



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. China

**FCC ID: Q5EPT650001**

<b>This Report Concerns:</b> <input checked="" type="checkbox"/> Original Report	<b>Equipment Type:</b> Two-way Radio
<b>Test Engineer:</b> David Zhang <i>David Zhang</i>	
<b>Report No.:</b> RSZ07101701	
<b>Test Date:</b> 2007-11-01 to 2007-11-08	
<b>Report Date:</b> 2007-11-09	
<b>Reviewed By:</b> EMC Manager: Boni Baniqued <i>Boni Baniqued</i>	
<b>Prepared By:</b> 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**

<b>GENERAL INFORMATION.....</b>	<b>4</b>
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) .....	4
OBJECTIVE .....	4
RELATED SUBMITTAL(S)/GRANT(S).....	4
TEST METHODOLOGY .....	4
TEST FACILITY .....	4
<b>SYSTEM TEST CONFIGURATION.....</b>	<b>6</b>
DESCRIPTION OF TEST CONFIGURATION .....	6
EQUIPMENT MODIFICATIONS .....	6
CONFIGURATION OF TEST SETUP .....	7
BLOCK DIAGRAM OF TEST SETUP .....	7
<b>SUMMARY OF TEST RESULTS .....</b>	<b>8</b>
<b>§2.1093 – RF EXPOSURE .....</b>	<b>9</b>
<b>§2.1046 - CONDUCTED OUTPUT POWER.....</b>	<b>10</b>
APPLICABLE STANDARD .....	10
TEST EQUIPMENT LIST AND DETAILS .....	10
TEST PROCEDURE .....	10
TEST DATA .....	10
<b>§2.1046, and §90.205 – RADIATED OUTPUT POWER .....</b>	<b>13</b>
APPLICABLE STANDARD .....	13
TEST EQUIPMENT LIST AND DETAILS.....	13
TEST PROCEDURE .....	13
TEST DATA .....	14
<b>§2.1047, and §90.207 - MODULATION CHARACTERISTIC .....</b>	<b>15</b>
APPLICABLE STANDARD .....	15
TEST EQUIPMENT LIST AND DETAILS.....	15
TEST PROCEDURE .....	15
TEST DATA .....	15
<b>§2.1049, and § 90.209 – OCCUPIED BANDWIDTH .....</b>	<b>22</b>
APPLICABLE STANDARD .....	22
TEST EQUIPMENT LIST AND DETAILS.....	22
TEST PROCEDURE .....	23
TEST DATA .....	23
<b>§2.1051 and §90.210 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS .....</b>	<b>25</b>
APPLICABLE STANDARD .....	25
TEST EQUIPMENT LIST AND DETAILS.....	25
TEST PROCEDURE .....	26
TEST DATA .....	26
<b>§2.1053 and §90.210 - RADIATED SPURIOUS EMISSIONS .....</b>	<b>34</b>
APPLICABLE STANDARD .....	34
TEST EQUIPMENT LIST AND DETAILS.....	34
TEST PROCEDURE .....	34
TEST RESULTS SUMMARY .....	34
TEST DATA .....	35
<b>§2.1055 (d) and §90.213- FREQUENCY STABILITY.....</b>	<b>37</b>
APPLICABLE STANDARD .....	37
TEST EQUIPMENT LIST AND DETAILS.....	37
TEST PROCEDURE .....	37
TEST DATA .....	37

---

---

<b>§90.214 - TRANSIENT FREQUENCY BEHAVIOR.....</b>	<b>40</b>
APPLICABLE STANDARD .....	40
TEST EQUIPMENT LIST AND DETAILS.....	40
TEST PROCEDURE .....	40
TEST DATA .....	40

---

## GENERAL INFORMATION

---

### Product Description for Equipment Under Test (EUT)

The *KIRISUN ELECTRONICS (SHENZHEN) CO., LTD*'s product, model number: *PT6500-01* or the "EUT" as referred to in this report is a *Two-way Radio*. The EUT is measured approximately 29.0 cm L x 6.2 cmW x 4.5 cmH, rated input voltage: DC 7.5 V battery.

AC/DC Adapter:

Manufacturer: HuntKey

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

*\* The test data gathered are from production sample, serial number: 0710009, Provided by the manufacturer, we received the EUT on 2007-10-17.*

### 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 Laboratories, under the National Voluntary Laboratories Accredited Program (Lab Code 200707-0).



NVLAP LAB CODE 200707-0

The current scope of accreditations can be found at  
<http://ts.nist.gov/ts/htdocs/210/214/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**

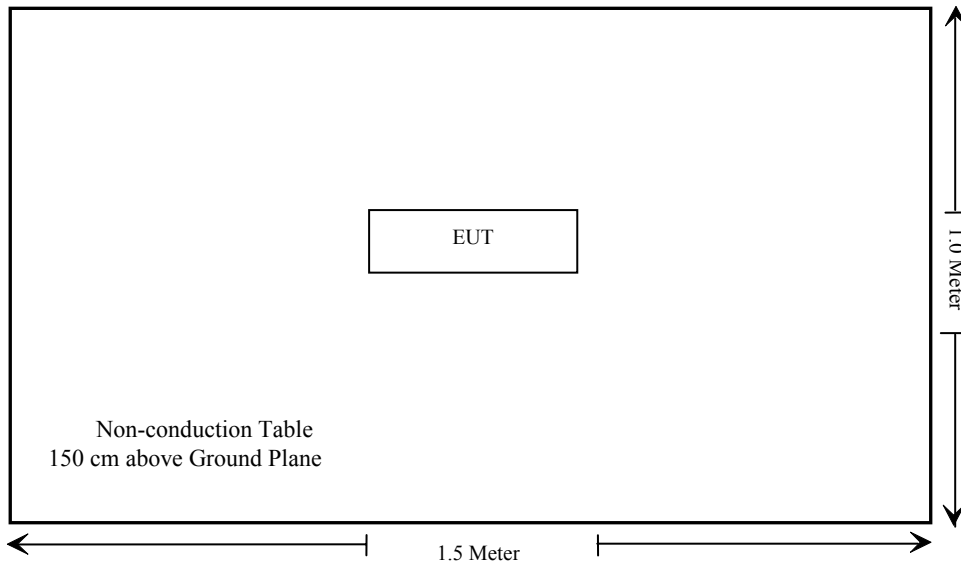
Bay Area Compliance Laboratories Corp. (Shenzhen) has not done any modification on the EUT.

**Configuration of Test Setup**



EUT

**Block Diagram of Test Setup**



**SUMMARY OF TEST RESULTS**

FCC RULES	DESCRIPTION OF TEST	RESULT
§1.1310 §2.1093	RF Exposure	Compliant
§2.1046	Conducted Output Power	Compliant
§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



## §2.1093 – RF EXPOSURE

According to §2.1093 §1.1307(b)(1) and §2.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

According to TCB Exclusions list, no SAR required if power is lower than the flowing threshold:

Frequency Range		Center Frequency (MHz)	375/f SAR Limitation (mw)
Low Frequency (MHz)	High Frequency (MHz)		
136.125	173.915	155.125	2417.4

Maximum measured transmitter power:

Conducted Power (mw)	Duty Cycle	Power with Duty Cycle (mw)
3872	50%	1936

Threshold at which no SAR required is 2417.4 mw.

Tx power with duty cycle is 1936 mw.

**Conclusion:** No SAR is required.

## §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	2007-09-29	2008-09-29

\* **Statement of Tractability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed per the NVLAP requirements, traceable to 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

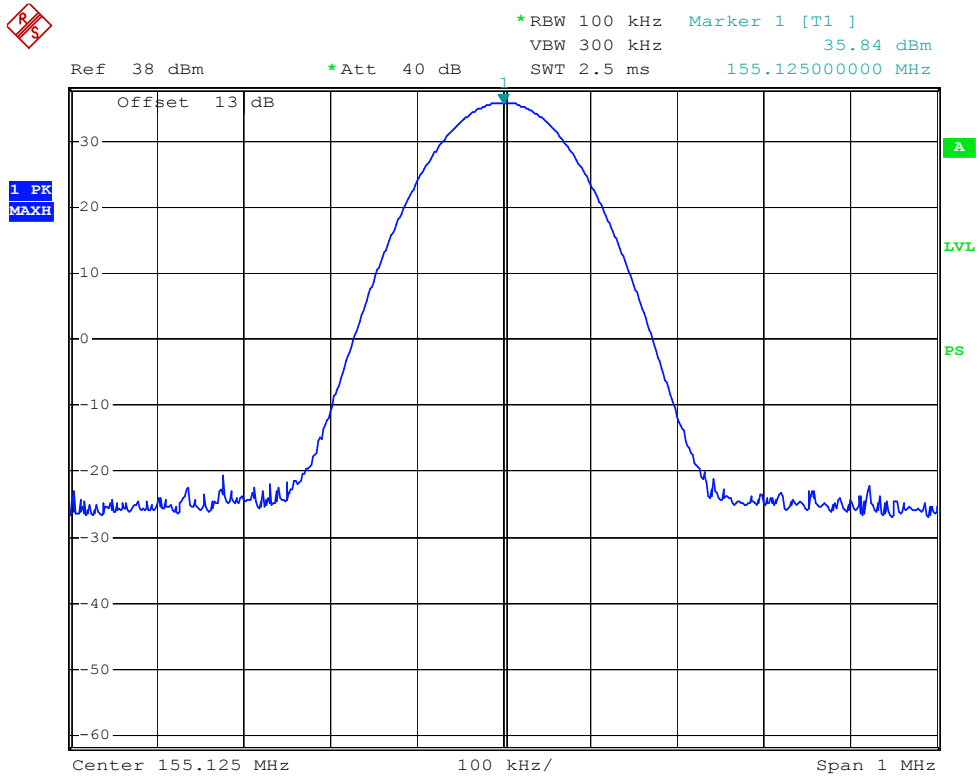
*The testing was performed by David Zhang on 2007-11-08.*

Test Result: Pass

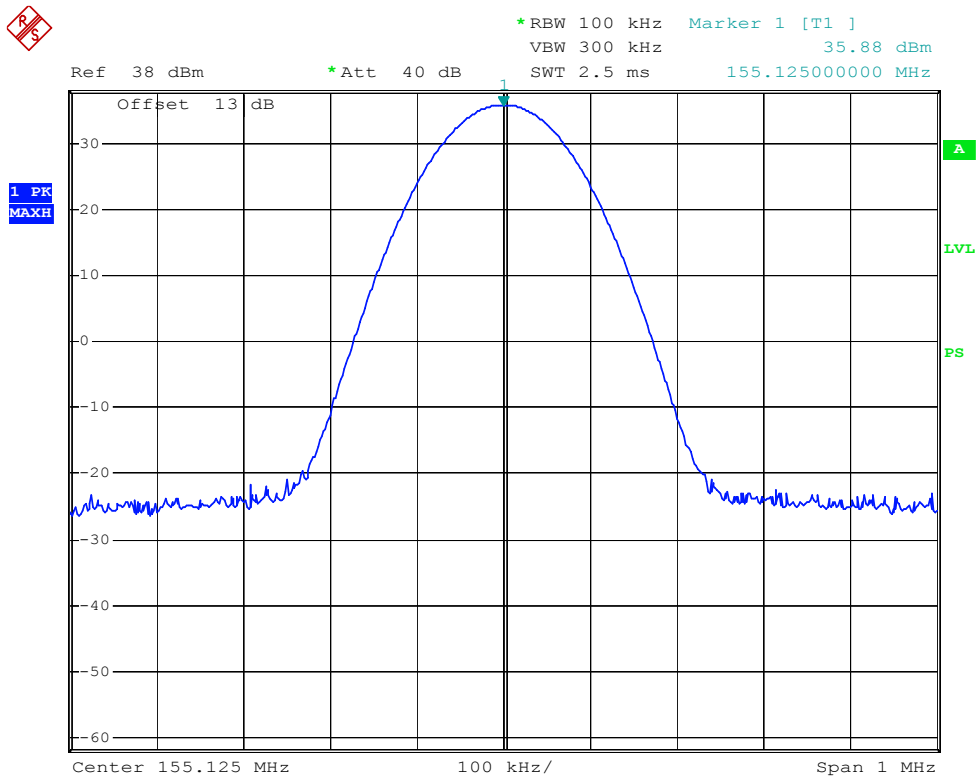
*Test Mode: Transmitting*

Frequency (MHz)	Channel Separation (kHz)	Conducted Output power (dBm)	Conducted Output power (Watt)
155.125	12.5	35.84	3.837
	25.0	35.88	3.872

Note: The test channels are channel 2 and channel 5, with identical frequencies. The difference of both test channels is the Channel Separation, 12.5 kHz for Channel 5 and 25.0 kHz for channel 2.



Kirisun Two-way radio M/N:PT6500-01 carrier power For 12.5KH  
z channel bandwidth  
Date: 26.OCT.2007 11:26:50



Kirisun Two-way radio M/N:PT6500-01 carrier power For 25.0KH  
z channel bandwidth  
Date: 26.OCT.2007 11:22:13

## §2.1046, and §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	2007-07-20	2008-07-20
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
Agilent	Spectrum Analyzer	8564E	3943A01781	2006-11-22	2007-11-22
HP	Signal Generator	HP8657A	2849U00982	2007-09-29	2008-09-29
Giga-tronics	Signal Generator	1026	270801	2007-09-29	2008-09-29
A.H. System	Horn Antenna	SAS-200/571	135	2007-05-17	2008-05-17

\* **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 David Zhang on 2007-11-08.*

Test Result: Pass

*Test Mode: Transmitting*

Indicated		Table Angle Degree	Test Antenna		Substituted			Antenna Gain Correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	FCC 90
Frequency (MHz)	Reading (dBuV/m)		Height (m)	Polar H/V	Frequency (MHz)	Level (dBm)	Polar H/V				Output Power (W)
Transmitting channel 2 = 155.125Mhz Channel Separation = 25.0kHz											
155.125	93.3	45	1.6	H	155.125	32.3	H	0	1.84	30.5	1.122
155.125	100.4	45	1.5	V	155.125	36.8	V	0	1.84	35.0	3.162
Transmitting channel 5 = 155.125Mhz Channel Separation = 12.5kHz											
155.125	94.2	126	1.56	H	155.125	32.8	H	0	1.84	31.0	1.259
155.125	102.7	126	1.72	V	155.125	36.7	V	0	1.84	34.9	3.090

## §2.1047, and §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	2007-03-01	2008-03-01
HP	RF COMMUNICATIONS TEST SET	8920A	3438A05201	2007-07-13	2008-07-13

\* **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 David Zhang on 2007-11-08.*

Test Result: Pass

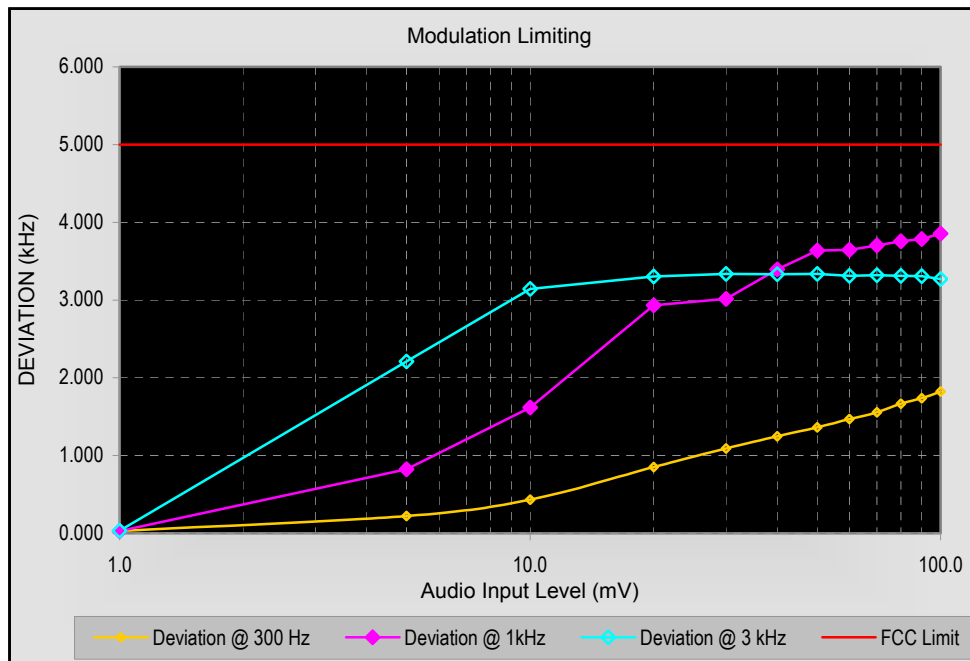
*Test Mode: Transmitting*

**MODULATION LIMITING**

Mode: Two-way Radio

Carrier Frequency: 155.125 MHz Channel 2 Channel Separation=25.0 kHz

AUDIO INPUT LEVEL [mV]	DEVIATION (@300Hz) [kHz]	DEVIATION (@ 1kHz) [kHz]	DEVIATION (@ 3kHz) [kHz]	FCC Limit [kHz]
1.0	0.028	0.029	0.031	5.0
5.0	0.223	0.821	2.208	5.0
10.0	0.433	1.616	3.143	5.0
20.0	0.852	2.933	3.306	5.0
30.0	1.090	3.015	3.338	5.0
40.0	1.245	3.394	3.335	5.0
50.0	1.361	3.638	3.339	5.0
60.0	1.468	3.648	3.314	5.0
70.0	1.556	3.703	3.319	5.0
80.0	1.667	3.756	3.314	5.0
90.0	1.736	3.786	3.308	5.0
100.0	1.824	3.856	3.270	5.0



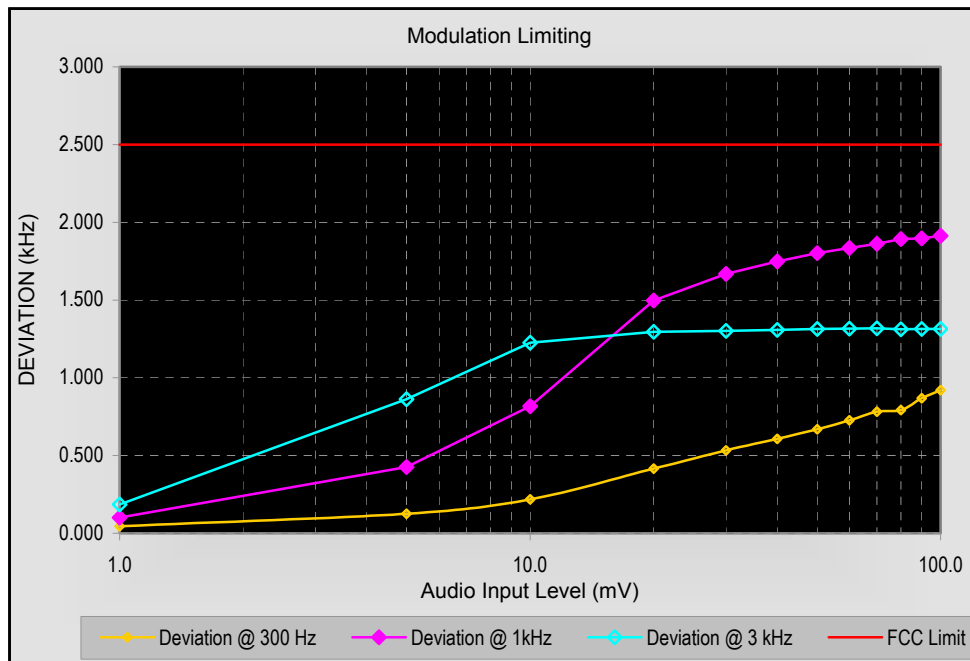


**MODULATION LIMITING**

Mode: Two-way Radio

Carrier Frequency: 155.125 MHz Channel 5 Channel Separation=12.5 kHz

AUDIO INPUT LEVEL [mV]	DEVIATION (@300Hz) [kHz]	DEVIATION (@ 1kHz) [kHz]	DEVIATION (@ 3kHz) [kHz]	FCC Limit [kHz]
1.0	0.045	0.101	0.186	2.5
5.0	0.126	0.426	0.862	2.5
10.0	0.218	0.816	1.226	2.5
20.0	0.416	1.497	1.296	2.5
30.0	0.533	1.668	1.303	2.5
40.0	0.607	1.748	1.308	2.5
50.0	0.668	1.802	1.314	2.5
60.0	0.727	1.835	1.316	2.5
70.0	0.782	1.862	1.319	2.5
80.0	0.793	1.893	1.312	2.5
90.0	0.869	1.898	1.314	2.5
100.0	0.920	1.914	1.314	2.5



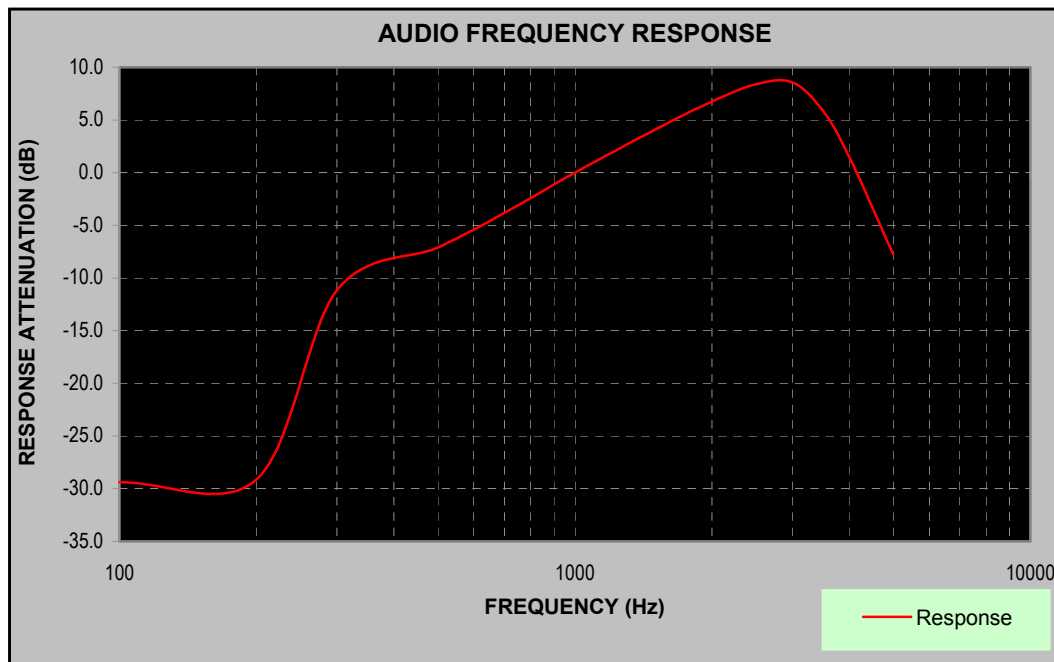
## Audio Frequency Response FCC

**AUDIO FREQUENCY RESPONSE**

Mode: Two-way Radio

Carrier Frequency: 155.125 MHz Channel 2 Channel Separation=25.0kHz

Audio Frequency (Hz)	Response Attenuation (dB)
100	-29.4
200	-29.1
300	-11.2
500	-7.1
700	-3.8
1000	0.0
1500	4.1
2000	6.8
2500	8.4
3000	8.6
3500	5.9
4000	1.5
5000	-7.7

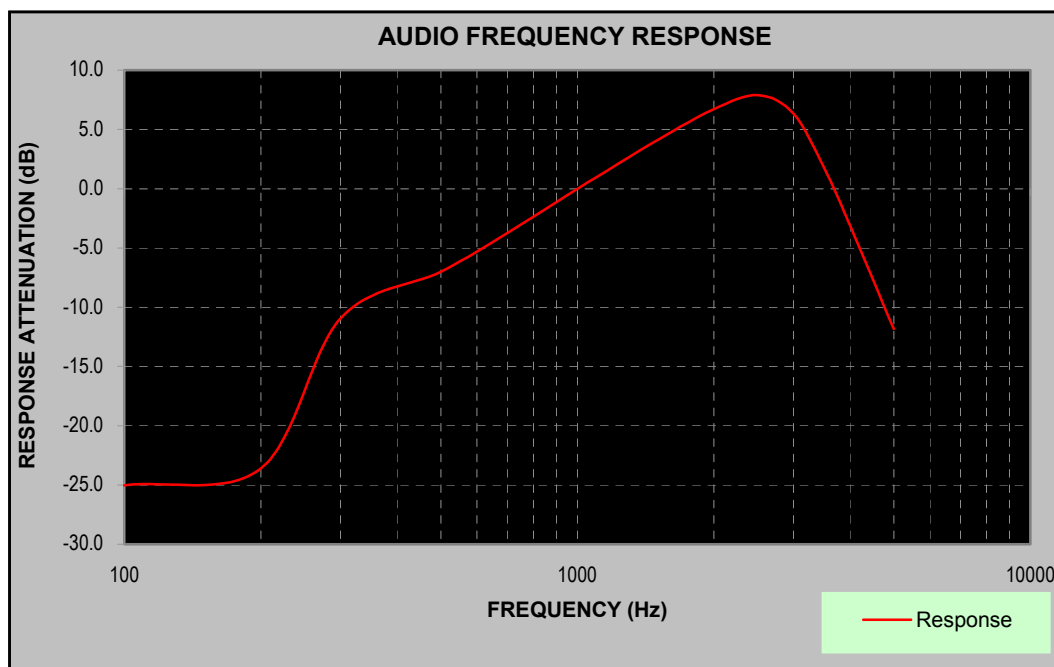


**AUDIO FREQUENCY RESPONSE**

Mode: Two-way Radio

Carrier Frequency: 155.125 MHz Channel 5 Channel Separation=12.5kHz

Audio Frequency (Hz)	Response Attenuation (dB)
100	-25.0
200	-23.6
300	-10.9
500	-7.0
700	-3.7
1000	0.0
1500	4.1
2000	6.7
2500	7.9
3000	6.3
3500	1.8
4000	-3.1
5000	-11.8



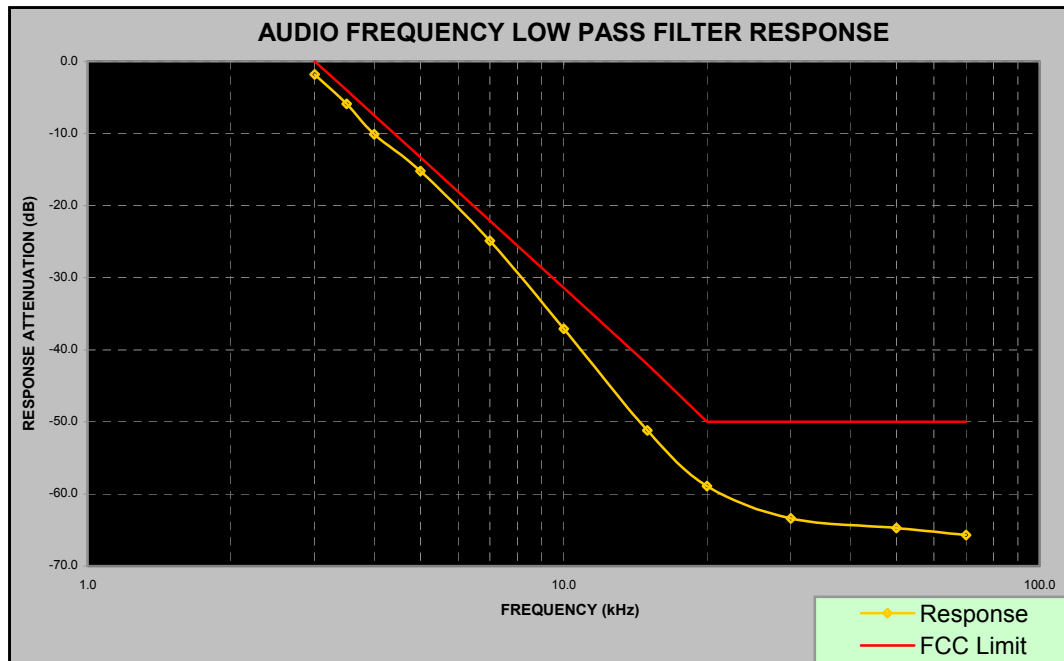
Audio Frequency Response Low Pass Filter FCC

**AUDIO FREQUENCY LOW PASS FILTER RESPONSE**

Mode: Two-way Radio

Carrier Frequency: 155.125 MHz Channel 2 Channel Separation=25.0kHz

Audio Frequency (kHz)	Response Attenuation (dB)	FCC Limit (dB)
3.0	-1.8	0.0
3.5	-5.9	-4.0
4.0	-10.1	-7.5
5.0	-15.2	-13.3
7.0	-24.9	-22.1
10.0	-37.1	-31.4
15.0	-51.2	-42.0
20.0	-58.9	-50.0
30.0	-63.4	-50.0
50.0	-64.7	-50.0
70.0	-65.7	-50.0

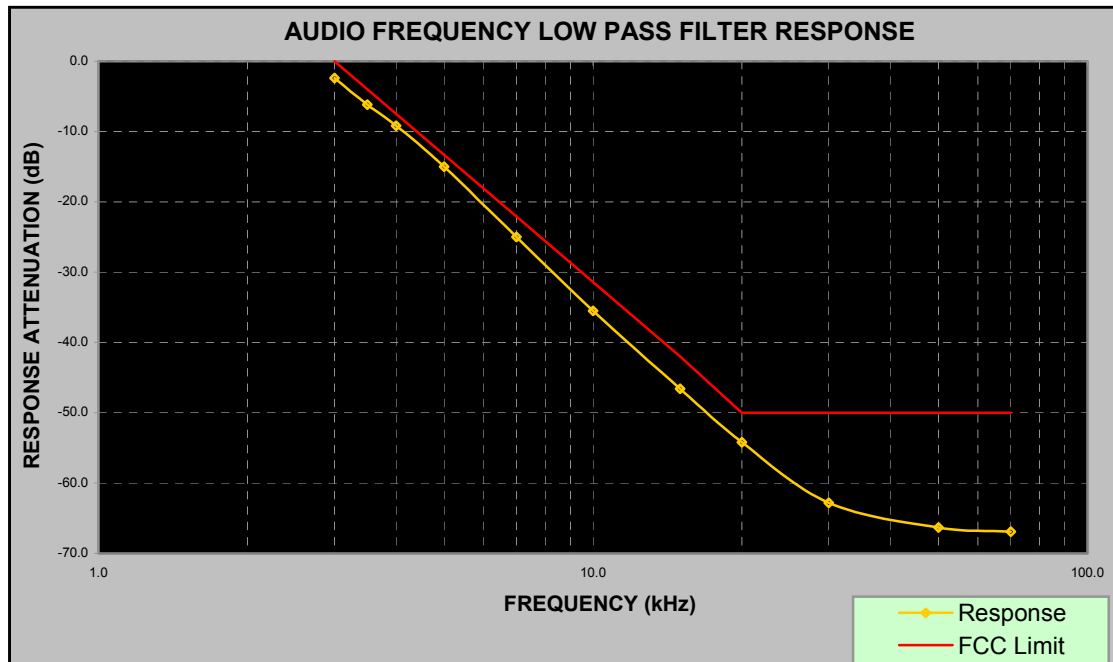


**AUDIO FREQUENCY LOW PASS FILTER RESPONSE**

Mode: Two-way Radio

Carrier Frequency: 155.125 MHz Channel 5 Channel Separation=12.5kHz

Audio Frequency (kHz)	Response Attenuation (dB)	FCC Limit (dB)
3.0	-2.4	0.0
3.5	-6.2	-4.0
4.0	-9.2	-7.5
5.0	-15.0	-13.3
7.0	-25.0	-22.1
10.0	-35.5	-31.4
15.0	-46.6	-42.0
20.0	-54.2	-50.0
30.0	-62.8	-50.0
50.0	-66.3	-50.0
70.0	-66.9	-50.0



## §2.1049, and § 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:

$$43+10\log P=43+10\log(3.872)=48.88 \text{ dB}$$

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 ( $f_d - 2.88$ 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:

$$43+10\log P=43+10\log(3.837)=48.84 \text{ dB}$$

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	2007-09-29	2008-09-29
HP	Modulation Analyzer	8901B	3438A05208	2007-03-01	2008-03-01
HP	RF COMMUNICATIONS TEST SET	HP8920A	3438A05201	2007-07-13	2008-07-13

\* **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

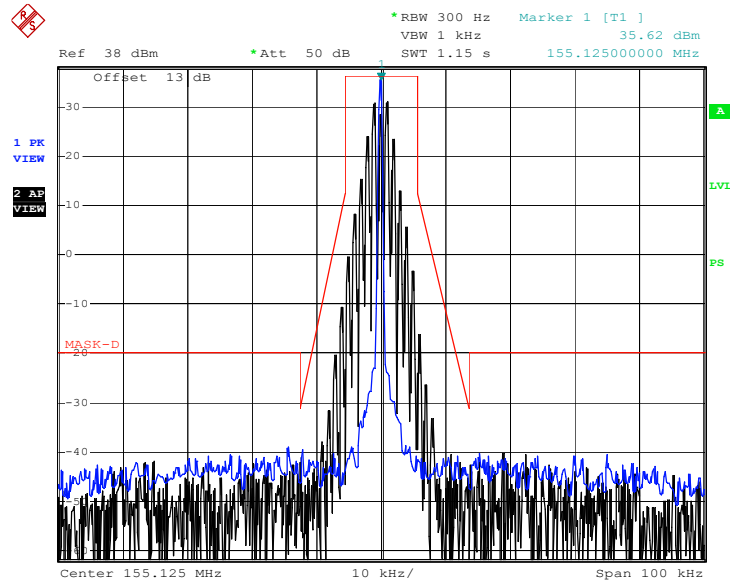
Temperature:	25 °C
Relative Humidity:	50%
ATM Pressure:	100.5kPa

The testing was performed by David Zhang on 2007-11-08.

Test Result: Pass

Test Mode: Transmitting

Emission Designator:  
 Chanel 2=155.125 MHz Channel Separation=12.5 kHz  
 According to CFR47 §2.201 & §2.202  
 Bn=2M+2DK  
 M=3000  
 D=2500  
 K=1  
 $Bn = 2*(3000) + 2*(2500) = 11$   
 Type of Emission: 11K0F3E

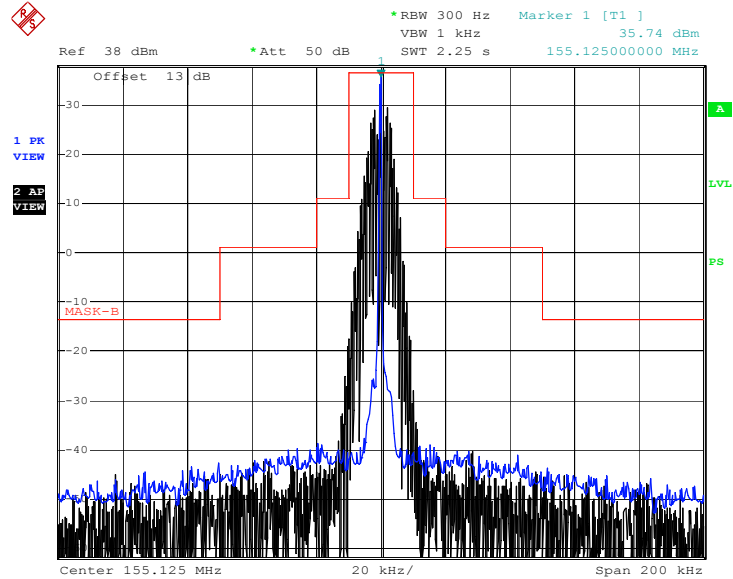


KIRISUN Emission Mask CH5=155.125MHz channel separation=12.5

KHz

Date: 1.NOV.2007 16:57:22

Channel 2=155.125 MHz Channel Separation=25.0 kHz  
According to CFR47 §2.201 & §2.202  
 $B_n = 2M + 2DK$   
 $M = 3000$   
 $D = 5000$   
 $K = 1$   
 $B_n = 2*(3000) + 2*(5000) = 16$   
Type of Emission: 16K0F3E



KIRISUN Emission Mask CH2=155.125MHz channel separation=25.0

KHz

Date: 1.NOV.2007 17:00:23



## **§2.1051 and §90.210 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS**

### **Applicable Standard**

§2.1051 and §90.210 (25kHz 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:

$$43+10\log P=43+10\log(3.872)=48.88 \text{ dB}$$

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 ( $f_d - 2.88$ 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:

$$43+10\log P=43+10\log(3.837)=48.84 \text{ dB}$$

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	2007-09-29	2008-09-29
Agilent	Spectrum Analyzer	8564E	3943A01781	2006-11-22	2007-11-22

\* **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 10<sup>th</sup> harmonic.

**Test Data**

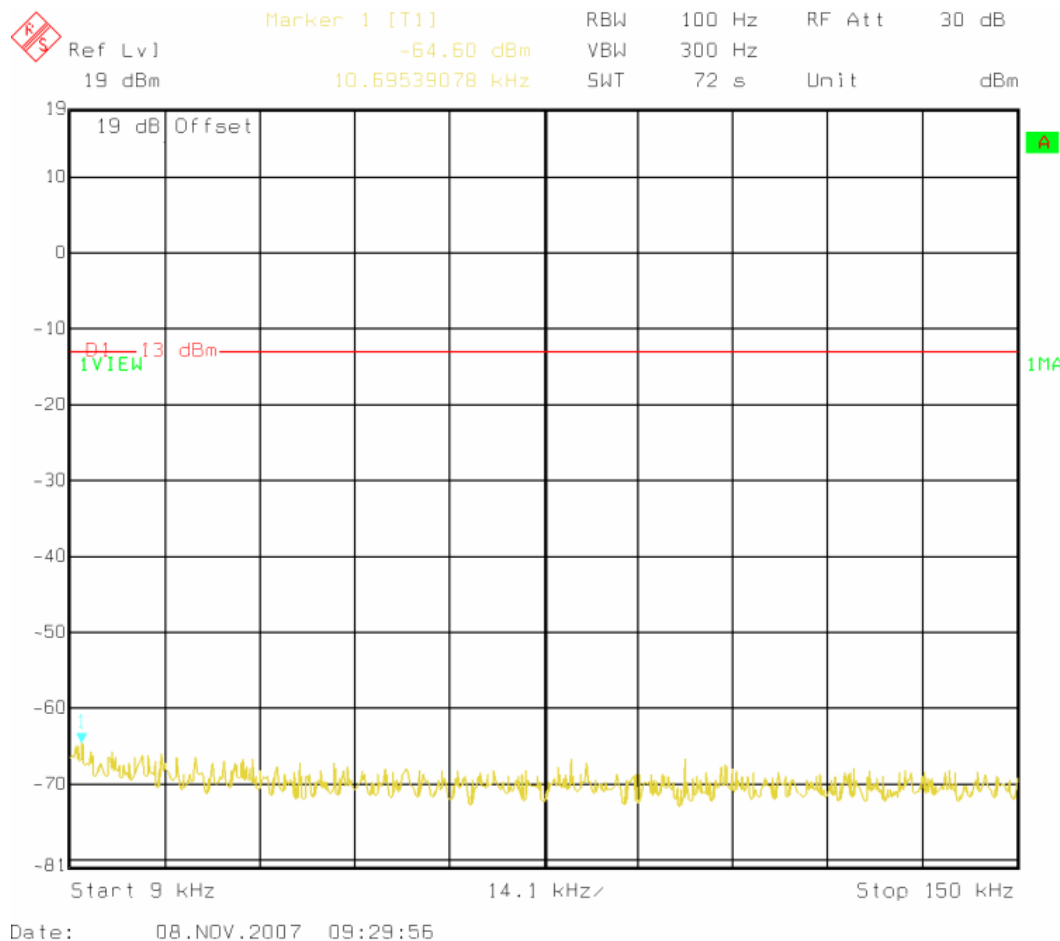
**Environmental Conditions**

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

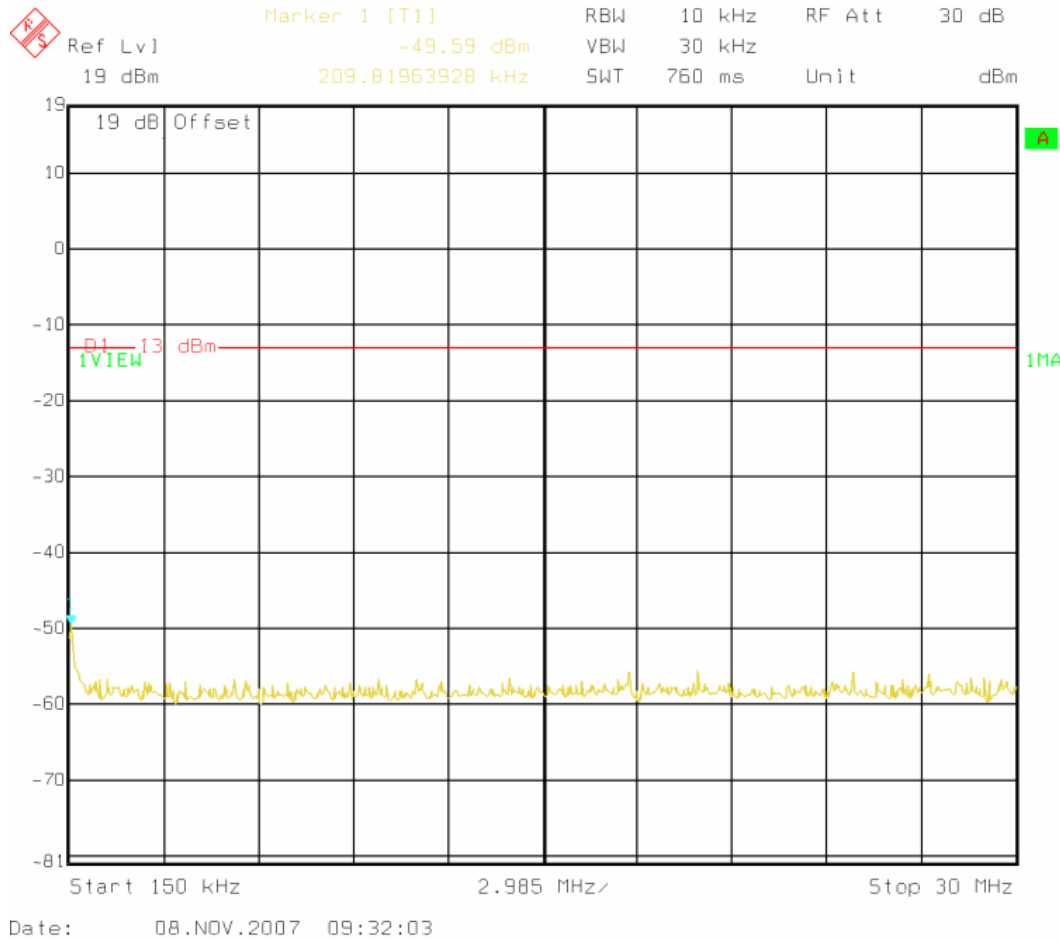
The testing was performed by David Zhang on 2007-11-08.

Test Result: Pass

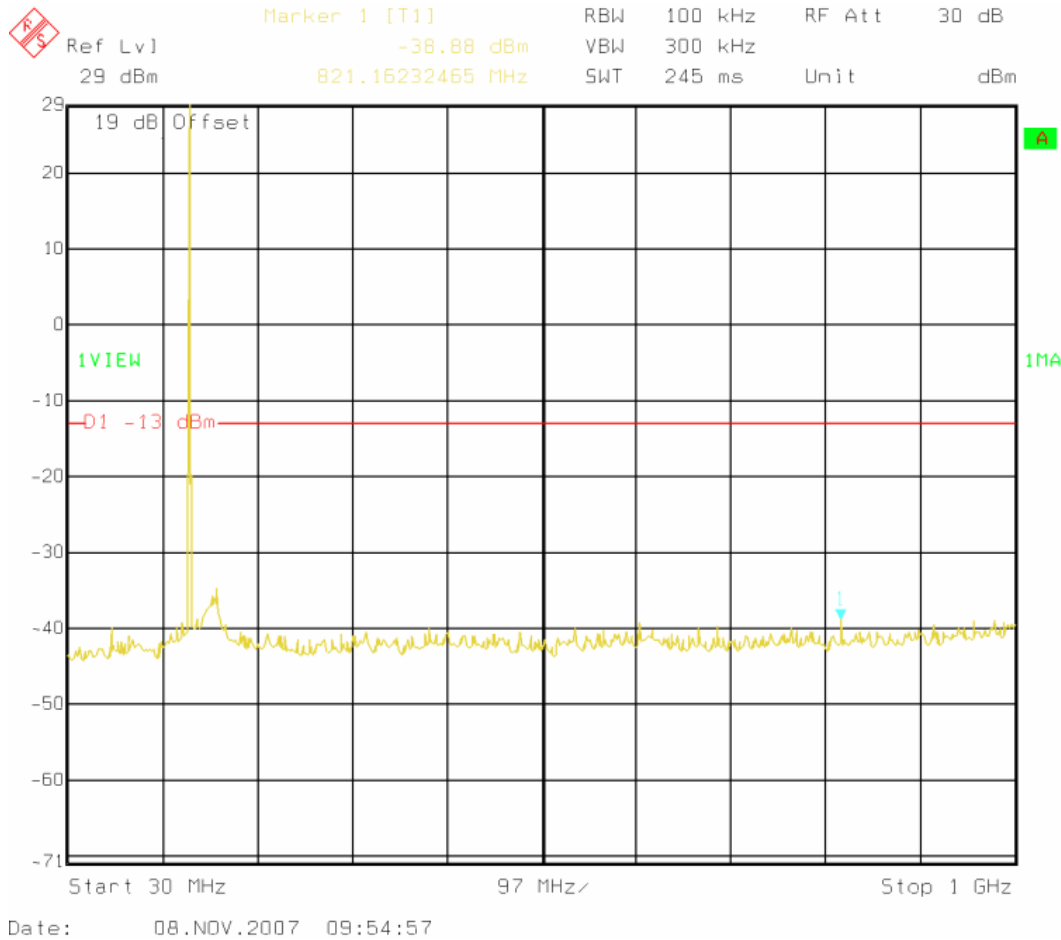
Test Mode: Transmitting



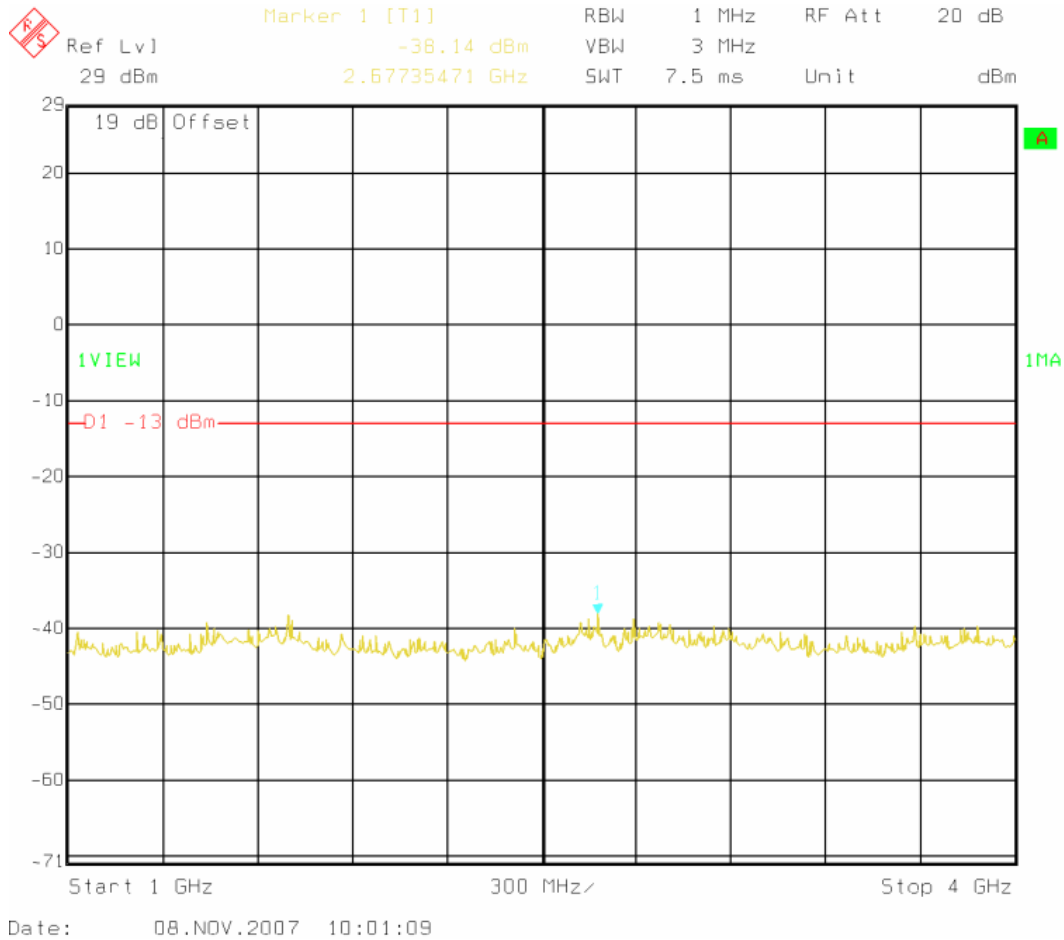
**Channel 5 (12.5 kHz Channel Separation)  
 Plot 1**



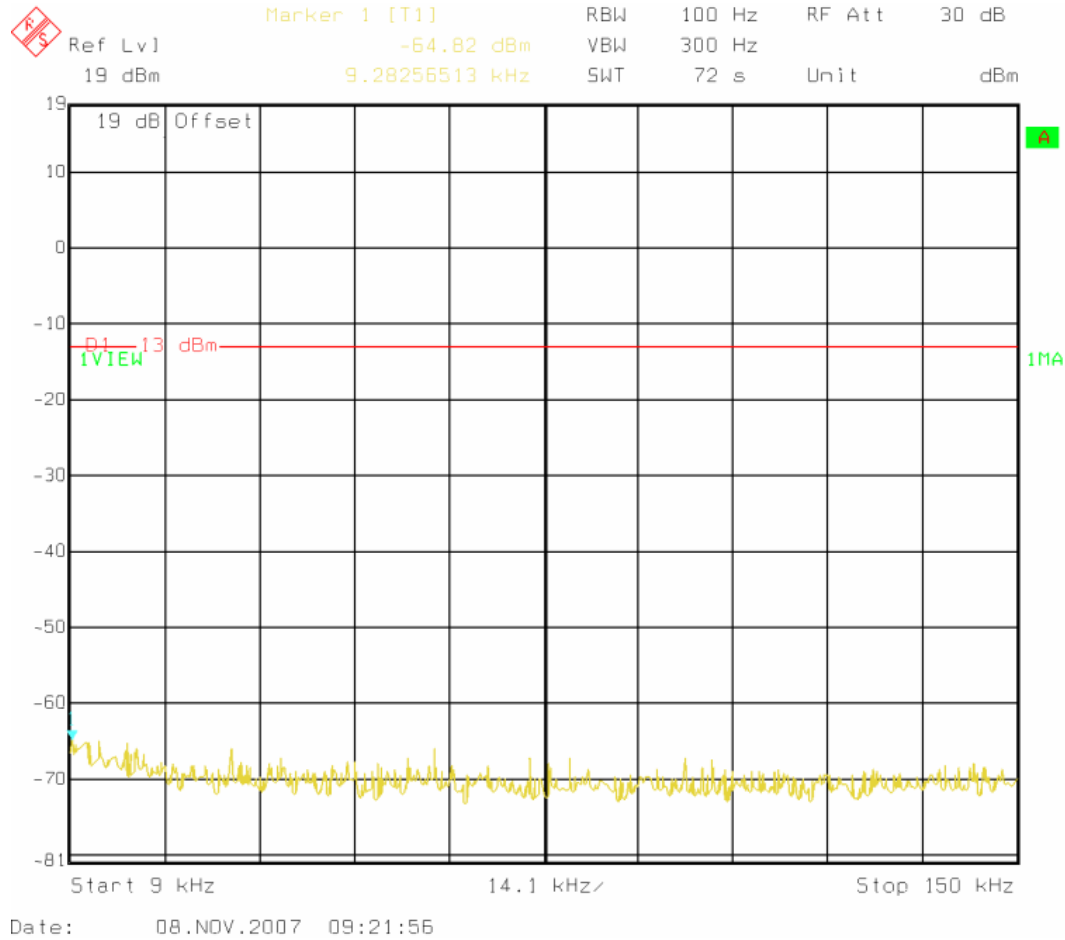
**Channel 5 (12.5 kHz Channel Separation)  
Plot 2**



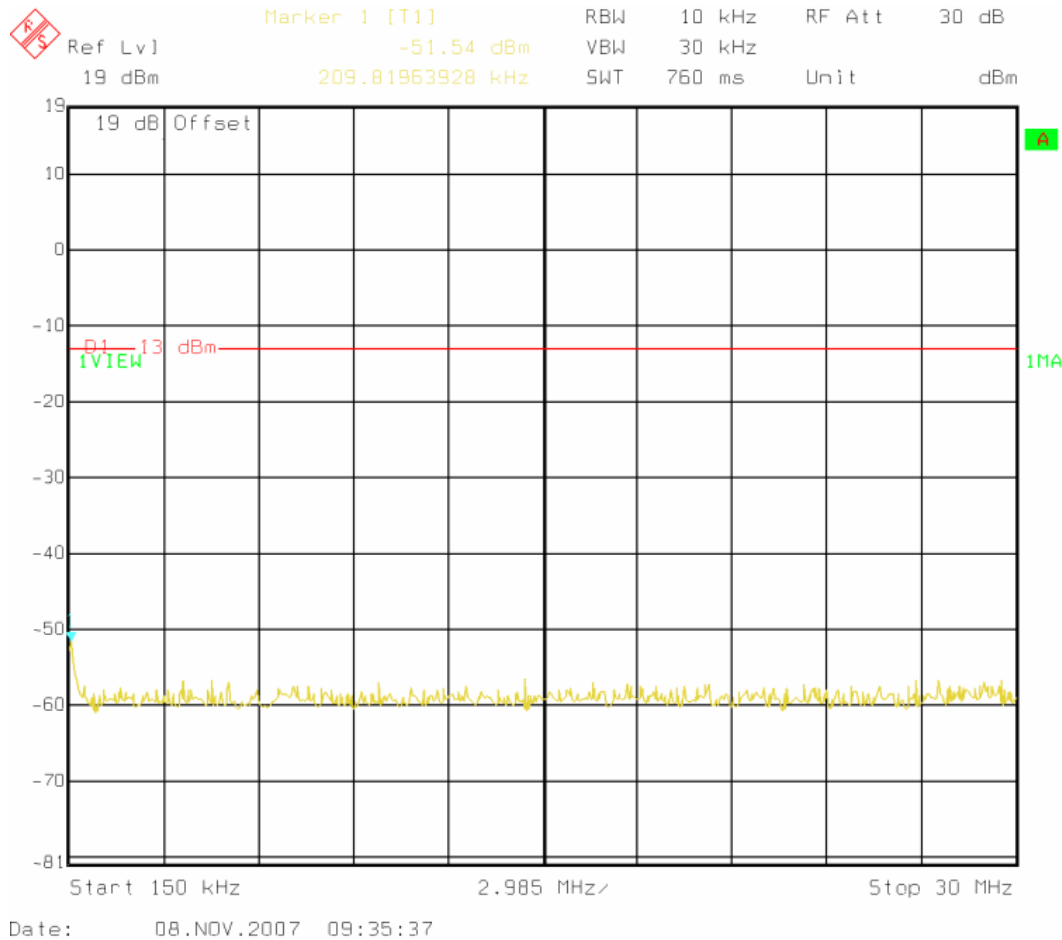
**Channel 5 (12.5 kHz Channel Separation)  
Plot 3**



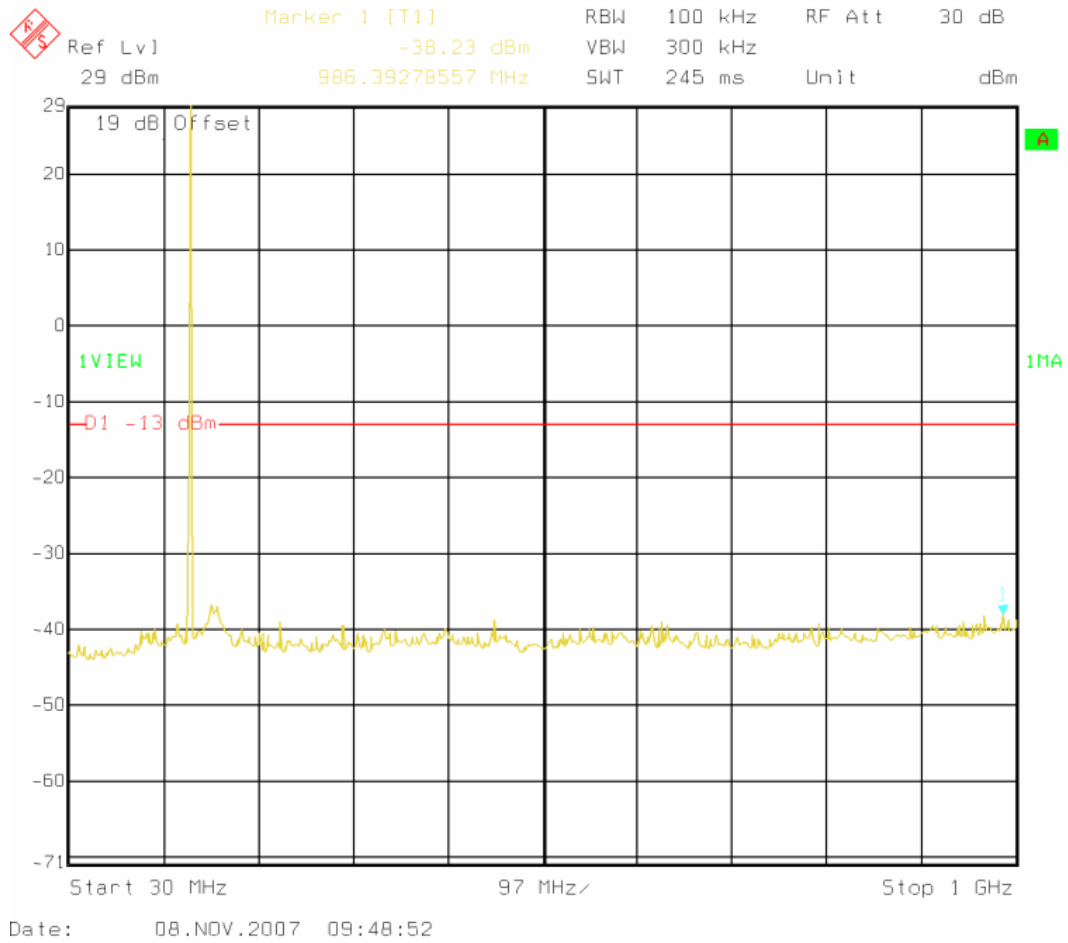
**Channel 5 (12.5 kHz Channel Separation)  
Plot 4**



**Channel 2(25 kHz Channel Separation)  
Plot 1**

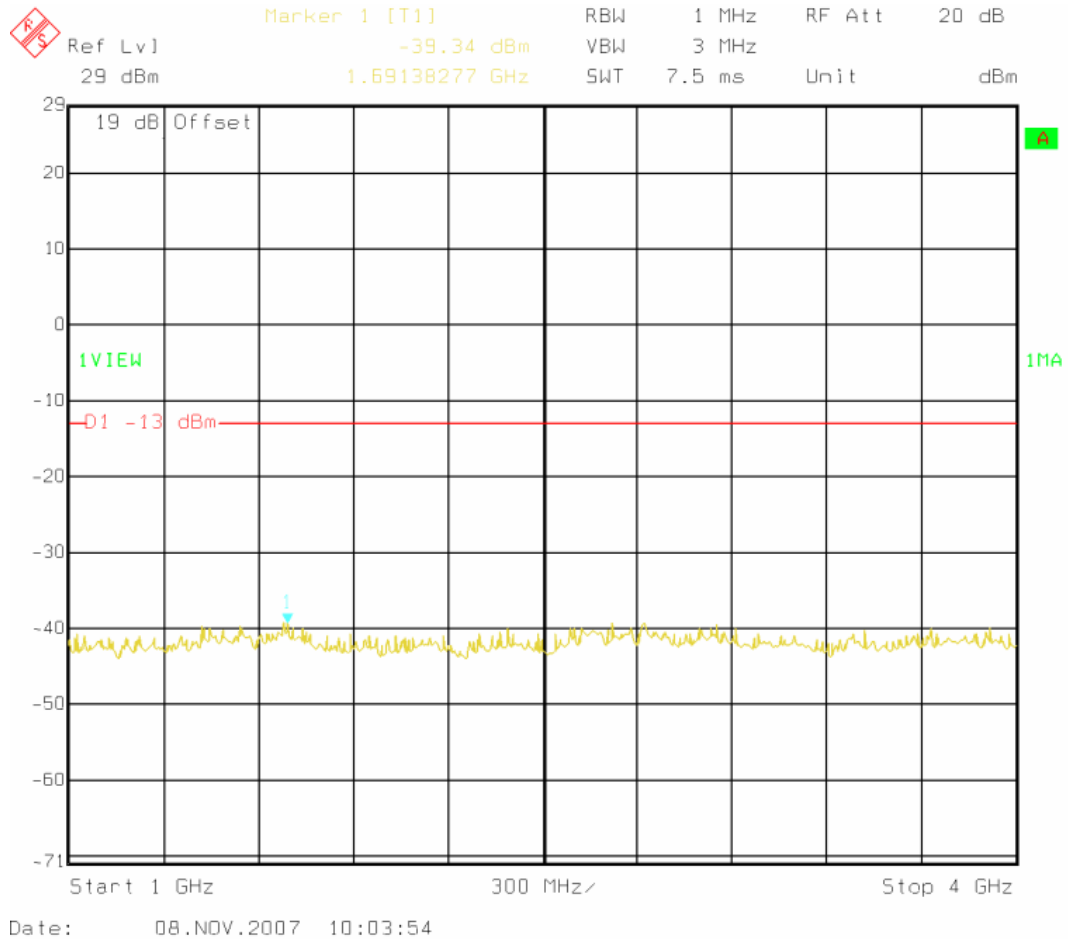


**Channel 2(25 kHz Channel Separation)  
Plot 2**



**Channel 2(25 kHz Channel Separation)  
Plot 3**





**Channel 2(25 kHz Channel Separation)  
Plot 4**

## §2.1053 and §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	2007-07-20	2008-07-20
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
Agilent	Spectrum Analyzer	8564E	3943A01781	2006-11-22	2007-11-22
HP	Signal Generator	HP8657A	2849U00982	2007-09-29	2008-09-29
Giga-tronics	Signal Generator	1026	270801	2007-09-29	2008-09-29
A.H. System	Horn Antenna	SAS-200/571	135	2007-05-17	2008-05-17

\* **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 Log<sub>10</sub> (power out in Watts)

### Test Results Summary

Channel 2: **14.50 dB** at **310.250 MHz** in the **Horizontal** polarization.  
 Channel 5: **23.75 dB** at **465.375 MHz** in the **Horizontal** polarization.

**Test Data****Environmental Conditions**

Temperature:	25 ° C
Relative Humidity:	50%
ATM Pressure:	1005mbar

The testing was performed by David Zhang on 2007-11-08.

Test Mode: Transmitting

**Channel 2**

Frequency (MHz)	Polar (H/V)	Absolute Level (dBm)	Transmission Power (dBm)	Attenuation (dBc)	Spurious Attenuation Limit (dB)	Margin (dB)
310.250	H	-27.50	35.0	62.50	48.0	14.50
310.250	V	-28.83	35.0	63.83	48.0	15.83
465.375	H	-33.77	35.0	68.77	48.0	20.77
465.375	V	-36.85	35.0	71.85	48.0	23.85
620.500	H	-41.33	35.0	76.33	48.0	28.33
620.500	V	-43.17	35.0	78.17	48.0	30.17
775.625	H	-47.50	35.0	82.50	48.0	34.50
775.625	V	-49.17	35.0	84.17	48.0	36.17
930.750	H	-53.77	35.0	88.77	48.0	40.77
930.750	V	-55.54	35.0	90.54	48.0	42.54
1085.875	H	-62.67	35.0	97.67	48.0	49.67
1085.875	V	-62.86	35.0	97.86	48.0	49.86
1241.000	H	-64.63	35.0	99.63	48.0	51.63
1241.000	V	-70.70	35.0	105.70	48.0	57.70
1396.125	H	-71.53	35.0	106.53	48.0	58.53
1551.250	H	-71.77	35.0	106.77	48.0	58.77
1396.125	V	-73.64	35.0	108.64	48.0	60.64
1706.375	H	-73.74	35.0	108.74	48.0	60.74
1706.375	V	-75.57	35.0	110.57	48.0	62.57
1551.250	V	-75.68	35.0	110.68	48.0	62.68
1861.500	H	-76.77	35.0	111.77	48.0	63.77
1861.500	V	-77.11	35.0	112.11	48.0	64.11

Transmission Power = 3.162 W = 35.0 dBm  
 Spurious Attenuation Limit = 43 + 10 log (3.162) = 48.0 dB  
 Margin = Attenuation - Limit

**Channel 5**

Frequency (MHz)	Polar (H/V)	Absolute Level (dBm)	Transmission Power (dBm)	Attenuation (dBc)	Spurious Attenuation Limit (dB)	Margin (dB)
465.375	H	-36.75	34.9	71.65	47.9	23.75
465.375	V	-38.13	34.9	73.03	47.9	25.13
620.500	H	-43.77	34.9	78.67	47.9	30.77
775.625	H	-49.18	34.9	84.08	47.9	36.18
775.625	V	-52.74	34.9	87.64	47.9	39.74
930.750	H	-55.72	34.9	90.62	47.9	42.72
930.750	V	-60.75	34.9	95.65	47.9	47.75
1085.875	H	-64.92	34.9	99.82	47.9	51.92
1085.875	V	-65.87	34.9	100.77	47.9	52.87
1241.000	V	-68.58	34.9	103.48	47.9	55.58
1396.125	H	-68.98	34.9	103.88	47.9	55.98
1396.125	V	-70.13	34.9	105.03	47.9	57.13
1551.250	H	-72.84	34.9	107.74	47.9	59.84
1551.250	V	-74.79	34.9	109.69	47.9	61.79
1706.375	H	-78.24	34.9	113.14	47.9	65.24
1706.375	V	-79.37	34.9	114.27	47.9	66.37
1861.500	H	-80.35	34.9	115.25	47.9	67.35
620.500	V	-46.40	34.9	81.30	47.9	33.40
1241.000	H	-67.11	34.9	102.01	47.9	54.11
1861.500	V	-81.11	34.9	116.01	47.9	68.11
310.250	H	-32.50	34.9	67.40	47.9	19.50
310.250	V	-33.33	34.9	68.23	47.9	20.33

Transmission Power = 3.162 W = 35.8 dBm

Spurious Attenuation Limit = 43 + 10 log (3.802) = 48.0 dB

Margin = Attenuation - Limit

## §2.1055 (d) and §90.213- FREQUENCY STABILITY

### Applicable Standard

§2.1055 (d)

§90.213

For output power > 2 watts, the limit is 5.0ppm.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
WUHUAN	Temperature & Humidity Chamber	HTP205	20021115	2007-01-02	2008-01-02
Hewlett-Packard	Frequency Counter	5342A	2317A08289	2007-03-01	2008-03-01

\* **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 David Zhang on 2007-11-08.*

Test Result: Pass

*Test Mode: Transmitting*

Channel 5 (12.5 kHz Channel Separation)

***Frequency Stability Versus temperature***

Reference Frequency: 155.125 MHz, Limit: 5 PPM			
Environment Temperature (°C)	Power Supplied (VDC)	Measured Frequency (MHz)	Frequency Error (PPM)
50	7.5	155.12565	4.19
40	7.5	155.12563	4.06
30	7.5	155.12557	3.67
20	7.5	155.12525	1.61
10	7.5	155.12513	0.84
0	7.5	155.12500	0.00
-10	7.5	155.12487	-0.84
-20	7.5	155.12476	-1.55
-30	7.5	155.12458	-2.71

***Frequency Stability Versus Voltage***

Reference Frequency 155.125 MHz, Limit: 5 PPM			
Environment Temperature (°C)	Power Supplied (VDC)	Measured Frequency (MHz)	Frequency Error (PPM)
20	6.4	155.12525	1.611603545

Channel 2 (25 kHz Channel Separation)

***Frequency Stability Versus temperature***

Reference Frequency: 155.125 MHz, Limit: 5 PPM			
Environment Temperature (°C)	Power Supplied (VDC)	Measured Frequency (MHz)	Frequency Error (PPM)
50	7.5	155.12565	4.19
40	7.5	155.12563	4.06
30	7.5	155.12557	3.67
20	7.5	155.12559	3.80
10	7.5	155.12533	2.13
0	7.5	155.12517	1.10
-10	7.5	155.12487	-0.84
-20	7.5	155.12477	-1.48
-30	7.5	155.12458	-2.71

***Frequency Stability Versus Voltage***

Reference Frequency 155.125 MHz, Limit: 5 PPM			
Environment Temperature (°C)	Power Supplied (VDC)	Measured Frequency (MHz)	Frequency Error (PPM)
20	6.4	155.12556	3.609991942

**§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	2007-01-24	2008-01-24
HP	Modulation Analyzer	8901B	3438A05208	2007-02-28	2008-02-28
HP	Signal Generator	HP8657A	2849U00982	2007-02-28	2008-02-28

\* **Statement of Traceability:** Bay Area Compliance Lab 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

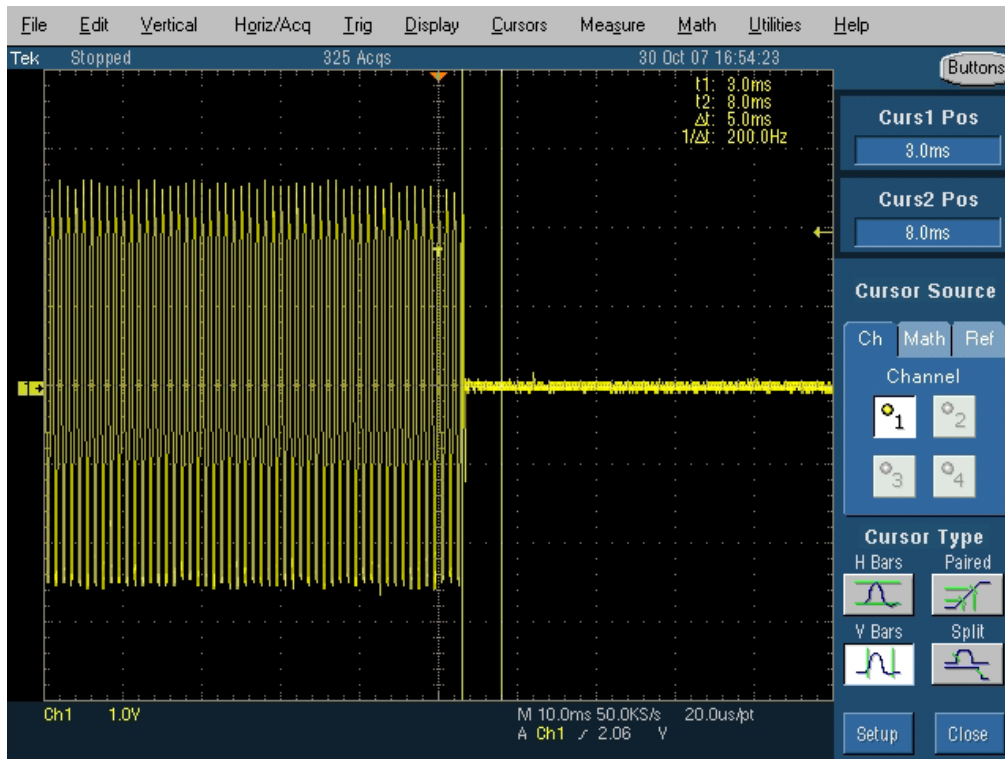
*The testing was performed by David Zhang on 2007-11-08.*

Test Result: Pass

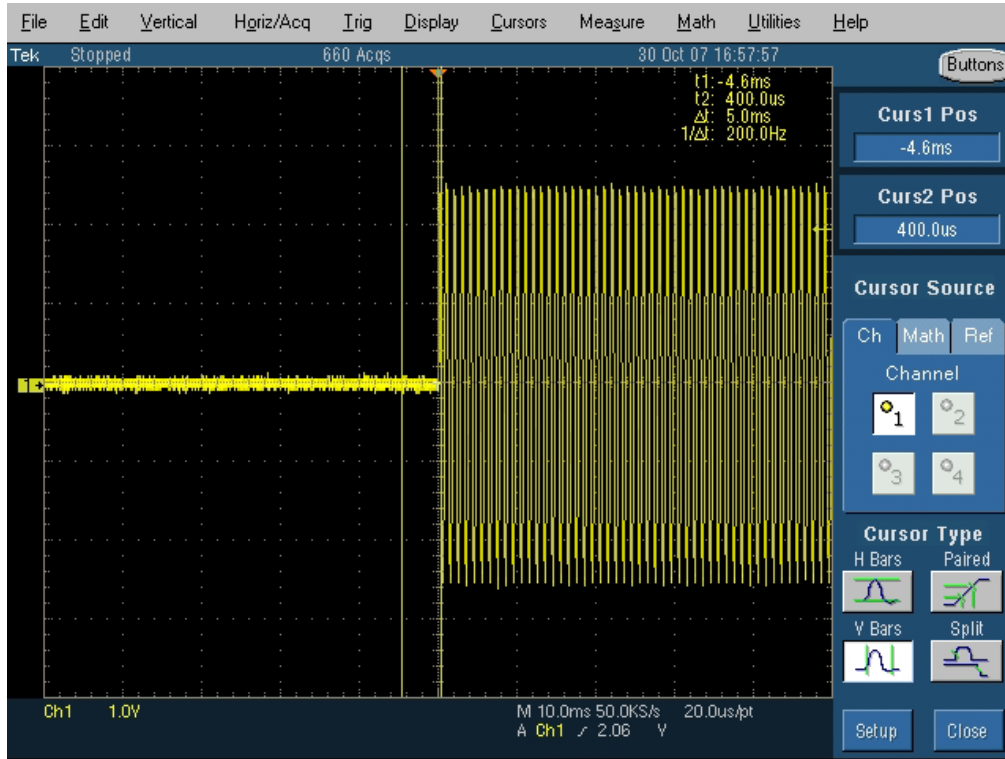
*Test Mode: Transmitting*



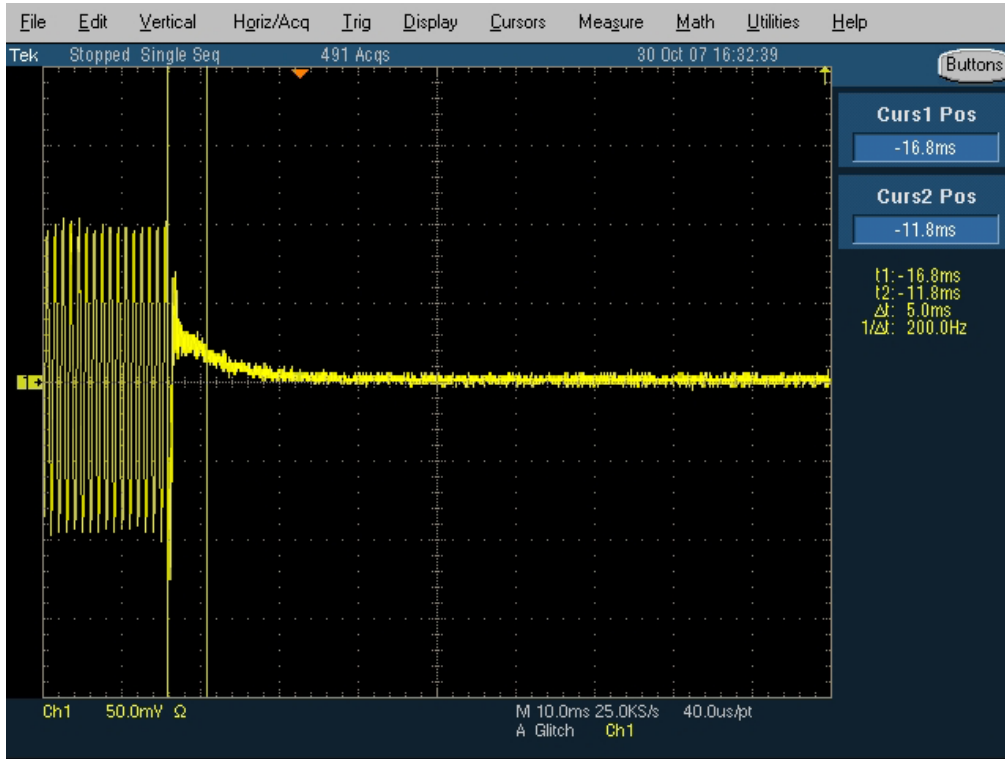
Frequency (MHz)	Channel Separation (kHz)	Transient Period (ms)	Transient Frequency	Result
155.125	12.5	5	< ± 12.5 kHz	Pass
		20	< ± 6.25 kHz	
		5	< ± 12.5 kHz	
	25.0	5	< ± 25.0 kHz	Pass
		20	< ± 12.5 kHz	
		5	< ± 25.0 kHz	



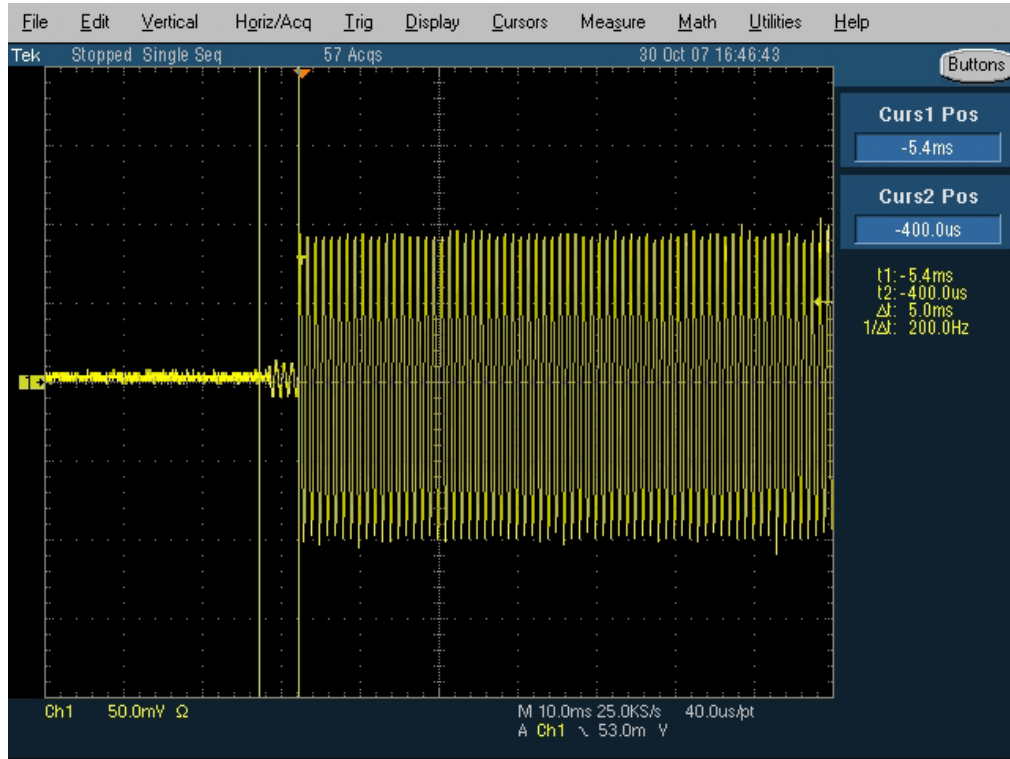
Plot 1 Ton (25 kHz)



Plot 2 Toff (25 kHz)



Plot 3 Ton (12.5 kHz)



Plot 4 Toff (12.5 kHz)