Lab Code: 200707-0

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: R74TC-700U

This Report Concerns:	**Equipment Type:**
☒ Class II permissive change	Two-way radio

Test Engineer:	Deny Xiong
Report No.:	RSZ06111601
Test Date:	2006-11-30
Report Date:	2006-12-08
Reviewed By:	EMC Manager: Boni Baniqued
Prepared By:	Bay Area Compliance Laboratory Corp. (ShenZhen) 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone, ShenZhen, Guangdong 518038, P.R.China Tel: +86-755-33320018 Fax: +86-755-33320008

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *Shenzhen HYT Science & Technology Co., Ltd*'s product, model number: TC-700U(2) or the "EUT" as referred to in this report is a Two-way radio. The EUT is measured approximately 25.5cmL x 6cmW x 4cmH, rated input voltage: DC 7.4 V battery.

** The test data gathered are from production sample, serial number: 05404F0083 provided by the manufacturer, we received the EUT on 2006-11-16.*

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.

This is the Class II permissive change application, the original frequency range is 450-470MHz, the manufacturer wants to expand to 440-490MHz without any hardware change except for the software change. This report is presented for testing with the additional frequency range.

Related Submittal(s)/Grant(s)

This is a Class II permissive change application. The original application was granted on 2005-06-29, the original frequency range is 450-470MHz.

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 Land Mobile FM or PM Communication Equipment Measurement and Performance Standards and ANSI C63.4-2003, 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 Laboratory 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 Laboratory 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 Laboratory 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 Laboratory 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

SYSTEM TEST CONFIGURATION

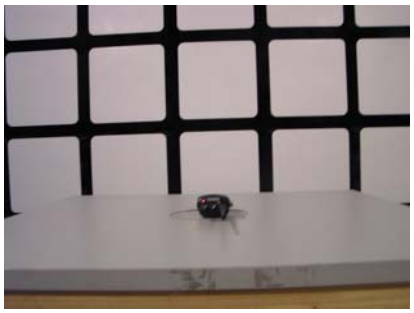
Description of Test Configuration

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

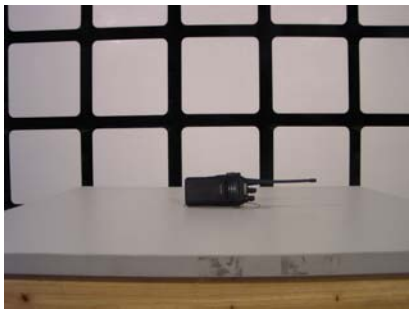
Equipment Modifications

Bay Area Compliance Laboratory Corp. (ShenZhen) has not done any modification on the EUT.

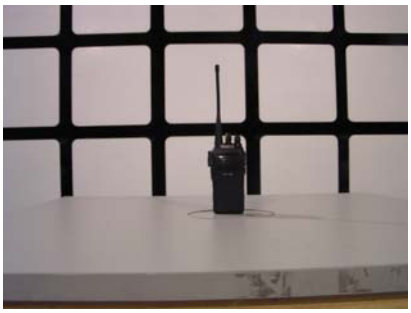
Configuration of Test Setup



Lie

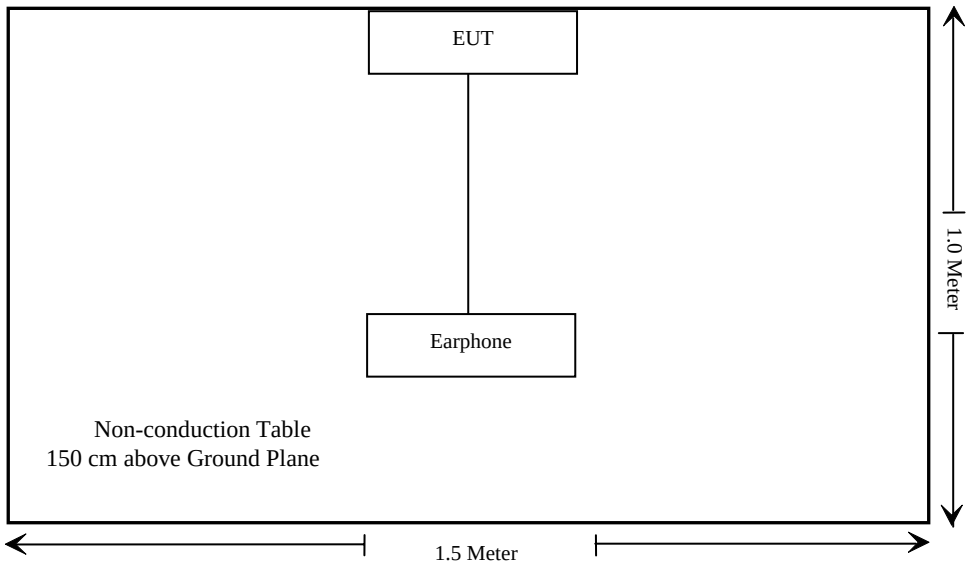


Side



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	Please refer to original report
§2.1049, §90.209	Occupied Bandwidth	Please refer to original report
§2.1051 §90.210	Spurious Emission at Antenna Terminal	Please refer to original report
§ 2.1053 § 90.210	Spurious Radiated Emissions	Compliant
§ 2.1055 § 90.213	Frequency stability	Please refer to original report
§ 90.214	Transient Frequency Behavior	Please refer to original report

§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	2006-9-29	2007-9-29

*** Statement of Tractability:** Bay Area Compliance Laboratory 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:	1005mbar

The testing was performed by Deny Xiong on 2006-11-30.

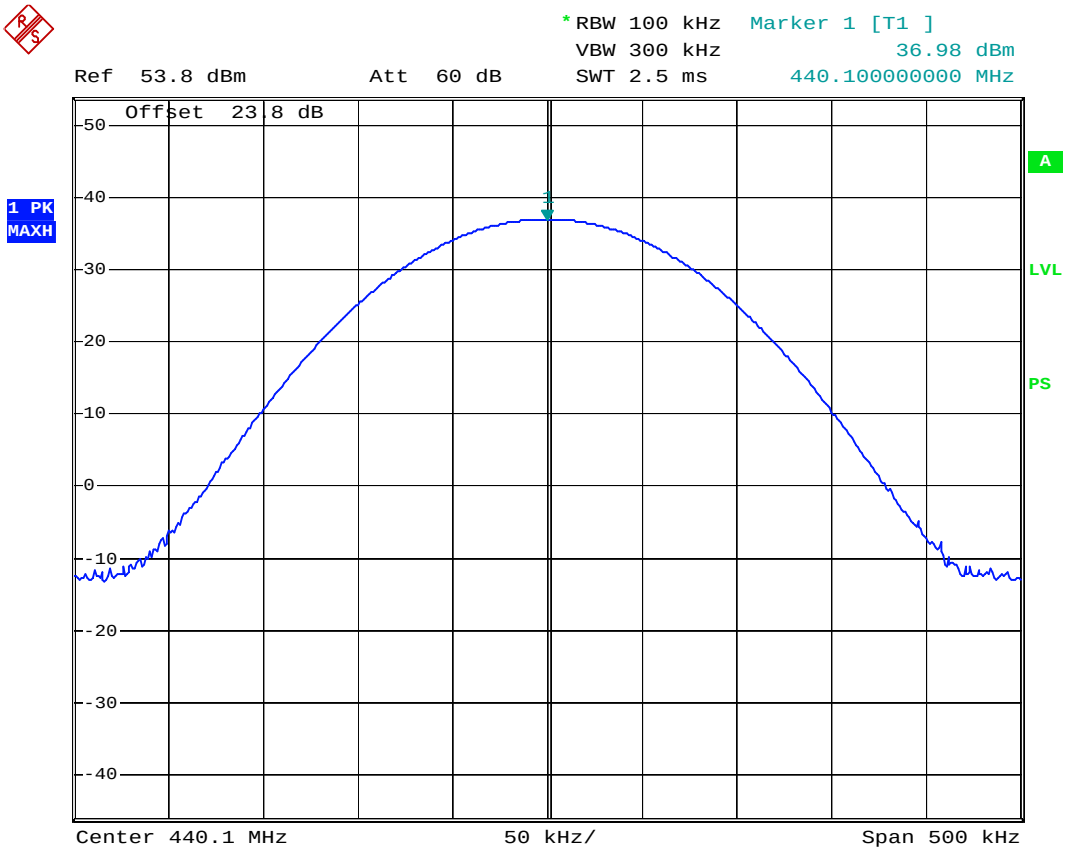
Test Result: Pass

Test Mode: Transmitting

High channel			
Frequency Spacing (kHz)	Frequency (MHz)	Output Power in dBm	Output Power in W
Narrow 12.5	489.9	36.91	4.909
Wide 25.0	489.9	37.33	5.407

Low channel			
Frequency Spacing (kHz)	Frequency (MHz)	Output Power in dBm	Output Power in W
Narrow 12.5	440.1	36.98	4.988
Wide 25.0	440.1	37.12	5.152

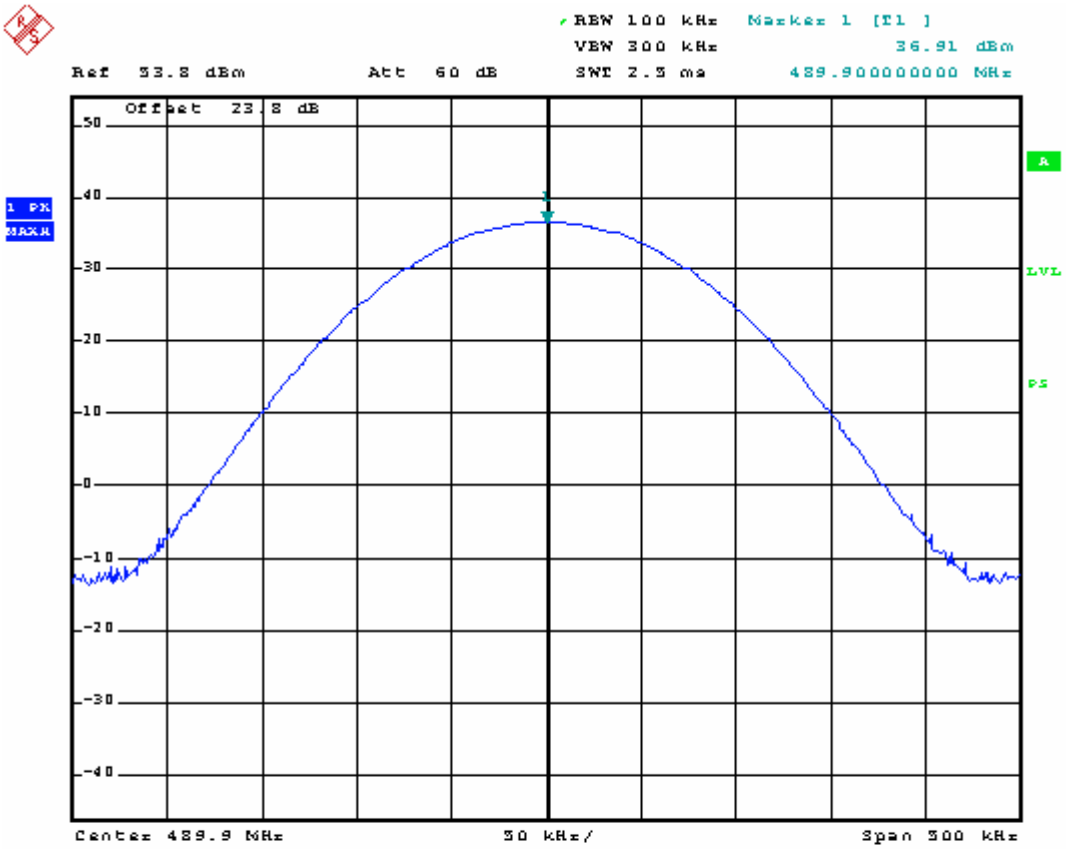
For Narrow Low Channel:



HYT Two-way radio M/N:TC-700U(2) Conducted output power narrow band low channel

Date: 30.NOV.2006 10:02:41

For Narrow High Channel:



HYT Two-way radio M/N:TC-700U(2) Conducted output power na
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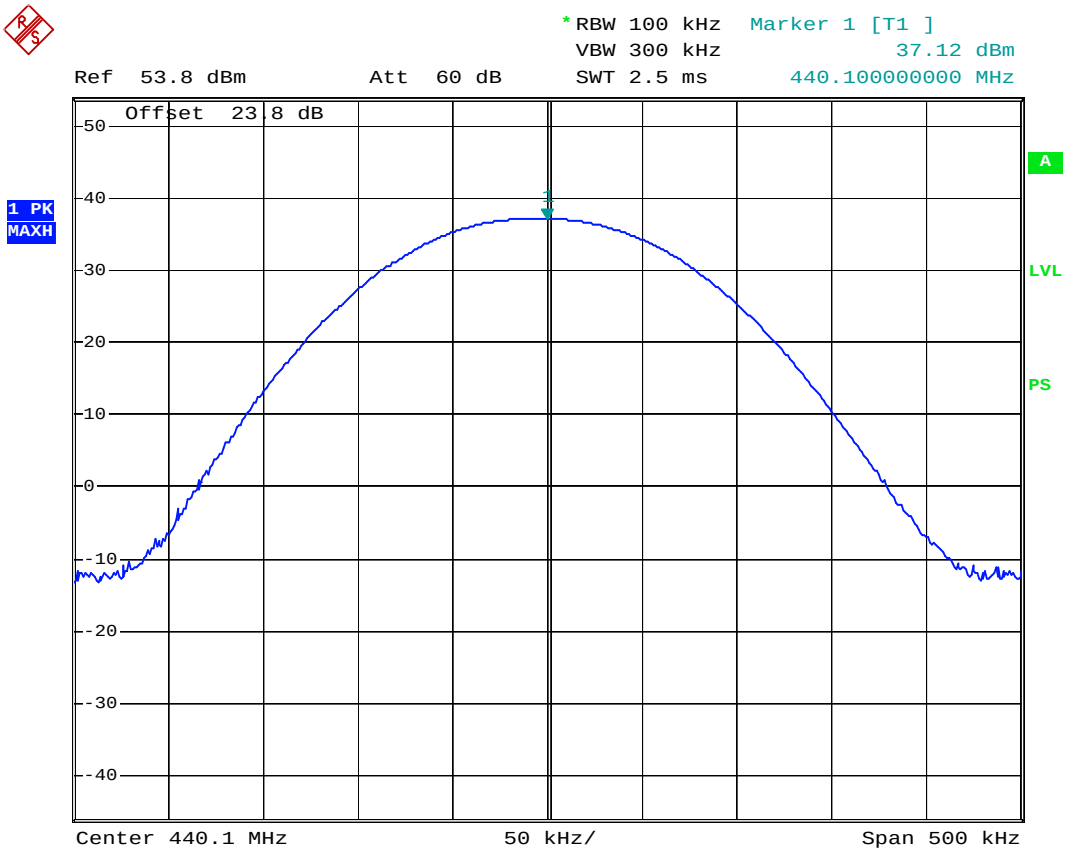
For Wideband Low Channel:



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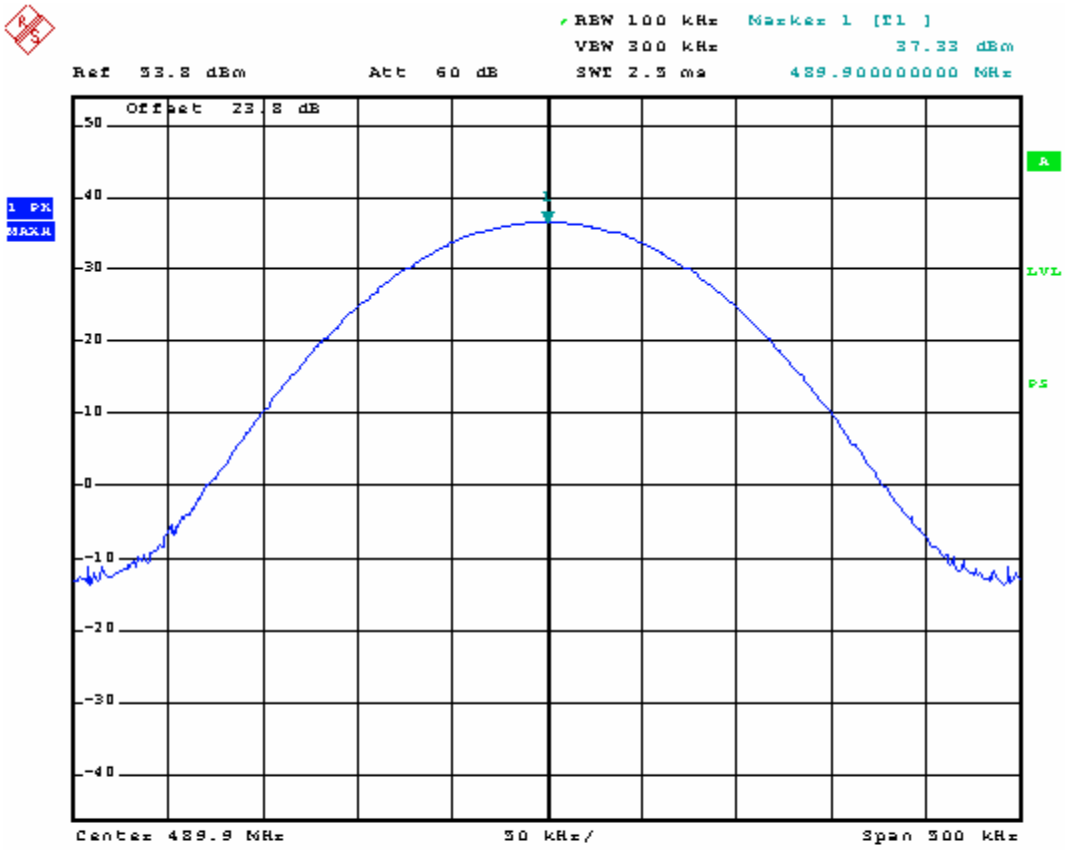
For Wideband High Channel:



HYT Two-way radio M/N:TC-700U(2) Conducted output power wi
de band high channel
Date: 30.NOV.2006 10:01:42

§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	2006-7-20	2007-7-20
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2006-8-14	2007-8-14
Sunol Sciences	Bilog Antenna	JB1	A040904-2	2006-8-14	2007-8-14
Agilent	Spectrum Analyzer	8564E	3943A01781	2005-11-22	2006-11-22
HP	Signal Generator	HP8657A	2849U00982	2006-9-29	2007-9-29
Giga-tronics	Signal Generator	1026	270801	2006-9-29	2007-9-29
A.H. System	Horn Antenna	SAS-200/571	135	2006-5-17	2007-5-17

*** Statement of Traceability:** Bay Area Compliance Laboratory 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 2006-11-30.

Test Mode: Transmitting

For Narrow band:

Indicated		Table	Test Antenna		Substituted			Antenna Gain Correction	Cable Loss dB	FCC Part 90 Absolute Level	
Frequency MHz	Meter Reading dBuV	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Polar H/V			dBm	W
Transmitting in Low Channel (CH4)											
440.1	105.19	147	1.5	H	440.1	38.0	H	0	4.85	33.15	2.0654
440.1	115.67	258	1.6	V	440.1	40.8	V	0	4.85	35.95	3.9355
Transmitting in High Channel (CH6)											
489.9	100.03	26	1.5	H	489.9	33.3	H	0	5.24	28.06	0.6397
489.9	110.09	84	1.5	V	489.9	37.3	V	0	5.24	32.06	1.6069

For Wide band:

Indicated		Table	Test Antenna		Substituted			Antenna Gain Correction	Cable Loss dB	FCC Part 90 Absolute Level	
Frequency MHz	Meter Reading dBuV	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Polar H/V			dBm	W
Transmitting in Low Channel (CH1)											
440.1	105.32	154	1.5	H	440.1	38.2	H	0	4.85	33.35	2.1627
440.1	115.79	248	1.5	V	440.1	41.2	V	0	4.85	36.35	4.3152
Transmitting in High Channel (CH3)											
489.9	103.34	247	1.3	H	489.9	34.6	H	0	5.24	29.36	0.8630
489.9	111.72	156	1.5	V	489.9	39.0	V	0	5.24	33.76	2.3768

§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	2006-7-20	2007-7-20
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2006-8-14	2007-8-14
Sunol Sciences	Bilog Antenna	JB1	A040904-2	2006-8-14	2007-8-14
Agilent	Spectrum Analyzer	8564E	3943A01781	2005-11-22	2006-11-22
HP	Signal Generator	HP8657A	2849U00982	2006-9-29	2007-9-29
Giga-tronics	Signal Generator	1026	270801	2006-9-29	2007-9-29
A.H. System	Horn Antenna	SAS-200/571	135	2006-5-17	2007-5-17

*** Statement of Traceability:** Bay Area Compliance Laboratory 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 1g (TXpwr in Watts/0.001)-the absolute level

Spurious attenuation limit in dB =43+10 Log_{10} (power out in Watts)

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

Test Results Summary

Channel 1(Wide band): -10.23 dB at 1320.3 MHz
Channel 3(Wide band): -8.45 dB at 2939.4 MHz

Channel 4(Narrow band): -4.43 dB at 1320.3 MHz
Channel 6(Narrow band): -4.55 dB at 2939.4 MHz

Test Data

Environmental Conditions

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

The testing was performed by Deny Xiong on 2006-11-30.

Test Mode: Transmitting

For wide band:

Indicated		Table	Test Antenna		Substituted			Antenna Gain Correction	Cable Loss dB	Absolute Level	FCC Part 90	
Frequency MHz	Meter Reading dBuV	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Polar H/V			dBm	Limit dBm	Margin dB
CH1 (wide band)												
1320.3	75.5	180	1.6	V	1800	-29.4	V	6.5	0.33	-23.23	-13	-10.23
3080.7	70.33	59	1.5	H	3600	-32.5	H	7.4	0.45	-25.55	-13	-12.55
3080.7	69.0	263	1.7	V	3600	-35.5	V	7.4	0.45	-28.55	-13	-15.55
1320.3	64.67	268	1.6	H	1800	-40.4	H	6.5	0.33	-34.23	-13	-21.23
880.2	34.73	20	1.6	V	1350	-27.7	V	0	7.25	-34.95	-13	-21.95
880.2	32.45	242	1.2	H	1350	-28.2	H	0	7.25	-35.45	-13	-22.45
1760.4	62.15	143	1.6	V	2250	-42.2	V	6.1	0.43	-36.53	-13	-23.53
2200.5	60.83	251	1.9	V	2700	-43.5	V	7.0	0.32	-36.82	-13	-23.82
2640.6	57.67	250	1.5	H	3150	-45.6	H	7.0	0.38	-38.98	-13	-25.98
1760.4	62.83	18	1.5	H	2250	-44.7	H	6.1	0.43	-39.03	-13	-26.03
2200.5	62.67	26	1.5	H	2700	-46.4	H	7.0	0.32	-39.72	-13	-26.72
2640.6	56.17	322	1.5	V	3150	-47.3	V	7.0	0.38	-40.68	-13	-27.68
3520.8	52.17	69	1.5	H	4050	-48.3	H	7.2	0.67	-41.77	-13	-28.77
3520.8	50.0	280	1.8	V	4050	-48.8	V	7.2	0.67	-42.27	-13	-29.27
3960.9	47.83	125	1.6	H	4500	-53.4	H	6.6	0.86	-47.66	-13	-34.66
3960.9	44.83	106	1.6	V	4500	-54.2	V	6.6	0.86	-48.46	-13	-35.46

Indicated		Table	Test Antenna		Substituted			Antenna Gain Correction	Cable Loss dB	Absolute Level	FCC Part 90	
Frequency MHz	Meter Reading dBuV	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Polar H/V			dBm	Limit dBm	Margin dB
CH3 (wide band)												
2939.4	73.0	250	1.6	H	3290	-28.4	H	7.4	0.45	-21.45	-13	-8.45
1469.7	71.0	28	1.4	H	1880	-32.8	H	6.5	0.33	-26.63	-13	-13.63
1469.7	72.03	107	1.3	V	1880	-32.8	V	6.5	0.33	-26.63	-13	-13.63
2939.4	67.33	96	1.5	V	3290	-34.2	V	7.4	0.45	-27.25	-13	-14.25
1959.6	65.0	143	1.6	V	2350	-38.6	V	6.3	0.37	-32.67	-13	-19.67
2449.5	62.0	126	1.3	H	2820	-40.2	H	7.5	0.33	-33.03	-13	-20.03
2449.5	63.5	254	1.2	V	2820	-40.3	V	7.5	0.33	-33.13	-13	-20.13
979.8	35.97	20	1.6	V	1410	-26.3	V	0	7.92	-34.22	-13	-21.22
979.8	34.68	86	1.5	H	1410	-28.9	H	0	7.92	-36.82	-13	-23.82
1959.6	57.83	108	1.5	H	2350	-43.8	H	6.3	0.37	-37.87	-13	-24.87
3429.3	54.0	229	1.5	H	3760	-46.6	H	6.7	0.74	-40.64	-13	-27.64
3429.3	52.83	263	1.4	V	3760	-49.4	V	6.7	0.74	-43.44	-13	-30.44
4409.1	44.83	107	1.2	V	4700	-54.8	V	8.1	0.63	-47.33	-13	-34.33
3919.2	43.67	69	1.5	H	4230	-54.2	H	6.6	0.86	-48.46	-13	-35.46
3919.2	44.5	20	1.4	V	4230	-54.6	V	6.6	0.86	-48.86	-13	-35.86
4409.1	42.33	12	1.7	H	4700	-56.5	H	8.1	0.63	-49.03	-13	-36.03

For narrow band:

Indicated		Table	Test Antenna		Substituted			Antenna Gain Correction	Cable Loss dB	Absolute Level	FCC Part 90	
Frequency MHz	Meter Reading dBuV	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Polar H/V			dBm	Limit dBm	Margin dB
CH4 (narrow band)												
1320.3	74.67	180	1.6	V	1320.3	-30.6	V	6.5	0.33	-24.43	-20	-4.43
1320.3	71.5	268	1.6	H	1320.3	-33.3	H	6.5	0.33	-27.13	-20	-7.13
3080.7	68.67	59	1.5	H	3080.7	-34.8	H	7.4	0.45	-27.85	-20	-7.85
2640.6	64.87	250	1.5	H	2640.6	-38.2	H	7.0	0.38	-31.58	-20	-11.58
880.2	34.68	242	1.2	H	880.2	-25.8	H	0	7.25	-33.05	-20	-13.05
880.2	35.97	20	1.6	V	880.2	-26.7	V	0	7.25	-33.95	-20	-13.95
3080.7	62.6	263	1.7	V	3080.7	-42.2	V	7.4	0.45	-35.25	-20	-15.25
2640.6	62.37	322	1.5	V	2640.6	-42.1	V	7.0	0.38	-35.48	-20	-15.48
2200.5	61.67	251	1.9	V	2200.5	-42.5	V	7.0	0.32	-35.82	-20	-15.82
1760.4	63.83	143	1.6	V	1760.4	-41.6	V	6.1	0.43	-35.93	-20	-15.93
2200.5	59.60	26	1.5	H	2200.5	-43.4	H	7.0	0.32	-36.72	-20	-16.72
1760.4	60.83	18	1.5	H	1760.4	-42.7	H	6.1	0.43	-37.03	-20	-17.03
3520.8	50.5	280	1.8	V	3520.8	-48.3	V	7.2	0.67	-41.77	-20	-21.77
3520.8	51.03	69	1.5	H	3520.8	-49.5	H	7.2	0.67	-42.97	-20	-22.97
3960.9	48.32	125	1.6	H	3960.9	-52.9	H	6.6	0.86	-47.16	-20	-27.16
3960.9	44.17	106	1.6	V	3960.9	-54.7	V	6.6	0.86	-48.96	-20	-28.96

Indicated		Table	Test Antenna		Substituted			Antenna Gain Correction	Cable Loss dB	Absolute Level	FCC Part 90	
Frequency MHz	Meter Reading dBuV	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Polar H/V			dBm	Limit dBm	Margin dB
CH6 (narrow band)												
2939.4	71.0	250	1.6	H	2939.4	-31.5	H	7.4	0.45	-24.55	-20	-4.55
1469.7	71.5	28	1.4	H	1469.7	-33.2	H	6.5	0.33	-27.03	-20	-7.03
1469.7	71.83	107	1.3	V	1469.7	-33.4	V	6.5	0.33	-27.23	-20	-7.23
979.8	41.29	20	1.6	V	979.8	-20.3	V	0	7.92	-28.22	-20	-8.22
979.8	38.71	86	1.5	H	979.8	-24.5	H	0	7.92	-32.42	-20	-12.42
2939.4	60.83	96	1.5	V	2939.4	-41.3	V	7.4	0.45	-34.35	-20	-14.35
2449.5	60.17	126	1.3	H	2449.5	-42.5	H	7.5	0.33	-35.33	-20	-15.33
1959.6	61.17	143	1.6	V	1959.6	-42.2	V	6.3	0.37	-36.27	-20	-16.27
1959.6	58.83	108	1.5	H	1959.6	-44.8	H	6.3	0.37	-38.87	-20	-18.87
2449.5	56.83	254	1.2	V	2449.5	-47.6	V	7.5	0.33	-40.43	-20	-20.43
3429.3	53.5	229	1.5	H	3429.3	-47.4	H	6.7	0.74	-41.44	-20	-21.44
3429.3	51.67	263	1.4	V	3429.3	-48.6	V	6.7	0.74	-42.64	-20	-22.64
3919.2	44.67	69	1.5	H	3919.2	-53.2	H	6.6	0.86	-47.46	-20	-27.46
4409.1	43.17	107	1.2	V	4409.1	-55.2	V	8.1	0.63	-47.73	-20	-27.73
4409.1	43.33	12	1.7	H	4409.1	-55.4	H	8.1	0.63	-47.93	-20	-27.93
3919.2	44.0	20	1.4	V	3919.2	-54.9	V	6.6	0.86	-49.16	-20	-29.16