



NVLAP LAB CODE 200707-0



FCC PART 90 TYPE APPROVAL EMI MEASUREMENT AND TEST REPORT

For

Kirisun Electronics (Shenzhen) Co., Ltd.

6/F., Bldg. H-2, East Industrial Zone of Overseas Chinese Town,
Nanshan Dist., Shenzhen P.R. of China

FCC ID: Q5EPT650002A

This Report Concerns: <input checked="" type="checkbox"/> Original Report	Equipment Type: Two-way Radio
Test Engineer:	Jim Li <i>Jim Li</i>
Report No.:	RSZ08032002
Test Date:	2007-04-07 to 2007-04-24
Report Date:	2008-04-24
Reviewed By:	EMC Manager: Green Xu <i>Green Xu</i>
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008

Note: This test report is for the customer shown above and their specific product only. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Shenzhen). This report **must not** be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the Federal Government.

TABLE OF CONTENTS

GENERAL INFORMATION.....	4
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	4
OBJECTIVE	4
RELATED SUBMITTAL(S)/GRANT(S).....	4
TEST METHODOLOGY	4
TEST FACILITY	5
SYSTEM TEST CONFIGURATION.....	6
DESCRIPTION OF TEST CONFIGURATION	6
EQUIPMENT MODIFICATIONS	6
CONFIGURATION OF TEST SETUP	6
BLOCK DIAGRAM OF TEST SETUP	6
SUMMARY OF TEST RESULTS	7
§2.1046 - CONDUCTED OUTPUT POWER.....	8
APPLICABLE STANDARD	8
TEST EQUIPMENT LIST AND DETAILS.....	8
TEST PROCEDURE	8
TEST DATA	8
§2.1046, §90.205 – RADIATED OUTPUT POWER.....	11
APPLICABLE STANDARD	11
TEST EQUIPMENT LIST AND DETAILS.....	11
TEST PROCEDURE	11
TEST DATA	12
§2.1047, §90.207 - MODULATION CHARACTERISTIC	13
APPLICABLE STANDARD	13
TEST EQUIPMENT LIST AND DETAILS.....	13
TEST PROCEDURE	13
TEST DATA	13
§2.1049, § 90.209 – OCCUPIED BANDWIDTH.....	20
APPLICABLE STANDARD	20
TEST EQUIPMENT LIST AND DETAILS.....	20
TEST PROCEDURE	21
TEST DATA	21
§2.1051 §90.210 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS.....	24
APPLICABLE STANDARD	24
TEST EQUIPMENT LIST AND DETAILS.....	24
TEST PROCEDURE	25
TEST DATA	25
§2.1053 §90.210 - RADIATED SPURIOUS EMISSIONS.....	29
APPLICABLE STANDARD	29
TEST EQUIPMENT LIST AND DETAILS.....	29
TEST PROCEDURE	29
TEST RESULTS SUMMARY.....	29
TEST DATA	30

§2.1055 §90.213- FREQUENCY STABILITY32
 APPLICABLE STANDARD32
 TEST EQUIPMENT LIST AND DETAILS.....32
 TEST PROCEDURE32
 TEST DATA33

§90.214 - TRANSIENT FREQUENCY BEHAVIOR.....36
 APPLICABLE STANDARD36
 TEST EQUIPMENT LIST AND DETAILS.....36
 TEST PROCEDURE36
 TEST DATA36

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *KIRISUN ELECTRONICS (SHENZHEN) CO., LTD*'s product, model number: PT6500-02 or the "EUT" as referred to in this report is a Two-way Radio. The EUT is measured approximately 5.6 cm L x 3.5 cmW x 12.0 cmH, rated input voltage: DC 7.5 V battery.

AC/DC Adapter:

Model: ADP125-3A

Input: 100-240 V 0.4A 50-60 Hz

Output: +12V --- 0.5A 6W Max

Charger: RAPID CHARGER

Model: KBC-36C,

Input: DC 11-20V 500mA

Output: 400mA

** All measurement and test data in this report was gathered from production sample serial number: 0803043 (Assigned by BAACL, Shenzhen). The EUT was received on 2008-03-20.*

Objective

This Type approval report is prepared on behalf of *KIRISUN ELECTRONICS (SHENZHEN) CO., LTD* in accordance with Part 2, and Part 90 of the Federal Communication Commissions rules.

Related Submittal(s)/Grant(s)

No related submittal(s).

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of federal Regulations Title 47 Part 2, Sub-part J as well as the following individual parts:

Part 90 – Private Land Mobile Radio Service

Applicable Standards: TIA 603-C and ANSI 63.4-2003.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 04, 2004. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0).



NVLAP LAB CODE 200707-0

The current scope of accreditations can be found at <http://ts.nist.gov/Standards/scopes/2007070.htm>

SYSTEM TEST CONFIGURATION

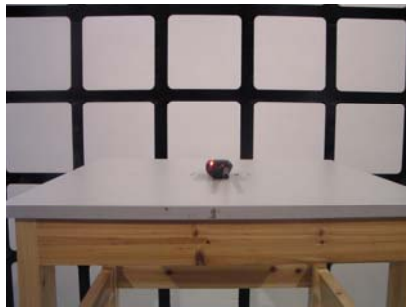
Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user).

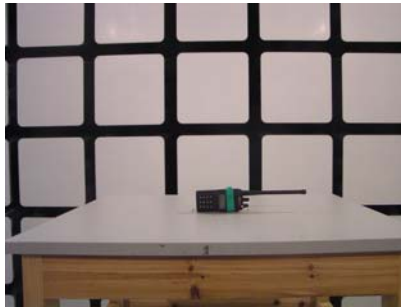
Equipment Modifications

No modifications were made to the unit tested.

Configuration of Test Setup



Lie

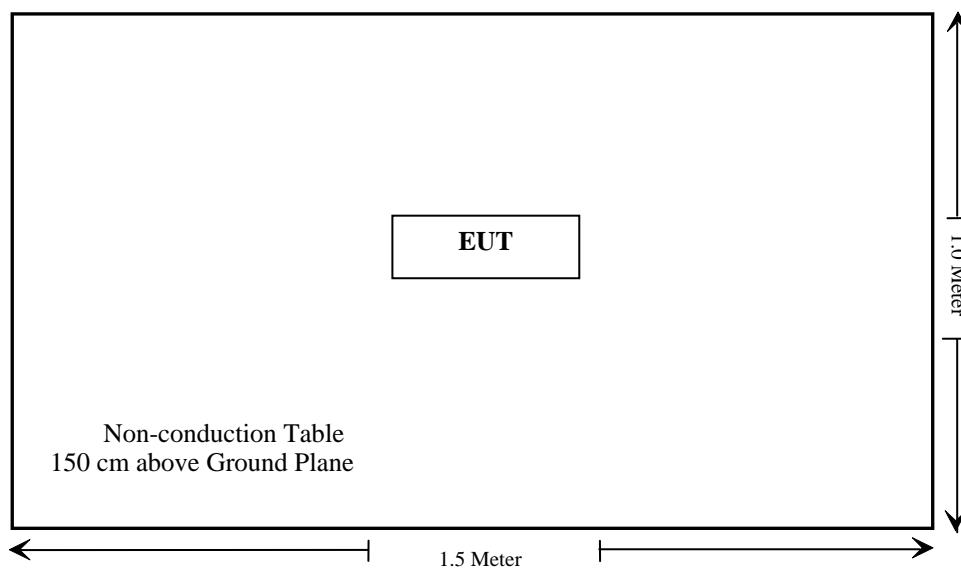


Side



Stand

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§1.1310 §2.1093	RF Exposure	Compliant, refer to SAR Report
§2.1046, §90.205	Radiated Output Power	Compliant
§2.1047 §90.207	Modulation Characteristic	Compliant
§2.1049, §90.209	Occupied Bandwidth	Compliant
§2.1051 §90.210	Spurious Emission at Antenna Terminal	Compliant
§ 2.1053 § 90.210	Spurious Radiated Emissions	Compliant
§ 2.1055 § 90.213	Frequency stability	Compliant
§ 90.214	Transient Frequency Behavior	Compliant

§2.1046 - CONDUCTED OUTPUT POWER

Applicable Standard

According to FCC §2.1046, and §90.205.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2007-10-16	2008-10-16

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

Spectrum Analyzer Setting:

R B/W	Video B/W
100 kHz	300 kHz

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	50%
ATM Pressure:	100.5kPa

The testing was performed by Jim Li on 2008-04-13.

Test Mode: Transmitting

Frequency (MHz)	Channel Separation (kHz)	Conducted Output power (dBm)	Conducted Output power (W)
435.125	12.5	35.94	3.926
	20.0	35.93	3.917

Note: The test channel is channel 2 and channel 5, the frequency is same. Only channel separation is difference.

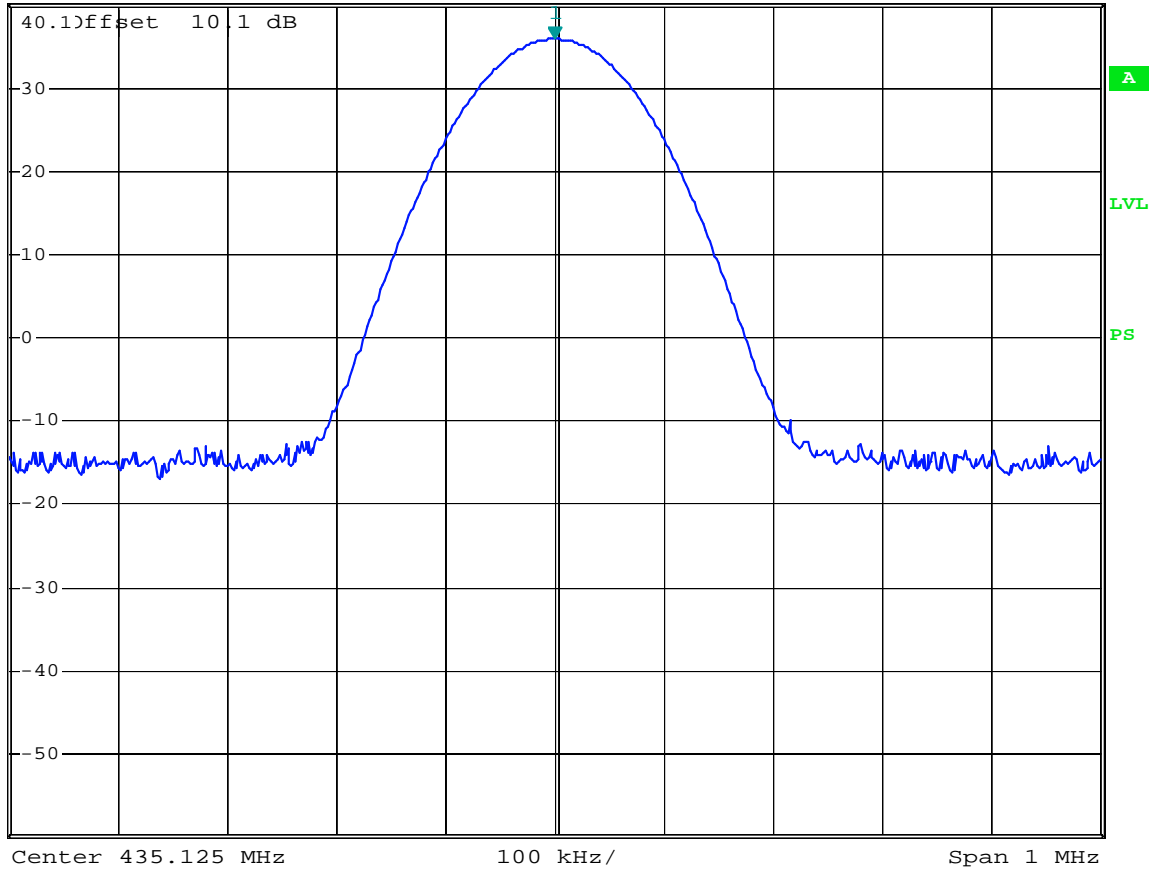
Test Result: Compliance.

Please refer to following plots



Ref 40.1 dBm *Att 75 dB SWT 2.5 ms 435.12500000 MHz
*RBW 100 kHz Marker 1 [T1] 35.93 dBm
VBW 300 kHz

1 PK
VIEW



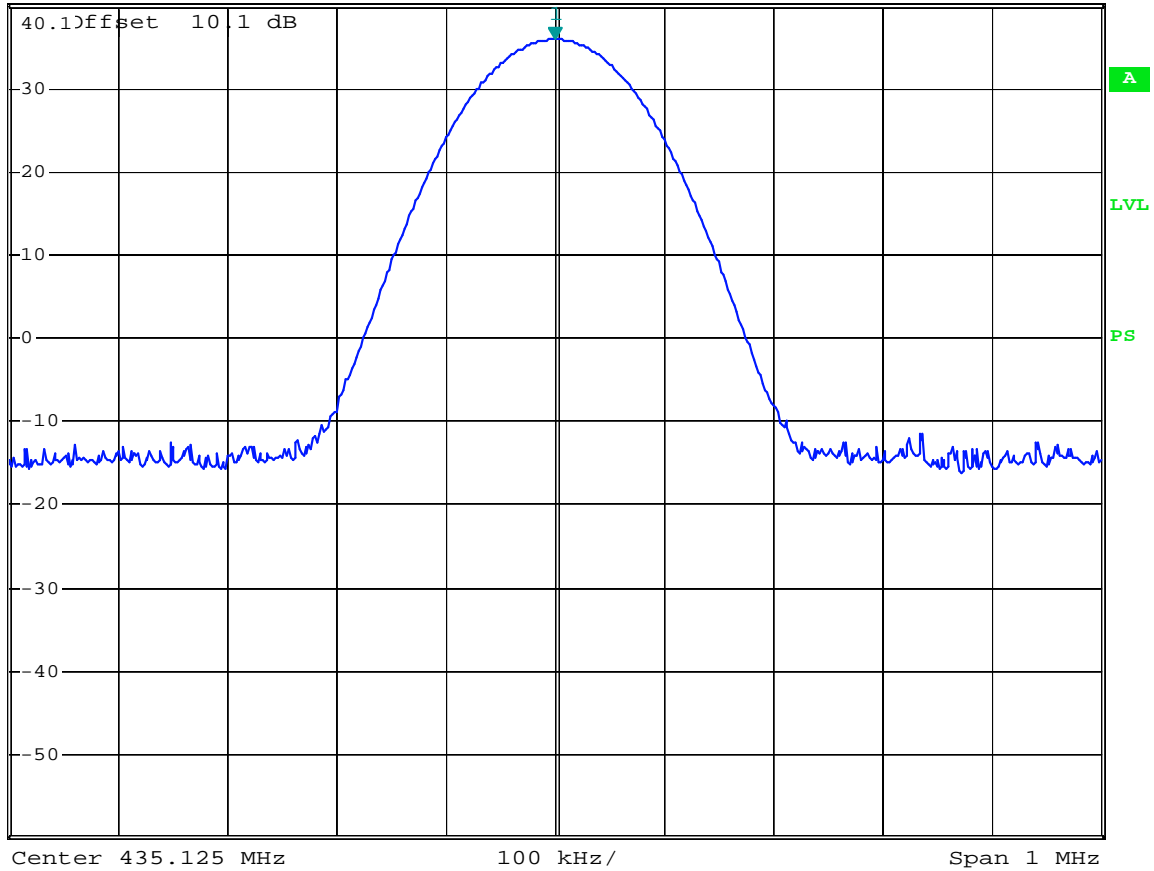
kirisun:PT6500-02 WIDE CHANNEL RF OUTPUT POWER

Date: 13.APR.2008 01:07:55



Ref 40.1 dBm *Att 75 dB *RBW 100 kHz Marker 1 [T1]
VBW 300 kHz 35.94 dBm
SWT 2.5 ms 435.12500000 MHz

1 PK
VIEW



kirisun:PT6500-02 NARROW CHANNEL RF OUTPUT POWER

Date: 13.APR.2008 01:09:39

§2.1046, §90.205 – RADIATED OUTPUT POWER

Applicable Standard

According to FCC §2.1046, and §90.205.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Horn Antenna	DRH-118	A052604	2007-09-25	2008-09-25
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2007-08-14	2008-08-14
Sunol Sciences	Bilog Antenna	JB1	A040904-2	2007-08-14	2008-08-14
Rohde&Schwarz	Spectrum Analyzer	FSEM30	849720/019	2007-05-09	2008-05-09
HP	Signal Generator	HP8657A	2849U00982	2007-10-16	2008-10-16
A.H. System	Horn Antenna	SAS-200/571	135	2007-05-17	2008-05-17
Giga-tronics	Signal Generator	1026	270801	2007-09-29	2008-09-29

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load, which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to teeth harmonic of the fundamental frequency was investigated.

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 ERP were measured by the substitution.

Absolute level = substituted level + Antenna gain - Cable Loss

Test Data**Environmental Conditions**

Temperature:	25 ° C
Relative Humidity:	50%
ATM Pressure:	100.5kPa

The testing was performed by Jim Li on 2008-04-17.

Test Mode: Transmitting

Indicated		Table Angle Degree	Test Antenna		Substituted			Ant. Gain Correction (dBd)	FCC Part 90		
Freq. (MHz)	Receiver Reading (dBuV)		Height (m)	Polar (H/V)	Freq. (MHz)	Level (dBm)	Ant. Polar (H/V)		Cable Loss (dB)	Absolute Level (dBm)	Output Power (W)
Transmitting CH2 (435.125 MHz) channel separation = 20.0 kHz											
435.125	92.1	45	1.6	H	435.125	31.2	H	0	1.84	29.36	0.862
435.125	99.9	45	1.5	V	435.125	36.3	V	0	1.84	34.46	2.793
Transmitting CH5 (435.125 MHz) channel separation = 12.5 kHz											
435.125	93.6	126	1.56	H	435.125	32.1	H	0	1.84	30.26	1.062
435.125	100.7	126	1.72	V	435.125	36.1	V	0	1.84	34.26	2.667

§2.1047, §90.207 - MODULATION CHARACTERISTIC

Applicable Standard

§2.1047 & §90.207:

- (a) Equipment which utilizes voice modulated communication shall show the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz. for equipment which is required to have a low pass filter, the frequency response of the filter, or all of the circuitry installed between the modulation limited and the modulated stage shall be supplied.
- (b) Equipment which employs modulation limiting, a curve showing the percentage of modulation versus the modulation input voltage shall be supplied.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Modulation Analyzer	8901B	3438A05208	2008-04-11	2009-04-11
NANYAN	Audio Generator	NY2201	019829	2007-12-23	2008-12-23

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

Test Method: TIA/EIA-603 2.2.3

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	50%
ATM Pressure:	100.5kPa

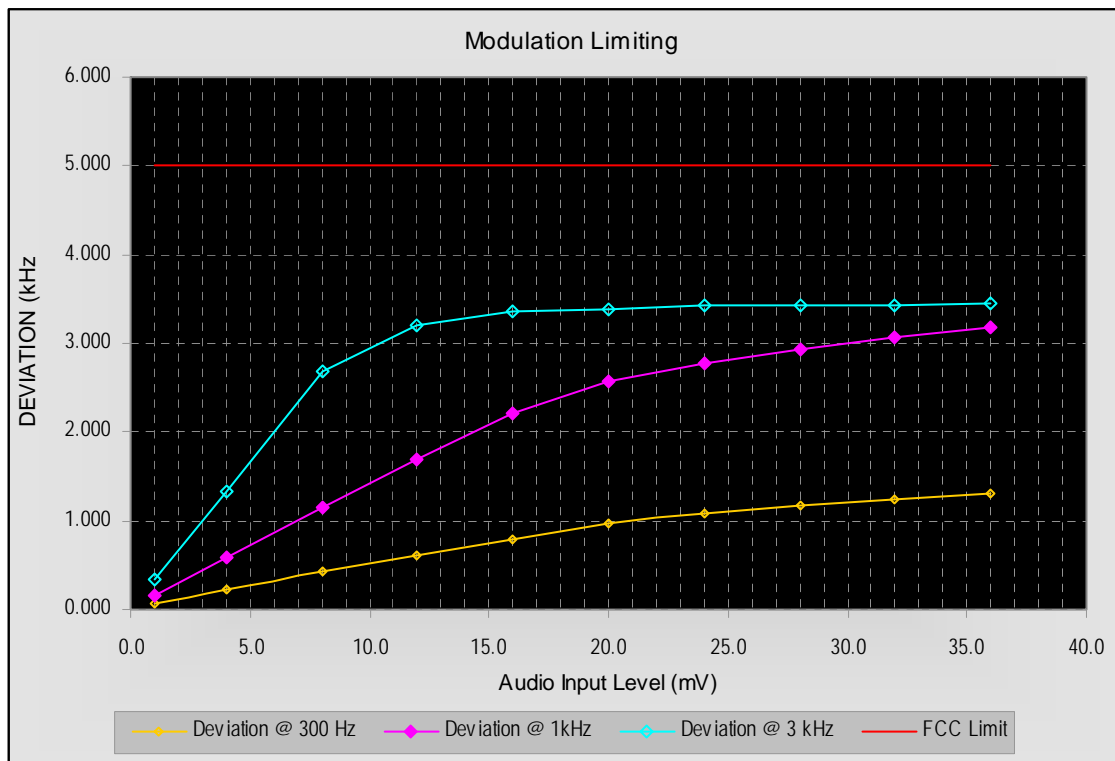
The testing was performed by Jim Li on 2008-04-07.

Test Mode: Transmitting

MODULATION LIMITING

Mode: Two-way Radio
 Carrier Frequency: 435.125 MHz CH2 channel
 Separation = 20.0 kHz

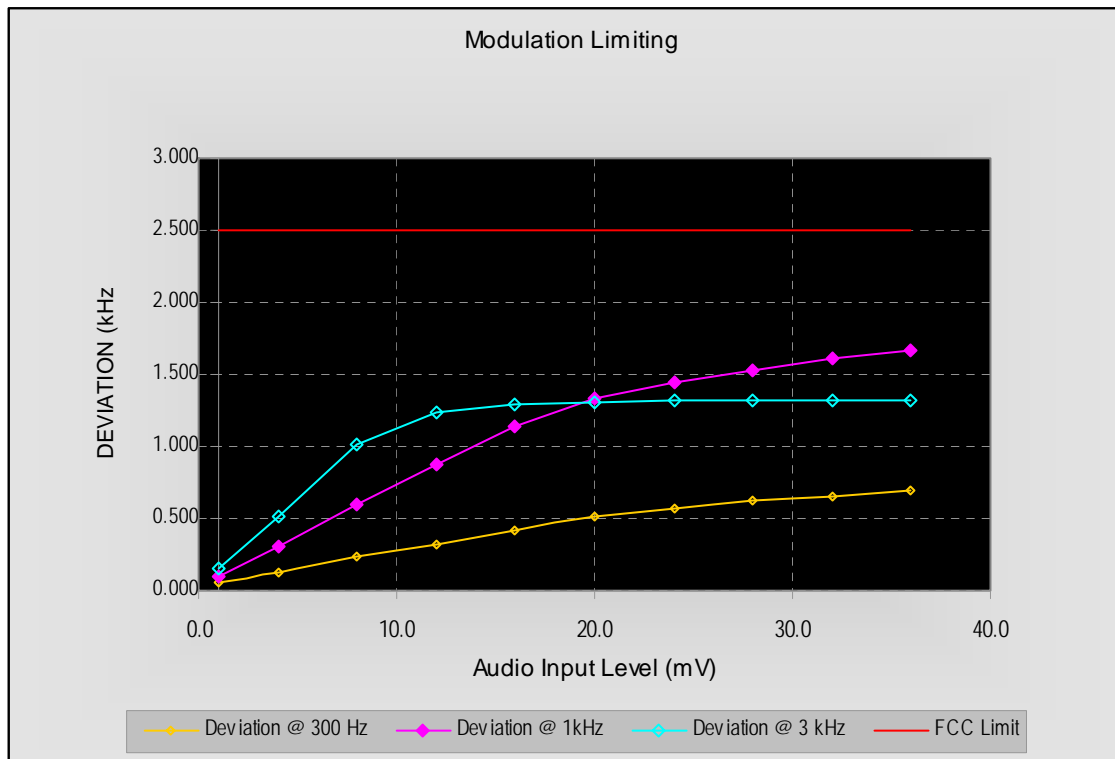
AUDIO INPUT LEVEL [mV]	DEVIATION (@300Hz) [kHz]	DEVIATION (@ 1kHz) [kHz]	DEVIATION (@ 3kHz) [kHz]	FCC Limit [kHz]
1.0	0.078	0.163	0.340	5.0
4.0	0.222	0.578	1.330	5.0
8.0	0.430	1.150	2.680	5.0
12.0	0.620	1.688	3.210	5.0
16.0	0.789	2.200	3.350	5.0
20.0	0.972	2.570	3.390	5.0
24.0	1.085	2.780	3.420	5.0
28.0	1.164	2.930	3.430	5.0
32.0	1.242	3.070	3.435	5.0
36.0	1.301	3.180	3.440	5.0



MODULATION LIMITING

Mode: Two-way Radio
 Carrier Frequency: 435.125 MHz CH5 channel
 Separation = 12.5 kHz

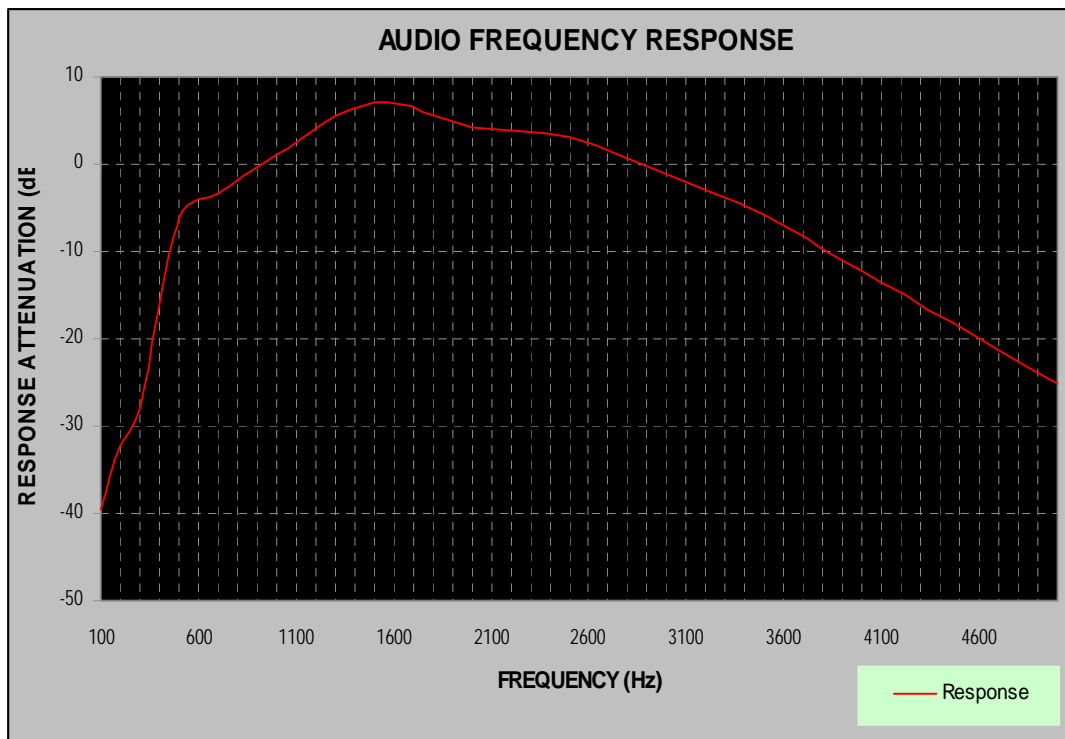
AUDIO INPUT LEVEL [mV]	DEVIATION (@300Hz) [kHz]	DEVIATION (@ 1kHz) [kHz]	DEVIATION (@ 3kHz) [kHz]	FCC Limit [kHz]
1.0	0.060	0.100	0.147	2.5
4.0	0.120	0.300	0.520	2.5
8.0	0.230	0.600	1.020	2.5
12.0	0.320	0.870	1.230	2.5
16.0	0.420	1.140	1.290	2.5
20.0	0.520	1.330	1.300	2.5
24.0	0.570	1.450	1.320	2.5
28.0	0.620	1.530	1.320	2.5
32.0	0.650	1.610	1.320	2.5
36.0	0.690	1.670	1.320	2.5



AUDIO FREQUENCY RESPONSE

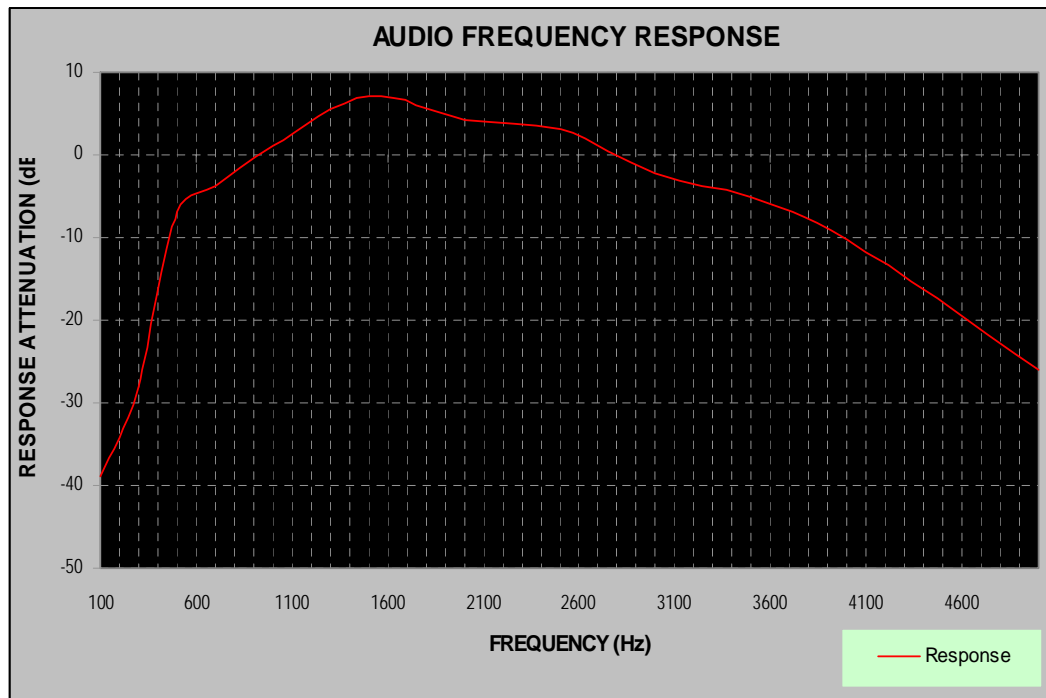
Mode: Two-way Radio
Carrier Frequency: 435.125 MHz CH2 channel
Separation = 20.0 kHz

Audio Frequency (Hz)	Response Attenuation (dB)
100	-39.59
200	-32.19
300	-27.9
500	-6.29
700	-3.4
1000	1.1
1500	7.01
2000	4.2
2500	3.1
3000	-1.2
3500	-5.8
4000	-12.2
5000	-25.1



AUDIO FREQUENCY RESPONSE
 Mode: Two-way Radio
 Carrier Frequency: 435.125 MHz CH5 channel
 Separation = 12.5 kHz

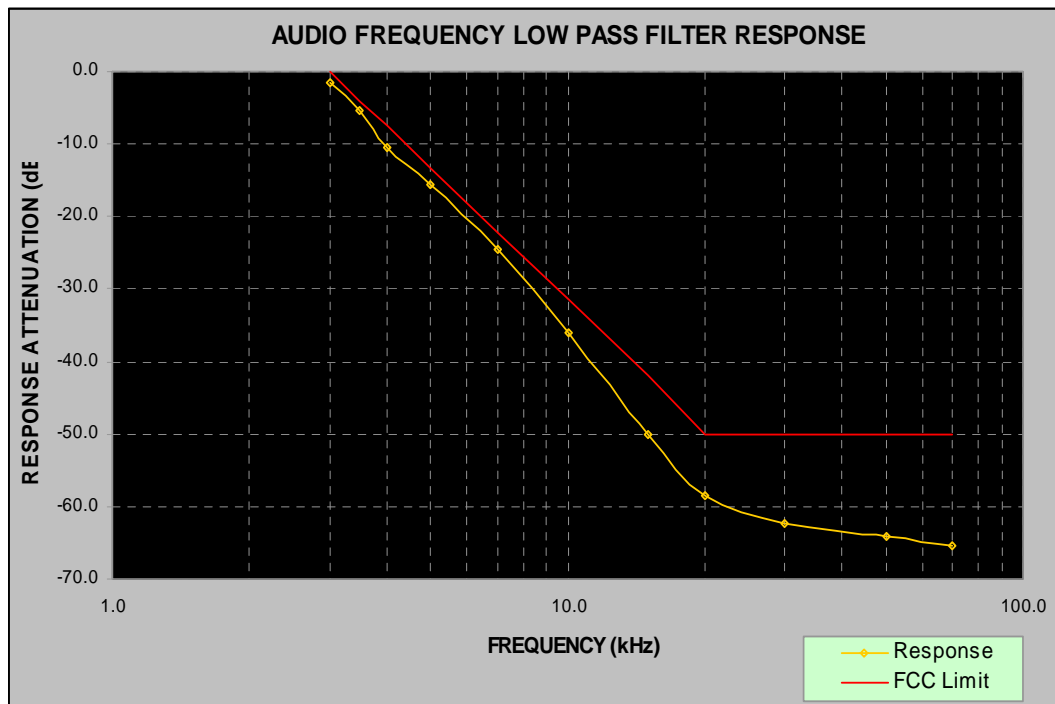
Audio Frequency (Hz)	Response Attenuation (dB)
100	-38.99
200	-34.19
300	-27.9
500	-6.89
700	-3.8
1000	1.2
1500	7.01
2000	4.2
2500	3.1
3000	-2.2
3500	-5
4000	-10.2
5000	-26.1



AUDIO FREQUENCY LOW PASS FILTER RESPONSE

Mode: Two-way Radio
 Carrier Frequency: 435.125 MHz CH2 channel
 Separation = 20.0 kHz

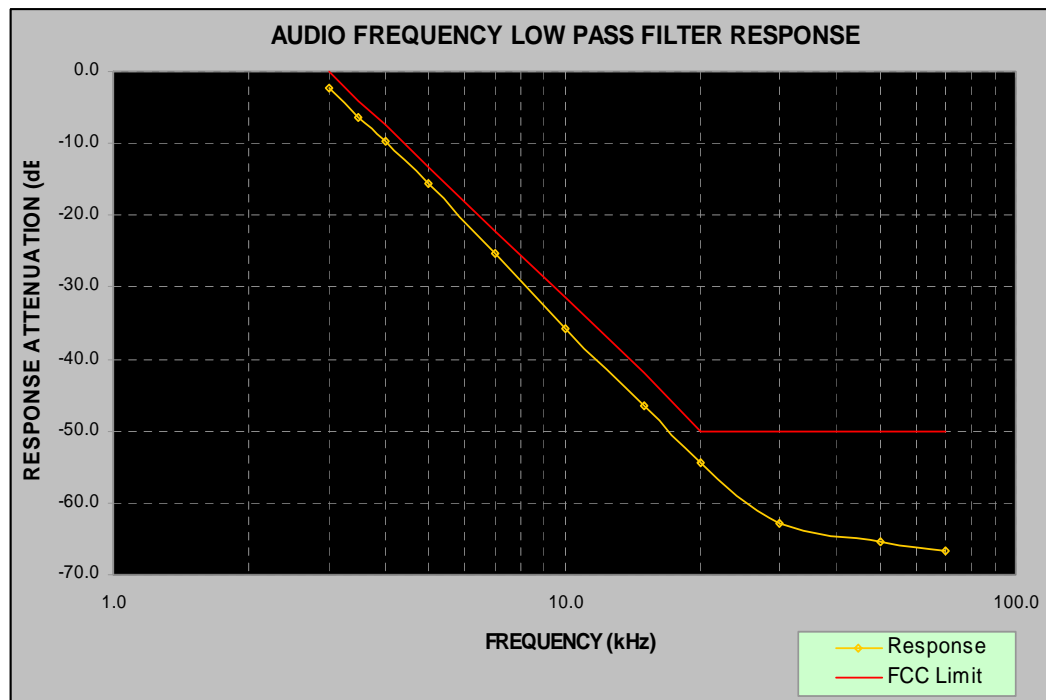
Audio Frequency (kHz)	Response Attenuation (dB)	FCC Limit (dB)
3.0	-1.6	0.0
3.5	-5.4	-4.0
4.0	-10.5	-7.5
5.0	-15.5	-13.3
7.0	-24.4	-22.1
10.0	-36.1	-31.4
15.0	-50.2	-42.0
20.0	-58.5	-50.0
30.0	-62.4	-50.0
50.0	-64.2	-50.0
70.0	-65.4	-50.0



AUDIO FREQUENCY LOW PASS FILTER RESPONSE

Mode: Two-way Radio
Carrier Frequency: 435.125 MHz CH5 channel
Separation = 12.5 kHz

Audio Frequency (kHz)	Response Attenuation (dB)	FCC Limit (dB)
3.0	-2.2	0.0
3.5	-6.4	-4.0
4.0	-9.7	-7.5
5.0	-15.5	-13.3
7.0	-25.2	-22.1
10.0	-35.8	-31.4
15.0	-46.6	-42.0
20.0	-54.3	-50.0
30.0	-62.8	-50.0
50.0	-65.3	-50.0
70.0	-66.8	-50.0



§2.1049, § 90.209 – OCCUPIED BANDWIDTH

Applicable Standard

§2.1049, §90.209 and §90.210

Emission Mask B. For transmitters that are equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:

- 1) For any frequency removed from the center of the assigned channel by more than 50 percent up to and including 100 percent of the authorized bandwidth, at least 25 dB.
- 2) On any frequency removed from the center of the assigned channel by more than 100 percent up to and including 250 percent, at least 35 dB.
- 3) On any frequency removed from the center of the assigned channel by more than 250 percent at least:

$$43+10\log P=43+10\log(35.93)=58.55 \text{ dB}$$

The resolution bandwidth was 300Hz or greater for measuring up to 250kHz from the edge of the authorized frequency segment, and 30kHz or greater for measuring more than 250kHz from the authorized frequency segment.

Emission Mask D—12.5 kHz channel bandwidth equipment. For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

- 1) For any frequency removed from the center of the authorized bandwidth f_0 to 5.625kHz removed from f_0 , 0dB.
- 2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5.626kHz but no more than 12.5kHz, at least 7.27 ($f_d - 2.88\text{kHz}$) dB.
- 3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5kHz at least:

$$43+10\log P=43+10\log(35.94)=58.56 \text{ dB}$$

The resolution bandwidth was 300Hz or greater for measuring up to 250kHz from the edge of the authorized frequency segment, and 30kHz or greater for measuring more than 250kHz from the authorized frequency segment.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2007-10-16	2008-10-16
HP	Modulation Analyzer	8901B	3438A05208	2008-04-11	2009-04-11
NANYAN	Audio Generator	NY2201	019829	2007-12-23	2008-12-23

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at 300 Hz and the spectrum was recorded in the frequency band ± 50 KHz from the carrier frequency.

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	50%
ATM Pressure:	100.5kPa

The testing was performed by Jim Li on 2008-04-18.

Test Mode: Transmitting

Emission Designator:

Channel Separation = 20.0 kHz

$B_n = 2M + 2DK$

$M = 3000; D = 5.0K; K = 1$

$B_n = 2*(3000) + 2*(5000) = 16$

Type of Emission: 16K0F3E

Channel Separation = 12.5 kHz

$B_n = 2M + 2DK$

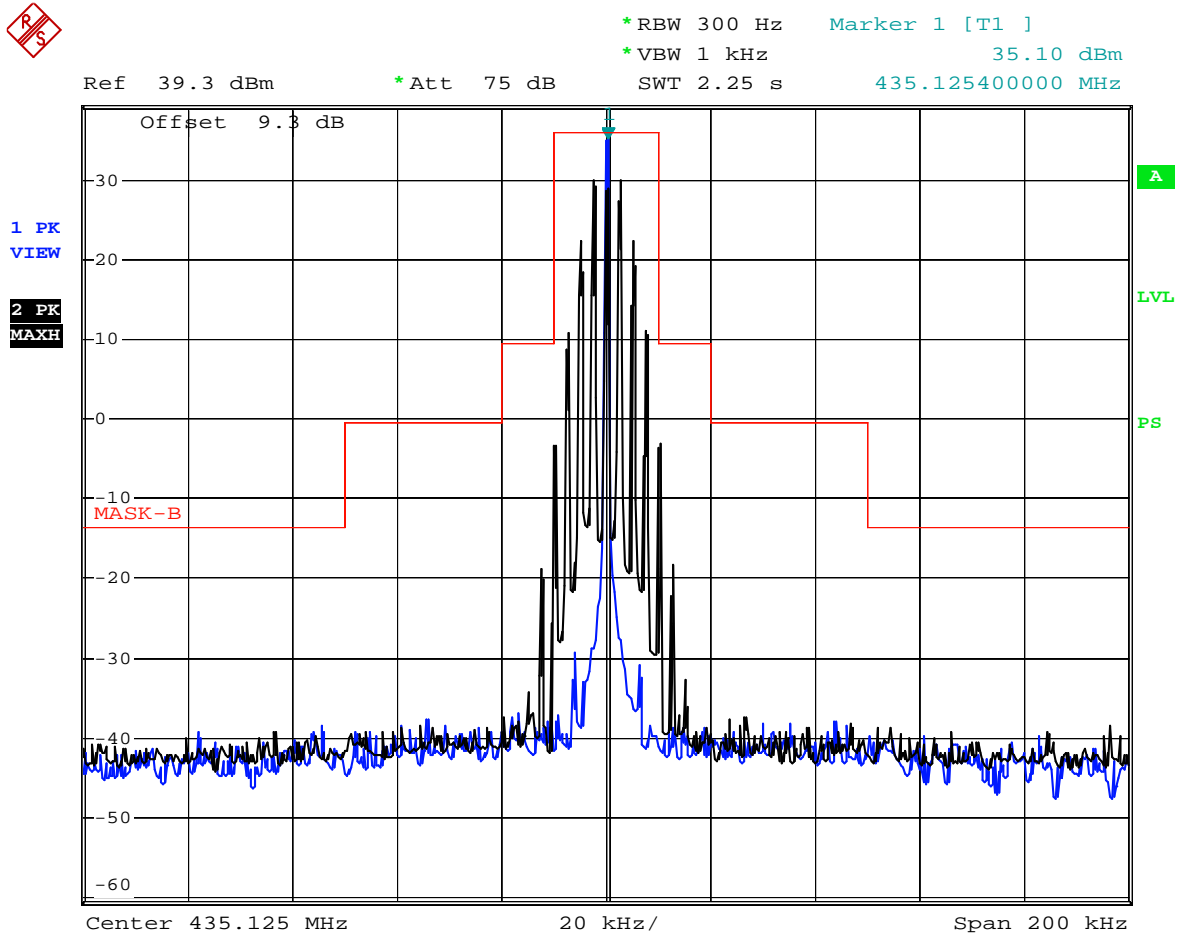
$M = 3000; D = 2.5K; K = 1$

$B_n = 2*(3000) + 2*(2500) = 11$

Type of Emission: 11K0F3E

Please refer to the hereinafter plots.

Emission Mask



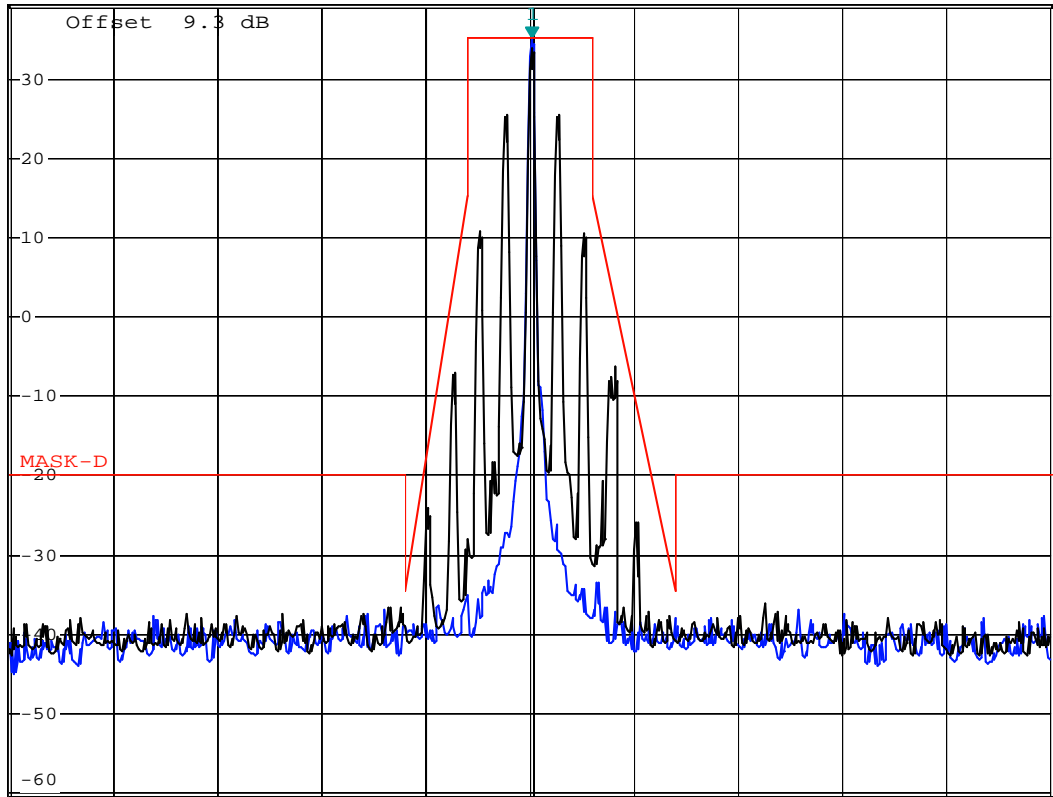
022WW

Date: 18.APR.2008 10:59:47



Ref 39.3 dBm *Att 75 dB *RBW 300 Hz Marker 1 [T1]
*VBW 1 kHz 35.14 dBm
SWT 1.15 s 435.125200000 MHz

1 PK
VIEW
2 PK
MAXH



Center 435.125 MHz 10 kHz/ Span 100 kHz

022NN

Date: 18.APR.2008 10:52:13

§2.1051 §90.210 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Applicable Standard

§2.1051 and §90.210 (25 kHz bandwidth and 20 kHz bandwidth)

Emission Mask B. For transmitters that are equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:

- 1) For any frequency removed from the center of the assigned channel by more than 50 percent up to and including 100 percent of the authorized bandwidth, at least 25 dB.
- 2) On any frequency removed from the center of the assigned channel by more than 100 percent up to and including 250 percent, at least 35 dB.
- 3) On any frequency removed from the center of the assigned channel by more than 250 percent at least:

$$43 + 10 \log P = 43 + 10 \log(35.93) = 58.55 \text{ dB}$$

The resolution bandwidth was 300Hz or greater for measuring up to 250kHz from the edge of the authorized frequency segment, and 30kHz or greater for measuring more than 250kHz from the authorized frequency segment.

Emission Mask D—12.5 kHz channel bandwidth equipment. For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

- 1) For any frequency removed from the center of the authorized bandwidth f_0 to 5.625kHz removed from f_0 , 0dB.
- 2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5.626kHz but no more than 12.5kHz, at least 7.27 ($f_d - 2.88\text{kHz}$) dB.
- 3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5kHz at least:

$$43 + 10 \log P = 43 + 10 \log(35.94) = 58.56 \text{ dB}$$

The resolution bandwidth was 300Hz or greater for measuring up to 250kHz from the edge of the authorized frequency segment, and 30kHz or greater for measuring more than 250kHz from the authorized frequency segment.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2007-05-09	2008-05-09
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2007-10-16	2008-10-16

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.

Test Data

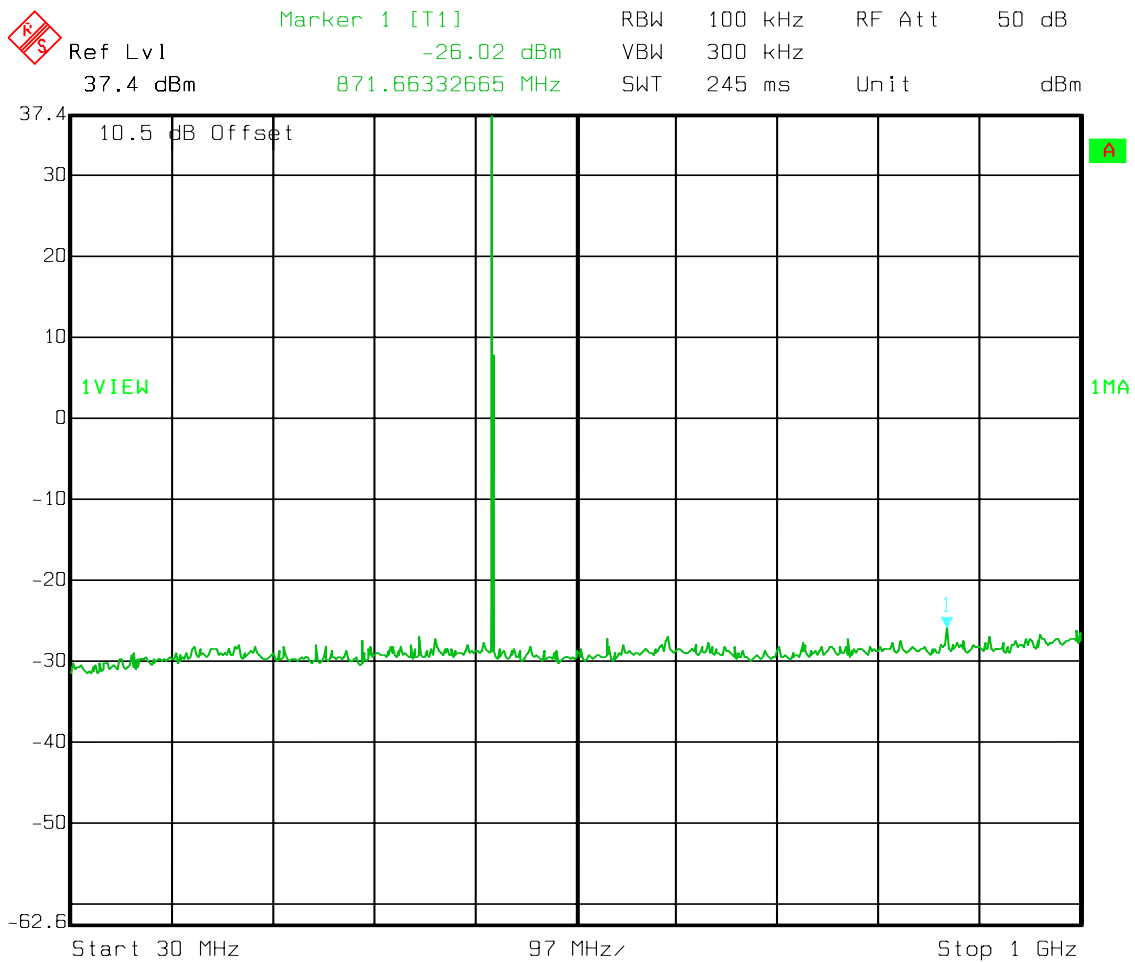
Environmental Conditions

Temperature:	25 °C
Relative Humidity:	50%
ATM Pressure:	100.5kPa

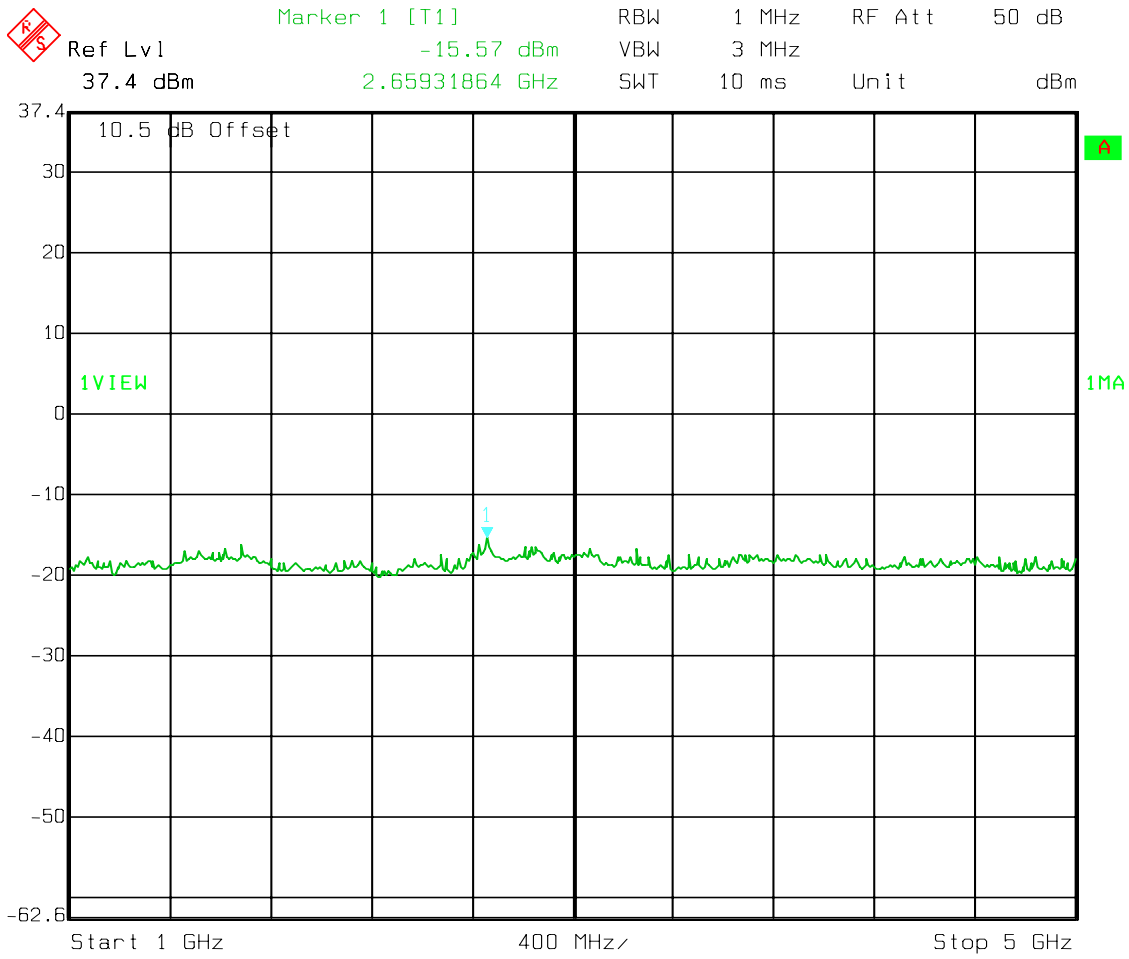
The testing was performed by Jim Li on 2008-04-13.

Test Mode: Transmitting

12.5 kHz Channel Separation

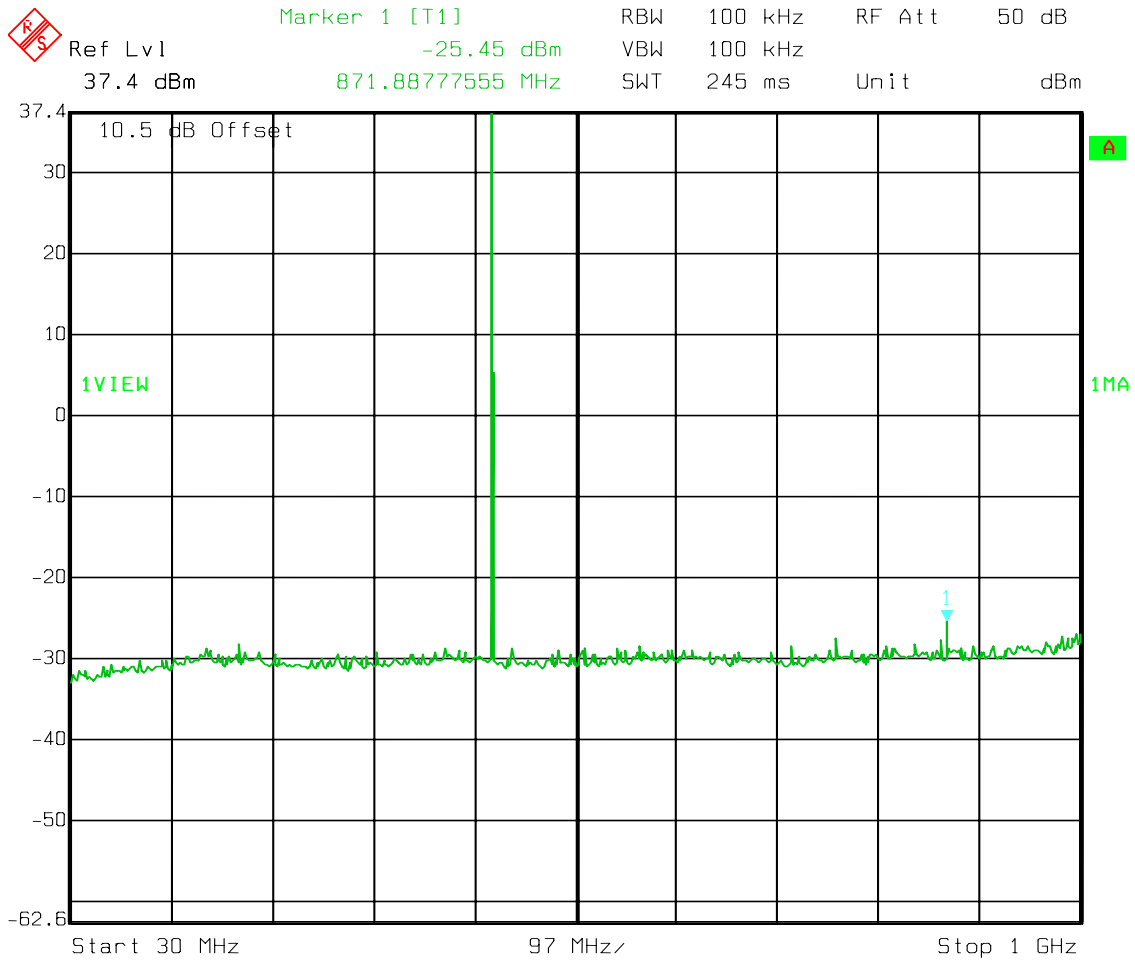


Date: 13.APR.2008 10:40:34



Date: 13.APR.2008 10:42:45

20 kHz Channel Deperation



Date: 13.APR.2008 10:33:39

§2.1053 §90.210 - RADIATED SPURIOUS EMISSIONS

Applicable Standard

§2.1053 and §90.210

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Horn Antenna	DRH-118	A052604	2007-09-25	2008-09-25
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2007-08-14	2008-08-14
Sunol Sciences	Bilog Antenna	JB1	A040904-2	2007-08-14	2008-08-14
Rohde&Schwarz	Spectrum Analyzer	FSEM30	849720/019	2007-05-09	2008-05-09
HP	Signal Generator	HP8657A	2849U00982	2007-10-16	2008-10-16
A.H. System	Horn Antenna	SAS-200/571	135	2007-05-17	2008-05-17
Giga-tronics	Signal Generator	1026	270801	2007-09-29	2008-09-29

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load, which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to teeth harmonic of the fundamental frequency was investigated.

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 spurious emissions were measured by the substitution.

Spurious emissions in dB = 10 lg (TXpwr in Watts/0.001)-the absolute level

Spurious attenuation limit in dB = 43 + 10 Log₁₀ (power out in Watts)

Test Results Summary

Channel 2: **14.53 dB** at **870.25 MHz** in the **Horizontal** polarization.

Channel 5: **11.03 dB** at **870.25 MHz** in the **Vertical** polarization.

Test Data**Environmental Conditions**

Temperature:	25 ° C
Relative Humidity:	50%
ATM Pressure:	100.5kPa

The testing was performed by Jim Li on 2008-04-16.

Test Mode: Transmitting

Indicated		Table Angle Degree	Test Antenna		Substituted			FCC PART 90				
Freq. (MHz)	Reading (dBuV)		Height (m)	Polar (H/V)	Freq. (MHz)	Level (dBm)	Polar (H/V)	Antenna Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Transmitting channel 2 = 435.125MHz channel separation = 20.0 kHz												
870.25	40.00	256	1.5	H	870.25	-23.6	H	0.0	3.93	-27.53	-13	14.53
870.25	41.66	175	1.9	V	870.25	-27.6	V	0.0	3.93	-31.53	-13	18.53
3044.08	41.24	54	1.9	V	30440.8	-36.52	V	7.4	2.22	-31.74	-13	18.74
3044.08	41.91	152	1.5	H	30440.8	-36.6	H	7.4	2.22	-31.82	-13	18.82
1740.5	41.97	296	1.7	H	1740.5	-36.8	H	6.1	1.18	-31.88	-13	18.88
3917.8	35.13	123	1.7	H	3917.8	-37.8	H	6.6	2.5	-33.7	-13	20.7
3484.96	34.84	45	1.3	V	3484.96	-38.4	V	6.7	3.78	-35.48	-13	22.48
3917.8	38.05	325	2.1	V	3917.8	-45.5	V	6.6	2.5	-41.4	-13	28.4
1740.5	33.54	23	2.1	V	1740.5	-46.5	V	6.1	1.18	-41.58	-13	28.58
2175.625	36.5	257	2.4	H	2175.625	-46.8	H	6.5	1.36	-41.66	-13	28.66
3484.96	33.13	65	2.0	H	3484.96	-45.5	H	6.7	3.78	-42.58	-13	29.58
2175.625	35.8	347	2.1	V	2175.625	-48.9	V	6.5	1.36	-43.76	-13	30.76
1305.375	32.71	342	2.0	H	1305.375	-49.6	H	6.3	1.14	-44.44	-13	31.44
1305.375	33.15	227	1.3	V	1305.375	-49.8	V	6.3	1.14	-44.64	-13	31.64

Indicated		Table Angle Degree	Test Antenna		Substituted			FCC PART 90				
Freq. (MHz)	Reading (dBuV)		Height (m)	Polar (H/V)	Freq. (MHz)	Level (dBm)	Polar (H/V)	Antenna Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Transmitting channel 5 = 435.125MHz channel separation = 12.5 kHz												
870.25	42.08	175	1.9	V	870.25	-27.1	V	0.0	3.93	-31.03	-20.0	11.03
1305.375	33.04	227	1.3	V	1305.375	-37.6	V	6.3	1.14	-32.44	-20.0	12.44
870.25	35.87	256	1.5	H	870.25	-30.6	H	0.0	3.93	-34.53	-20.0	14.53
3917.83	34.45	257	1.5	H	3917.83	-41.8	H	6.6	2.5	-35.7	-20.0	15.7
3044.08	33.15	296	2.4	H	3044.08	-41.2	H	7.4	2.22	-36.02	-20.0	16.02
3044.08	32.23	23	2.1	V	3044.08	-42.8	V	7.4	2.22	-37.62	-20.0	17.62
3917.83	38.71	159	1.4	V	3917.83	-42.3	V	6.6	2.5	-38.2	-20.0	18.2
2865.73	38.7	267	1.4	V	2865.73	-43.6	V	7.4	2.24	-38.44	-20.0	18.44
1740.5	33.84	296	1.7	H	1740.5	-44.2	H	6.1	1.18	-39.28	-20.0	19.28
2865.73	38.2	275	1.5	H	2865.73	-44.8	H	7.4	2.24	-39.64	-20.0	19.64
3484.97	33.5	227	2.1	V	3484.97	-42.5	V	6.7	4.03	-39.83	-20.0	19.83
2175.625	36.5	257	2.4	H	2175.625	-46.8	H	6.5	1.36	-41.66	-20.0	21.66
1305.375	32.16	342	2.0	H	1305.375	-47.5	H	6.3	1.14	-42.34	-20.0	22.34
1740.5	31.55	23	2.1	V	1740.5	-47.5	V	6.1	1.18	-42.58	-20.0	22.58
3484.97	32.22	342	1.7	H	3484.97	-45.8	H	6.7	4.03	-43.13	-20.0	23.13
2175.625	36.1	347	2.1	V	2175.625	-48.8	V	6.5	1.36	-43.66	-20.0	23.66

§2.1055 §90.213- FREQUENCY STABILITY

Applicable Standard

§2.1055; §90.213.

Minimum Frequency Stability

Frequency range (MHz)	Fixed and Base Stations	Mobile stations	
		Over 2 watts output power	2 watts or less output power
Below 25	^{1,2,3} 100	100	200
25–50	20	20	50
72–76	5		50
150–174	^{5,11} 5	⁶ 5	^{4,6} 50
216–220	1.0		1.0
220–222 ¹²	0.1	1.5	1.5
421–512	^{7,11,14} 2.5	⁸ 5	⁸ 5
806–809	¹⁴ 1.0	1.5	1.5
809–824	¹⁴ 1.5	2.5	2.5
851–854	1.0	1.5	1.5
854–869	1.5	2.5	2.5
896–901	¹⁴ 0.1	1.5	1.5
902–928	2.5	2.5	2.5
902–928 ¹³	2.5	2.5	2.5
929–930	1.5		
935–940	0.1	1.5	1.5
1427–1435	⁹ 300	300	300
Above 2450 ¹⁰			

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
WUHUAN	Temperature & Humidity Chamber	HTP205	20021115	2007-12-28	2008-12-28
Hewlett-Packard	Frequency Counter	5342A	2317A08289	2008-03-24	2009-03-24

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to a f Spectrum Analyzer via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the counter.

The frequency stability shall be measured with variation of primary supply voltage as follows:

(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	50%
ATM Pressure:	100.5kPa

The testing was performed by Jim Li on 2008-04-16 & 2008-04-24.

Test Mode: Transmitting

Carrier Frequency: 435.125 MHz CH2 separation = 20.0 kHz

Frequency Stability Versus temperature

Reference Frequency: 435.125 MHz, Limit: ± 5 ppm			
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Frequency Error (ppm)
55	7.5	435.126827	4.20
40	7.5	435.126788	4.11
30	7.5	435.126509	3.47
20	7.5	435.126675	3.85
10	7.5	435.125970	2.23
0	7.5	435.125500	1.15
-10	7.5	435.124617	-0.88
-20	7.5	435.124382	-1.42
-25	7.5	435.123790	-2.78

Frequency Stability versus Voltage

Reference Frequency 435.125 MHz, Limit: ± 5 ppm			
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Frequency Error (ppm)
20	6.4	435.126483	3.41

Carrier Frequency: 435.125 MHz CH5 separation = 12.5 kHz

Frequency Stability Versus temperature

Reference Frequency: 435.125 MHz, Limit: ± 2.5 ppm			
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Frequency Error (ppm)
55	7.5	435.125805	1.85
40	7.5	435.125792	1.82
30	7.5	435.125787	1.81
20	7.5	435.125700	1.61
10	7.5	435.125321	0.74
0	7.5	435.125104	0.24
-10	7.5	435.124638	-0.83
-20	7.5	435.124312	-1.58
-25	7.5	435.124299	-1.61

Frequency Stability versus Voltage

Reference Frequency 435.125 MHz, Limit: ± 2.5 ppm			
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed	
		Measured Frequency (MHz)	Frequency Error (ppm)
20	6.4	435.12525	1.61

§90.214 - TRANSIENT FREQUENCY BEHAVIOR

Applicable Standard

§90.214

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
TEKTRONIX	Digital Phosphor Oscilloscope	TDS 7104	B020518	2007-04-11	2008-04-11
HP	Modulation Analyzer	8901B	3438A05208	2008-04-11	2009-04-11
HP	Signal Generator	HP8657A	2849U00982	2007-10-16	2008-10-16

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

TIA/EIA-603 2.2.19

Test Data

Environmental Conditions

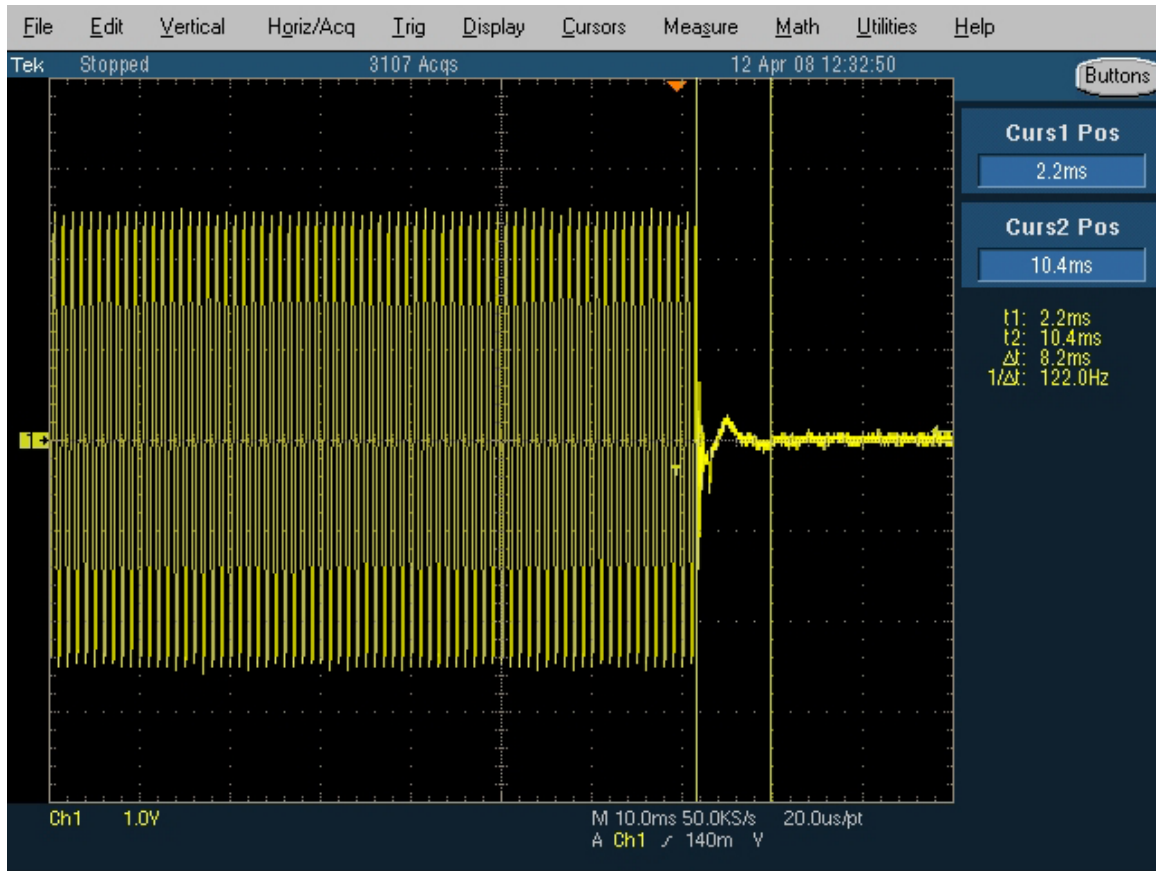
Temperature:	25 °C
Relative Humidity:	50%
ATM Pressure:	100.5kPa

The testing was performed by Jim Li on 2008-04-12.

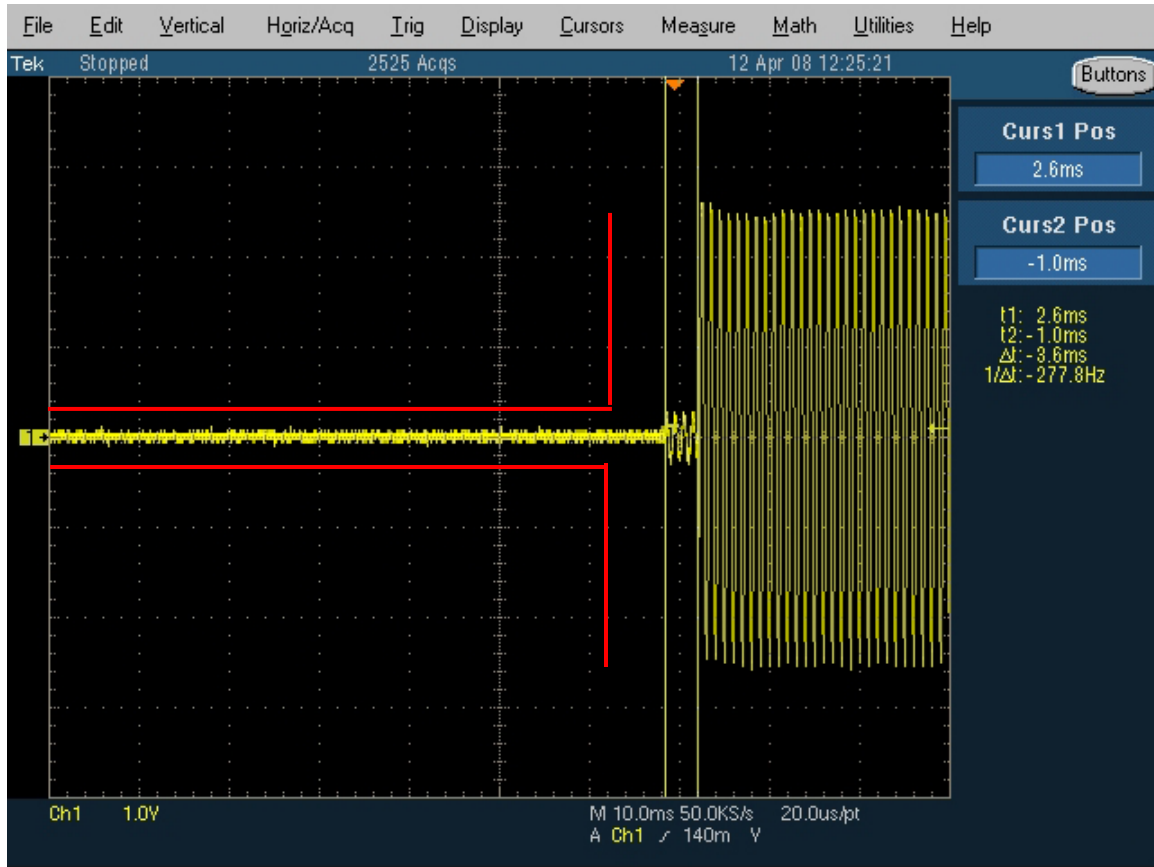
Operation Frequency (MHz)	Channel Separation (kHz)	Transient Period (ms)	Transient Frequency	Result
435.125	12.5	10	< ±12.5 kHz	Pass
		25	< ±6.25 kHz	
		10	< ±12.5 kHz	
	25.0	10	< ±25.0 kHz	Pass
		25	< ±12.5 kHz	
		10	< ±25.0 kHz	

Test Result: Compliance.

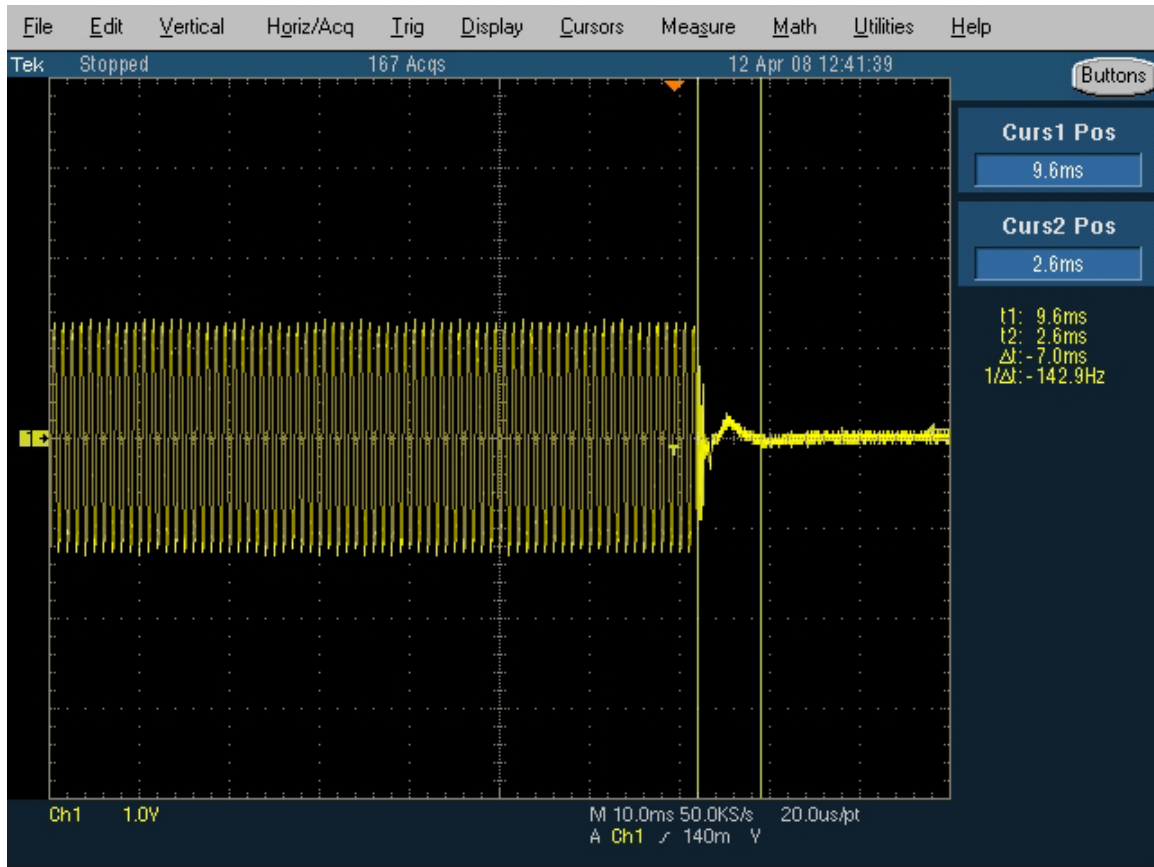
Turn On



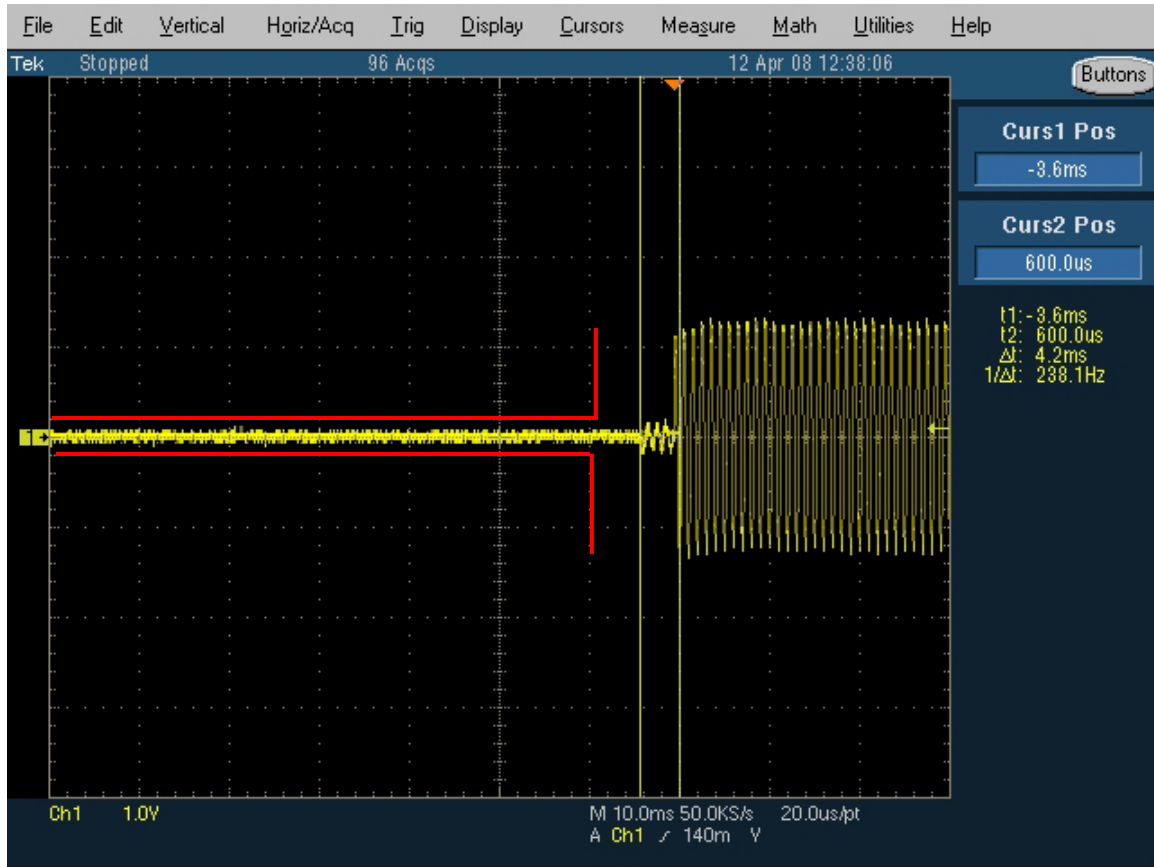
Turn Off



Turn On



Turn Off



***** END OF REPORT *****