

FCC PART 90 TYPE APPROVAL
EMI MEASUREMENT AND TEST REPORT

For

Shenzhen HYT Science & Technology Co., Ltd

HYT Tower, Shenzhen Hi-Tech Industrial Park North, Beihuan Rd., Nanshan District, Shenzhen, P.R.C.

FCC ID: R74TC2108U

June 23, 2006

This Report Concerns: ☒ Original Report	Equipment Type: Two-way radio
Test Engineer: Charmi Peng <i>Charmi Peng</i> Deny Xiong <i>Deny Xiong</i>	
Report No.: RSZ06043002	
Test Date: May 23, 2006-June 20, 2006	
Reviewed By: Boni Baniqued <i>Boni Baniqued</i>	
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Note: The test report is specially limited to the above company and this particular sample only.
It may not be duplicated without prior written consent of Bay Area Compliance Lab Corp.
(ShenZhen). This report **must not** be used by the client to claim product certification,
approval, or endorsement by NVLAP, NIST or any agency of the US 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	4
LOCAL SUPPORT EQUIPMENT LIST AND DETAILS	5
SYSTEM TEST CONFIGURATION.....	6
DESCRIPTION OF TEST CONFIGURATION	6
EQUIPMENT MODIFICATIONS	6
CONFIGURATION OF TEST SETUP	7
BLOCK DIAGRAM OF TEST SETUP	7
SUMMARY OF TEST RESULTS	8
§2.1046 - CONDUCTED OUTPUT POWER.....	9
APPLICABLE STANDARD	9
TEST EQUIPMENT LIST AND DETAILS.....	9
TEST PROCEDURE	9
TEST DATA	10
§2.1046, and §90.205 – RADIATED OUTPUT POWER.....	14
APPLICABLE STANDARD	14
TEST EQUIPMENT LIST AND DETAILS.....	14
TEST PROCEDURE	14
TEST DATA	15
§2.1047, and §90.207 - MODULATION CHARACTERISTIC.....	16
APPLICABLE STANDARD	16
TEST EQUIPMENT LIST AND DETAILS.....	16
TEST PROCEDURE	16
TEST DATA	16
§2.1049, and § 90.209 – OCCUPIED BANDWIDTH	20
APPLICABLE STANDARD	20
TEST EQUIPMENT LIST AND DETAILS.....	20
TEST PROCEDURE	21
TEST DATA	21
§2.1051 and §90.210 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS.....	24
APPLICABLE STANDARD	24
TEST EQUIPMENT LIST AND DETAILS.....	24
TEST PROCEDURE	24
TEST DATA	24
§2.1053 and §90.210 - RADIATED SPURIOUS EMISSION	31
APPLICABLE STANDARD	31
TEST EQUIPMENT LIST AND DETAILS.....	31
TEST PROCEDURE	31
TEST RESULTS SUMMARY	31
TEST DATA	32
§2.1055 (d) and §90.213- FREQUENCY STABILITY.....	36
APPLICABLE STANDARD	36
TEST EQUIPMENT LIST AND DETAILS.....	36
TEST PROCEDURE	36
TEST DATA	36
§90.214 - TRANSIENT FREQUENCY BEHAVIOR.....	38

APPLICABLE STANDARD	38
TEST EQUIPMENT LIST AND DETAILS.....	38
TEST PROCEDURE	38
TEST DATA	38

GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *Shenzhen HYT Science & Technology Co., Ltd*'s product, model number: TC2108U or the "EUT" as referred to in this report is a Two-way radio. The EUT is measured approximately 18.5 cm L x 6.0 cmW x 3.5 cmH, rated input voltage: DC 7.2 V battery.

** The test data gathered are from production sample, serial number: 0604059. Provided by the manufacturer, we received the EUT on 2006-4-30.*

Objective

This Type approval report is prepared on behalf of *Shenzhen HYT Science & Technology 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 EIA 137-A, TIA EIA 98-C, TIA603-C and ANSI 63.4-2003, American National Standard for Method of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All emissions measurement was performed and Bay Area Compliance Lab 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 Lab 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 518038, P.R.China.

Test site at Bay Area Compliance Lab 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 and Industrial Canada registration test site No.: 5500A. 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 Lab Corp. (ShenZhen) is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0). The current scope of accreditations can be found at <http://ts.nist.gov/ts/htdocs/210/214/scopes/2007070.htm>

Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
NANYAN	Audio Generator	NY2201	007727	N/A

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 Lab Corp. (ShenZhen) has not done any modification on the EUT.

Configuration of Test Setup



Lie

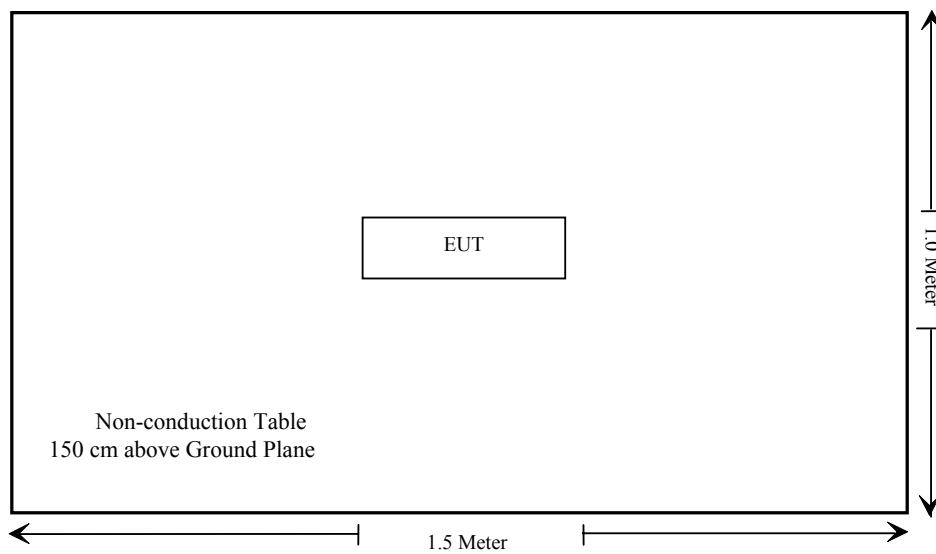


Side



Stand

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§1.1310 §2.1093	RF Exposure	Compliant, refer to SAR Report
§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

* Within the measurement uncertainty

§2.1046 - CONDUCTED OUTPUT POWER

Applicable Standard

According to FCC §2.1046, and §90.205, maximum ERP is dependent upon the station's antenna HAAT and required service area.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde&Schwarz	EMI Test Receiver	ESCI	100035	2005-8-17	2006-8-17

* **Statement of Tractability:** Bay Area Compliance Lab 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:

<u>R B/W</u>	<u>Video B/W</u>
100 kHz	300 kHz

Test Data**Environmental Conditions**

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

The testing was performed by Charmi Peng on 2006-5-23.

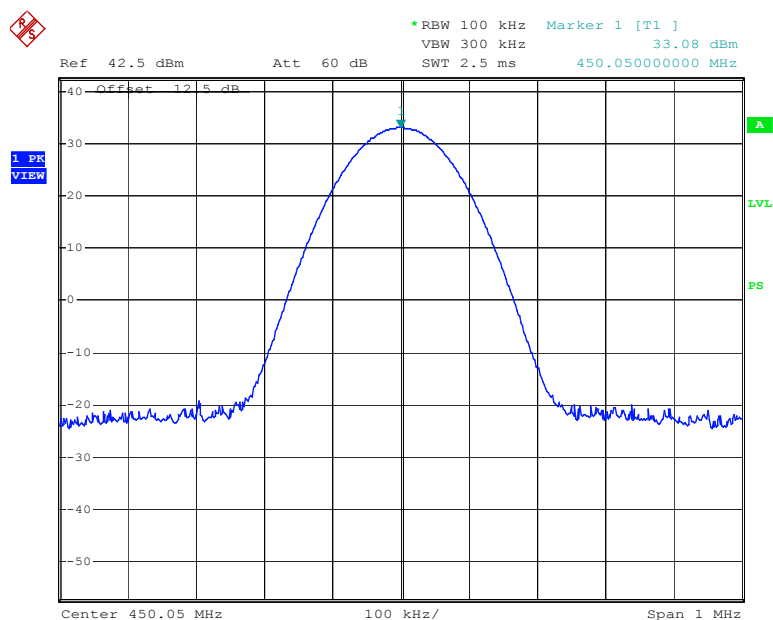
Test Result: Pass

Test Mode: Transmitting

Frequency Spacing (kHz)	Frequency (MHz)	Output Power in dBm	Output Power in W
Narrow12.5	450.05	33.08	2.033
	460.05	33.56	2.270
	469.95	33.65	2.317
Wide25.0	450.05	33.02	2.004
	460.05	33.10	2.042
	469.95	33.64	2.312

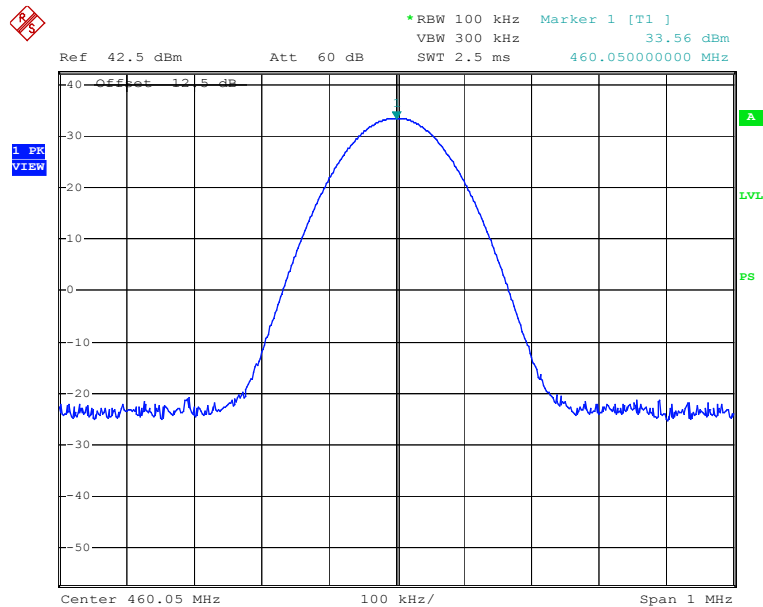
For Narrow 12.5kHz

Low channel:



HYT Two-way radio M/N:TC2108U RF Output power Narrow Low ch
 Date: 23.MAY.2006 09:23:25

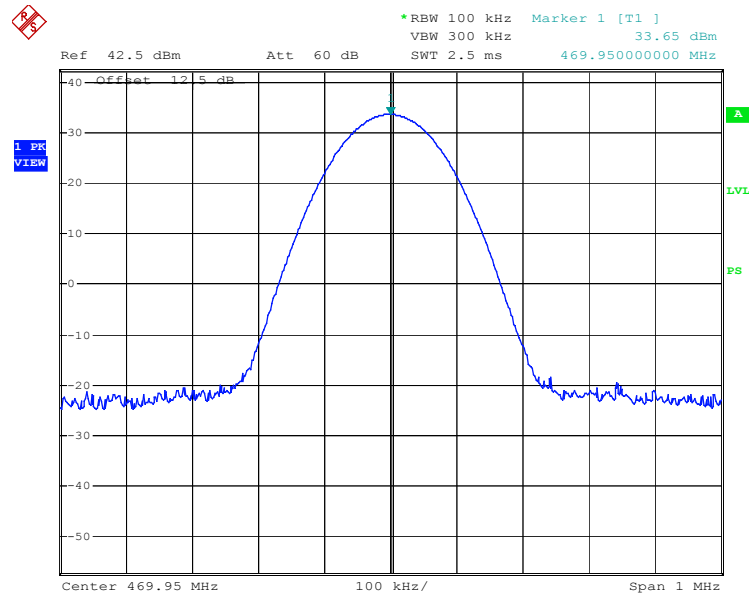
Middle channel:



HYT Two-way radio M/N:TC2108U RF Output power Narrow Mid ch

Date: 23.MAY.2006 09:22:38

High channel:

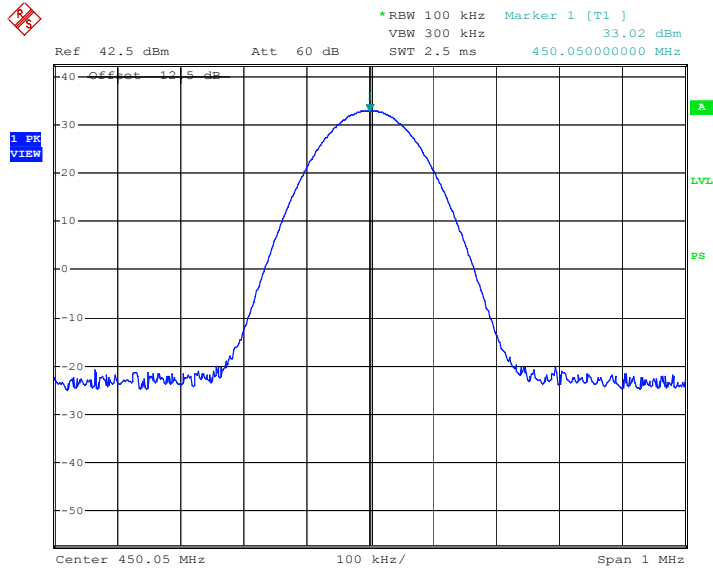


HYT Two-way radio M/N:TC2108U RF Output power Narrow High ch

Date: 23.MAY.2006 09:26:52

For Wideband 25kHz:

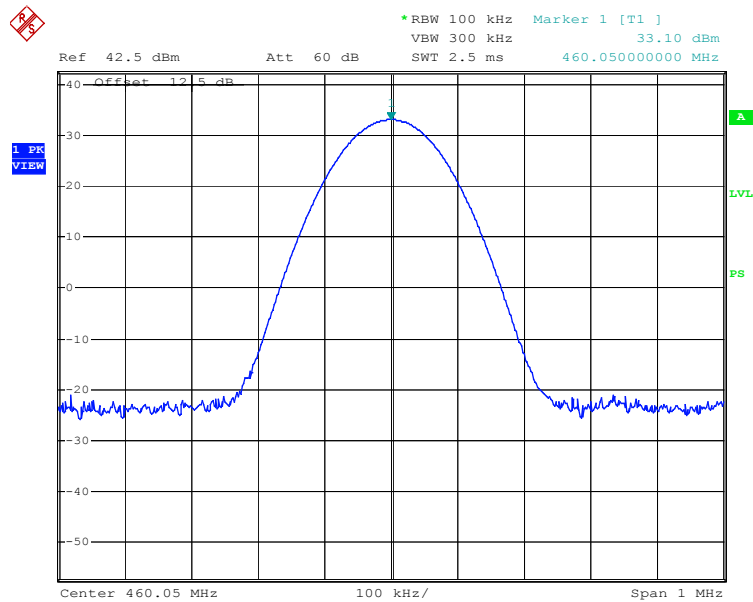
Low channel:



HYT Two-way radio M/N:TC2108U RF Output power Wide Low ch

Date: 23.MAY.2006 09:36:35

Middle channel:



HYT Two-way radio M/N:TC2108U RF Output power Wide Mid ch

Date: 23.MAY.2006 09:34:47



A

LVL

PS

§2.1046, and §90.205 – RADIATED OUTPUT POWER

Applicable Standard

According to FCC §2.1046, and §90.205, maximum ERP is dependent upon the station's antenna HAAT and required service area.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
SUNOL SCIENCES	Horn Antenna	DRH-118	A052604	2005-7-20	2006-7-20
SUNOL SCIENCES	Broadband Antenna	JB1	A040904-1	2006-4-28	2007-4-28
SUNOL SCIENCES	Broadband Antenna	JB1	A040904-2	2006-4-28	2007-4-28
Agilent	Spectrum Analyzer	8564E	3943A01781	2005-12-08	2006-12-08
HP	Signal Generator	HP8657A	2849U00982	2006-2-28	2007-2-28
Giga-tronics	Signal Generator	1026	270801	2006-2-28	2007-2-28
A.H. System	Horn Antenna	SAS-200/571	135	2006-4-28	2007-4-28

* **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

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:	1005mbar

The testing was performed by Deny Xiong on 2006-5-29.

Test Mode: Transmitting

For Wide band:

Indicated		Table	Test Antenna		Substituted			Antenna Gain Correction	Cable Loss dB	FCC Part 90 Absolute Level dBm
Frequency MHz	Meter Reading dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Polar H/V			
Transmitting in Low Channel (CH1)										
450.05	81.68	154	1.5	H	450.05	9.4	H	0	4.85	4.55
450.05	94.18	248	1.5	V	450.05	36.4	V	0	4.85	31.55
Transmitting in Middle Channel (CH2)										
460.05	85.23	268	1.6	H	460.05	13.5	H	0	5.07	8.43
460.05	99.50	230	1.4	V	460.05	38.6	V	0	5.07	33.53
Transmitting in High Channel (CH3)										
469.95	87.44	247	1.3	H	469.95	18.4	H	0	5.24	13.16
469.95	99.03	156	1.5	V	469.95	38.2	V	0	5.24	32.96

For Narrow band

Indicated		Table	Test Antenna		Substituted			Antenna Gain Correction	Cable Loss dB	FCC Part 90 Absolute Level dBm
Frequency MHz	Meter Reading dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Polar H/V			
Transmitting in Low Channel (CH1)										
450.05	94.06	147	1.5	H	450.05	21.9	H	0	4.85	17.05
450.05	94.6	258	1.6	V	450.05	37.0	V	0	4.85	32.15
Transmitting in Middle Channel (CH2)										
460.05	94.05	321	1.3	H	460.05	22.3	H	0	5.07	17.23
460.05	99.54	258	1.4	V	460.05	38.6	V	0	5.07	33.53
Transmitting in High Channel (CH3)										
469.95	95.98	26	1.5	H	469.95	20.8	H	0	5.24	15.56
469.95	99.54	84	1.5	V	469.95	38.8	V	0	5.24	33.56

§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	2006-2-28	2007-2-28
NANYAN	Audio Generator	NY2201	019829	2005-12-23	2006-12-23

* **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

Test Method: TIA/EIA-603 2.2.3

Test Data**Environmental Conditions**

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

The testing was performed by Charmi Peng on 2006-5-29.

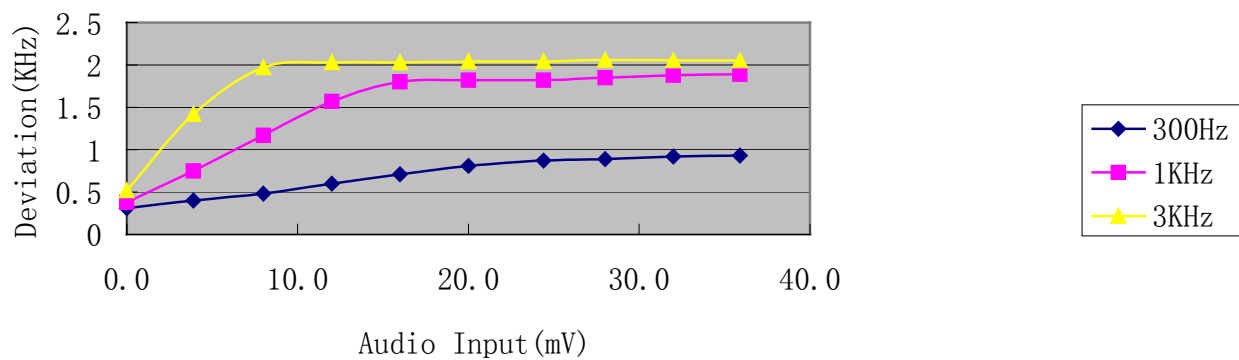
Test Result: Pass

Test Mode: Transmitting

For 12.5 kHz Channel Bandwidth:

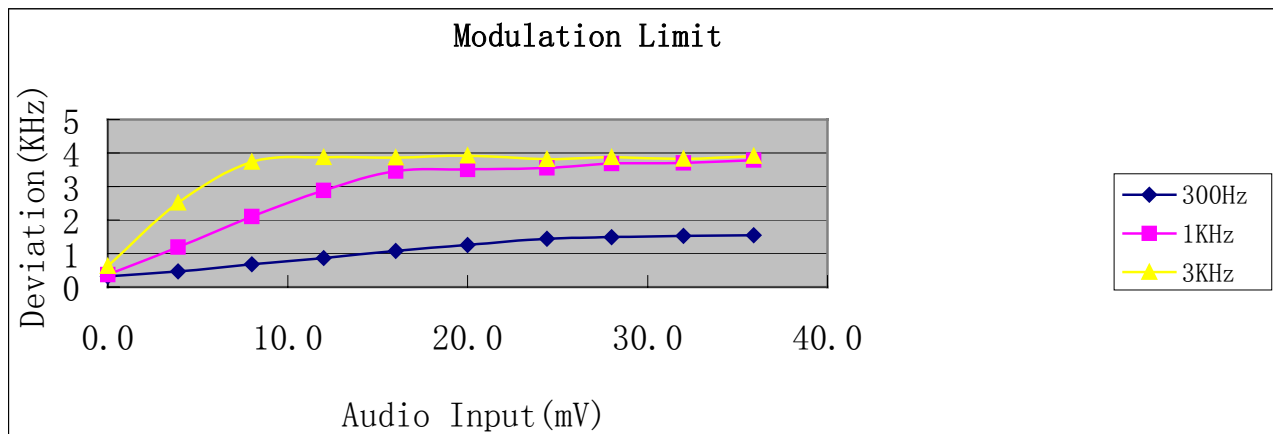
Audio Input (mV)	300Hz Deviation (kHz)	1kHz Deviation (kHz)	3kHz Deviation (kHz)
0.0	0.31	0.38	0.52
4.0	0.40	0.75	1.42
8.0	0.48	1.17	1.97
12.0	0.60	1.57	2.03
16.0	0.71	1.80	2.03
20.0	0.81	1.82	2.04
24.0	0.87	1.82	2.04
28.0	0.89	1.85	2.06
32.0	0.92	1.88	2.05
36.0	0.93	1.89	2.05

Modulation Limit

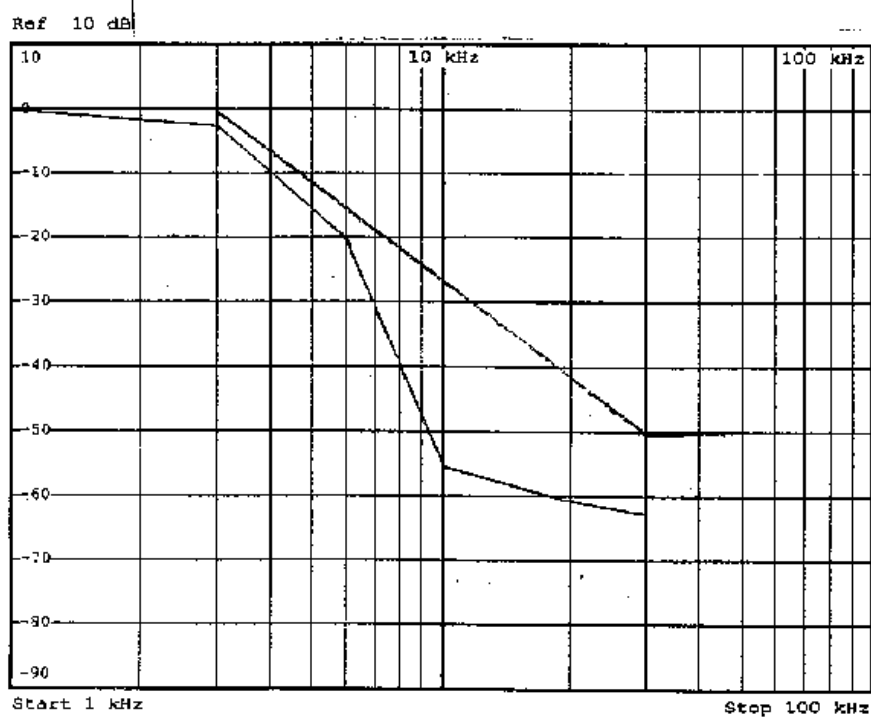
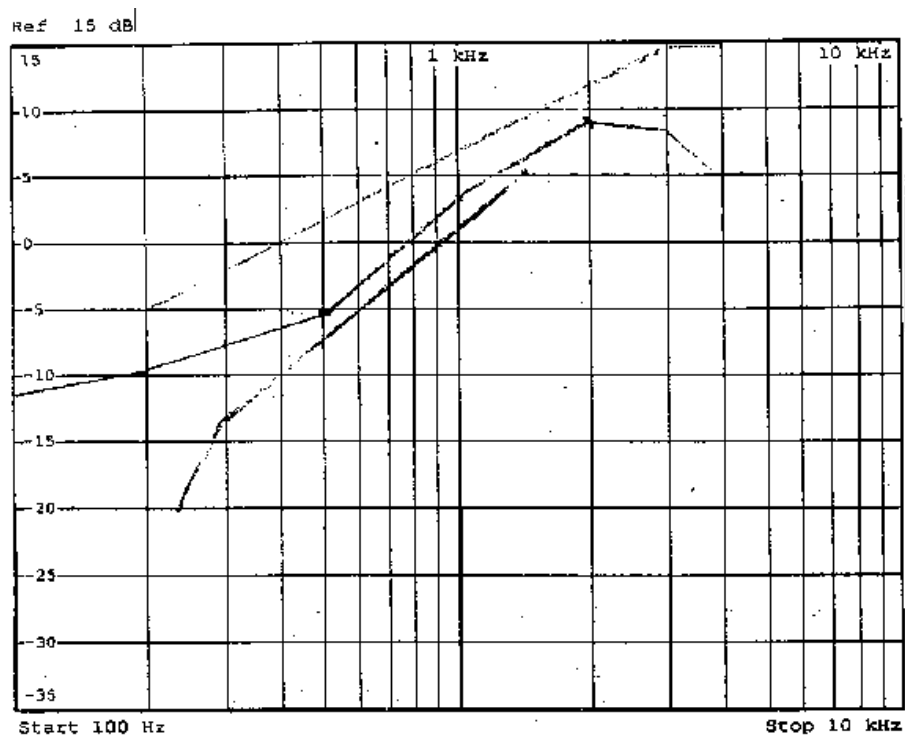


For 25 kHz Channel Bandwidth:

Audio Input (mV)	300Hz Deviation (kHz)	1kHz Deviation (kHz)	3kHz Deviation (kHz)
0	0.32	0.37	0.62
4	0.47	1.19	2.51
8	0.68	2.10	3.73
12	0.87	2.89	3.87
16	1.08	3.46	3.86
20	1.26	3.51	3.92
24	1.44	3.56	3.82
28	1.49	3.69	3.87
32	1.53	3.71	3.83
36	1.55	3.79	3.91



Audio Low Filter Characteristic:



§2.1049, and § 90.209 – OCCUPIED BANDWIDTH

Applicable Standard

§2.1049, §90.209 and §90.210

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:

$$50 + 10 \log P = 50 + 10 \log(2.317) = 53.65 \text{ dB}$$

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:

$$43 + 10 \log P = 43 + 10 \log(2.312) = 46.64 \text{ dB}$$

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	2005-8-17	2006-8-17
HP	Modulation Analyzer	8901B	3438A05208	2006-2-28	2007-2-28
NANYAN	Audio Generator	NY2201	019829	2005-12-23	2006-12-23

* **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

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:	1005mbar

The testing was performed by Charmi Peng on 2006-5-23.

Test Result: Pass.

Test Mode: Transmitting

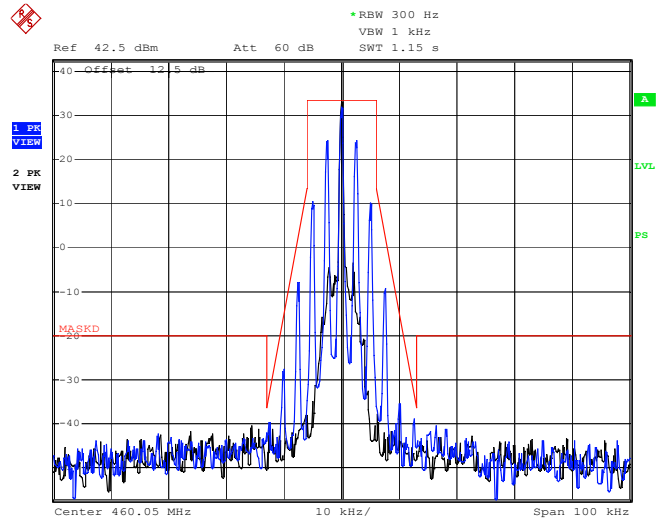
Please refer to the hereinafter plots.

Emission Designator:

For 12.5KHz Channel Spacing: $2M+2D = 2x3+2x2.5 = 11K0F3E$

For 25.0KHz Channel Spacing: $2M+2D = 2x3+2x5.0 = 16K0F3E$

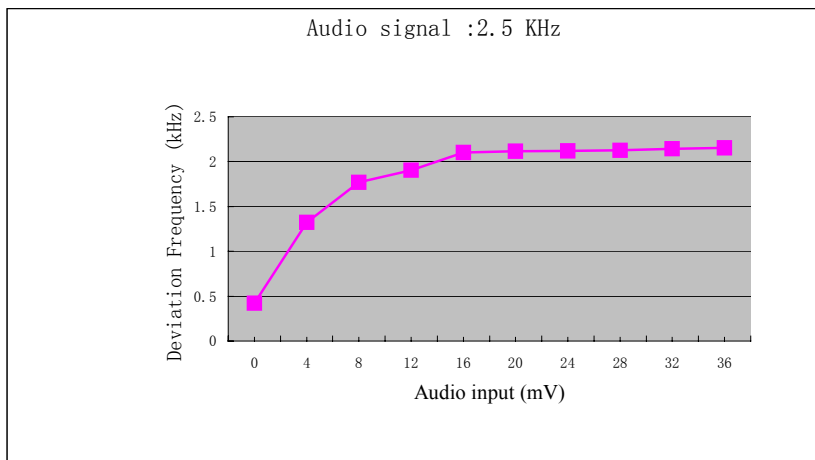
Emission Mask D For 12.5 KHz Channel Bandwidth:



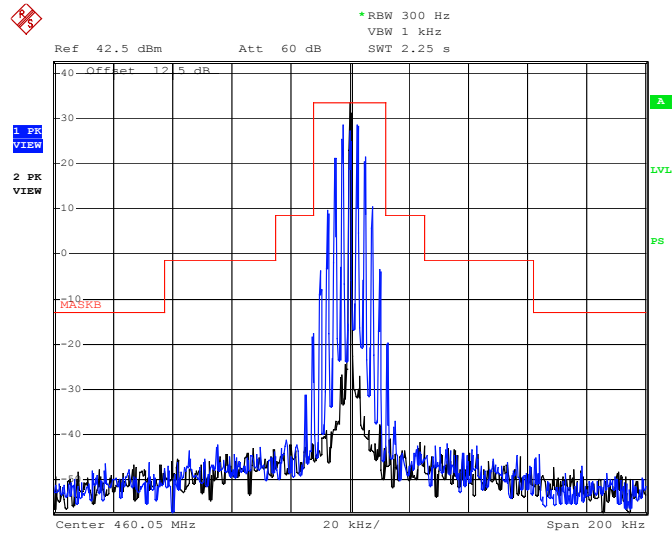
HYT Two-way radio M/N:TC2108U Emission mask Narrow

Date: 23.MAY.2006 09:30:52

Audio input (mV)	Frequency Deviation (kHz)
0	0.423
4	1.322
8	1.771
12	1.903
16	2.101
20	2.115
24	2.118
28	2.127
32	2.142
36	2.153



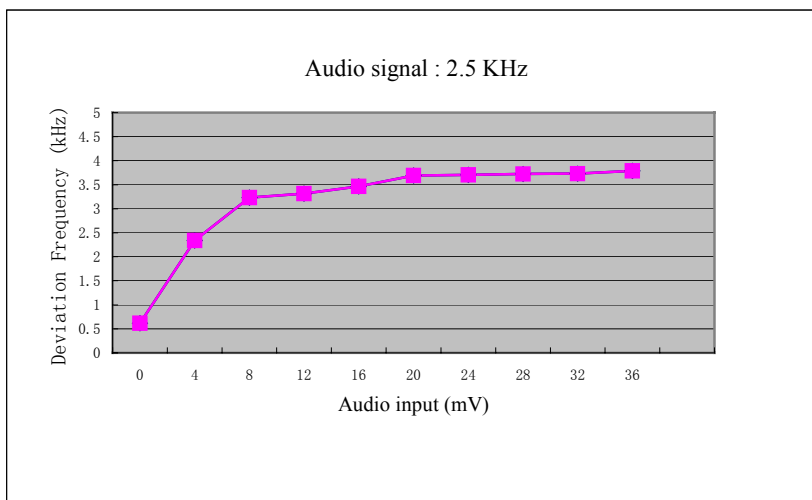
Emission Mask B For 25 KHz Channel Bandwidth:



HYT Two-way radio M/N:TC2108U Emission mask Wide

Date: 23.MAY.2006 09:41:17

Audio input (mV)	Frequency Deviation (kHz)
0	0.614
4	2.341
8	3.235
12	3.317
16	3.468
20	3.691
24	3.702
28	3.721
32	3.733
36	3.789



§2.1051 and §90.210 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Applicable Standard

§90.210 (12.5kHz bandwidth only)

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:

$$50+10\log P=50+10\log(2.317)=53.65\text{dB}$$

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

On any frequency removed from the center of the assigned channel by more than 250 percent at least:

$$43+10\log P=43+10\log(2.312)=46.64\text{dB}$$

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde&Schwarz	EMI Test Receiver	ESCI	100035	2005-8-17	2006-8-17

* **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

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:	1005mbar

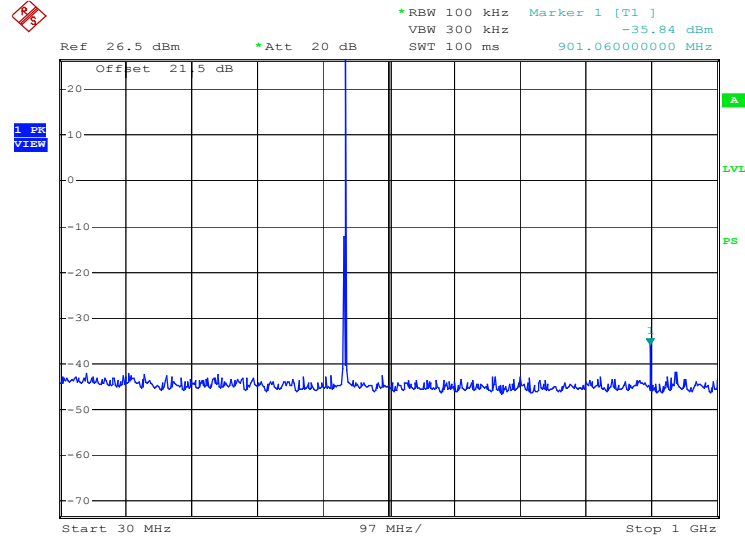
The testing was performed by Charmi Peng on 2006-5-29.

Test Result: Pass

Test Mode: Transmitting

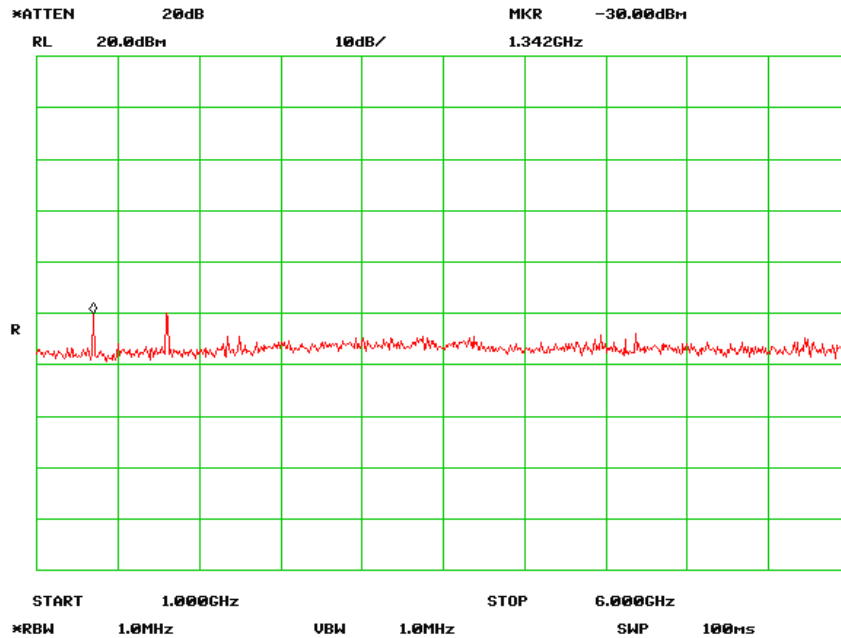
For 12.5KHz Channel bandwidth:

Low channel:
(30MHz-1GHz)

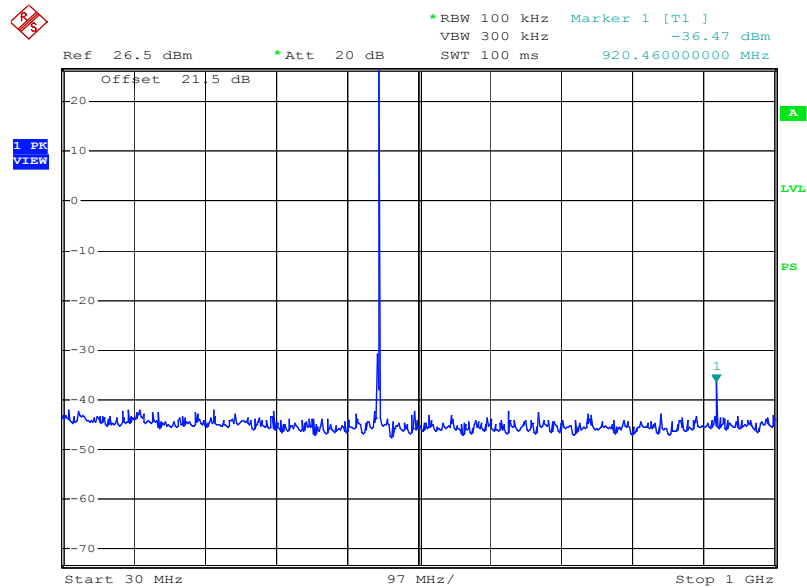


HYT Two-way radio M/N:TC2108U Spurious emission at antenna terminal Narrow Low ch(30M-1G)
Date: 29.MAY.2006 08:36:21

(1GHz-6GHz)

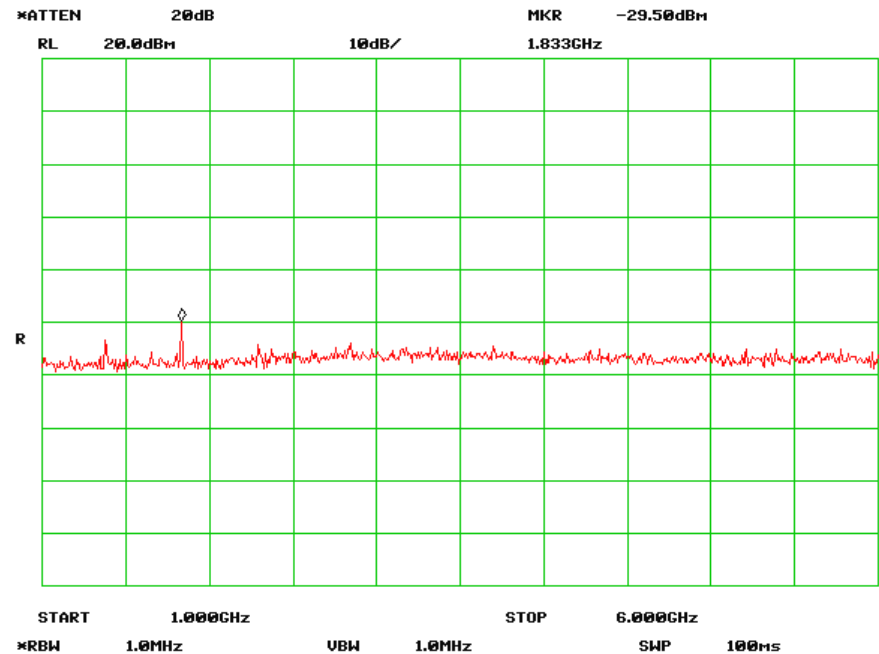


Middle channel:
(30MHz-1GHz)

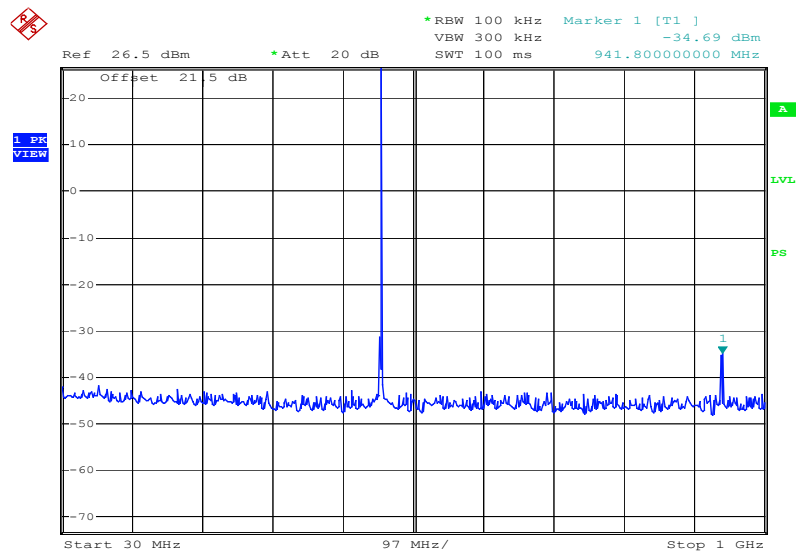


HYT Two-way radio M/N:TC2108U Spurious emission at antenna terminal Narrow Mid ch(30M-1G)
Date: 29.MAY.2006 08:37:00

(1GHz-6GHz)

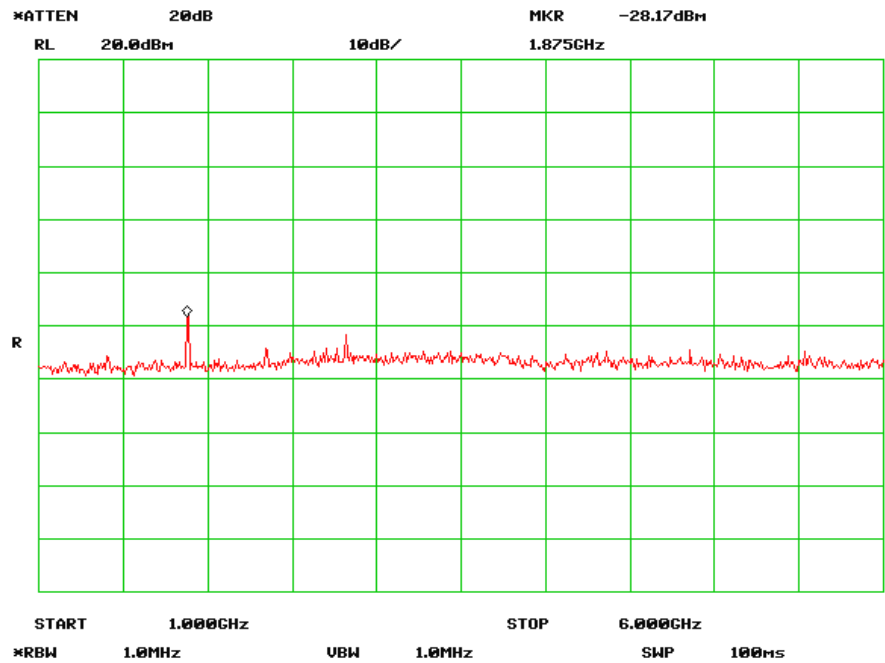


High channel:
(30MHz-1GHz)



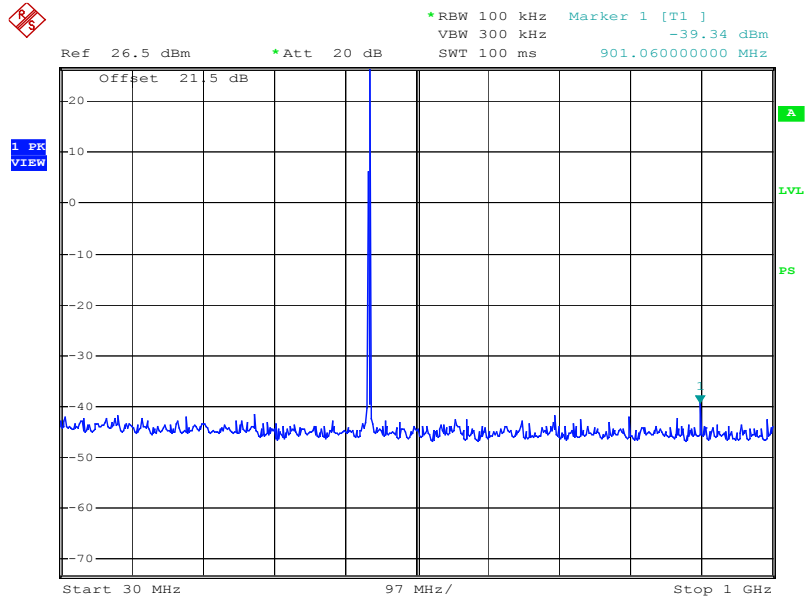
HYT Two-way radio M/N:TC2108U Spurious emission at antenna t
erminal Narrow High ch(30M-1G)
Date: 29.MAY.2006 08:37:35

(1GHz-6GHz)



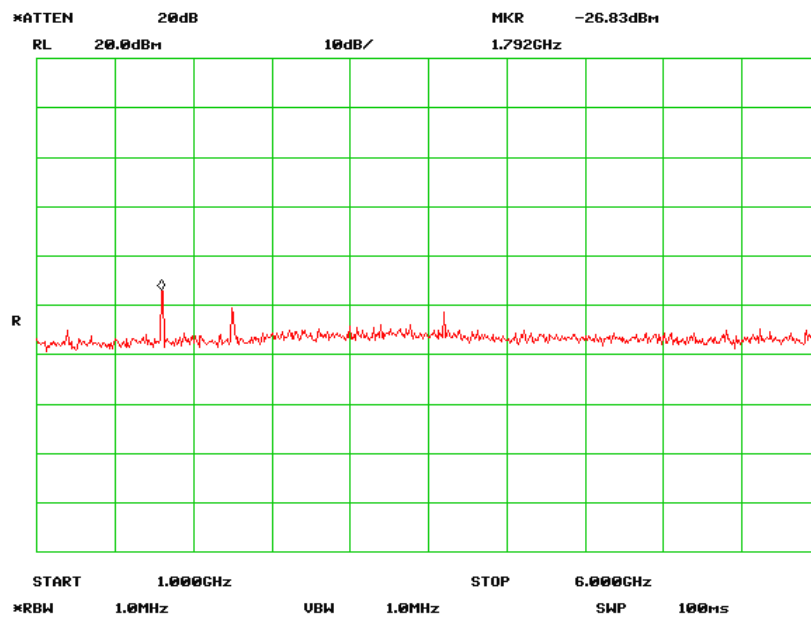
For 25 KHz Channel bandwidth:

Low channel:
(30MHz-1GHz)

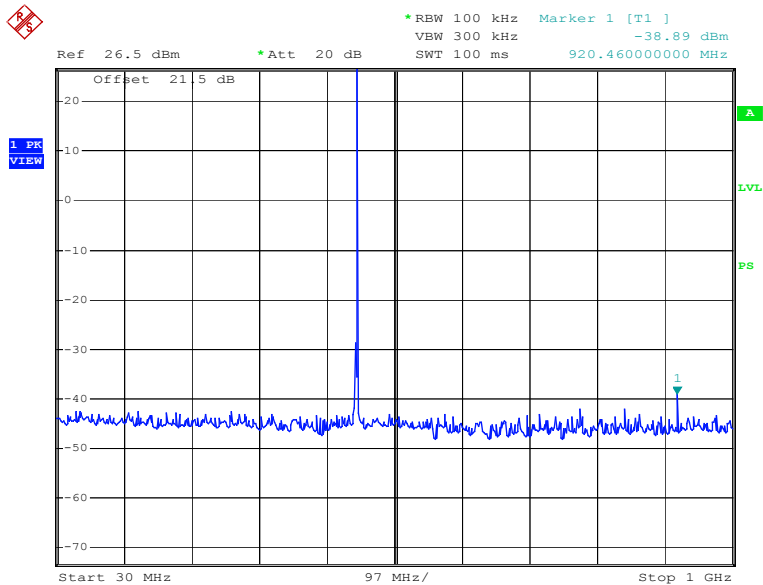


HYT Two-way radio M/N:TC2108U Spurious emission at antenna terminal Wide Low ch(30M-1G)
Date: 29.MAY.2006 08:41:22

(1GHz-6GHz)

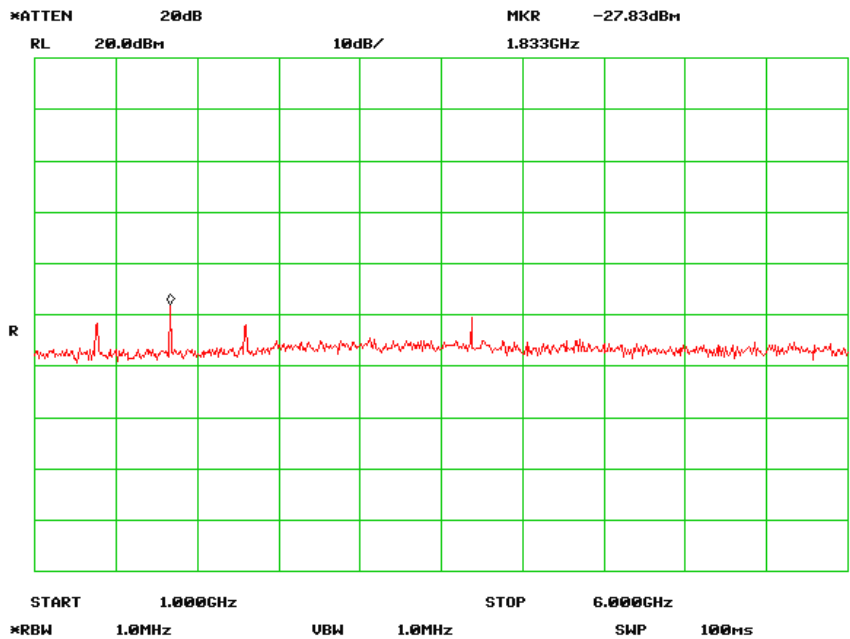


Middle channel:
(30MHz-1GHz)

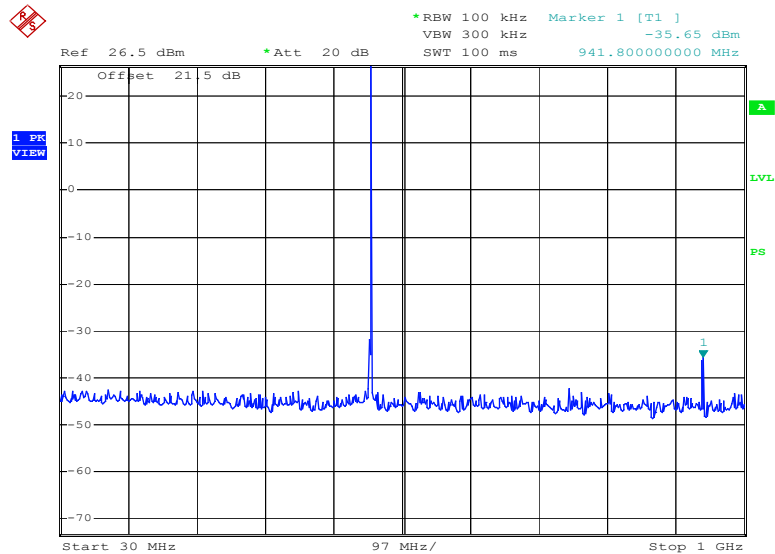


HYT Two-way radio M/N:TC2108U Spurious emission at antenna t
erminal Wide Mid ch(30M-1G)
Date: 29.MAY.2006 08:42:05

(1GHz-6GHz)

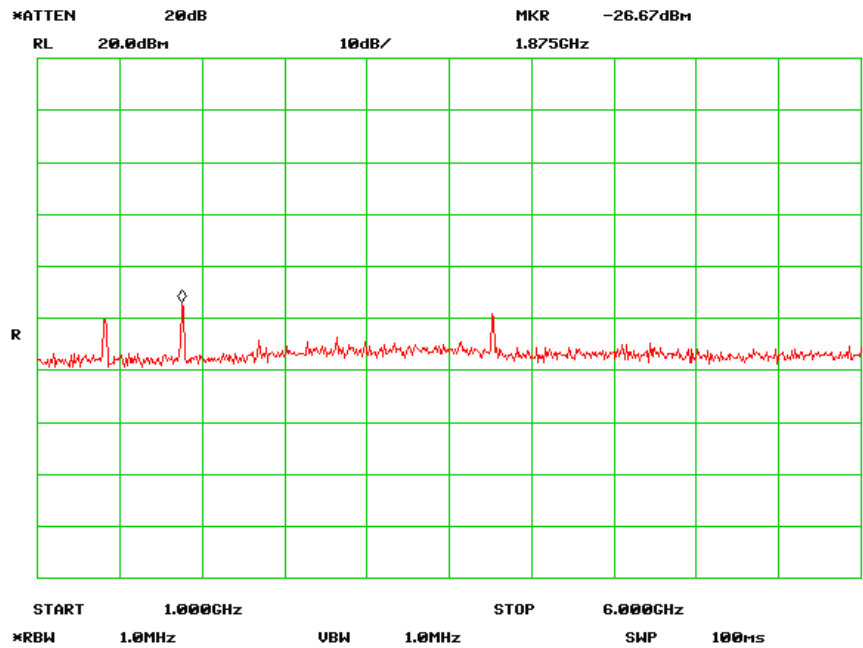


High channel:
(30MHz-1GHz)



HYT Two-way radio M/N:TC2108U Spurious emission at antenna t
erminal Wide High ch(30M-1G)
Date: 29.MAY.2006 08:42:34

(1GHz-6GHz)



§2.1053 and §90.210 - RADIATED SPURIOUS EMISSION

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	2005-7-20	2006-7-20
SUNOL SCIENCES	Broadband Antenna	JB1	A040904-1	2006-4-28	2007-4-28
SUNOL SCIENCES	Broadband Antenna	JB1	A040904-2	2006-4-28	2007-4-28
Agilent	Spectrum Analyzer	8564E	3943A01781	2005-12-08	2006-12-08
HP	Signal Generator	HP8657A	2849U00982	2006-2-28	2007-2-28
Giga-tronics	Signal Generator	1026	270801	2006-2-28	2007-2-28
A.H. System	Horn Antenna	SAS-200/571	135	2006-4-28	2007-4-28

* **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

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)

Spurious attenuation limit in dB = 50 + 10 Log₁₀ (power out in Watts) for EUT with a 12.5KHz channel bandwidth.

Test Results Summary

CH1 (Wide band): -9.02 dB at 900.0 MHz
 CH2 (Wide band): -7.62 dB at 920.1 MHz
 CH3 (Wide band): -10.91 dB at 2820.0 MHz
 CH1 (Narrow band): -3.82 dB at 900.0 MHz
 CH2 (Narrow band): -5.32 dB at 920.1 MHz
 CH3 (Narrow band): -5.97 dB at 3290.0 MHz

Test Data**Environmental Conditions**

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

The testing was performed by Deny Xiong on 2006-5-29.

Test Mode: Transmitting

Indicated		Table	Test Antenna		Substituted			Antenna Gain Correction	Cable Loss dB	Absolute Level	FCC Part 90	
Frequency MHz	Meter Reading dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Polar H/V			dBm	Limit dBm	Margin
CH1 (Wide band)												
900.0	50.33	256	1.6	V	900.0	-14.4	V	0	7.62	-22.02	-13	-9.02
4500.0	63.83	125	1.6	H	4500	-35.2	H	8.1	0.63	-27.73	-13	-14.73
2250.0	70.67	18	1.5	H	2250	-35.8	H	7.0	0.32	-29.12	-13	-16.12
2700.0	66.17	26	1.5	H	2700	-37.3	H	7.0	0.38	-30.68	-13	-17.68
2250.0	68.67	143	1.6	V	2250	-37.6	V	7.0	0.32	-30.92	-13	-17.92
1800.0	72.33	180	1.6	V	1800	-37.1	V	6.1	0.43	-31.43	-13	-18.43
2700.0	65.50	251	1.9	V	2700	-38.5	V	7.0	0.38	-31.88	-13	-18.88
4050.0	60.17	280	1.8	V	4050	-38.5	V	6.6	0.86	-32.76	-13	-19.76
1800.0	69.50	268	1.6	H	1800	-41.1	H	6.1	0.43	-35.43	-13	-22.43
3150.0	62.60	250	1.5	H	3150	-42.1	H	6.9	0.57	-35.77	-13	-22.77
4050.0	57.50	69	1.5	H	4050	-41.9	H	6.6	0.86	-36.16	-13	-23.16
4500.0	59.33	106	1.6	V	4500	-44.0	V	8.1	0.63	-36.53	-13	-23.53
1350.0	71.00	20	1.6	V	1350	-43.1	V	6.5	0.33	-36.93	-13	-23.93
900.0	36.67	144	1.5	H	900.0	-30.5	H	0	7.62	-38.12	-13	-25.12
3600.0	54.67	59	1.5	H	3600	-47.2	H	7.2	0.67	-40.67	-13	-27.67
1350.0	64.83	242	1.2	H	1350	-47.9	H	6.5	0.33	-41.73	-13	-28.73
3600.0	54.67	263	1.7	V	3600	-49.8	V	7.2	0.67	-43.27	-13	-30.27
3150.0	57.83	322	1.5	V	3150	-51.0	V	6.9	0.57	-44.67	-13	-31.67

Indicated		Table	Test Antenna		Substituted			Antenna Gain Correction	Cable Loss dB	Absolute Level	FCC Part 90	
Frequency MHz	Meter Reading dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Polar H/V			dBm	Limit dBm	Margin
CH2 (Wide band)												
920.1	52.50	350	1.2	V	920.1	-13.0	V	0	7.62	-20.62	-13	-7.62
2760.0	69.33	206	1.5	H	2760	-34.3	H	7.4	0.51	-27.41	-13	-14.41
2300.0	70.83	118	1.5	H	2300	-34.5	H	7.0	0.32	-27.82	-13	-14.82
2760.0	67.67	250	1.2	V	2760	-36.1	V	7.4	0.51	-29.21	-13	-16.21
2300.0	68.50	143	1.3	V	2300	-37.2	V	7.0	0.32	-30.52	-13	-17.52
1840.0	73.17	183	1.5	V	1840	-37.9	V	6.1	0.43	-32.23	-13	-19.23
920.1	39.17	280	1.6	H	920.1	-25.0	H	0	7.62	-32.62	-13	-19.62
840.0	70.50	128	1.5	H	1840	-40.4	H	6.1	0.43	-34.73	-13	-21.73
4600.0	58.67	126	1.6	H	4600	-42.5	H	8.3	0.68	-34.88	-13	-21.88
1380.0	70.50	200	1.0	V	1380	-43.0	V	6.5	0.33	-36.83	-13	-23.83
4600.0	58.33	201	1.3	V	4600	-45.1	V	8.3	0.68	-37.48	-13	-24.48
3680.0	53.17	154	1.5	H	3680	-44.2	H	7.2	0.67	-37.67	-13	-24.67
4140.0	56.33	168	1.5	H	4140	-46.0	H	7.8	0.64	-38.84	-13	-25.84
4140.0	58.67	83	1.1	V	4140	-46.4	V	7.8	0.64	-39.24	-13	-26.24
3220.0	57.50	258	1.5	H	3220	-47.4	H	6.9	0.57	-41.07	-13	-28.07
3680.0	56.00	65	1.7	V	3680	-50.8	V	7.2	0.67	-44.27	-13	-31.27
1380.0	61.50	222	1.3	H	1380	-51.5	H	6.5	0.33	-45.33	-13	-32.33
3220.0	56.00	234	1.5	V	3220	-52.6	V	6.9	0.57	-46.27	-13	-33.27

Indicated		Table	Test Antenna		Substituted			Antenna Gain Correction	Cable Loss dB	Absolute Level	FCC Part 90	
Frequency MHz	Meter Reading dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Polar H/V			dBm	Limit dBm	Margin
CH3 (Wide band)												
2820.0	71.00	254	1.2	V	2820	-30.8	V	7.4	0.51	-23.91	-13	-10.91
2820.0	72.67	126	1.3	H	2820	-31.5	H	7.4	0.51	-24.61	-13	-11.61
2350.0	73.50	108	1.5	H	2350	-31.9	H	7.5	0.33	-24.73	-13	-11.73
940.0	48.00	187	1.4	V	940.0	-16.9	V	0	7.92	-24.82	-13	-11.82
2350.0	69.00	143	1.6	V	2350	-35.9	V	7.5	0.33	-28.73	-13	-15.73
1880.0	73.33	107	1.3	V	1880	-36.3	V	6.1	0.43	-30.63	-13	-17.63
3290.0	66.17	250	1.6	H	3290	-37.6	H	6.9	0.57	-31.27	-13	-18.27
1880.0	71.17	28	1.4	H	1880	-39.2	H	6.1	0.43	-33.53	-13	-20.53
3760.0	60.67	229	1.5	H	3760	-39.5	H	6.6	0.85	-33.75	-13	-20.75
4230.0	56.83	69	1.5	H	4230	-41.4	H	7.8	0.64	-34.24	-13	-21.24
4230.0	57.33	20	1.4	V	4230	-42.3	V	7.8	0.64	-35.14	-13	-22.14
3760.0	58.83	263	1.4	V	3760	-42.2	V	6.6	0.85	-36.45	-13	-23.45
3290.0	61.17	96	1.5	V	3290	-43.5	V	6.9	0.57	-37.17	-13	-24.17
4700.0	55.50	107	1.2	V	4700	-45.9	V	8.3	0.68	-38.28	-13	-25.28
4700.0	54.67	12	1.7	H	4700	-46.3	H	8.3	0.68	-38.68	-13	-25.68
940.0	35.33	287	1.3	H	940.0	-32.8	H	0	7.92	-40.72	-13	-27.72
1410.0	64.50	20	1.6	V	1410	-47.8	V	6.5	0.33	-41.63	-13	-28.63
1410.0	57.00	86	1.5	H	1410	-54.6	H	6.5	0.33	-48.43	-13	-35.43

Indicated		Table	Test Antenna		Substituted			Antenna Gain Correction	Cable Loss dB	Absolute Level	FCC Part 90	
Frequency MHz	Meter Reading dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Polar H/V			dBm	Limit dBm	Margin
CH1 (Narrow band)												
900.0	48.00	256	1.6	V	900.0	-16.2	V	0	7.62	-23.82	-20	-3.82*
4500.0	63.83	125	1.6	H	4500	-35.2	H	8.1	0.63	-27.73	-20	-7.73
4050.0	63.50	280	1.8	V	4050	-34.9	V	6.6	0.86	-29.16	-20	-9.16
2250.0	69.83	143	1.6	V	2250	-36.6	V	7.0	0.32	-29.92	-20	-9.92
4500.0	62.50	106	1.6	V	4500	-39.4	V	8.1	0.63	-31.93	-20	-11.93
2250.0	67.50	18	1.5	H	2250	-38.7	H	7.0	0.32	-32.02	-20	-12.02
4050.0	60.83	69	1.5	H	4050	-37.9	H	6.6	0.86	-32.16	-20	-12.16
2700.0	62.67	251	1.9	V	2700	-41.8	V	7.0	0.38	-35.18	-20	-15.18
3150.0	62.67	250	1.5	H	3150	-42.0	H	6.9	0.57	-35.67	-20	-15.67
3600.0	53.35	59	1.5	H	3600	-44.3	H	7.2	0.67	-37.77	-20	-17.77
1350.0	69.33	20	1.6	V	1350	-44.3	V	6.5	0.33	-38.13	-20	-18.13
1800.0	65.67	268	1.6	H	1800	-45.0	H	6.1	0.43	-39.33	-20	-19.33
2700.0	58.17	26	1.5	H	2700	-46.1	H	7.0	0.38	-39.48	-20	-19.48
900.0	34.83	144	1.5	H	900.0	-32.8	H	0	7.62	-40.42	-20	-20.42
1800.0	64.33	180	1.6	V	1800	-47.2	V	6.1	0.43	-41.53	-20	-21.53
3600.0	55.17	263	1.7	V	3600	-49.5	V	7.2	0.67	-42.97	-20	-22.97
3150.0	57.50	322	1.5	V	3150	-51.1	V	6.9	0.57	-44.77	-20	-24.77
1350.0	60.17	242	1.2	H	1350	-52.6	H	6.5	0.33	-46.43	-20	-26.43

Indicated		Table	Test Antenna		Substituted			Antenna Gain Correction	Cable Loss dB	Absolute Level	FCC Part 90	
Frequency MHz	Meter Reading dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Polar H/V			dBm	Limit dBm	Margin
CH2 (Narrow band)												
920.1	47.83	350	1.2	V	920.1	-17.7	V	0	7.62	-25.32	-20	-5.32
2300.0	69.83	143	1.3	V	2300	-35.8	V	7.0	0.32	-29.12	-20	-9.12
4600.0	62.00	126	1.6	H	4600	-38.1	H	8.3	0.68	-30.48	-20	-10.48
2300.0	67.33	118	1.5	H	2300	-37.6	H	7.0	0.32	-30.92	-20	-10.92
4600.0	61.17	201	1.3	V	4600	-40.1	V	8.3	0.68	-32.48	-20	-12.48
2760.0	63.67	206	1.5	H	2760	-40.0	H	7.4	0.51	-33.11	-20	-13.11
4140.0	60.17	168	1.5	H	4140	-41.5	H	7.8	0.64	-34.34	-20	-14.34
4140.0	63.33	83	1.1	V	4140	-42.1	V	7.8	0.64	-34.94	-20	-14.94
2760.0	62.50	250	1.2	V	2760	-42.0	V	7.4	0.51	-35.11	-20	-15.11
1840.0	69.83	183	1.5	V	1840	-41.1	V	6.1	0.43	-35.43	-20	-15.43
1840.0	66.50	128	1.5	H	1840	-44.6	H	6.1	0.43	-38.93	-20	-18.93
3680.0	55.67	154	1.5	H	3680	-45.6	H	7.2	0.67	-39.07	-20	-19.07
1380.0	67.50	200	1.0	V	1380	-46.0	V	6.5	0.33	-39.83	-20	-19.83
3220.0	58.17	258	1.5	H	3220	-46.7	H	6.9	0.57	-40.37	-20	-20.37
3680.0	58.17	65	1.7	V	3680	-48.6	V	7.2	0.67	-42.07	-20	-22.07
1380.0	59.83	222	1.3	H	1380	-53.2	H	6.5	0.33	-47.03	-20	-27.03
3220.0	55.67	234	1.5	V	3220	-53.4	V	6.9	0.57	-47.07	-20	-27.07
920.1	26.50	280	1.6	H	920.1	-45.0	H	0	7.62	-52.62	-20	-32.62

Indicated		Table	Test Antenna		Substituted			Antenna Gain Correction	Cable Loss dB	Absolute Level	FCC Part 90	
Frequency MHz	Meter Reading dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Polar H/V			dBm	Limit dBm	Margin
CH3 (Narrow band)												
3290.0	70.50	250	1.6	H	3290	-32.3	H	6.9	0.57	-25.97	-20	-5.97
2350.0	72.00	143	1.6	V	2350	-33.2	V	7.5	0.33	-26.03	-20	-6.03
3760.0	69.67	263	1.4	V	3760	-32.1	V	6.6	0.85	-26.35	-20	-6.35
3760.0	67.83	229	1.5	H	3760	-32.4	H	6.6	0.85	-26.65	-20	-6.65
940.0	44.67	187	1.4	V	940.0	-20.3	V	0	7.92	-28.22	-20	-8.22
2820.0	66.17	126	1.3	H	2820	-35.3	H	7.4	0.51	-28.41	-20	-8.41
2350.0	69.33	108	1.5	H	2350	-36.3	H	7.5	0.33	-29.13	-20	-9.13
4230.0	61.33	20	1.4	V	4230	-37.1	V	7.8	0.64	-29.94	-20	-9.94
2820.0	62.0	254	1.2	V	2820	-40.0	V	7.4	0.51	-33.11	-20	-13.11
4230.0	57.33	69	1.5	H	4230	-40.6	H	7.8	0.64	-33.44	-20	-13.44
4700.0	58.83	12	1.7	H	4700	-41.3	H	8.3	0.68	-33.68	-20	-13.68
3290.0	62.17	96	1.5	V	3290	-42.4	V	6.9	0.57	-36.07	-20	-16.07
1880.0	68.17	107	1.3	V	1880	-41.8	V	6.1	0.43	-36.13	-20	-16.13
4700.0	57.17	107	1.2	V	4700	-44.3	V	8.3	0.68	-36.68	-20	-16.68
1880.0	66.83	28	1.4	H	1880	-43.6	H	6.1	0.43	-37.93	-20	-17.93
940.0	30.83	287	1.3	H	940.0	-37.9	H	0	7.92	-45.82	-20	-25.82
1410.0	58.83	20	1.6	V	1410	-54.1	V	6.5	0.33	-47.93	-20	-27.93
1410.0	55.17	86	1.5	H	1410	-57.3	H	6.5	0.33	-51.13	-20	-31.13

* Within measurement uncertainty.

§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	2006-1-2	2007-1-2
Hewlett-Packard	Frequency Counter	5342A	2317A08289	2006-1-26	2007-1-26

* **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

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 Spectrum Analyzer.

Frequency Stability vs. Voltage: An external variable DC power supply Source. The voltage was set to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the end point. The output frequency was recorded for each voltage.

Test Data**Environmental Conditions**

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

The testing was performed by Charmi Peng on 2006-5-29.

Test Result: Pass

Test Mode: Transmitting

For Narrow

Reference Frequency: 460.05 MHz, Limit: 2.5 ppm			
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed	
		MCF (MHz)	PPM Error
50	7.2	460.050060	0.13
40	7.2	460.050013	0.03
30	7.2	460.050002	0.00
20	7.2	460.049962	-0.08
10	7.2	460.049901	-0.22
0	7.2	460.049883	-0.25
-10	7.2	460.049819	-0.39
-20	7.2	460.049769	-0.50
-30	7.2	460.049720	0.13

Frequency Stability Versus Input Voltage

Reference Frequency: 460.05 MHz, Limit: 2.5 ppm		
Power Supplied (Vdc)	Frequency Measure with Time Elapsed	
	Frequency (MHz)	PPM Error
6.5	460.049980	-0.61

For Wide

Reference Frequency: 460.05 MHz, Limit: 5.0 ppm			
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed	
		MCF (MHz)	PPM Error
50	7.2	460.050126	-0.04
40	7.2	460.050083	0.27
30	7.2	460.050027	0.18
20	7.2	460.050005	0.06
10	7.2	460.049969	0.01
0	7.2	460.049913	-0.07
-10	7.2	460.049853	-0.19
-20	7.2	460.049801	-0.32
-30	7.2	460.049728	-0.43

Frequency Stability Versus Input Voltage

Reference Frequency: 460.05 MHz, Limit: 5.0 ppm		
Power Supplied (Vdc)	Frequency Measure with Time Elapsed	
	Frequency (MHz)	PPM Error
6.5	460.04999	-0.02

§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	2006-1-24	2007-1-24
HP	Modulation Analyzer	8901B	3438A05208	2006-2-28	2007-2-28
HP	Signal Generator	HP8657A	2849U00982	2006-2-28	2007-2-28

* **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:	1005mbar

The testing was performed by Charmi Peng on 2006-6-15~2006-6-20.

Test Result: Pass

Test Mode: Transmitting

For Narrowband:

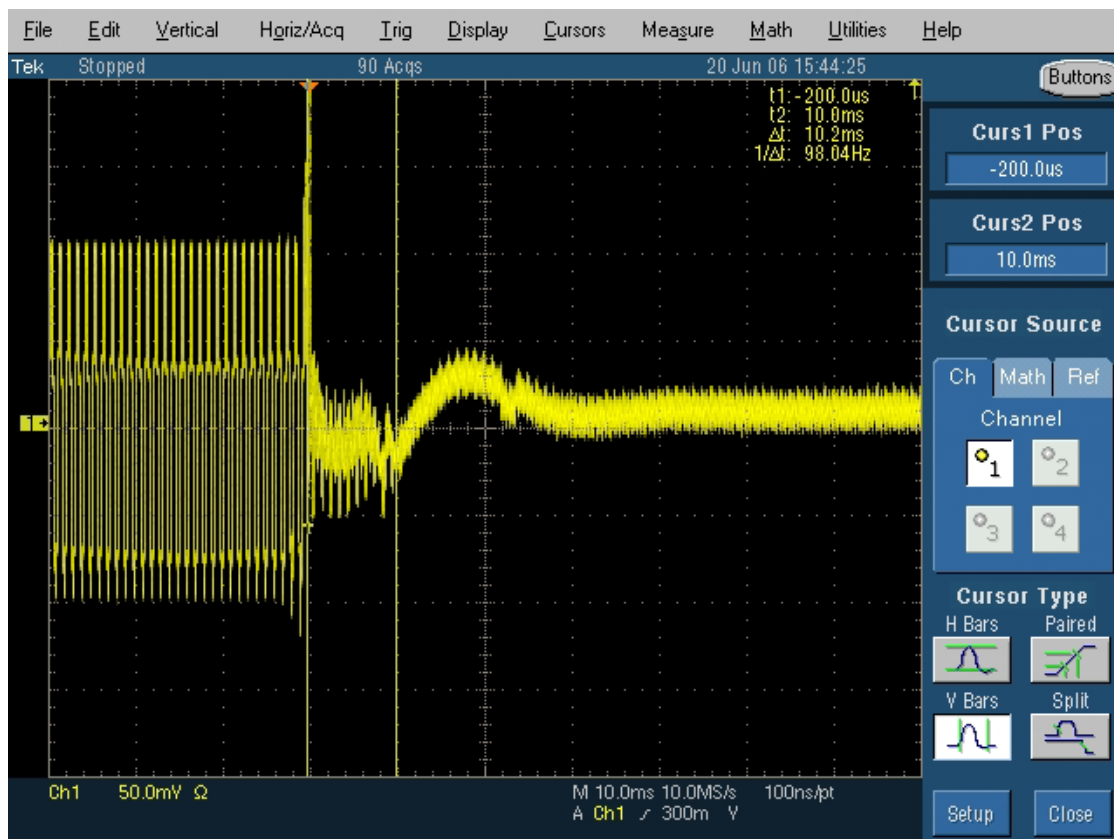
Operation Frequency (MHz)	Channel Separation (kHz)	Transient Period (ms)	Transient Frequency	Result
460.050 MHz	12.5	10	<+/-12.5 kHz	Pass
		25	<+/-6.25 kHz	
		10	<+/-12.5 kHz	

For Wideband:

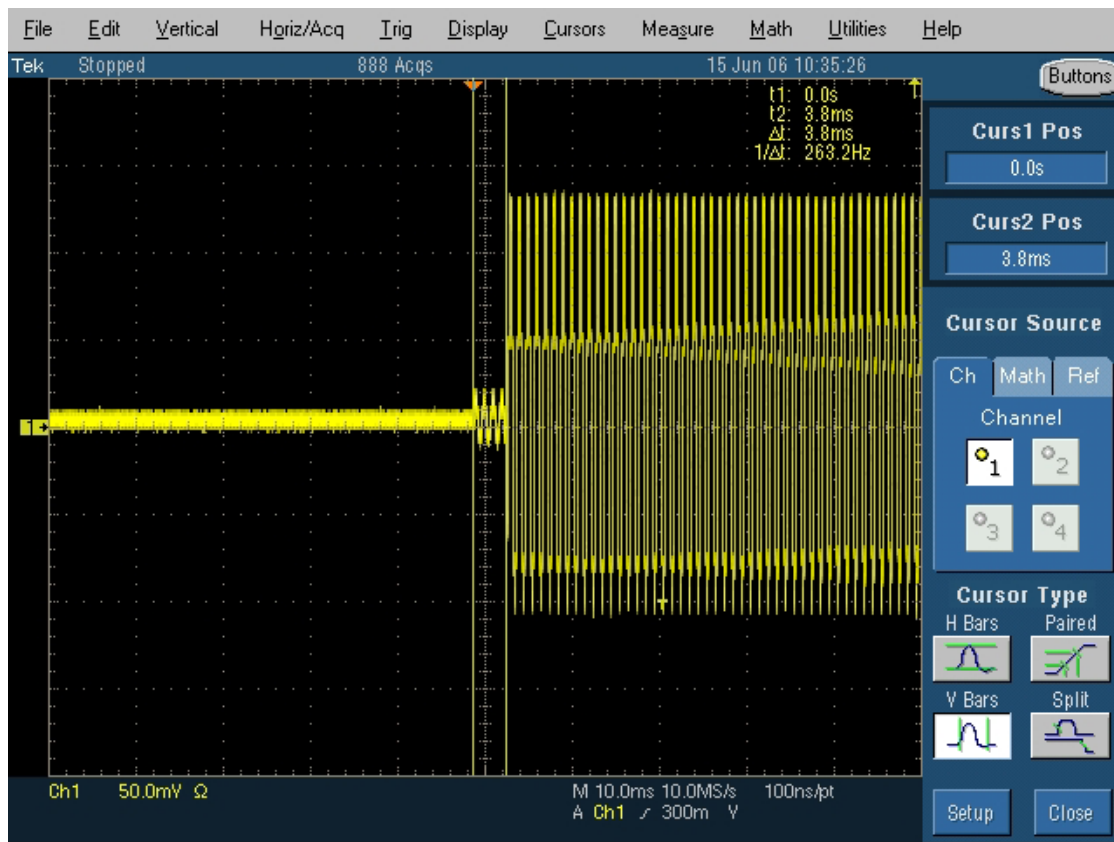
Operation Frequency (MHz)	Channel Separation (kHz)	Transient Period (ms)	Transient Frequency	Result
460.050 MHz	25	10	<+/-25.0 kHz	Pass
		25	<+/-12.5 kHz	
		10	<+/-25.0kHz	

For Narrowband

Turn on

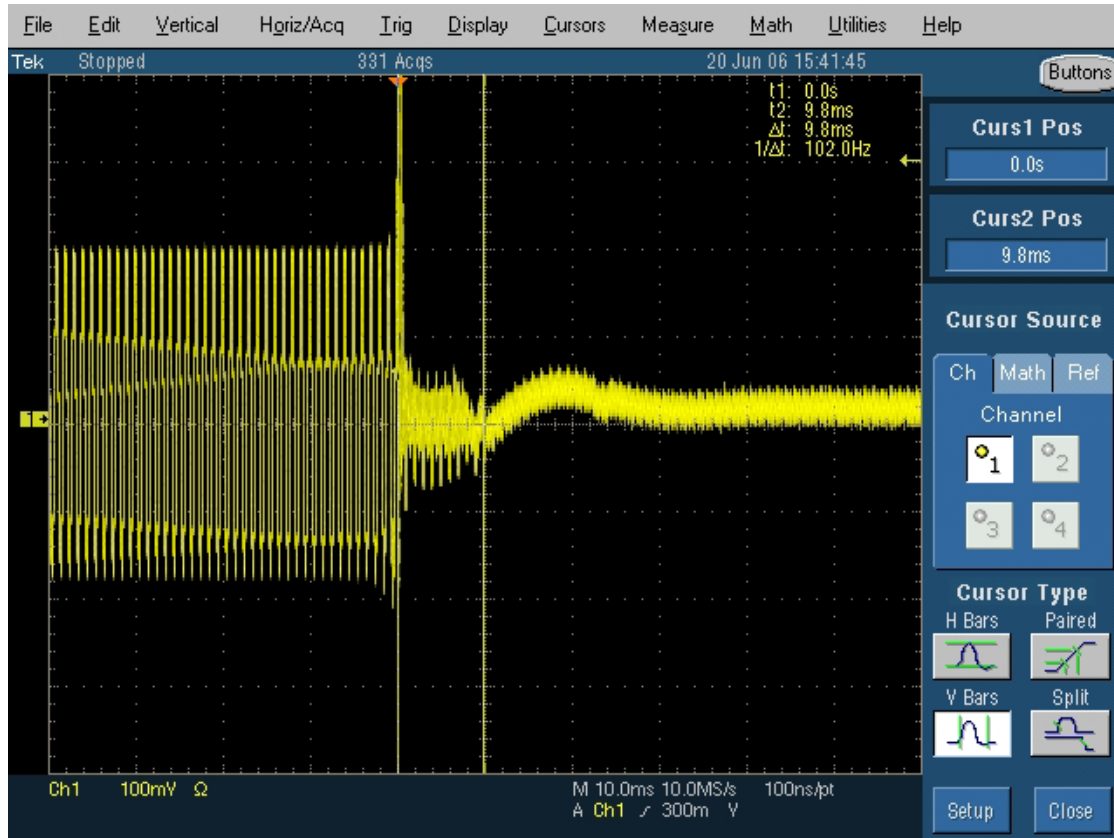


Turn off



For Wideband

Turn on



Turn off

