

FCC PART 15.225
EMI MEASUREMENT AND TEST REPORT

For

Power 7 Technology Corporation

2F, No. 176, Jian-Yi Road, Chung-Ho City, Taipei Hsien, Taiwan

FCC ID: TQNNFCENETPAD

July 12, 2006

This Report Concerns: ☒ Original Report	Equipment Type: Transmitter, RFID Reader
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Report No.: RSZ06062301	
Test Date: June 29- July 5, 2006	
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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.

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The Power 7 Technology Corporation's product, model number: NFC or the "EUT" as referred to in this report is a *RFID Reader*, the product name is *eNetPad*. The EUT is measured approximately 7.0 cm L x 7.0 cm W x 0.5 cm H. rated input voltage: DC 5V(from PC).

** The test data gathered are from production sample, serial number: 0606041, provided by the manufacturer, we received EUT on 2006-6-23.*

Objective

This Type approval report is prepared on behalf of Power 7 Technology Corporation in accordance with Part 2, Subpart J, and Part 15, Subparts A, B and C of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC rules, sec 15.203, 15.205, 15.207, 15.209 and 15.225.

Related Submittal(s)/Grant(s)

No Related Submittals.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All radiated and conducted emissions measurement was performed at 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 radiated and conducted emission measurement 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. 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>

Host System Configuration List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
DELL	Motherboard	OWC297	CN-OWC297-70821-566-02BR	DoC
DELL	Power	NPS-250KB D	CN-0H2678-17972-56E8NBM	DoC
Seagate	Hard Disk	ST340014A	5JXK3NAD	DoC
DELL	3.5' Floppy	N/A	CN-0N8893-69802-54Q-02OZ	DoC
Lite-ON	CD-Rom	LTN-489S	N/A	DoC
Intel	Ethernet	PRO 10/100 VE	N/A	DoC

Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
DELL	PC	DELL 170L	CN-0TC670-70821-560-F4WQ	DoC
DELL	Keyboard	SK-8110	CN07N244-71616-56I-1100	DoC
DELL	Mouse	M071KC	519046820	DoC
DELL	LCD Monitor	1505FP	Y4287-7168-574-GBSH	DoC
Intel	CPU	Celeron D-2533	N/A	DoC
ProMOS	Memory	V826632K24SATG-C0	0525-K1933700	DoC
HP	Laser Jet5L	C3941A	JPTVOB2337	DoC
ECOM	Modem	EM-56DEV	6588D51200013	DoC

External I/O Cable

Cable Description	Length (M)	From/Port	To
Shielded Detachable Keyboard Cable	1.50	Keyboard Port / Host	Keyboard
Shielded Detachable Mouse Cable	1.50	PS/2 Port / Host	Mouse
Shielded Detachable Printer Cable	1.20	Parallel Port / Host	Printer
Shielded Detachable Serial Cable	1.20	Serial Port / Host	Modem
Shielded Detachable VGA Cable	1.50	VGA Port / Host	Monitor
Shielded Undetachable USB Phone	0.90	EUT	host PC

SYSTEM TEST CONFIGURATION

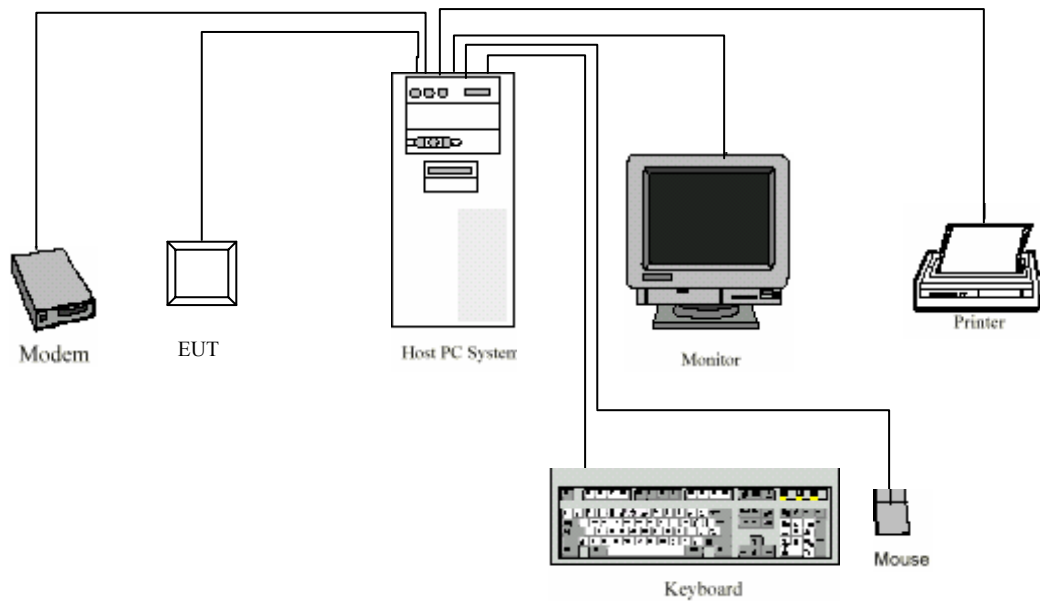
Justification

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

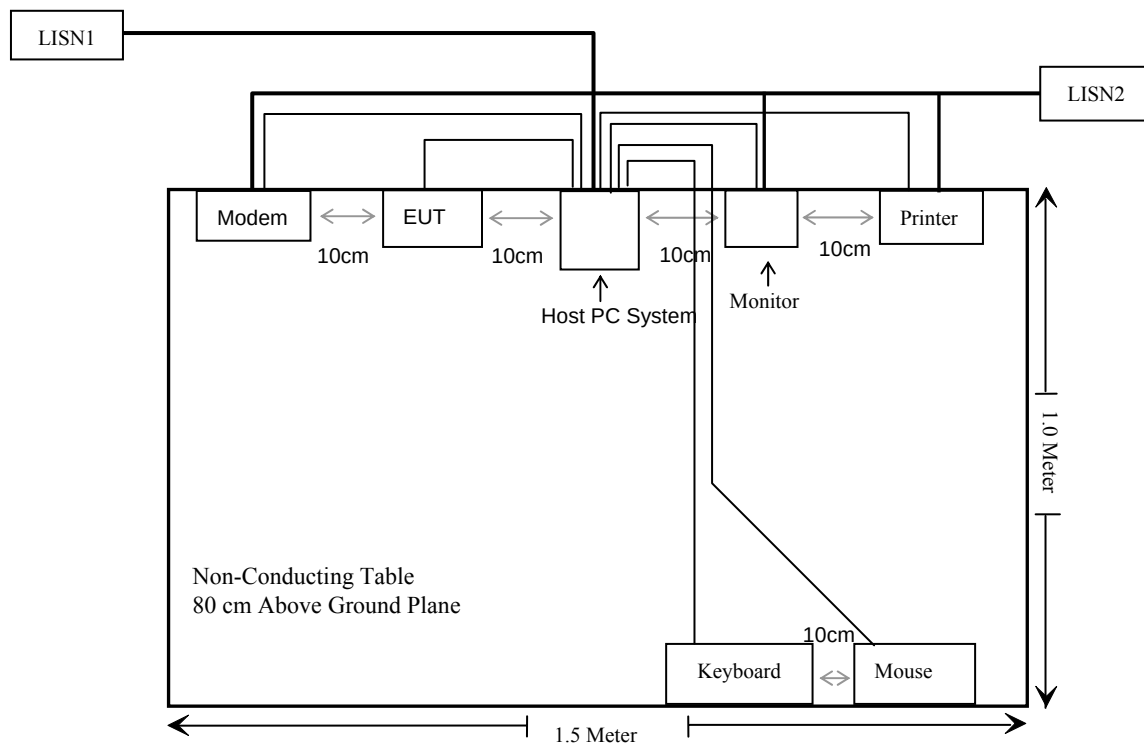
Equipment Modifications

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

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.203	Antenna requirement	Compliant
§15.205	Restricted Band of operation	Compliant
§15.207	Conducted Emission	Compliant
§15.209	Radiated Emission Limit*	Compliant
§15.225(a) (b) (c)	Field Strength of Radiated Emissions	Compliant
§15.225(d)	Out of band emission	Compliant
§15.225(e)	Frequency Stability	Compliant

* Within measurement uncertainty

§15.203 - ANTENNA REQUIREMENT

Standard Applicable

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

Antenna Connected Construction

The EUT was a permanently attached antenna which, in accordance to the above sections, is considered sufficient to comply with the provisions of these sections. Please see EUT photo for details.

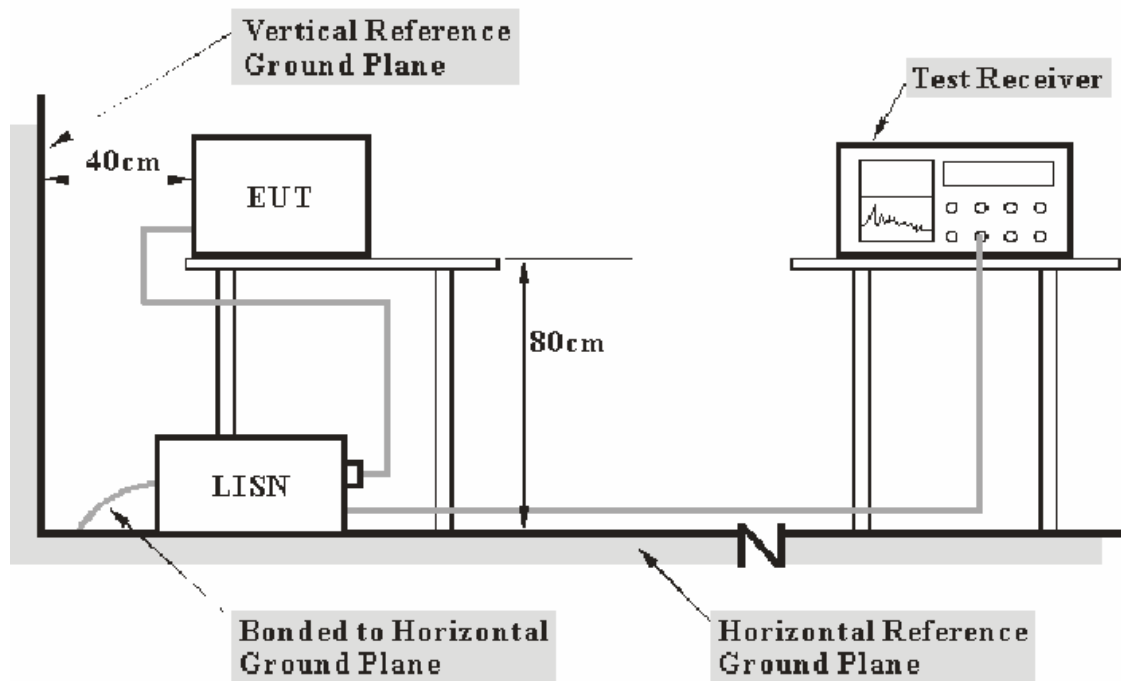
§15.207 - CONDUCTED EMISSION

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Lab Corp. (ShenZhen) is ± 2.4 dB.

EUT Setup



- Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.207.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

The host PC was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

<u>Frequency Range</u>	<u>IF B/W</u>
150 kHz – 30 MHz	9 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	100035	2005-8-17	2006-8-17
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2006-3-1	2007-3-1

* Com-Power's LISN were used as the supporting equipment.

* **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

During the conducted emission test, the host PC was connected to the outlet of the first LISN, and all other support equipment power cords were connected to the outlet of the second LISN.

Maximizing procedure were performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207, with the worst margin reading of:

-6.50 dB at 1.985 MHz/2.075MHz in the Neutral conductor mode.

Test Data**Environmental Conditions**

Temperature:	27 °C
Relative Humidity:	58 %
ATM Pressure:	1000mbar

The testing was performed by Louise Lu on 2006-6-29.

Test Mode: Transmitting

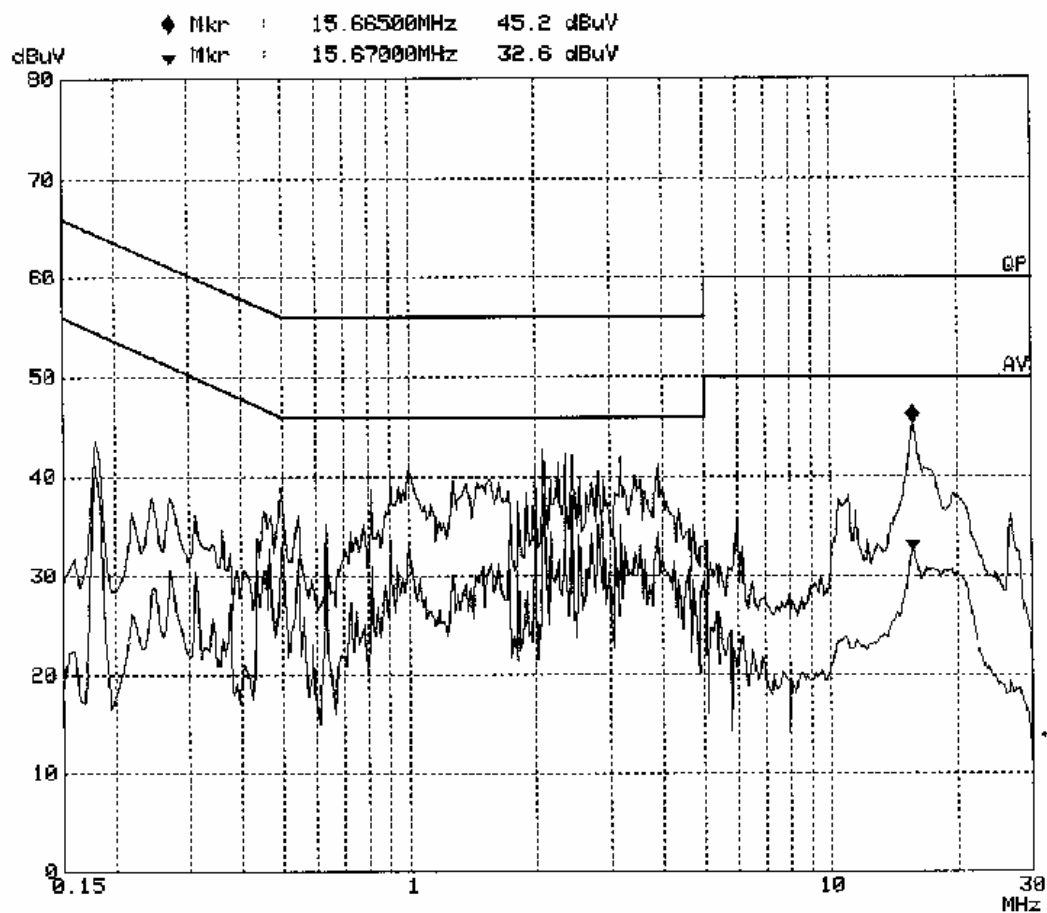
Frequency MHz	LINE CONDUCTED EMISSIONS			FCC PART 15.207	
	Amplitude dBμV	Detector QP/AV	Phase Live/Neutral	Limit dBμV	Margin dB
1.985	39.50	AV	Neutral	46.00	-6.50
2.075	39.50	AV	Neutral	46.00	-6.50
2.355	37.50	AV	Live	46.00	-8.50
0.500	36.50	AV	Neutral	46.00	-9.50
1.995	36.10	AV	Live	46.00	-9.90
2.075	45.80	QP	Neutral	56.00	-10.20
15.665	45.30	QP	Live	56.00	-10.70
1.985	45.20	QP	Neutral	56.00	-10.80
0.995	33.30	AV	Live	46.00	-12.70
10.060	47.20	QP	Neutral	60.00	-12.80
0.180	41.40	AV	Live	54.49	-13.09
15.575	46.40	QP	Neutral	60.00	-13.60
2.355	42.20	QP	Live	56.00	-13.80
0.495	31.60	AV	Live	46.08	-14.48
0.995	41.20	QP	Live	56.00	-14.80
1.995	40.80	QP	Live	56.00	-15.20
0.495	38.90	QP	Live	56.08	-17.18
15.575	32.70	AV	Neutral	50.00	-17.30
15.665	32.60	AV	Live	50.00	-17.40
0.180	36.40	AV	Neutral	54.49	-18.09
0.500	37.70	QP	Neutral	56.00	-18.30
0.180	44.00	QP	Live	64.49	-20.49
10.060	26.70	AV	Neutral	50.00	-23.30
0.180	40.20	QP	Neutral	64.49	-24.29

Plot(s) of Test Data

Plot(s) of Test Data is presented hereinafter as reference.

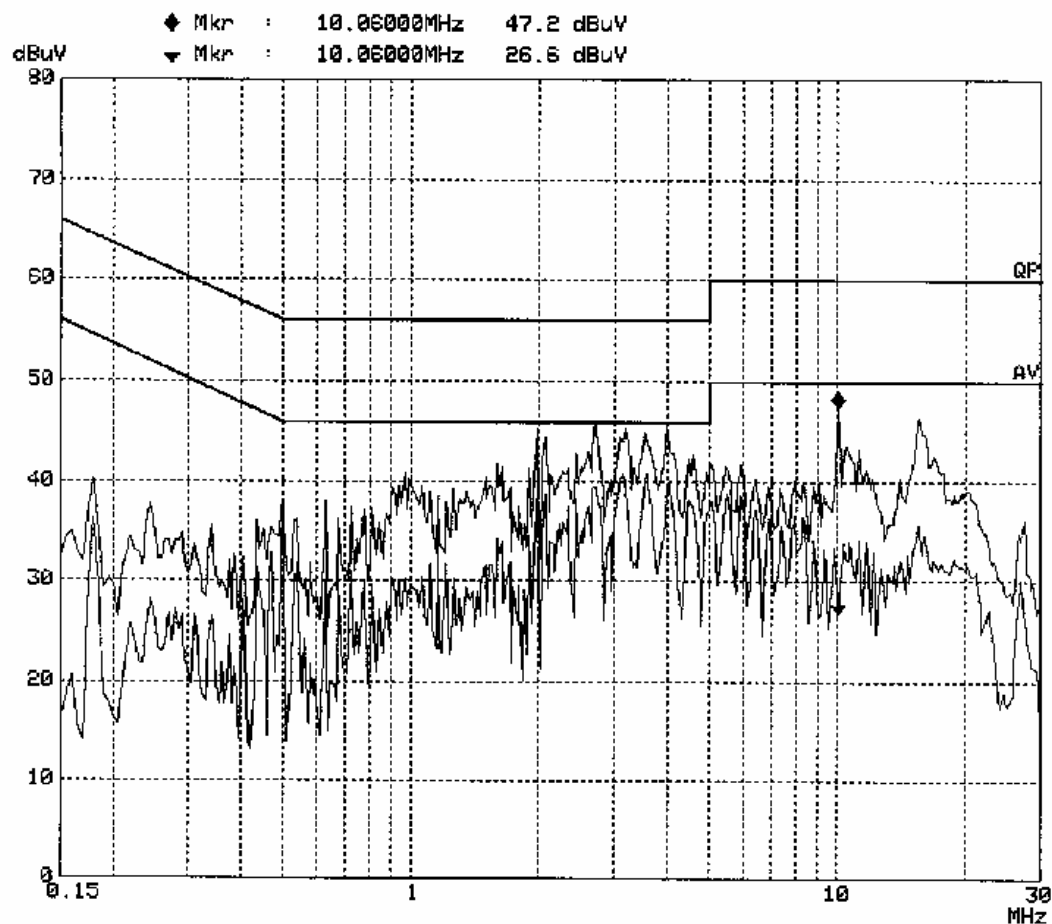
Conducted emission FCC Part 15

EUT: eNetPad
Manuf: Power 7
Op Cond: transmitting
Operator: Louise
Test Spec: AC 120V/60Hz L
Comment: Temp.:25 Humi.: 55%
Date: 29. Jun 06 16:38



Conducted emission FCC Part 15

EUT: eNetPad
Manuf: Power 7
Op Cond: transmitting
Operator: Louise
Test Spec: AC 120V/60Hz N
Comment: Temp.:25 Humi.: 55%
Date: 29. Jun 06 15:32



§15.205, §15.209 - RADIATED EMISSIONS TEST

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Lab Corp. (ShenZhen) is ± 4.0 dB.

The fundamental data was recorded in average detection mode: set the VBW AVE on, then record the data.

EUT Setup

The radiated emission tests were performed in the 3-meter chamber A test site, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC Part Subpart C limits.

EMI Test Receiver Setup

According to FCC Rules, 47 CFR 15.33, the EUT emissions were investigated from 30 MHz to 1000 MHz.

During the radiated emission test, the EMI test Receiver was set with the following configurations:

<u>Frequency Range</u>	<u>RBW</u>	<u>Video B/W</u>
30 – 1000 MHz	100 kHz	300 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	HP8447E	1937A01046	2005-8-17	2006-8-17
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2005-8-17	2006-8-17
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2006-4-28	2007-4-28

*** Statement of Traceability:** Bay Area Compliance Lab Corp. (ShenZhen) attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Loss and Cable Loss, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Meter Reading} + \text{Antenna Loss} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the maximum limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corr. Ampl.}$$

Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15.209 with the worst margin reading of:

0.9 dB at 216.996750 MHz in the Horizontal polarization.

Test Data

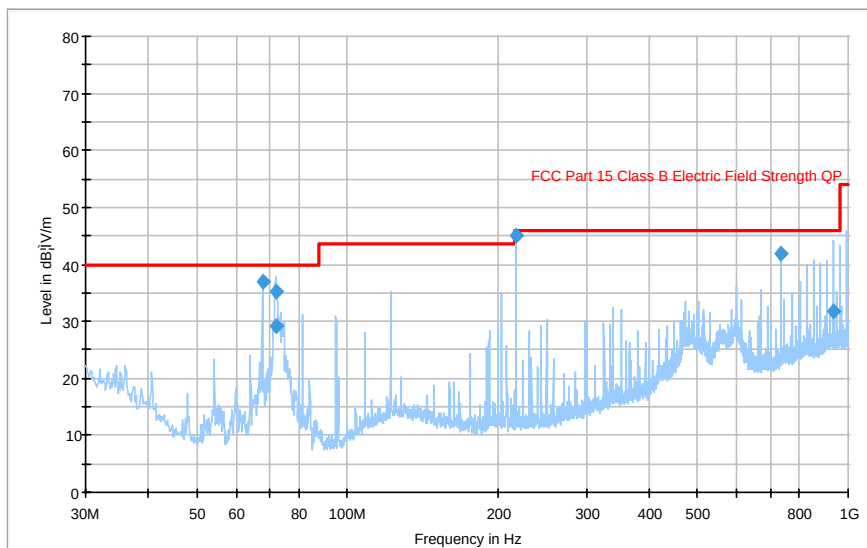
Environmental Conditions

Temperature:	25 °C
Relative Humidity:	53 %
ATM Pressure:	1010 mbar

The testing was performed by Henry Yang on 2006-6-29.

Test mode: Transmitting

Auto Test(FCC 15 Class B)



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dB µ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity
67.814575	36.9	3000.000	120.000	109.0	V
72.019125	35.4	3000.000	120.000	130.0	V
72.148625	29.0	3000.000	120.000	289.0	V
216.996750	45.1	3000.000	120.000	189.0	H
733.318600	42.0	3000.000	120.000	184.0	H
935.789075	31.7	3000.000	120.000	261.0	H

(continuation of the "Final Measurement Detector 1" table from column 6 ...)

Frequency (MHz)	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dB µ V/m)	Comment
67.814575	40.0	-18.2	3.1*	40.0	
72.019125	33.0	-18.2	4.6	40.0	
72.148625	147.0	-18.2	11.0	40.0	
216.996750	86.0	-14.0	0.9*	46.0	
733.318600	168.0	-2.8	4.0*	46.0	
935.789075	3.0	0.8	14.3	46.0	

* Within measurement uncertainty

§15.225(a) (b) (c) – FIELD STRENGTH OF RADIATED EMISSIONS**Test Standard**

(a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

(b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

(c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	8447E	1937A01046	2005-8-17	2006-8-17
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2005-8-17	2006-8-17
ETS	Passive Loop Antenna	6512	00029604	2006-4-26	2007-4-26

*** Statement of Traceability:** Bay Area Compliance Lab Corp. (ShenZhen) attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

EUT Setup

The field strength of radiated emissions tests were performed in the 3-meter chamber A test site, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC Part Subpart C limits.

Test Data**Environmental Conditions**

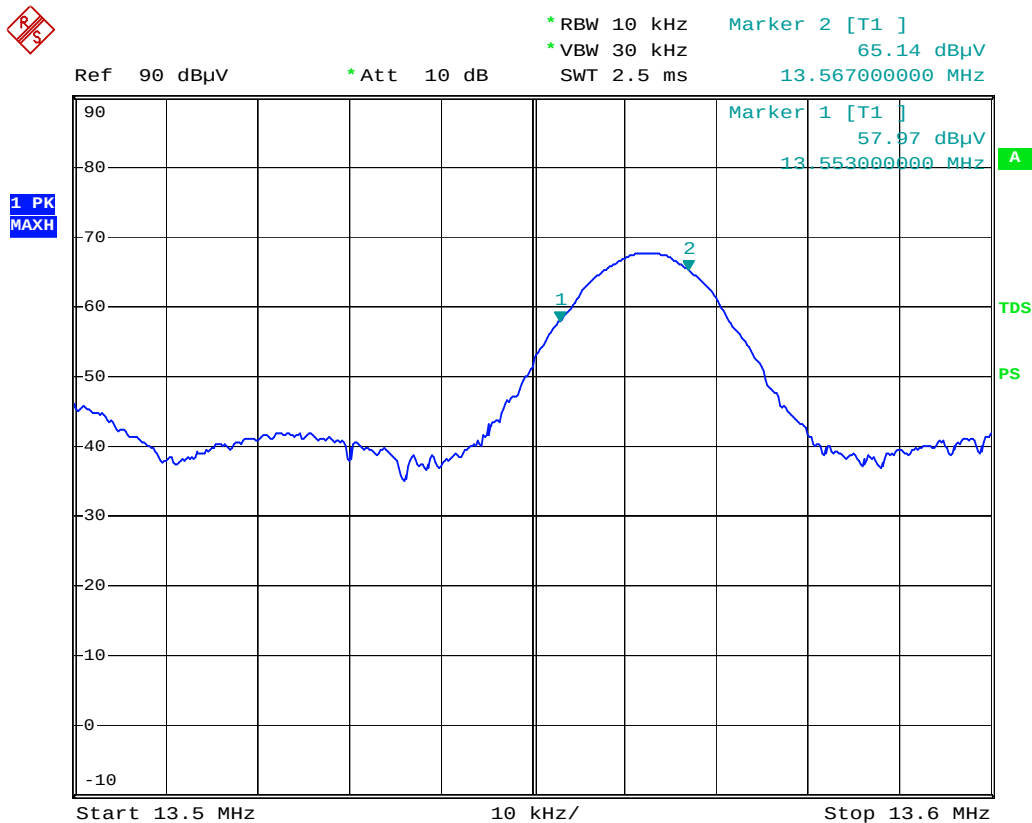
Temperature:	25 °C
Relative Humidity:	53 %
ATM Pressure:	1010 mbar

The testing was performed by Louise Lu on 2006-7-5.

The result has been complied with the 15.225(a), (b), (c) see the following plot:

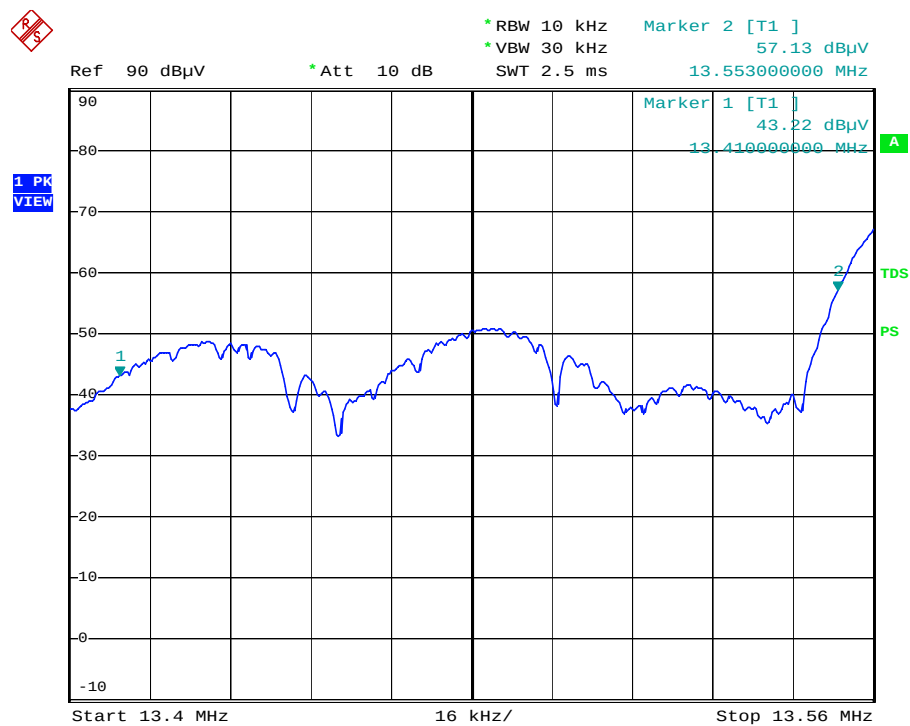
Frequency MHz	Emission dB μ V/m	Limit dB μ V/m	Margin dB
13.553	57.97	104	-46.03
13.567	65.14	104	-38.86
13.56	67.32	104	-36.68
13.410	43.22	70.47	-27.25
13.710	44.73	70.47	-25.74
13.11	22.48	60.5	-38.02
14.01	22.70	60.5	-37.80

Test Result: Pass



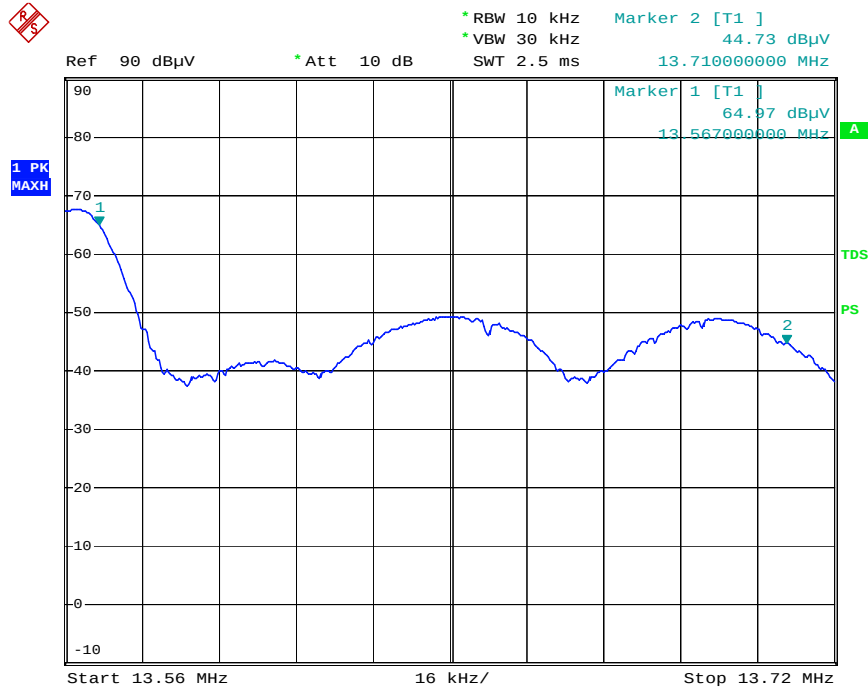
13.553MHz-13.567MHz

Date: 5.JUL.2006 10:33:47



13.41MHz-13.553MHz

Date: 5.JUL.2006 10:29:01



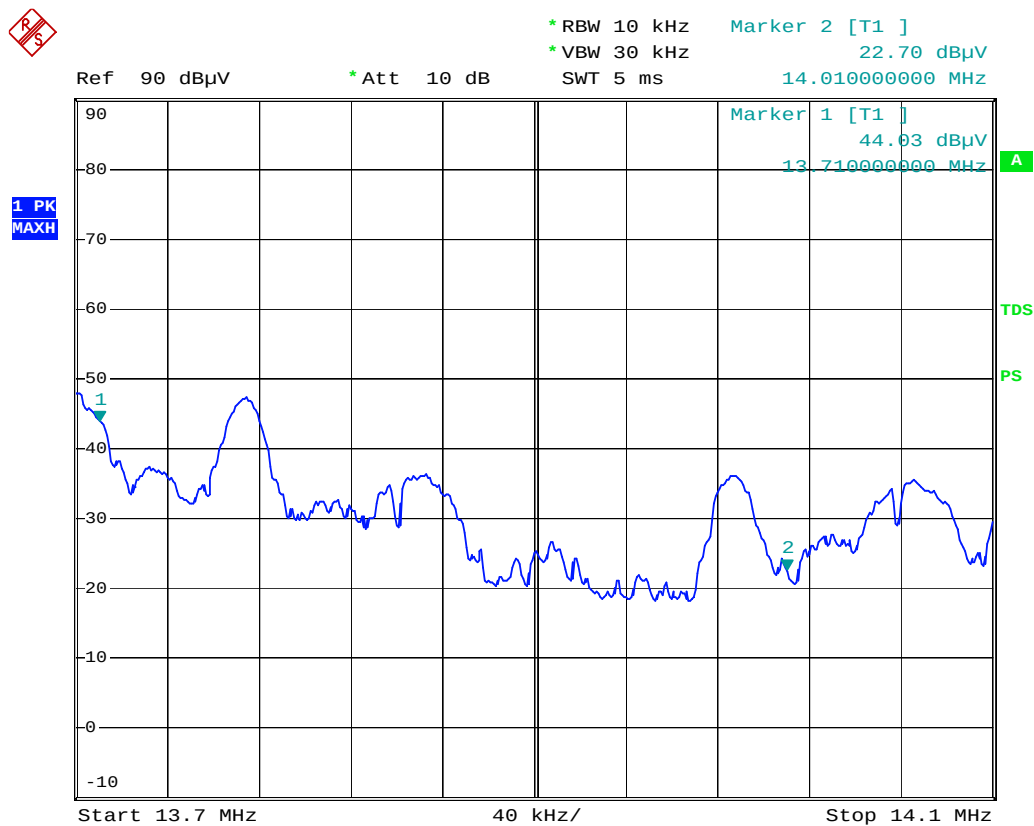
13.567MHz-13.71MHz

Date: 5.JUL.2006 10:31:08



13.11MHz-13.41MHz

Date: 5.JUL.2006 10:27:14



13.71MHz-14.01MHz

Date: 5.JUL.2006 10:36:25

§15.225(d) - OUT OF BAND EMISSION

Test Standard

(d) The field strength of any emissions appearing outside of the 13.110–14.010 MHz band shall not exceed the general radiated emission limits in §15.209.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	8447E	1937A01046	2005-8-17	2006-8-17
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2005-8-17	2006-8-17
ETS	Passive Loop Antenna	6512	00029604	2006-4-26	2007-4-26

*** Statement of Traceability:** Bay Area Compliance Lab Corp. (ShenZhen) attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

EUT Setup

The out of band emission tests were performed in the 3-meter chamber A test site, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC Part Subpart C limits.

Test Data

Environmental Conditions

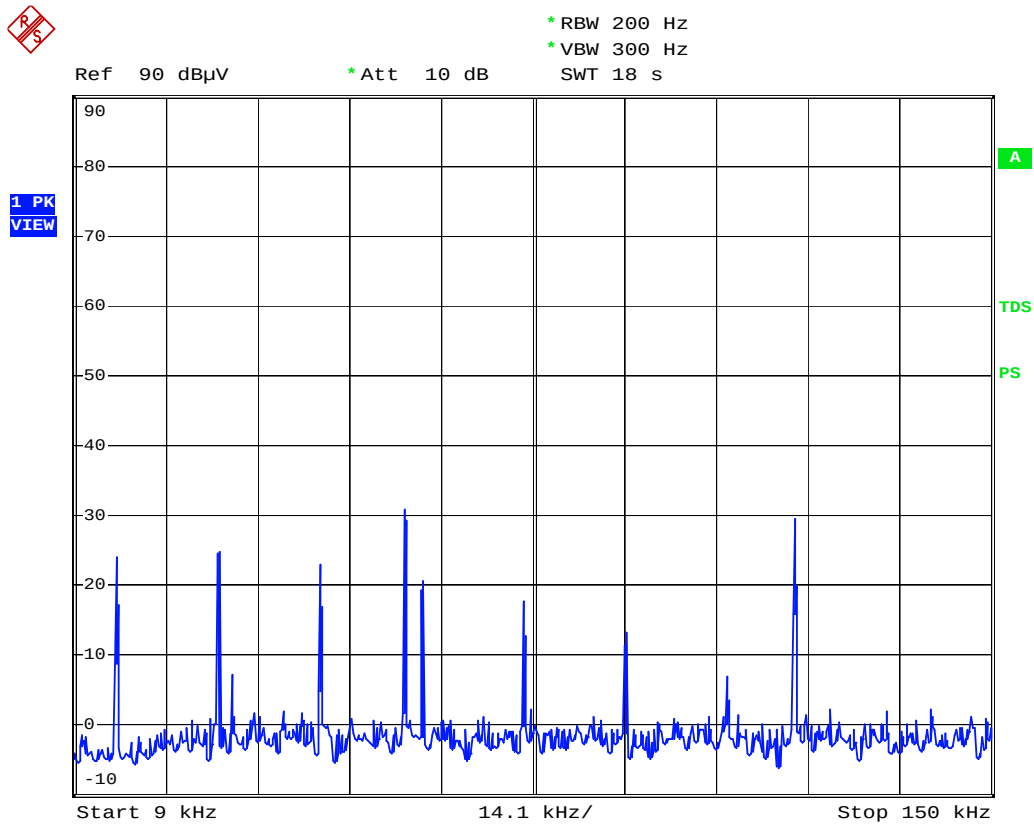
Temperature:	25 °C
Relative Humidity:	53 %
ATM Pressure:	1010 mbar

The testing was performed by Louise Lu on 2006-7-5.

The result has been complied with the 15.225(d), see the following plot:

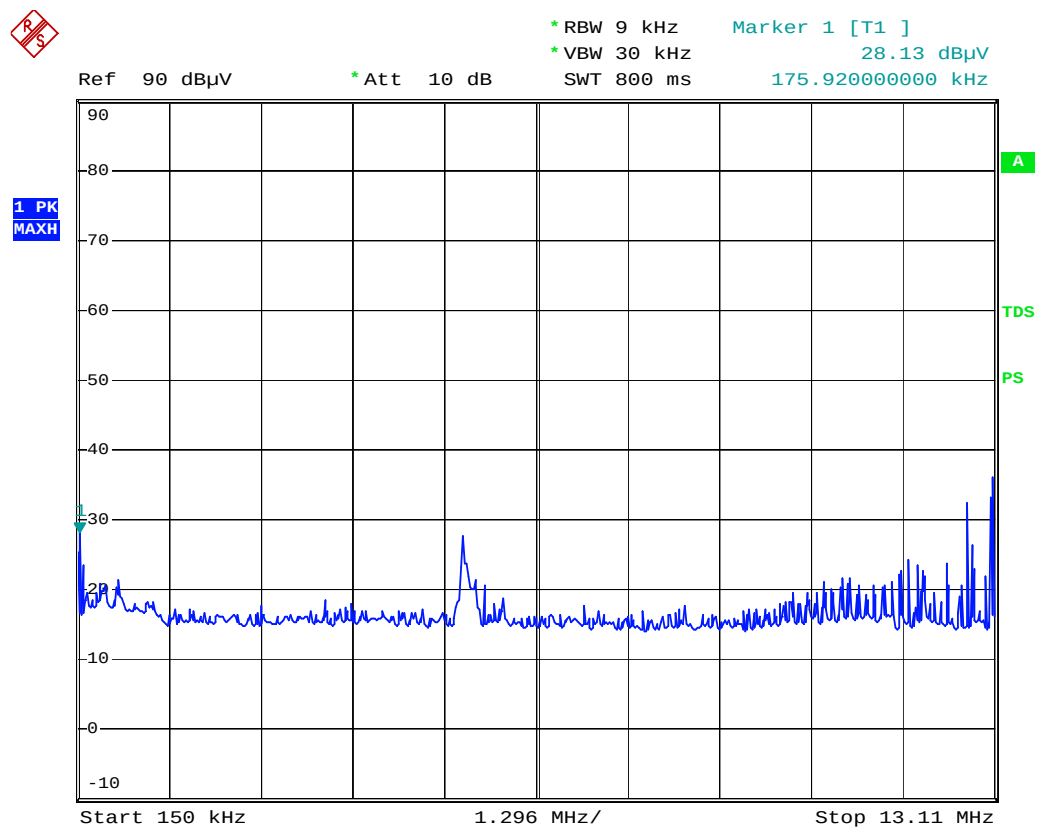
Frequency MHz	Emission dBμV/m	Limit dBμV/m	Margin dB
13.11	25.81	49.5	-23.69
14.01	25.12	49.5	-24.38

Test Result: Pass



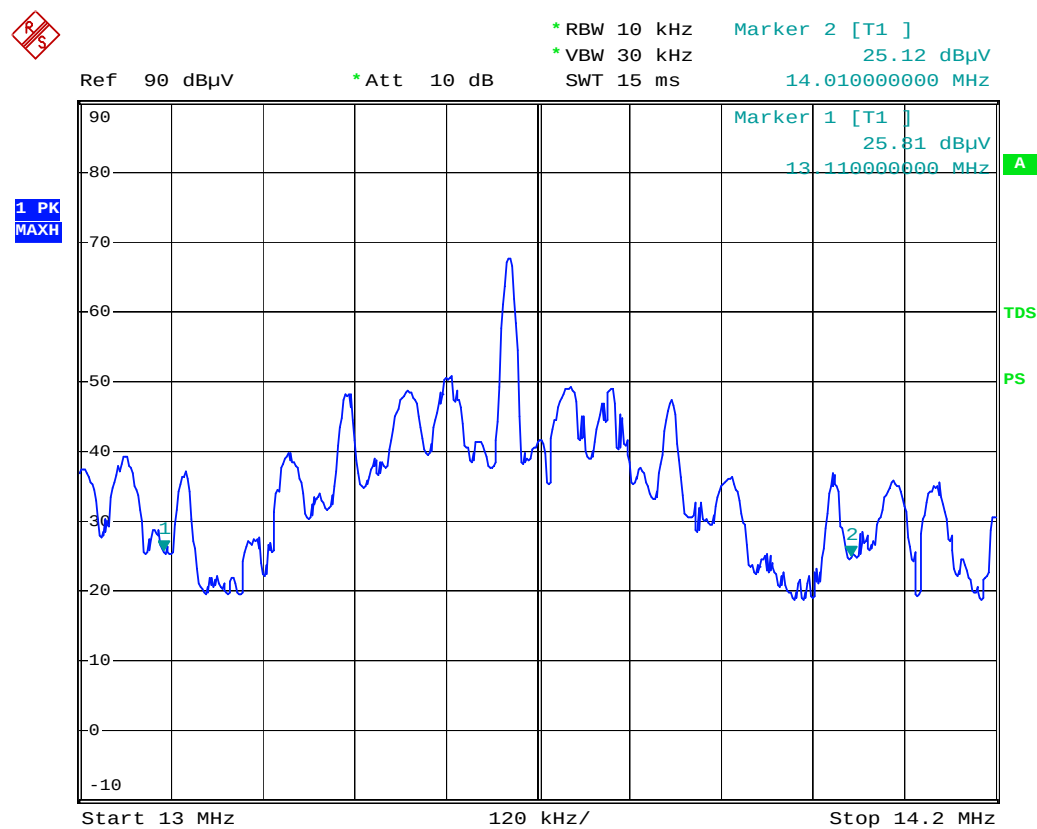
9kHz-150kHz

Date: 5.JUL.2006 10:43:14



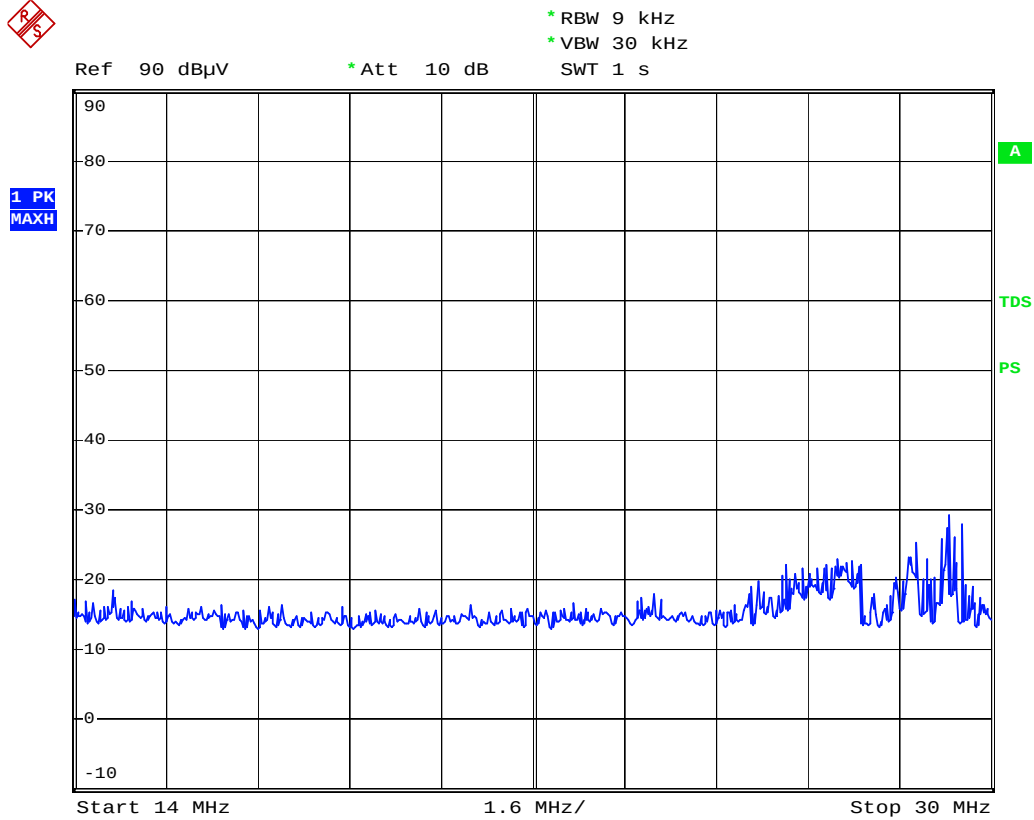
150KHz-13.11MHz

Date: 5.JUL.2006 10:45:19



13.110MHz-14.01MHz

Date: 5.JUL.2006 10:40:33



14MHz-30MHz

Date: 5.JUL.2006 10:46:17

§15.225(e)- FREQUENCY STABILITY

Applicable Standard

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20 degrees to $+50$ degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

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
WUHUAN	Temperature & Humidity Chamber	HTP205	20021115	2005-12-28	2006-12-28

* **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

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 Louise Lu on 2006-6-29.

Test Result: Pass

Test Mode: Transmitting

Reference Frequency : 13.56217 MHz				
Environment Temperature (°C)	Power Supplied (Vdc)	Measured Frequency (MHz)	Frequency Error (kHz)	Limit (kHz)
50	5	13.56212	-0.05	± 1.356
40	5	13.56214	-0.03	± 1.356
30	5	13.56216	-0.01	± 1.356
20	5	13.56217	0	± 1.356
10	5	13.56222	+0.05	± 1.356
0	5	13.56225	+0.08	± 1.356
-10	5	13.56228	+0.11	± 1.356
-20	5	13.56232	+0.15	± 1.356

Frequency Stability Versus Input Voltage

Reference Frequency : 13.56217 MHz			
Power Supplied (V)	Measured Frequency (MHz)	Frequency Error (kHz)	Limit (kHz)
102	13.56223	+0.06	± 1.356
138	13.56227	+0.1	± 1.356