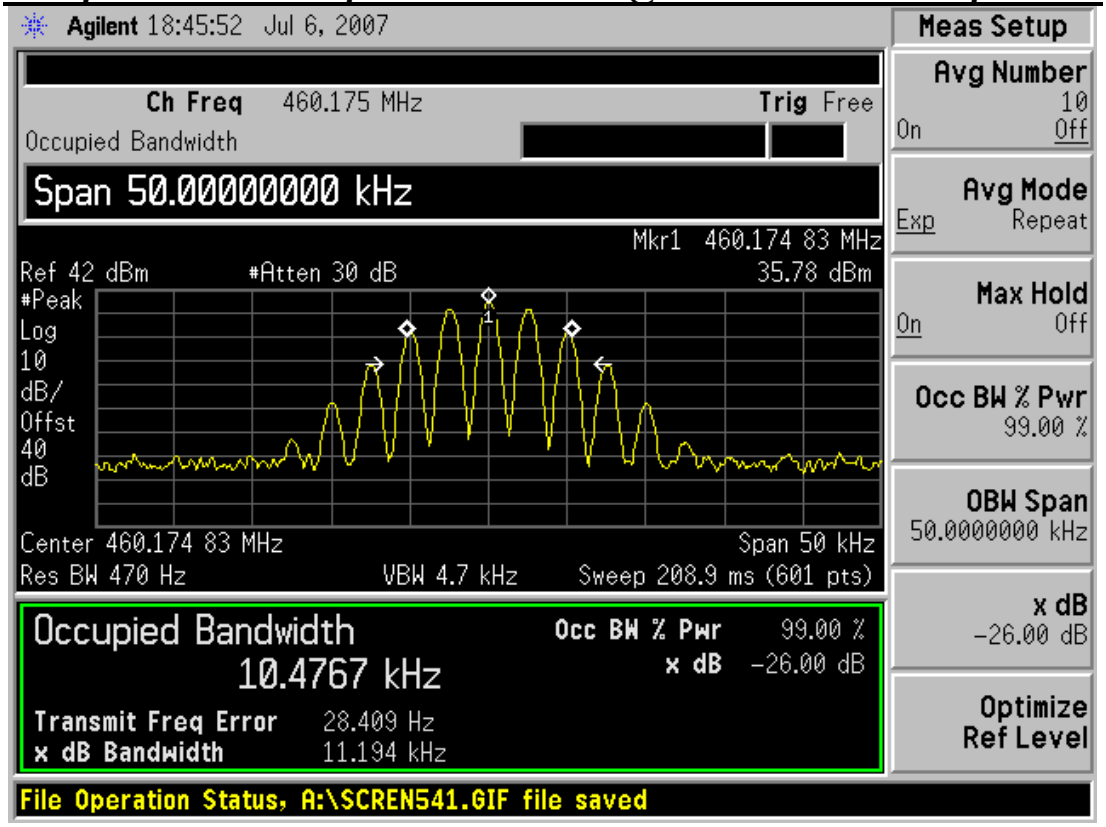
7.5 MEASUREMENT RESULT:

26 dB Bandwidth Measurement Result						
Operating Frequency	12.5 KHz Channel Separation			25 KHz Channel Separation		
	Test Data	Limits	Result	Test Data	Limits	Result
Bottom Channel	5.21 KHz	11.25 KHz	Pass	10.41 KHz	20.00 KHz	Pass
Middle Channel	5.83 KHz	11.25 KHz	Pass	10.48 KHz	20.00 KHz	Pass
Top Channel	5.46 KHz	11.25 KHz	Pass	10.43 KHz	20.00 KHz	Pass

Occupied bandwidth of Middle Channel @ 12.5KHz Channel Separation



Occupied bandwidth of Middle Channel @ 25 KHz Channel Separation



8. UNWANTED RADIATION

8.1 PROVISIONS APPLICABLE

8.1.1 According to Section 90.210, the power of each unwanted emission shall be less than Transmitted Power as specified below for transmitters designed to operate with 12.5 KHz channel bandwidth:

1).On any frequency removed from the center of the authorized bandwidth f_o to 5.625 KHz Removed from f_o: Zero dB

2). On any frequency removed from the center of the authorized bandwidth by a displacement Frequency (f_d in KHz)f_o of more than 5.625 KHz but no more than 12.5 KHz: At least 7.27(fd-2.88 KHz) dB

3). On any frequency removed from the center of the authorized bandwidth by a displacement Frequency (f_d in KHz)f_o of more than 12.5 KHz: At least 50+10 log(P) dB or 70 dB, which ever is lesser attenuation.

8.1.2 According to Section 90.210, Emission masks B. For transmitters designed to transmit with 25KHz channel separation and equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as following:

1), On any frequency removed from the assigned frequency by more than 50 percent, but no more than 100 percent of the authorized bandwith: At least 25 dB.

2), On any frequency removed from the assigned frequency by more than 100 percent, but no more than 250 percent of the authorized bandwith: At least 35 dB.

3), On any frequency removed from the assigned frequency by more than 250 percent of the authoried bandwidth: At least 43+10Log (P) dB.

8.2 MEASUREMENT PROCEDURE

1). On a test site, the EUT shall be placed on a turntable, and in the position closest to the normal use as declared by the user.

2). The test antenna shall be oriented initially for vertical polarization located 3m from the EUT to correspond to the transmitter.

3). The output of the antenna shall be connected to the measuring receiver and either a peak or quasi-peak detector was used for the measurement as indicated on the report. The detector selection is based on how close the emission level was approaching the limit.

4). The transmitter shall be switched on; if possible, without the modulation and the measurement receiver shall be tuned to the frequency of the transmitter under test.

5). The test antenna shall be raised and lowered through the specified range of height until the measuring receiver detects a maximum signal level.

6). The transmitter shall than be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.

7). The test antenna shall be raised and lowered again through the specified range of height until the measuring receiver detects a maximum signal level.

8). The maximum signal level detected by the measuring receiver shall be noted.

9). The measurement shall be repeated with the test antenna set to horizontal polarization.

10). Replace the antenna with a proper Antenna (substitution antenna).

11). The substitution antenna shall be oriented for vertical polarization and, if necessary, the length of the substitution antenna shall be adjusted to correspond to the frequency of transmitting.

12). The substitution antenna shall be connected to a calibrated signal generator.
13). If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.

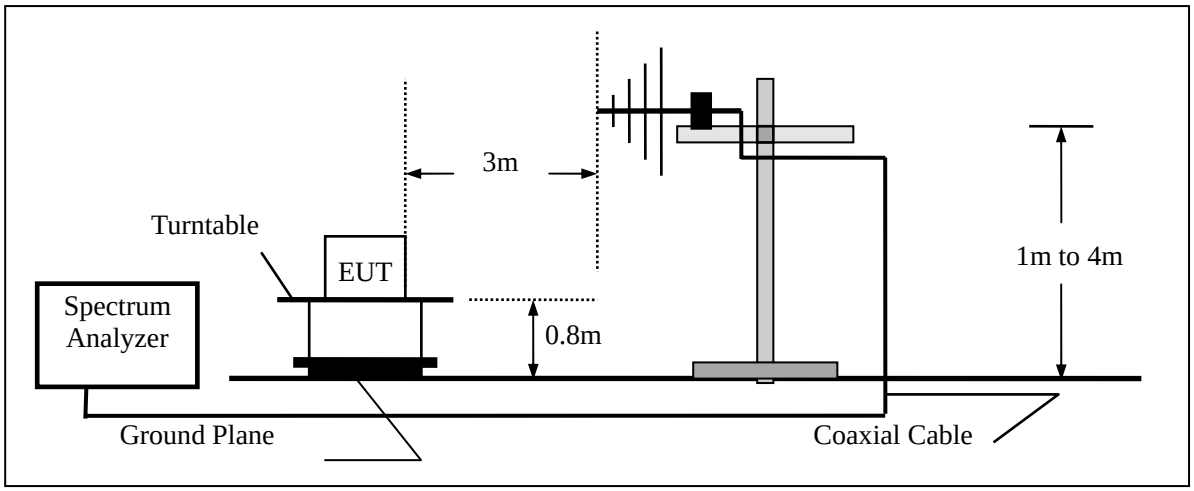
14). The test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.

15). The input signal to substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuation setting of the measuring receiver.

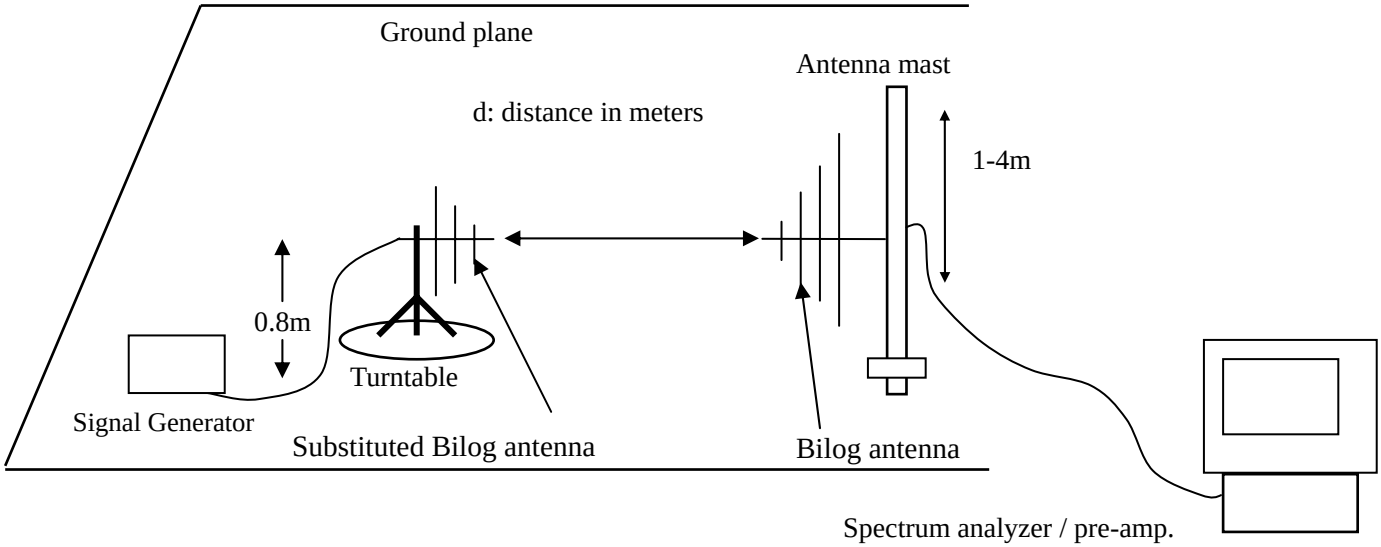
16). The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.

17). The measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.

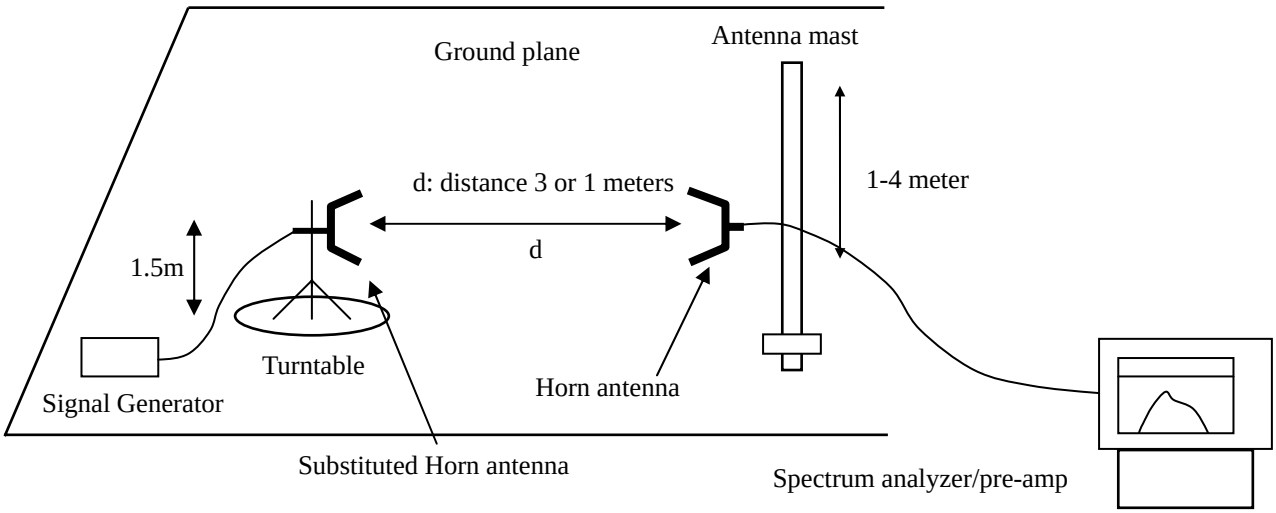
8.3 TEST SETUP BLOCK DIAGRAM (block diagram of configuration)



Radiation below 1GHz



Radiation above 1GHz



8.4 MEASUREMENT EQUIPMENT USED:

Radiated Emission Test Site				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
ULTRA-BROADBAND ANTENNA	Schwarzbeck	VULB9163	9163-194	11/13/2007
EMI TEST RECEIVER	Rohde & Schwarz	ESCS30	100307	11/11/2007
Spectrum Analyzer	ANRITSU	MS2651R	6200238856	11/11/2007
Signal Generator	Rohde & Schwarz	SML01	101161	11/11/2007

8.5 MEASUREMENT RESULTS:

Measurement Result For 12.5 KHz Channel Separation

Calculation: Limit (dBm)= EL-50-10log10 (TP)

Notes: EL is the emission level of the Output Power expressed in dBm,, in this application, the EL is 36.78 dBm.

Limit (dBm)=36.78-50-10log $_{10}$ (5) = -20

Bottom Channel

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Correction (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
***							-20	

Middle Channel

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Correction (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
***							-20	

Top Channel

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Correction (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
***							-20	

***Notes:**

***** means that the emission level is too low to be measured or at least 20 dB down than the limit.**

Measurement Result For 25 KHz Channel Separation

Calculation: Limit (dBm)= EL-43-10log10 (TP)

Notes: EL is the emission level of the Output Power expressed in dBm,, in this application, the EL is 36.71 dBm.

Limit (dBm)=36.71 - 43-10log $_{10}$ (5) = -13 dBm

Bottom Channel

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Correction (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
***							-13	

Middle Channel

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Correction (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
***							-13	

Top Channel

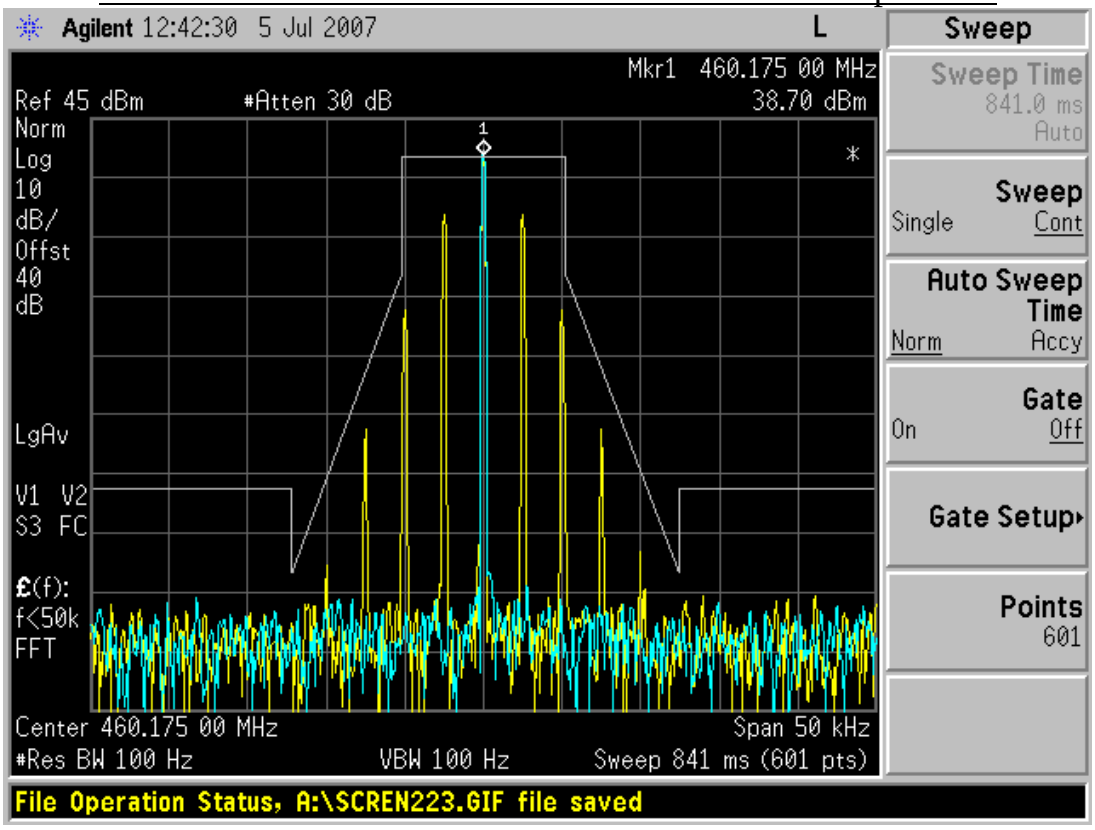
Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Correction (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
***							-13	

***Notes:**

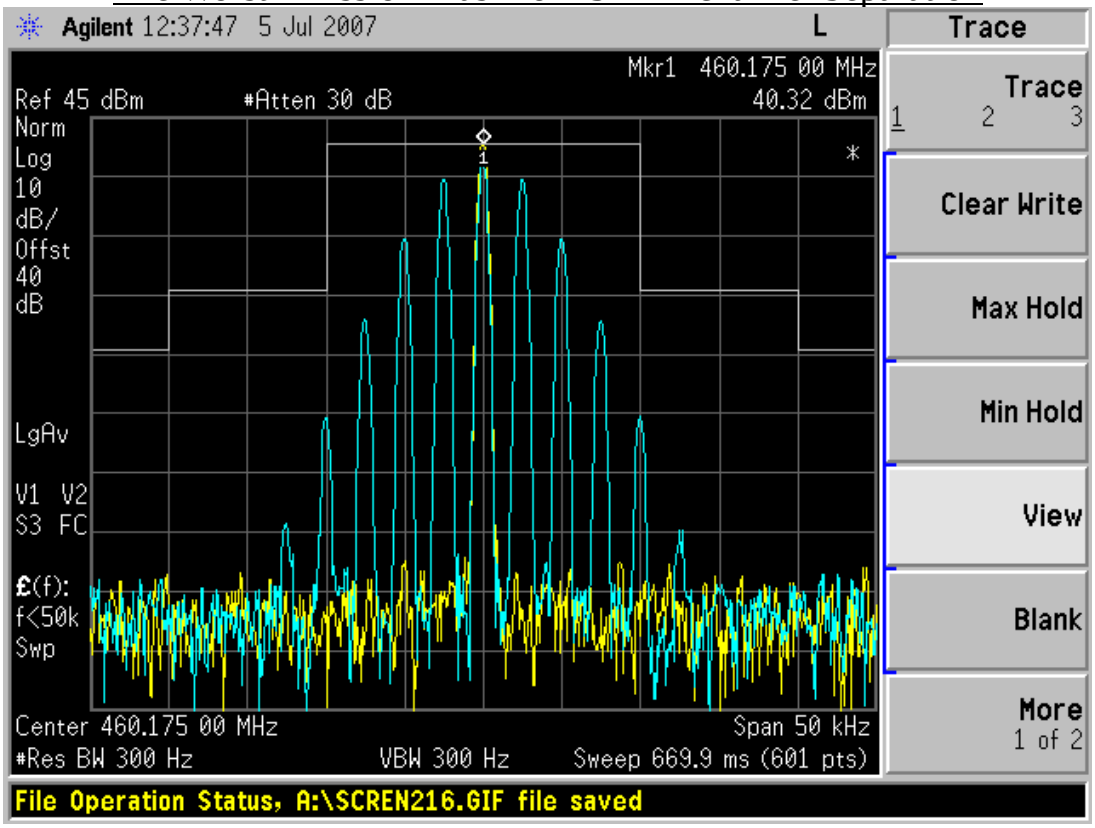
***** means that the emission level is too low to be measured or at least 20 dB down than the limit.**

8.6 Emission Mask Plot

The Worst Emission Mask for 12.5 KHz channel Separation



The Worst Emission Mask for 25 KHz channel Separation



9. MODULATION CHARACTERISTICS

9.1 PROVISIONS APPLICABLE

According to CFR 47 section 2.1047(a), for Voice Modulation Communication Equipment, the frequency response of the audio modulation circuit over a range of 100 to 5000Hz shall be measured.

9.2 MEASUREMENT METHOD

9.2.1 Modulation Limit

1). Configure the EUT as shown in figure 1, adjust the audio input for 60% of rated system deviation at 1KHz using this level as a reference (0dB) and vary the input level from –20 to +20dB. Record the frequency deviation obtained as a function of the input level.

2). Repeat step 1 with input frequency changing to 300, 1000, and 2500Hz in sequence.

9.2.2 Audio Frequency Response

1). Configure the EUT as shown in figure 1.

2). Adjust the audio input for 20% of rated system deviation at 1 KHz using this level as a reference (0 dB).

3). Vary the Audio frequency from 100 Hz to 10 KHz and record the frequency deviation.

4). Audio Frequency Response = 20log10 (Deviation of test frequency/Deviation of 1 KHz reference).

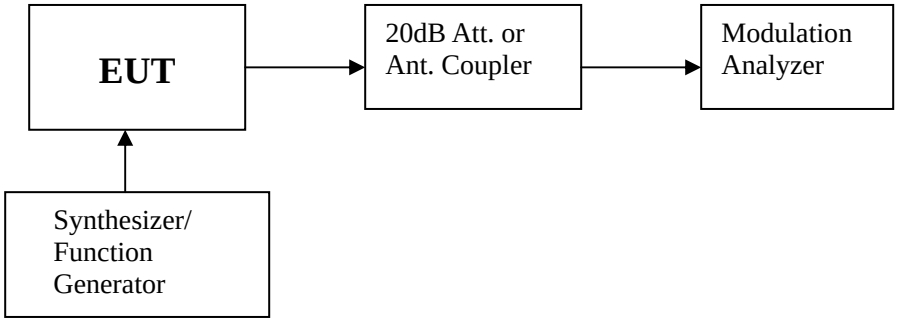


Figure 1: Modulation characteristic measurement configuration

9.3 MEASUREMENT INSTRUMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Modulation Analyzer	HP	8901B	3104A03367	07/08/2007
Signal Generator	Rohde & Schwarz	SMT03	100059	02/01/2007

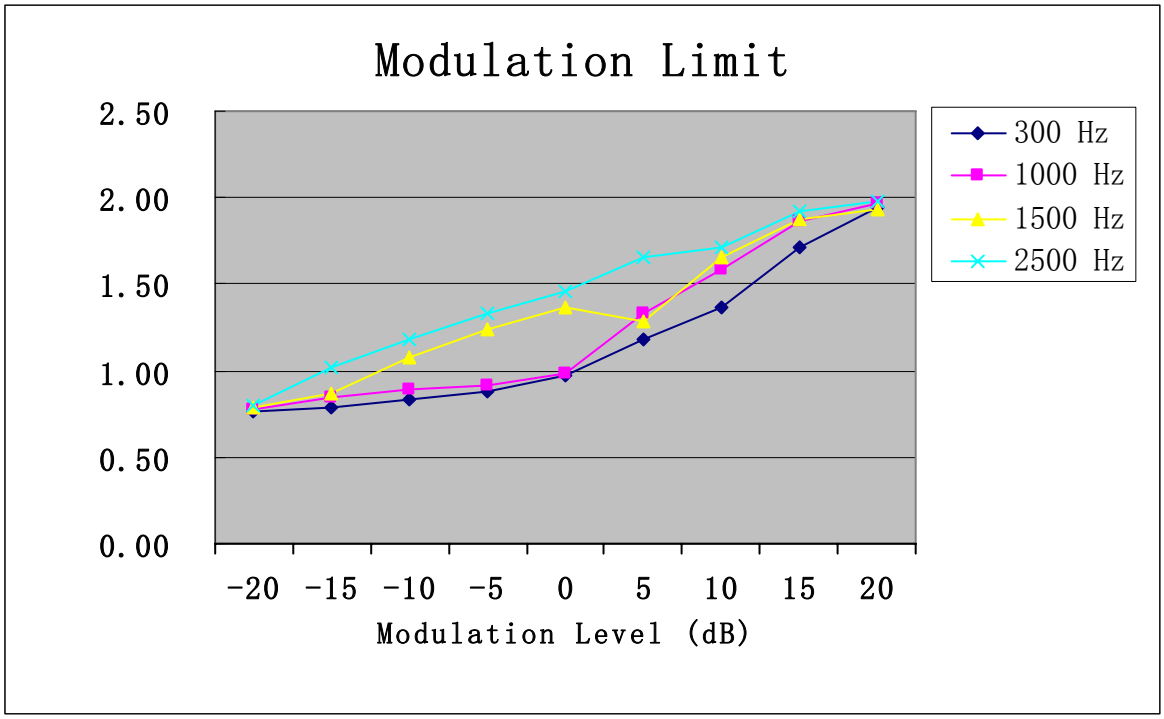
9.4 MEASUREMENT RESULT

a). Modulation Limit:

Middle Channel @12.5KHz Channel Separation

Modulation Level (dB)	Peak Freq. Deviation At 300 Hz (KHz)	Peak Freq. Deviation At 1000 Hz (KHz)	Peak Freq. Deviation At 1500 Hz (KHz)	Peak Freq. Deviation At 2500 Hz (KHz)
-20	0.76	0.77	0.79	0.80
-15	0.79	0.85	0.87	1.02
-10	0.83	0.89	1.08	1.18
-5	0.88	0.92	1.24	1.33
0	0.97	0.98	1.36	1.46
+5	1.18	1.33	1.28	1.65
+10	1.36	1.58	1.65	1.71
+15	1.71	1.86	1.88	1.92
+20	1.95	1.97	1.93	1.98

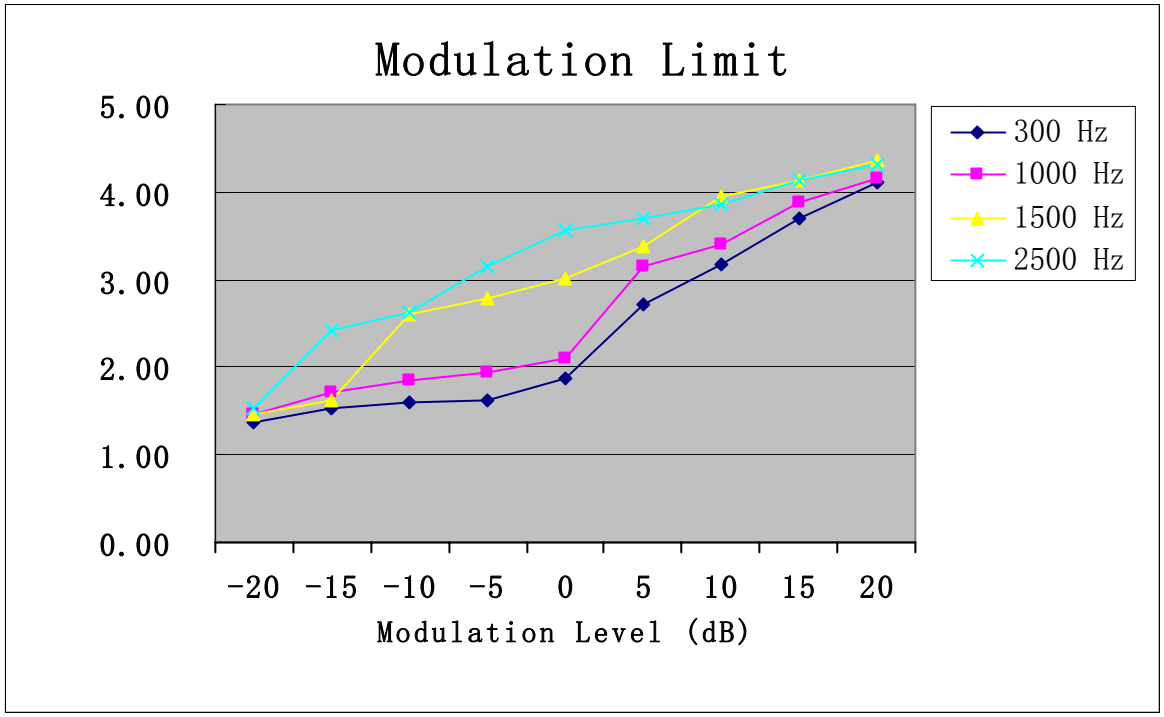
Middle Channel @ 12.5KHz Channel Separation



Middle Channel @ 25KHz Channel Separation

Modulation Level (dB)	Peak Freq. Deviation At 300 Hz (KHz)	Peak Freq. Deviation At 1004 Hz (KHz)	Peak Freq. Deviation At 1500 Hz (KHz)	Peak Freq. Deviation At 2500 Hz (KHz)
-20	1.36	1.46	1.45	1.53
-15	1.52	1.72	1.62	2.41
-10	1.59	1.86	2.61	2.62
-5	1.62	1.94	2.78	3.16
0	1.87	2.11	3.02	3.57
+5	2.71	3.16	3.37	3.71
+10	3.17	3.41	3.95	3.86
+15	3.69	3.89	4.14	4.13
+20	4.11	4.15	4.36	4.32

Middle Channel @ 25KHz Channel Separation

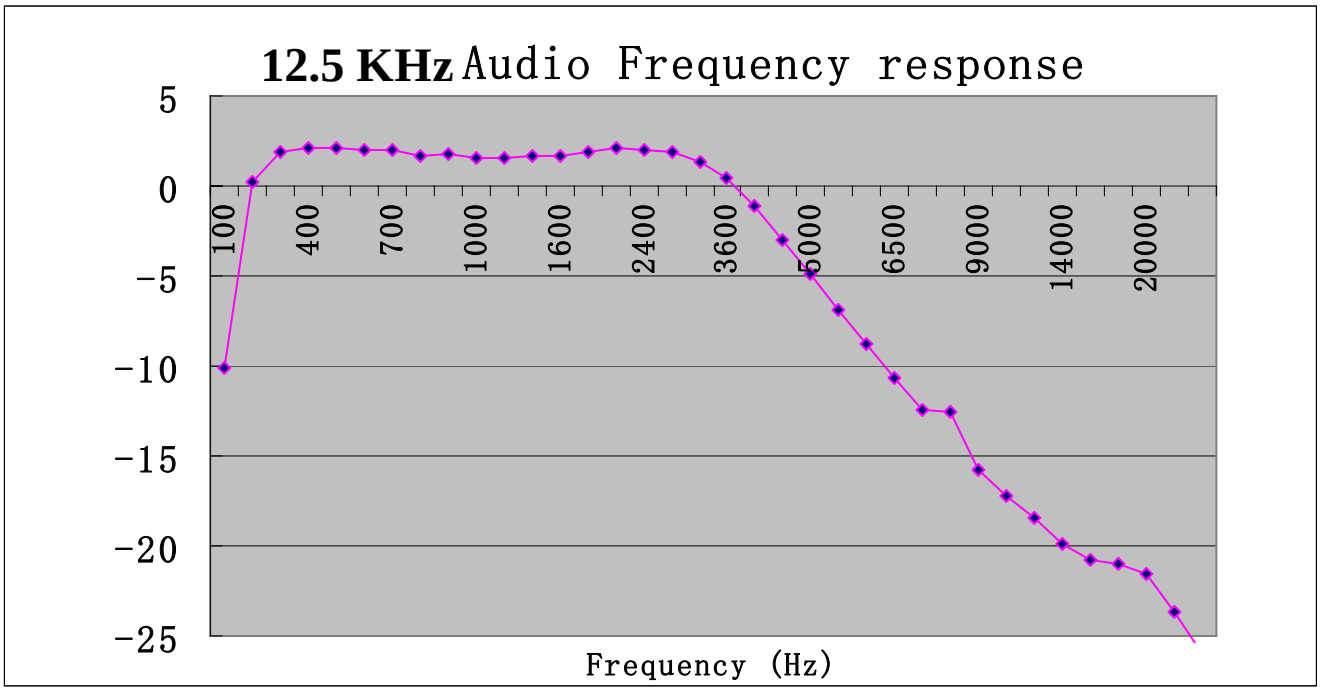


b). Audio Frequency Response:

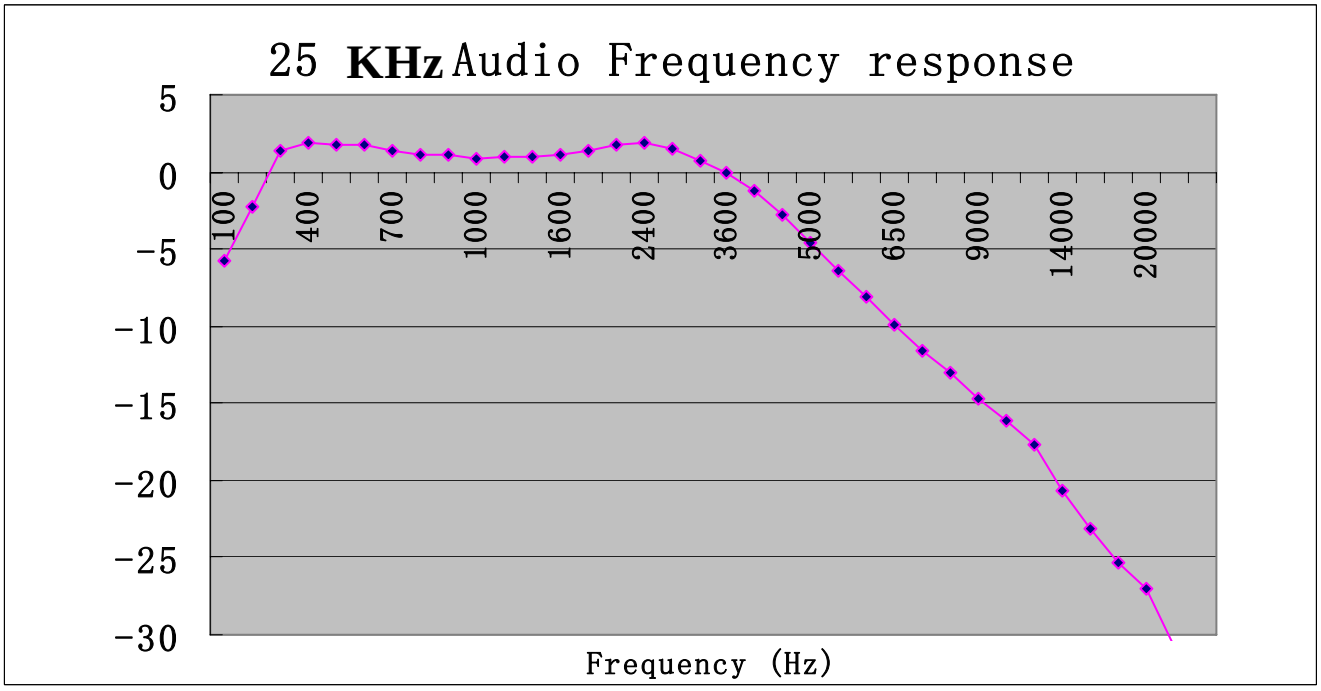
12.5KHz Channel Separation

Frequency (Hz)	Deviation (KHz)
100	0.505
200	1.650
300	2.012
400	2.041
500	2.040
600	2.033
700	2.031
800	1.957
900	1.983
1000	1.926
1200	1.933
1400	1.945
1600	1.955
1800	1.691
2000	1.417
2200	1.137
2400	0.919
2600	0.732
2800	0.586
3000	0.472
3200	0.383
3400	0.380
3600	0.262
3800	0.223
4000	0.193
4200	0.164
4400	0.148
4600	0.143
4800	0.135
5000	0.106
5500	0.081
6000	1.691
6500	1.417
7000	1.137
8500	0.919
10000	0.732

Frequency Response of Middle Channel



Frequency Response of Middle Channel



25KHz Channel Separation

Frequency (Hz)	Deviation (KHz)
100	1.857
200	2.791
300	4.245
400	4.473
500	4.461
600	4.457
700	4.267
800	4.136
900	4.088
1000	3.978
1200	4.042
1400	4.079
1600	4.105
1800	4.250
2000	4.432
2200	4.487
2400	4.322
2600	3.954
2800	3.593
3000	3.138
3200	2.632
3400	2.142
3600	1.741
3800	1.425
4000	1.156
4200	0.957
4400	0.803
4600	0.664
4800	0.567
5000	0.474
5500	0.335
6000	0.253
6500	0.196
7000	0.162
8500	0.104
10000	0.080

10. MAXIMUMN TRANSMITTER POWER (CONDUCTED OUTPUT POWER)

10.1 Provisions Applicable

Per FCC § 2.1046 and § 90.205: Maximum ERP is dependent upon the station's antenna HAAT and required service area.

10.2 Test Procedure

The RF output of transceiver was conducted to a spectrum analyzer through an appropriate attenuator.

10.3 Test Instruments

EQUIPMENT TYPE	MFR	MODEL NO.	SERIAL NO.	LAST CAL.	CAL DUE.
Spectrum Analyzer	ANRITSU	MS2651B	6200238856	11/11/2006	11/10/2007
Attenuator	R&S	50FH-010-30	N/A	12/18/2005	12/17/2007

10.4 Test Result

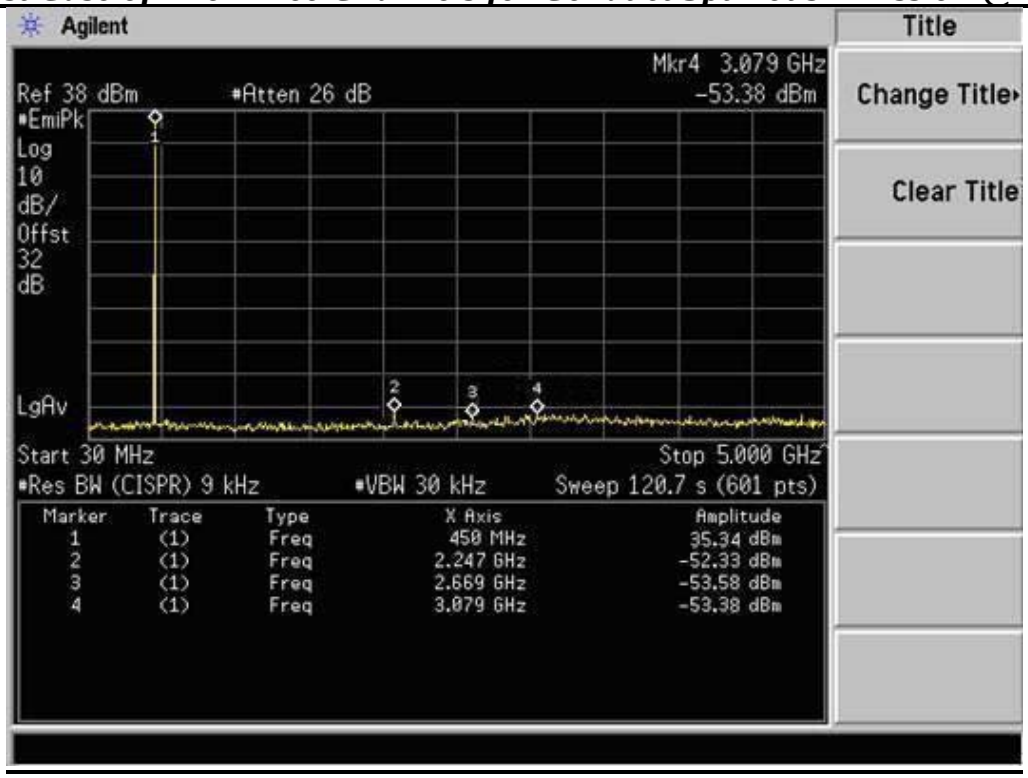
The maximum Conducted Power (CP) is
3.420 W for 12.5 KHz Channel Separation
3.793 W for 25 KHz Channel Separation

Calculation Formula: CP = R + A + L
* Note:
CP: The final Conducted Power
R: The reading value from spectrum analyzer
A: The attenuation value of the used attenuator
L: The loss of all connection cables

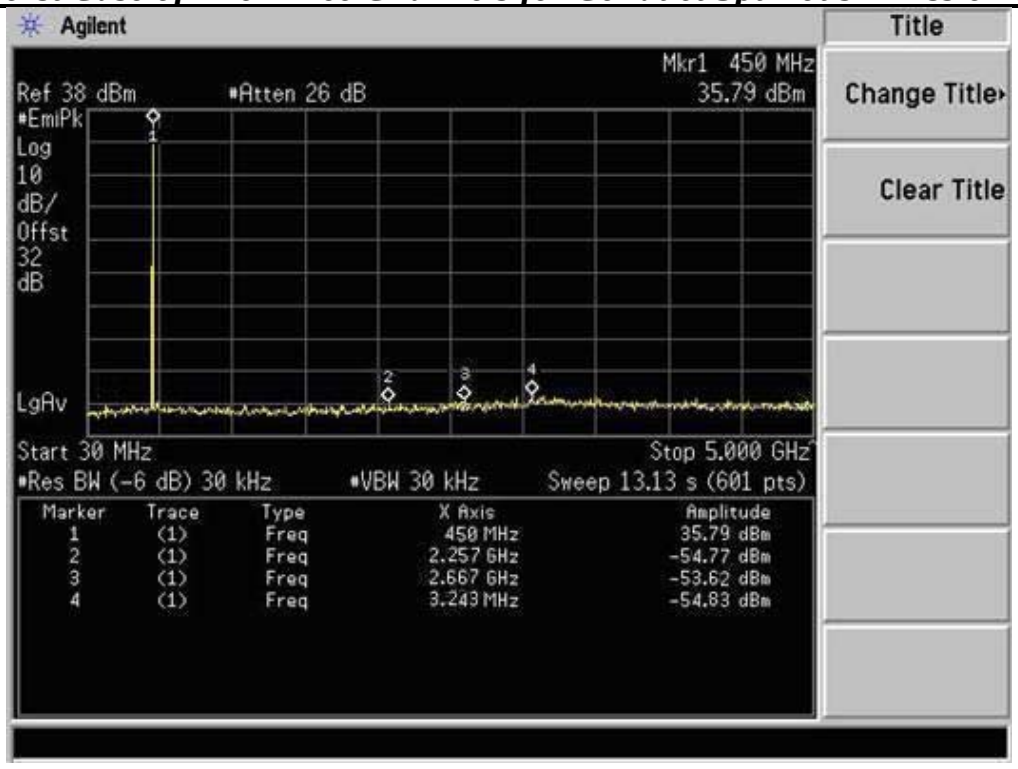
Conducted Power Measurement Results		
Channel Separation	**Channel**	**Measurement Result**
12.5 KHz	Bottom	35.11 dBm
	Middle	35.34 dBm
	Top	35.09 dBm
25 KHz	Bottom	35.13 dBm
	Middle	35.79 dBm
	Top	35.35 dBm

10.5 Conduct spurious plot

The Worst Case of The Three Channels for Conduct Spurious Emission @ 12.5KHz



The Worst Case of The Three Channels for Conduct Spurious Emission @ 25KHz



11 TRANSMITTER FREQUENCY BEHAVIOR

11.1 Provisions Applicable

Section 90.214

11.2 Test Method

TIA/EIA-603 2.2.19

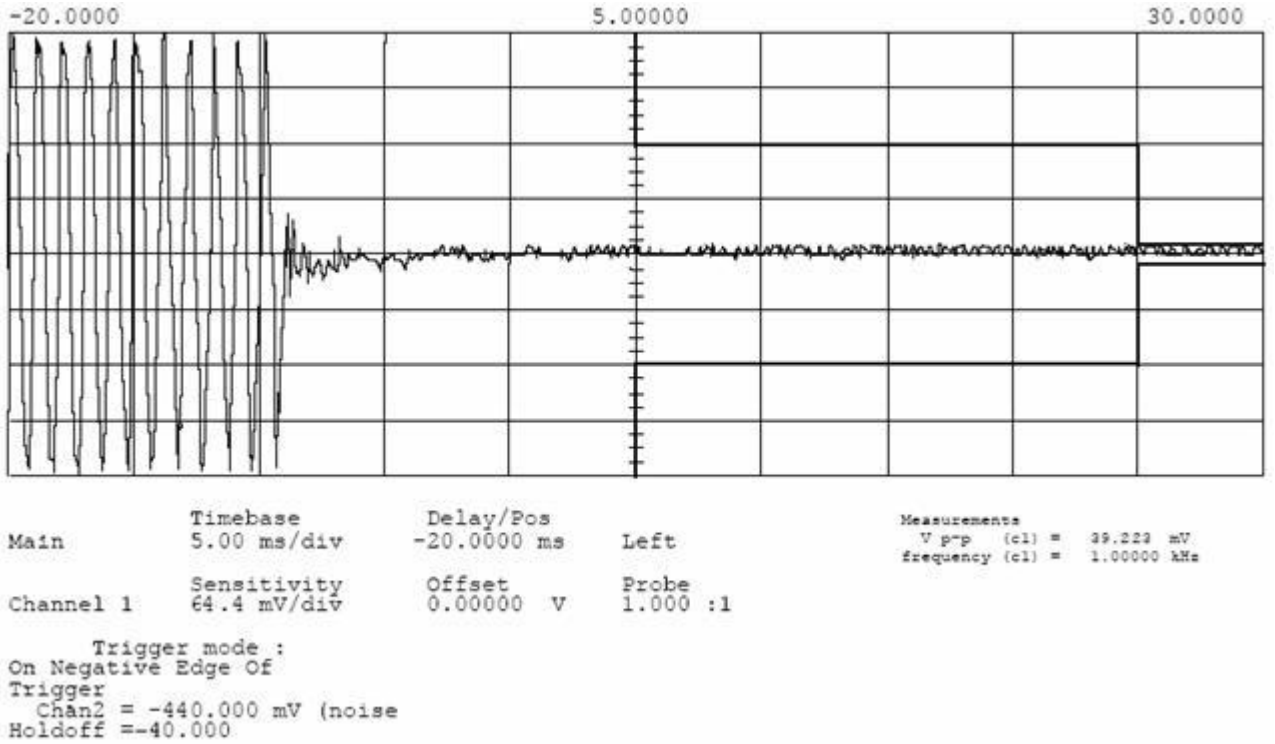
11.3 Test Instruments

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Signal Generator	Rohde&Schwarz	SML01	101161	11/10/2007
Storage Oscilloscope	Tektronix	TDS3052	B017447	06/28/2008

11.4 Measure Result

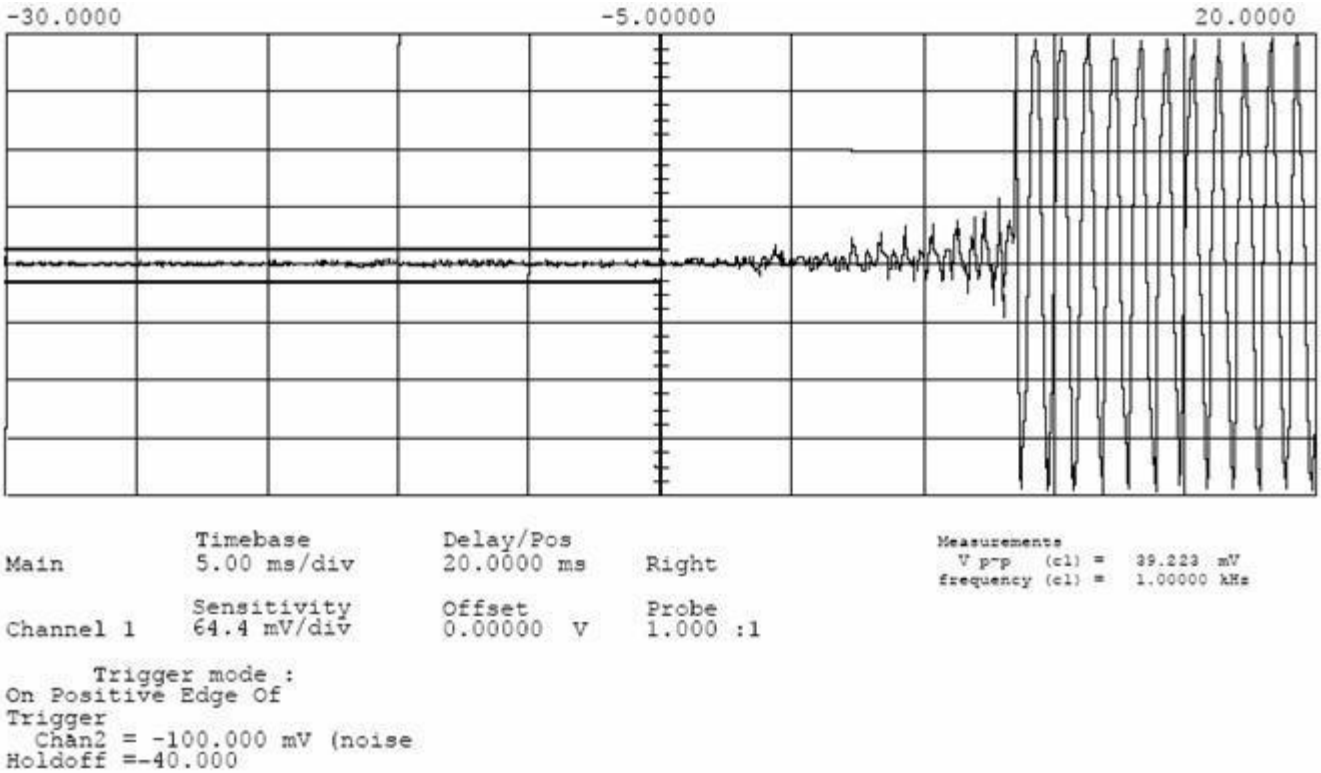
Transmitter Frequency Behaviour @ 25KHz Channel Separation------Off-On

| T1 =10 ms | T2 =25 ms |



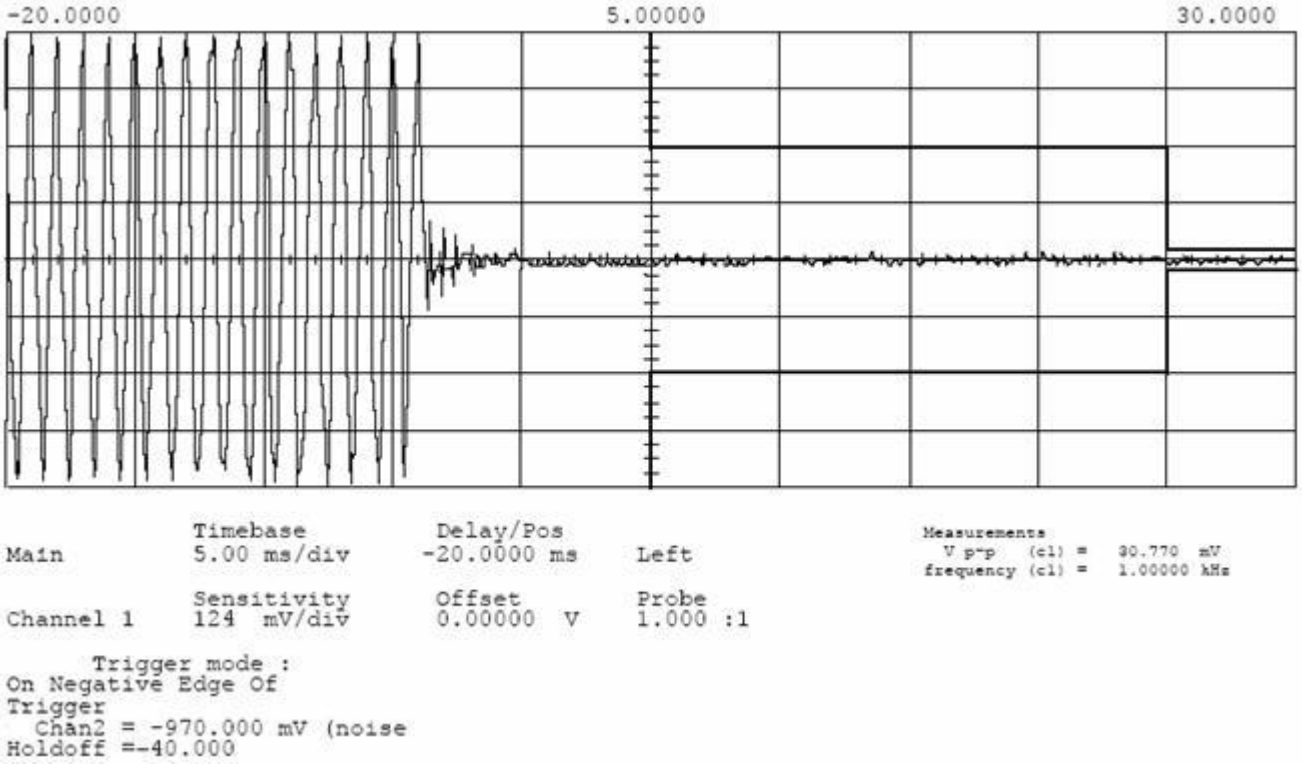
Transmitter Frequency Behaviour @ 25 KHz Channel Separation------On – Off

| T3=10 ms |



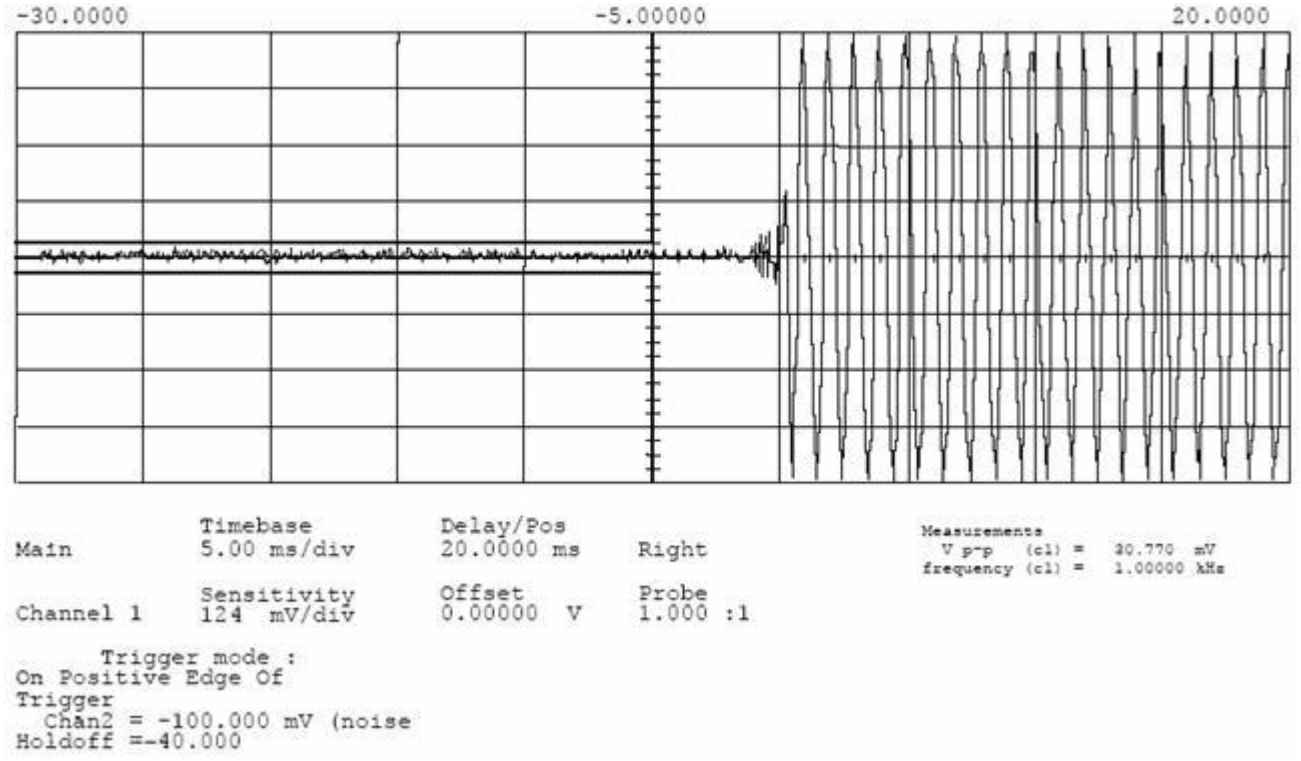
Transmitter Frequency Behaviour @ 12.5 KHz Channel Separation------Off – On

| T1=10 ms | T2= 25 ms |



Transmitter Frequency Behaviour @ 12.5 KHz Channel Separation------On-Off

| T3=10ms |



12 Radiated Emission on Receiving Mode

12.1 Provisions Applicable

FCC Part 15 Subpart B Section 15.109

12.2 Test Method

ANSI C 63.4: 2003

12.3 Test Instruments

Radiated Emission Test Site				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
ULTRA-BROADBAND ANTENNA	Schwarzbeck	VULB9163	9163-194	11/13/2007
EMI TEST RECEIVER	ROHDE & SCHWARZ	ESCS30	100307	11/11/2007
Spectrum Analyzer	ANRITSU	MS2651R	6200238856	11/11/2007
Signal Generator	Rohde & Schwarz	SML01	101161	11/11/2007

12.4 Test Mode:

The test configuration of the EUT was:

a. EUT+Adapter+Socket;
b. EUT+Earphone.

12.5 Measure Result (Measured at 3m using FCC Part15 B Limits)

The worst test mode was Mode b, its test data was showed as the follow:

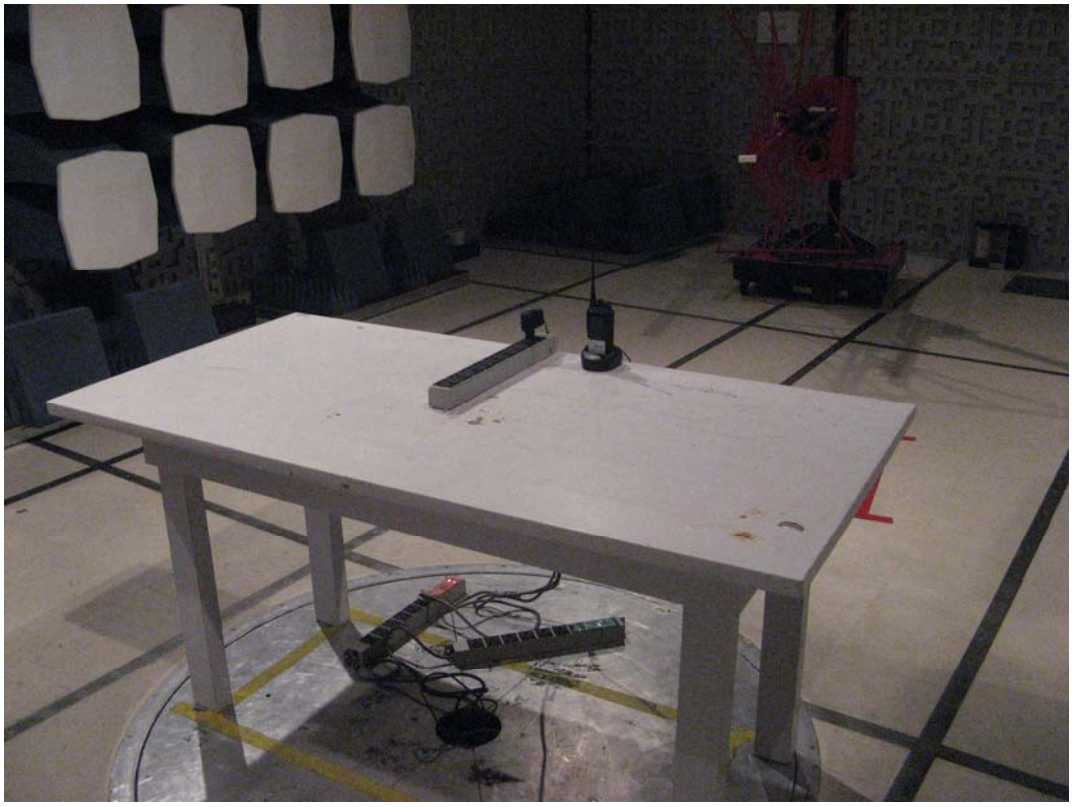
(MHz)	Peak	Q.P.	Avg.	dB	Peak	Q.P.	Avg.	Peak	Q.P.	Avg.	QP(dB)	(P/F)	(H/V)
71.58	23.22	--	--	8.09	31.31	--	--	--	40	--	-8.69	P	H
90.26	25.38	--	--	9.79	35.17	--		--	40	--	-4.83	P	H
108.15	22.15	--	--	10.03	32.18	--	--	--	43.5	--	-11.3	P	H
130.48	24.61	--	--	9.07	33.68	--	--	--	43.5	--	-9.82	P	H
211.75	23.76	--	--	12.72	36.48	--	--	--	43.5	--	-7.02	P	H
250.34	26.45	--		14.31	40.76	--			46		-5.24	P	H
69.87	22.46	--	--	8.09	30.547	--	--	--	40	--	-9.45	P	V
89.23	26.41	--	--	9.79	36.2	--	--	--	48	--	-11.8	P	V
107.15	27.75	--	--	10.03	37.78	--	--	--	43.5	--	-5.72	P	V
133.68	26.52	--	--	9.07	35.59	--	--	--	43.5	--	-7.91	P	V
210.46	24.32	--	--	12.72	37.037	--	--	--	43.5	--	-6.46	P	V
241.84	26.82	--	--	14.29	41.11	--	--	--	46	--	-4.89	P	V

APPENDIX I

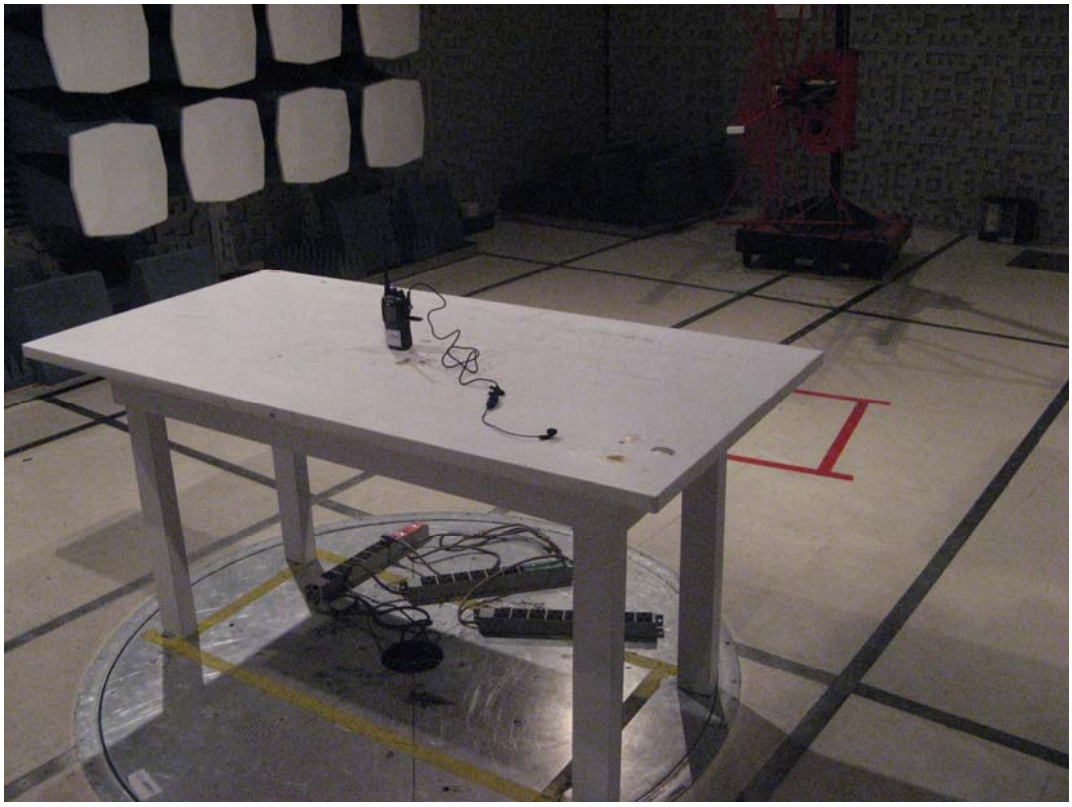
PHOTOGRAPHS OF SETUP

Radiated Test Setup

Mode a



Mode b



Conducted Test Setup

APPENDIX II

EXTERNAL VIEW OF EUT

Front view of EUT

Back view of EUT

Top view of EUT

Bottom view of EUT

Left view of EUT

Right view of EUT

EUT and the Appurtenance

Internal view-1

Internal view-2

Internal view-3