



NVLAP LAB CODE 200707-0



FCC PART 15.249

MEASUREMENT AND TEST REPORT

For

Latitude Limited

7/F, Southeast Industrial Building, 611-619 Castle Peak Road,

N.T., Hong Kong

FCC ID: WM4544

Report Type: Original Report	Product Type: 2.4GHz Heart Rate Monitor
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Report Number: <u>RSZ10080101</u>	
Report Date: <u>2010-09-02</u>	
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Note: This test report is prepared for the customer shown above and for the device described herein. 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.

* This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk "*" (Rev.2)

TABLE OF CONTENTS

GENERAL INFORMATION.....	3
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	3
OBJECTIVE	3
RELATED SUBMITTAL(S)/GRANT(S)	3
TEST METHODOLOGY	3
TEST FACILITY	3
SYSTEM TEST CONFIGURATION.....	5
JUSTIFICATION	5
EQUIPMENT MODIFICATIONS	5
BLOCK DIAGRAM OF TEST SETUP	5
SUMMARY OF TEST RESULTS	6
FCC §15.203 - ANTENNA REQUIREMENT.....	7
APPLICABLE STANDARD	7
ANTENNA CONNECTOR CONSTRUCTION	7
FCC §15.205, §15.209 & §15.249 - RADIATED EMISSIONS	8
APPLICABLE STANDARD	8
MEASUREMENT UNCERTAINTY	8
TEST EQUIPMENT SETUP	8
EUT SETUP	9
TEST EQUIPMENT LIST AND DETAILS	9
TEST PROCEDURE	10
CORRECTED AMPLITUDE & MARGIN CALCULATION	10
TEST RESULTS SUMMARY	10
TEST DATA	11
FCC §15.249(D) – OUT OF BAND EMISSIONS	14
APPLICABLE STANDARD	14
TEST PROCEDURE	14
MEASUREMENT UNCERTAINTY	14
TEST EQUIPMENT SETUP	14
TEST EQUIPMENT LIST AND DETAILS	14
TEST DATA	15
FCC §15.215(C) – 20 DB BANDWIDTH.....	16
APPLICABLE STANDARD	16
TEST EQUIPMENT LIST AND DETAILS	16
TEST PROCEDURE	16
TEST DATA	16

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Latitude Limited* 's product, model *D02H53* (FCC ID: *WM4544*), or the "EUT" as referred to in this report is a *2.4 GHz Heart Rate Monitor* which measures approximately: 26.0 cm (L) x 4.5 cm (W) x 1.3 cm (H), rated input voltage: DC 3V battery.

** All measurement and test data in this report was gathered from production sample serial number: 1008044 (Assigned by BACL, Shenzhen). The EUT was received on 2010-06-10.*

Objective

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

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.249 rules.

Related Submittal(s)/Grant(s)

N/A.

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 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 21, 2007. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

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

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



NVLAP LAB CODE 200707-0

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

SYSTEM TEST CONFIGURATION

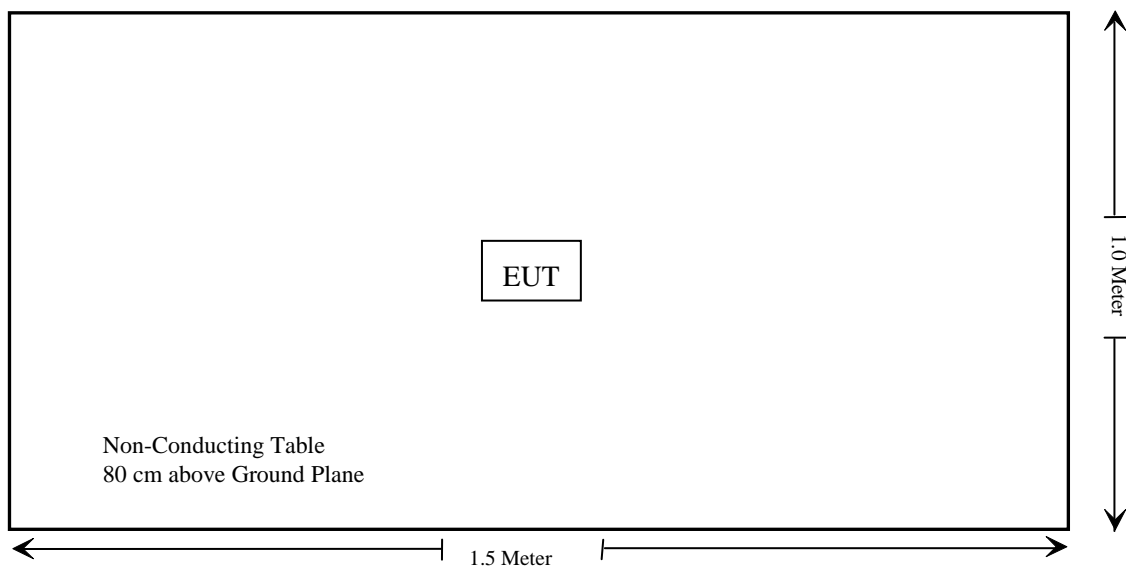
Justification

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

Equipment Modifications

No modifications were made to the unit tested.

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliance
§15.207(a)	Conduction Emissions	N/A*
§15.205(a), §15.209(a), 15.249(a), §15.249(c), §15.35	Radiated Emissions	Compliance
§15.249(d)	Out of Band Emissions	Compliance
§15.215(c)	20dB Bandwidth	Compliance

Note: N/A* Battery operation.

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used.

Antenna Connector Construction

The EUT has an integral antenna on PCB, which in accordance to section 15.203, is considered sufficient to comply with the provisions of this section.

Result: Compliant.

Please refer to the EUT photos.

FCC §15.205, §15.209 & §15.249 - RADIATED EMISSIONS

Applicable Standard

As per FCC§15.249 (a), except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

As per FCC§15.249 (c), Field strength limits are specified at a distance of 3 meters.

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

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 Laboratories Corp. (Shenzhen) is ± 4.0 dB.

Test Equipment Setup

The spectrum analyzer or receiver is set as:

Below 1000 MHz:

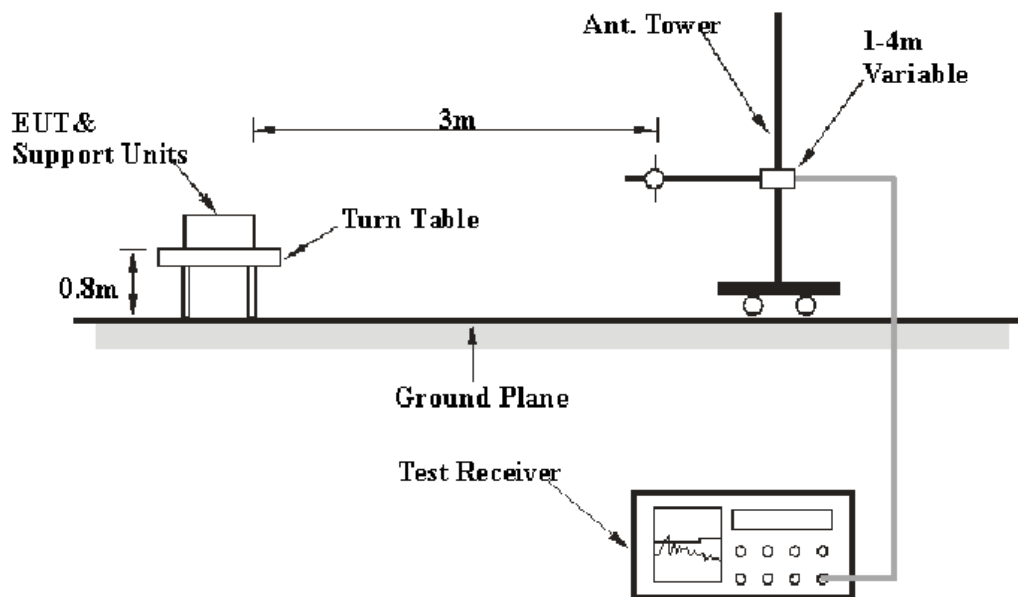
$$\text{RBW} = 100 \text{ kHz} / \text{VBW} = 300 \text{ kHz} / \text{Sweep} = \text{Auto}$$

Above 1000 MHz:

$$\text{Peak: RBW} = 1 \text{ MHz} / \text{VBW} = 1 \text{ MHz} / \text{Sweep} = \text{Auto}$$

$$\text{Average: RBW} = 1 \text{ MHz} / \text{VBW} = 10 \text{ Hz} / \text{Sweep} = \text{Auto}$$

EUT Setup



The radiated emission and out of band emission tests were performed in the 3 meters chamber B, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC 15.209 and FCC 15.249 limits.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	8447E	1937A01046	2010-08-02	2011-08-01
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2009-11-24	2010-11-23
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2010-03-11	2011-03-11
HP	Amplifier	2VA-213+	T-E27H	2010-03-08	2011-03-07
Sunol Sciences	Horn Antenna	DRH-118	A052604	2010-05-05	2011-05-04
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2010-07-08	2011-07-07

*** 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

For the radiated emissions test, the EUT, and all support equipment power cords was connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 mete, and the EUT is placed on a turntable, which is 0.8 meter above ground plane, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna should be changed the polarization both of horizontal and vertical.

Corrected Amplitude & Margin Calculation

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

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

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

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15.209 & 15.249, with the worst margin reading of:

Below 1 GHz:

Transmitting: 19.0 dB at 120.007500 MHz in the Horizontal polarization
Receiving: 19.2 dB at 30.869250 MHz in the Horizontal polarization

Above 1 GHz:

Transmitting: 3.04 dB at 4879.85 MHz in the Horizontal polarization

Test Data

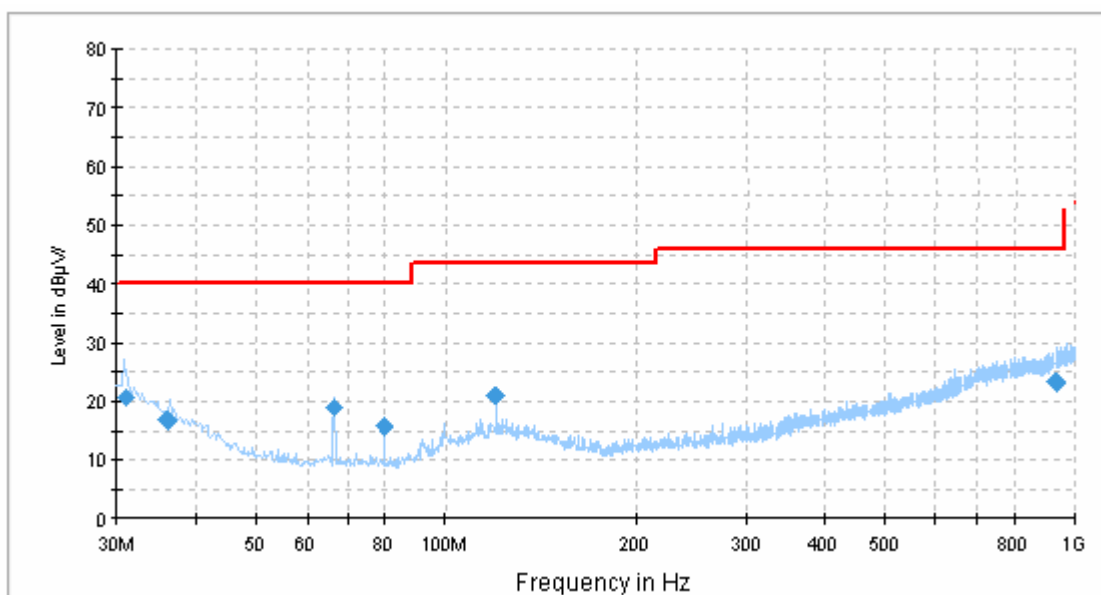
Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.2 kPa

The testing was performed by Jessica He on 2010-08-25.

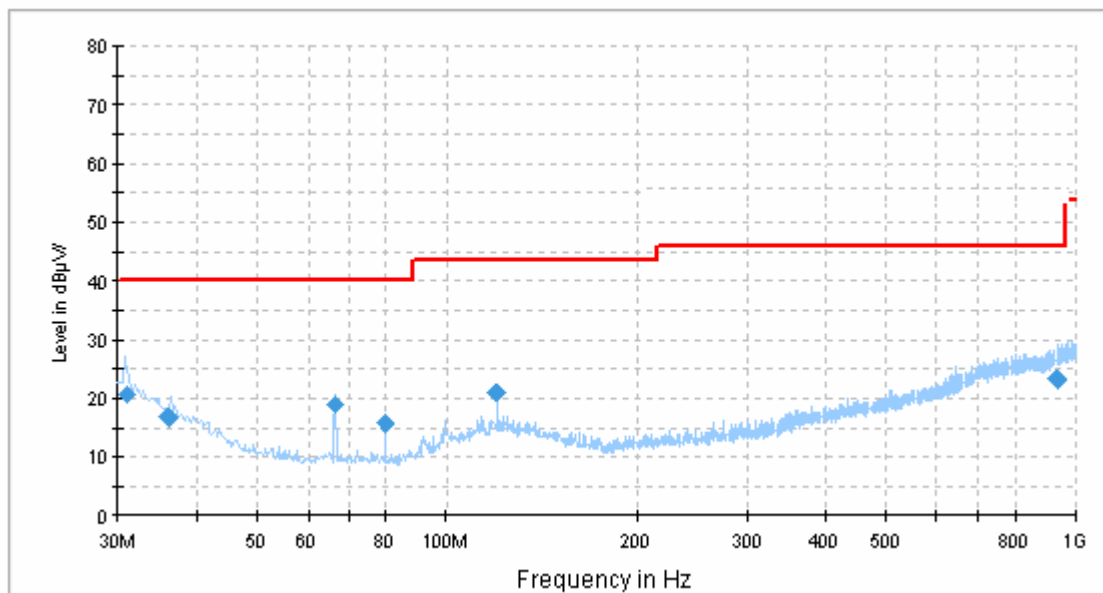
30-1000 MHz:

Test Mode: Transmitting (worse case)



Frequency (MHz)	Corrected Amplitude (dBμV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Position (degree)	Correction Factor (dB)	Limit (dBμV/m)	Margin (dB)
120.007500	24.5	400.0	H	60.0	-12.3	43.5	19.0
30.281625	20.1	203.0	V	278.0	-5.6	40.0	19.1
898.418750	26.5	357.0	V	340.0	-0.9	46.0	19.5
66.414250	20.2	325.0	V	44.0	-18.4	40.0	19.8
79.977250	19.3	400.0	H	125.0	-18.1	40.0	20.7
831.379500	24.0	400.0	V	78.0	-1.4	46.0	22.0

Test Mode: Receiving (worse case)



Frequency (MHz)	Corrected Amplitude (dBμV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Position (degree)	Correction Factor (dB)	Limit (dBμV/m)	Margin (dB)
30.869250	20.8	205.0	H	135.0	-6.0	40.0	19.2
66.401750	18.9	241.0	V	341.0	-18.4	40.0	21.1
119.967500	21.1	120.0	V	160.0	-12.3	43.5	22.4
936.672250	23.4	206.0	V	217.0	0.3	46.0	22.6
36.069250	16.7	400.0	V	0.0	-9.5	40.0	23.3
79.955000	15.7	323.0	H	312.0	-18.1	40.0	24.3

Above 1 GHz (Transmitting):

Freq. (MHz)	Reading (dB μ V)	Detector PK/Ave	Direction Degree	Test Antenna			Cable Loss (dB)	Amp. Gain (dB)	Cord. Amp. (dB μ V/m)	FCC 15.249 & 15.209		
				Height (m)	Polar (H/V)	Factor (dB)				Limit (dB μ V/m)	Margin (dB)	comment
4879.85	37.87	Ave	187	1.0	H	36.3	4.30	27.51	50.96	54	3.04*	harmonic
4879.82	36.82	Ave	149	1.0	V	35.0	4.30	27.51	48.61	54	5.39	harmonic
2964.80	35.06	Ave	185	1.0	H	32.6	2.81	27.71	42.76	54	11.24	spurious
2440.00	76.32	Ave	303	1.3	H	30.9	3.03	27.54	82.71	94	11.29	Fund.
2440.00	75.66	Ave	273	1.0	V	30.3	3.03	27.54	81.45	94	12.55	Fund.
2946.70	34.12	Ave	39	1.0	V	31.0	2.81	27.71	40.22	54	13.78	spurious
4879.85	43.72	PK	187	1.0	H	36.3	4.30	27.51	56.81	74	17.19	harmonic
2964.80	47.66	PK	185	1.0	H	32.6	2.81	27.71	55.36	74	18.64	spurious
4879.82	42.36	PK	149	1.0	V	35.0	4.30	27.51	54.15	74	19.85	harmonic
2946.70	46.51	PK	39	1.0	V	31.0	2.81	27.71	52.61	74	21.39	spurious
7211.90	13.57	Ave	150	1.0	H	39.2	5.24	27.49	30.52	54	23.48	harmonic
7211.70	13.32	Ave	137	1.0	V	38.0	5.24	27.49	29.07	54	24.93	harmonic
7211.90	28.57	PK	150	1.0	H	39.2	5.24	27.49	45.52	74	28.48	harmonic
7211.70	28.26	PK	137	1.0	V	38.0	5.24	27.49	44.01	74	29.99	harmonic
2440.00	77.08	PK	303	1.3	H	30.9	3.03	27.54	83.47	114	30.53	Fund.
2440.00	75.78	PK	273	1.0	V	30.3	3.03	27.54	81.57	114	32.43	Fund.

FCC §15.249(d) – OUT OF BAND EMISSIONS

Applicable Standard

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Test Procedure

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 mete, and the EUT is placed on a turntable, which is 0.8 meter above ground plane, the table shall be rotated for 360 degrees to find out the highest emission at the band edge. The receiving antenna should be changed the polarization both of horizontal and vertical.

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

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 Laboratories Corp. (Shenzhen) is ± 4.0 dB.

Test Equipment Setup

The spectrum analyzer or receiver is set as:

Above 1000 MHz:

Peak: RBW = 1MHz / VBW = 3MHz / Sweep = Auto

Average: RBW = 1MHz / VBW = 10Hz / Sweep = Auto

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2009-11-24	2010-11-23
HP	Amplifier	2VA-213+	T-E27H	2010-03-08	2011-03-07
Sunol Sciences	Horn Antenna	DRH-118	A052604	2010-05-05	2011-05-04

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

Test Data**Environmental Conditions**

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.2 kPa

**The testing was performed by Jessica He on 2010-06-28 and 2010-08-25*

Test Result: Compliant

Please refer to the following table and plots.

Test Mode: Transmitting (worse case)

Freq. (MHz)	S.A. Reading (dBμV)	Detector PK/Ave	Direction Degree	Test Antenna			Cable Loss (dB)	Amp. Gain (dB)	Cord. Amp. (dBμV/m)	FCC 15.209	
				Height (m)	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
Left edge											
2399.88	34.96	PK	182	2.0	H	30.9	3.03	33.9	34.99	74	39.01
2399.88	26.11	Ave	182	2.0	H	30.9	3.03	33.9	26.14	54	27.86
2399.88	35.02	PK	236	1.0	V	30.3	3.03	33.9	34.45	74	39.55
2399.88	26.34	Ave	236	1.0	V	30.3	3.03	33.9	25.77	54	28.23
Right edge											
2483.53	35.10	PK	360	1.8	H	31.1	3.07	33.9	35.37	74	38.63
2483.53	26.46	Ave	360	1.8	H	31.1	3.07	33.9	26.73	54	27.27
2483.53	34.02	PK	34	1.1	V	30.4	3.07	33.9	33.59	74	40.41
2483.53	25.87	Ave	34	1.1	V	30.4	3.07	33.9	25.44	54	28.56

FCC §15.215(c) – 20 dB BANDWIDTH

Applicable Standard

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in § 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2009-11-24	2010-11-23
HP	Amplifier	2VA-213+	T-E27H	2010-03-08	2011-03-07
Sunol Sciences	Horn Antenna	DRH-118	A052604	2010-05-05	2011-05-04

*** 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

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that indicated 20dB bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

Test Data

Environmental Conditions

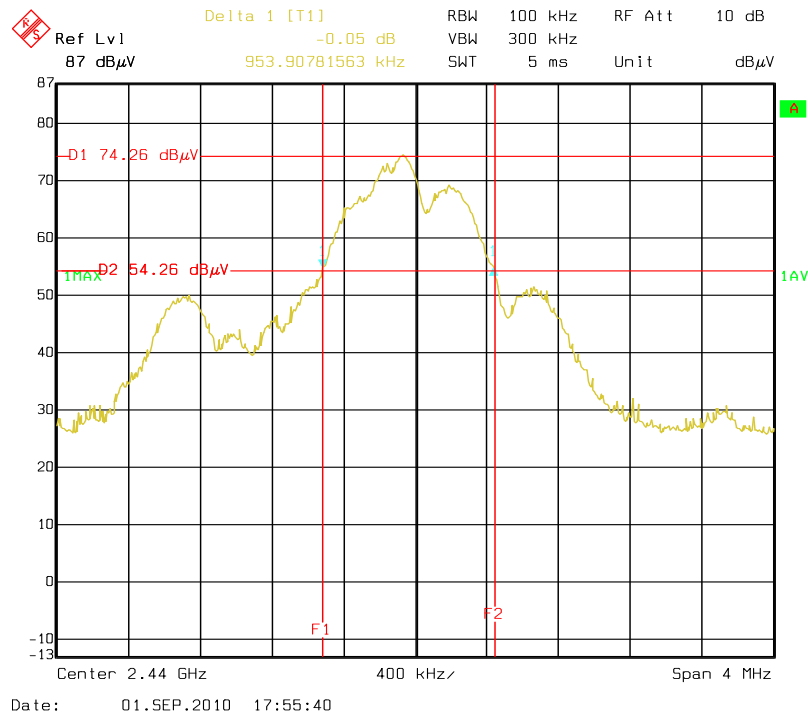
Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.2 kPa

**The testing was performed by Jessica He on 2010-09-01*

Test Mode: Transmitting

Pleas refer to the plot and tabular data sheet attached.

Channel Frequency (MHz)	20 dB Bandwidth (kHz)
2440	953.9078



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