Lab Code: 200707-0

FCC PART 15.407

MEASUREMENT AND TEST REPORT

For

Dfine Technology Co., Ltd.

4th Floor Building A2, Tianfu Software Park, No. 765 Tianfu Road Zhongduan,

Chengdu, Sichuan, China

FCC ID: Y48JDHMDZ-D1AR

Report Type:	Product Type:
Original Report	WHDI Wireless Transceiver Module (Rx)

Test Engineer:	Felix Li
Report Number:	RSZ10101107-Rx
Report Date:	2011-02-17
Reviewed By:	Merry Zhao EMC Engineer
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008

Note: This test report is 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. 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 contains data that are not covered by the NVLAP accreditation and are marked with an asterisk "★" (Rev.2)

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Dfine Technology Co., Ltd.*'s product, model number: *JDHMDZ-D1AR (FCC ID: Y48JDHMDZ-D1AR)* or the "EUT" as referred to in this report is a receiver of *WHDI Wireless Transceiver Module,* which measures approximately: 14.6 cm (L) x 9.3 cm (W) x 2.5 cm (H), rated input voltage: DC 5V adapter.

Adapter Information: AC ADAPTER
Model: 5FF0500300A18A
Input: 100-240 V 50/60 Hz 0.4 A
Output: 5.0 V 3.0 A

Specification	Receiver (JDHMDZ-D1AR)
Frequency Range	5.725-5.825 GHz
Operation Channel	5.755 GHz & 5.795 GHz
Antennas(Internal PCB antenna)	Downlink(RX)×5;Uplink(TX)×1
RF Output Power	15 dBm(Typ.)
Bandwidth	40 MHz
Modulation	OFDM

** All measurement and test data in this report was gathered from production sample serial number: 1010023 (Assigned by BACL, Shenzhen). The EUT was received on 2010-10-11.*

Objective

This Type approval report is prepared on behalf of *Dfine Technology Co., Ltd.* in accordance with Part 2, Subpart J, 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 E, and section 15.203, 15.205, 15.207, 15.209 and 15.407 rules.

Related Submittal(s)/Grant(s)

Transmitter part submission with FCC ID: Y48JDHMDZ-D1AT

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, 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 emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

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).

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

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in an engineering mode, which is provided by manufacture.

EUT Exercise Software

The driver: usb2com driver.exe and UART_install.zip
The apply software: jre-6u21-windows-i586-s.exe

Equipment Modifications

No modification was made to the unit tested.

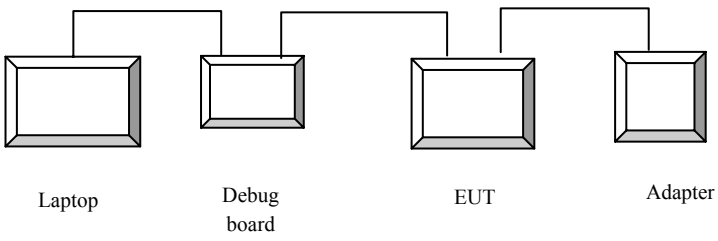
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
DELL	Laptop	D600	5812005F0F	DoC

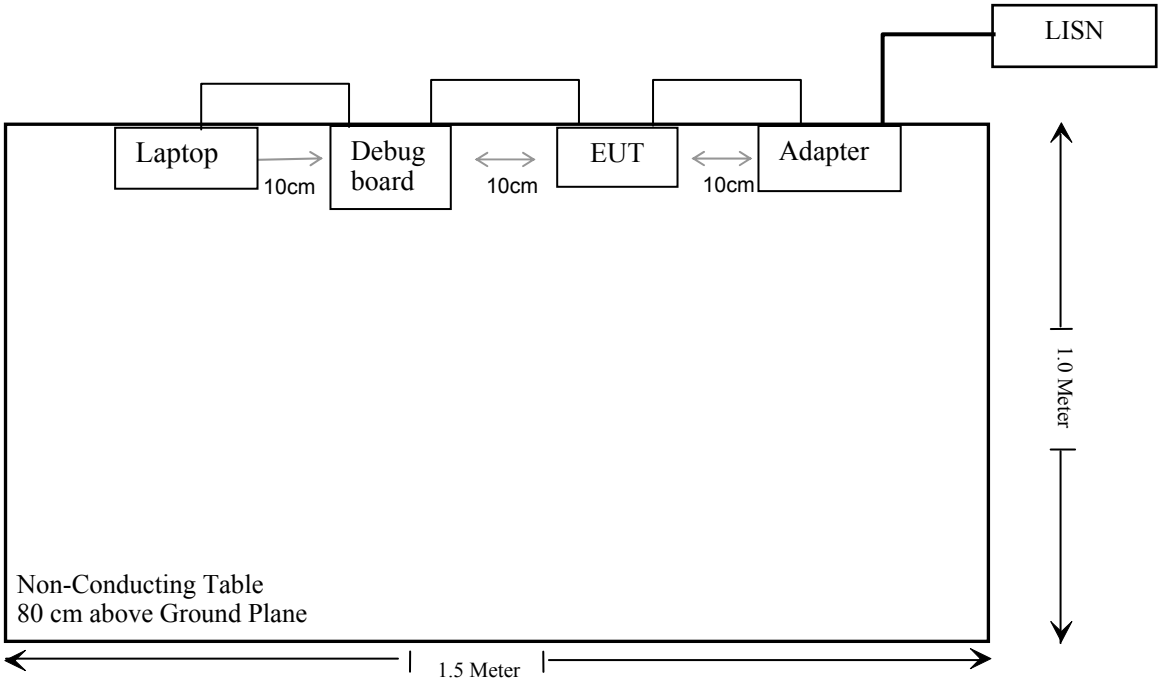
External I/O Cable

Cable Description	Length (m)	From Port	To
Shielded Detachable USB to Serial Cabel	1.2	Laptop	Debug board

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.407 (f), §2.1091, §1.1307(b)(1)	Maximum Permissible Exposure (MPE)	Compliance
§15.203	Antenna Requirement	Compliance
§15.407(b)(6)& §15.207	Conducted Emissions	Compliance
§15.205& §15.209 &§15.407(b)(4),(6),(7)	Undesirable Emission& Restricted Bands	Compliance
§15.407(a) (3)	26 dB Bandwidth	Compliance
§15.407(a)(3),	Conducted Transmitter Output Power	Compliance
§15.407 (a)(3),(5)	Power Spectral Density	Compliance
§15.407(a)(6)	Peak Excursion Ratio	Compliance
§15.407(g)	Frequency Stability	Compliance

FCC §15.407(f) & §2.1091 – MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to FCC §15.407 (f) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

According to §1.1310 and §2.1091 RF exposure is calculated.

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**Averaging Time (minutes)**
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

Test Data

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

Where: S = power density (in appropriate units, e.g. mW/cm2)
P = power input to the antenna (in appropriate units, e.g., mW).
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
	(dBi)	(numeric)	(dBm)	(mW)			
5755	1.5	1.41	14.72	29.648	20	0.00832	1.0
5795	1.5	1.41	14.79	30.130	20	0.00846	1.0

Result

The EUT meets MPE limit at 20 cm distance.

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

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 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. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.407 (a), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has only one integral (printed on PCB) antenna for transmiting and Receiving, in accordance to section 15.203, the directional gain is 1.5 dBi, otherwise the EUT has four integral (printed on PCB) antennas for receiving; please refer to the internal photos.

Result: Compliance.

FCC §15.407 (b)(6) & §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

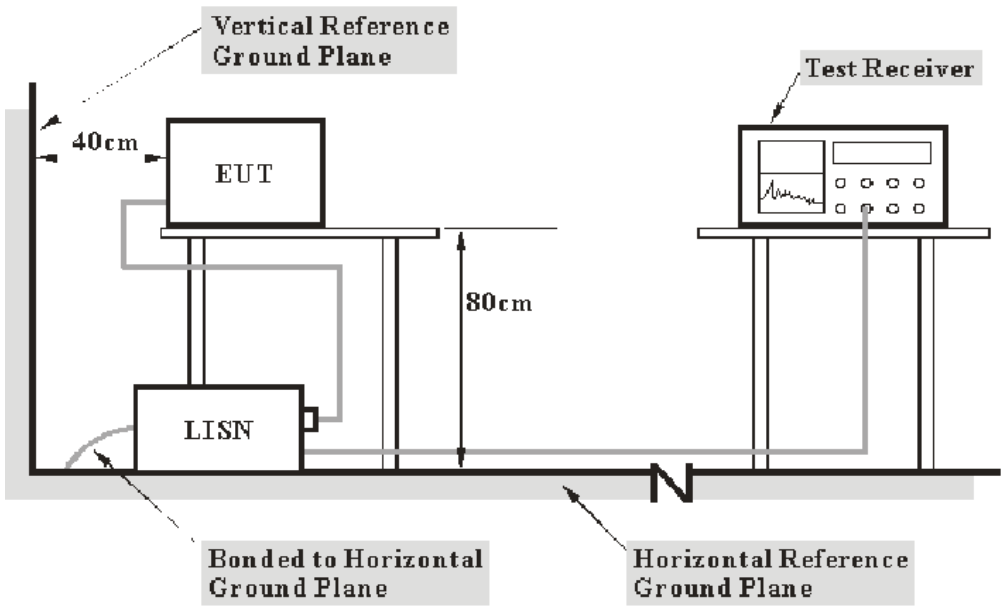
FCC §15.207, §15.407(b)(6)

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 Laboratory 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 C63.4-2009 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

The adapter 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:

Frequency Range	***IF B/W***
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	830245/006	2010-03-03	2011-03-02
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2010-03-09	2011-03-08

*** 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

During the conducted emission test, the adapter was connected to the LISN.

Maximizing procedure was 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:

19.88 dB at **0.150 MHz** in the **Neutral** conductor mode

Test Data

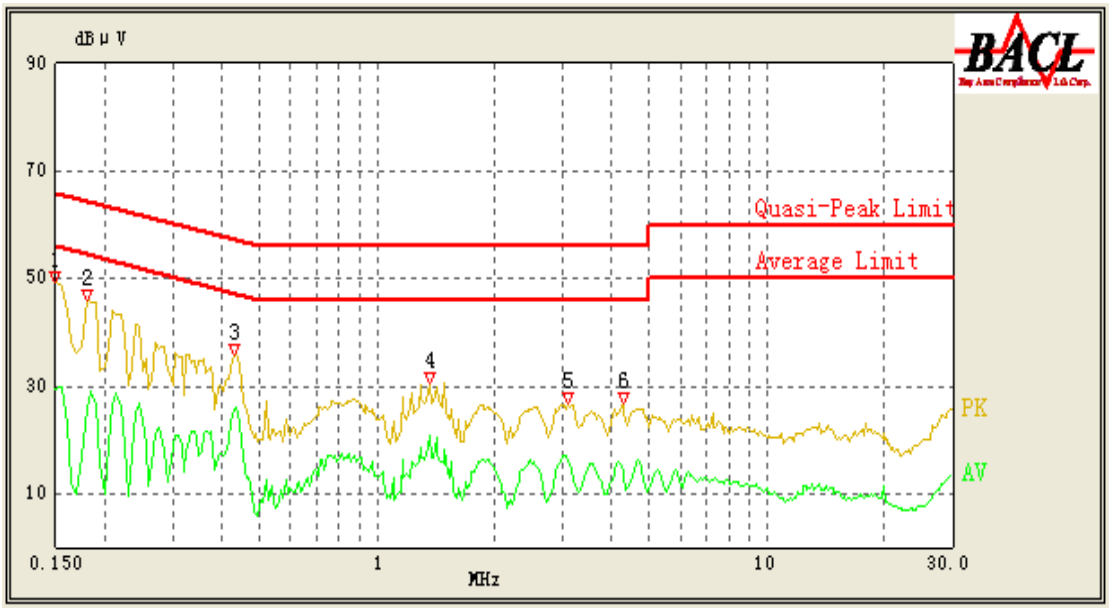
Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

The testing was performed by Felix Li on 2010-12-19.

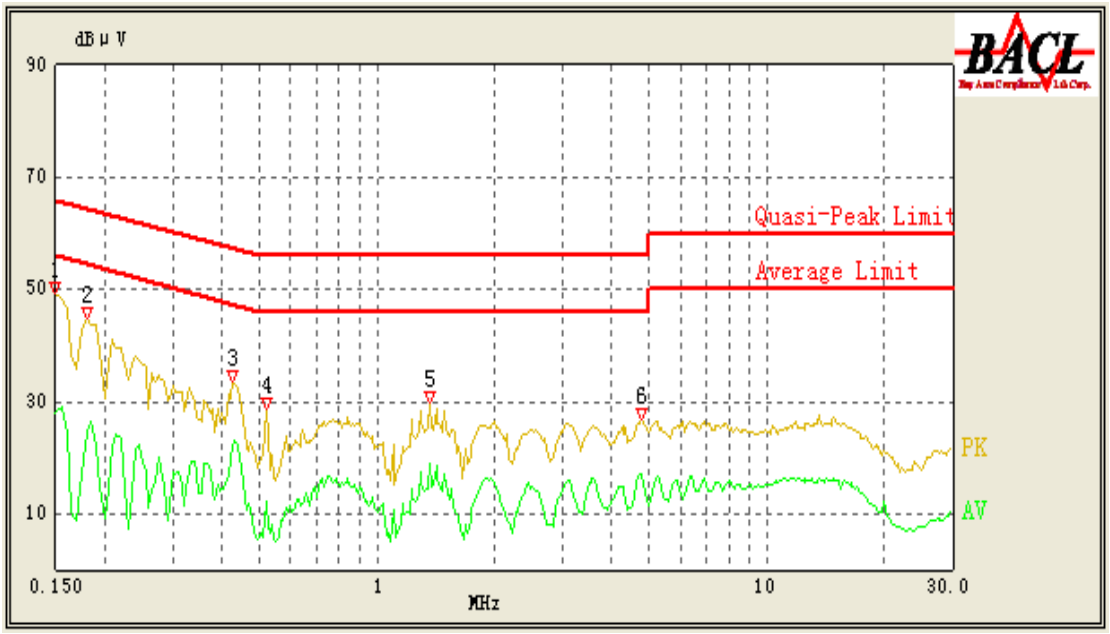
Test Mode: Transmitting (worse case)

120 V, 60 Hz, Line:



Conducted Emissions			FCC Part 15.207		
Frequency (MHz)	**Corrected Factor (dB)**	**Cord. Result (dBµV)**	**Limit (dBµV)**	**Margin (dB)**	**Remark (PK/QP/Ave.)**
0.150	45.93	10.10	66.00	20.07	QP
0.180	42.75	10.08	65.14	22.39	QP
0.430	25.18	10.13	48.00	22.82	Ave.
0.430	33.44	10.13	58.00	24.56	QP
1.360	20.76	10.14	46.00	25.24	Ave.
0.150	29.26	10.10	56.00	26.74	Ave.
1.360	28.32	10.14	56.00	27.68	QP
0.180	25.56	10.08	55.14	29.58	Ave.
3.085	16.23	10.15	46.00	29.77	Ave.
4.270	14.40	10.10	46.00	31.60	Ave.
3.105	22.18	10.14	56.00	33.82	QP
4.275	20.88	10.10	56.00	35.12	QP

120V, 60 Hz, Neutral:



Conducted Emissions			FCC Part 15.207		
Frequency (MHz)	**Corrected Factor (dB)**	**Cord. Result (dBµV)**	**Limit (dBµV)**	**Margin (dB)**	**Remark (PK/QP/Ave.)**
0.150	46.12	10.10	66.00	19.88	QP
0.180	41.93	10.08	65.14	23.21	QP
0.425	22.05	10.13	48.14	26.09	Ave.
1.360	19.02	10.14	46.00	26.98	Ave.
0.425	30.63	10.13	58.14	27.51	QP
0.150	27.90	10.10	56.00	28.10	Ave.
1.360	27.11	10.14	56.00	28.89	QP
4.760	16.96	10.10	46.00	29.04	Ave.
0.180	24.73	10.08	55.14	30.41	Ave.
0.520	23.63	10.20	56.00	32.37	QP
0.520	12.09	10.20	46.00	33.91	Ave.
4.785	21.99	10.10	56.00	34.01	QP

FCC §15.209, §15.205 & §15.407(b)(4)(6)(7) – UNDESIRABLE EMISSION & RESTRICTED BANDS

Applicable Standard

FCC §15.407 (b) (4), (6), (7); §15.209; §15.205;

Undesirable emission limits:

For transmitters operating in the 5.725–5.825 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of –17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of –27 dBm/MHz.

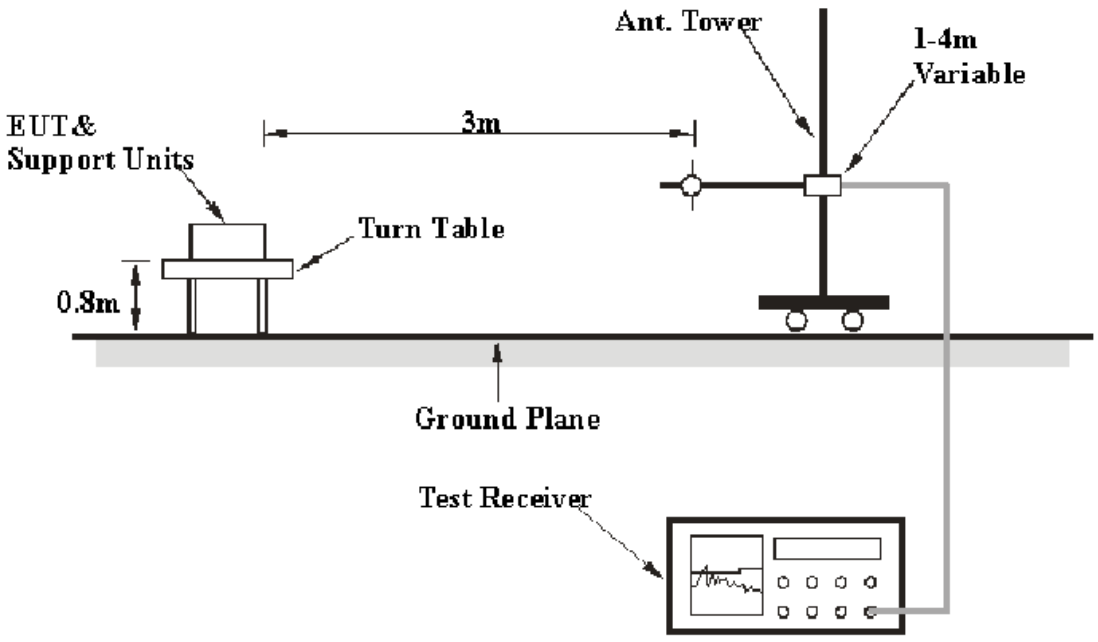
Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

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.

EUT Setup



The radiated emission tests were performed in the 3 meters, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC 15.209, and FCC 15.407 limits.

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 adapter was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	***RBW***	***Video B/W***
30MHz – 1000 MHz	100 kHz	300 kHz
1000 MHz – 25 GHz	1 MHz	3 MHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	HP8447D	2944A09795	2010-08-02	2011-08-02
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-24	2011-11-23
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2010-03-11	2011-03-11
HP	Amplifier	8449B	3008A00277	2010-09-12	2011-09-11
Sunol Sciences	Horn Antenna	DRH-118	A052604	2010-05-05	2011-05-04
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2010-07-08	2011-07-08

*** 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.

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:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - 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:

Margin = Limit – Corrected Amplitude

Test Procedure

For the radiated emissions test, the adapter was connected to the AC floor.

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

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1GHz, peak and Average detection modes for frequencies above 1GHz.

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.407, with the worst margin reading of:

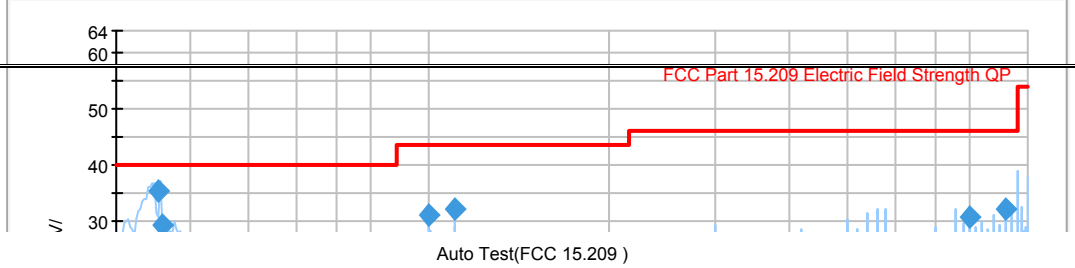
4.6 dB at **35.175750 MHz** in the **Vertical** polarization

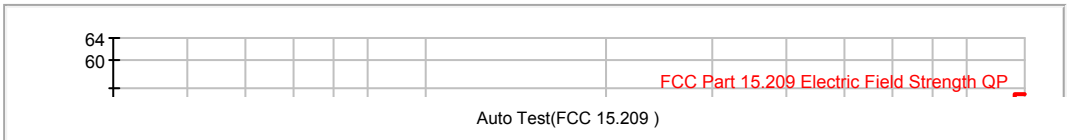
Test Data

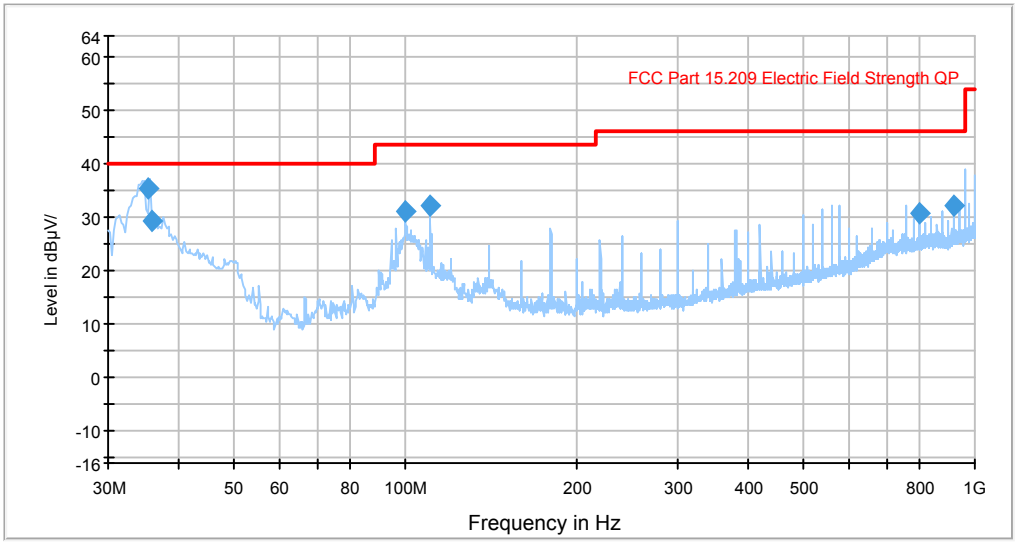
Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The testing was performed by Felix Li on 2010-12-15.







Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Anttenna Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
35.175750	35.4	100	V	223.0	-8.9	40.0	4.6
35.708000	29.2	100.0	V	223.0	-9.3	40.0	10.8
99.969250	31.2	199.0	H	90.0	-14.6	43.5	12.3
110.141750	32.0	354.0	H	84.0	-13.4	43.5	11.5
800.101750	30.8	201.0	V	163.0	-1.8	46.0	15.2
920.044500	32.3	100.0	V	356.0	-0.1	46.0	13.7

Above 1 GHz:

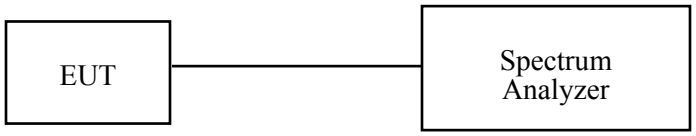
Indicated		Detector (PK/AV)	Table Angle Degree	Test Antenna		Correction Factor			FCC Part 15.407/15.205/15.209			
Frequency (MHz)	S.A. Reading (dBμV)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Comment
Low channel (5755 MHz)												
17265	23.45	AV	254	1.2	V	43.5	8.22	25.90	49.27	54	4.73	harmonic
11510	28.24	AV	160	1.0	V	40.4	6.69	26.2	49.13	54	4.87	Restricted band
11510	25.39	AV	160	1.0	H	41.4	6.69	26.2	47.28	54	6.72	Restricted band
23020	15.45	AV	168	1.1	V	45.6	10.35	24.7	46.7	54	7.30	Restricted band
17265	19.87	AV	254	1.2	H	43.7	8.22	25.90	45.89	54	8.11	harmonic
23020	12.05	AV	168	1.1	H	45.9	10.35	24.7	43.6	54	10.40	Restricted band
23020	31.87	PK	168	1.1	V	45.6	10.35	24.7	63.12	74	10.88	Restricted band
11510	40.47	PK	160	1.0	H	41.4	6.69	26.2	62.36	74	11.64	Restricted band
11510	40.22	PK	160	1.0	V	40.4	6.69	26.2	61.11	74	12.89	Restricted band
17265	34.12	PK	254	1.2	V	43.5	8.22	25.90	59.94	74	14.06	harmonic
23020	27.16	PK	168	1.1	H	45.9	10.35	24.7	58.71	74	15.29	Restricted band
17265	30.02	PK	254	1.2	H	43.7	8.22	25.90	56.04	74	17.96	harmonic
5058.56	45.86	PK	75	1.0	H	36.6	4.43	26.75	60.14	74	13.86	Restricted band
4925.38	45.52	PK	188	1.2	V	35.4	4.40	26.75	58.57	74	15.43	Restricted band
5058.56	22.01	AV	75	1.0	H	36.6	4.43	26.75	36.29	54	17.71	Restricted band
4925.38	22.15	AV	188	1.2	V	35.4	4.40	26.75	35.2	54	18.80	Restricted band
High channel (5795 MHz)												
11590	28.64	AV	10	1.2	V	40.4	6.71	26.2	49.55	54	4.45	Restricted band
11590	27.37	AV	10	1.2	H	41.4	6.71	26.2	49.28	54	4.72	Restricted band
17385	22.16	AV	157	1.1	V	43.5	8.22	25.90	47.98	54	6.02	harmonic
23180	15.05	AV	125	1.0	V	45.6	10.35	24.7	46.3	54	7.70	harmonic
17385	19.15	AV	157	1.1	H	43.7	8.22	25.90	45.17	54	8.83	harmonic
23180	13.17	AV	125	1.0	H	45.9	10.35	24.7	44.72	54	9.28	harmonic
11590	41.98	PK	10	1.2	H	41.4	6.71	26.2	63.89	74	10.11	Restricted band
23180	31.45	PK	125	1.0	V	45.6	10.35	24.7	62.7	74	11.30	harmonic
11590	41.57	PK	10	1.2	V	40.4	6.71	26.2	62.48	74	11.52	Restricted band
17385	35.81	PK	157	1.1	V	43.5	8.22	25.90	61.63	74	12.37	harmonic
23180	28.23	PK	125	1.0	H	45.9	10.35	24.7	59.78	74	14.22	harmonic
17385	32.05	PK	157	1.1	H	43.7	8.22	25.90	58.07	74	15.93	harmonic
5443.24	46.64	PK	327	1.3	H	36.7	4.49	26.70	61.13	74	12.87	Restricted band
5362.35	46.84	PK	225	1.2	V	35.5	4.51	26.70	60.15	74	13.85	Restricted band
5443.24	22.26	AV	327	1.3	H	36.7	4.49	26.70	36.75	54	17.25	Restricted band
5362.35	22.35	AV	225	1.2	V	35.5	4.51	26.70	35.66	54	18.34	Restricted band

Conducted Spurious Emission at Antenna Port

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. make the transmit chain (antenna outputs) to connect to the spectrum analyzer.The Resolution bandwidth is set to 1MHz, The Video bandwidth is set to 1MHz, report the peak value out of the oprating band.
3. Repeat above procedures until all frequencies measured were complete.

Offset value = cable loss



Test Data

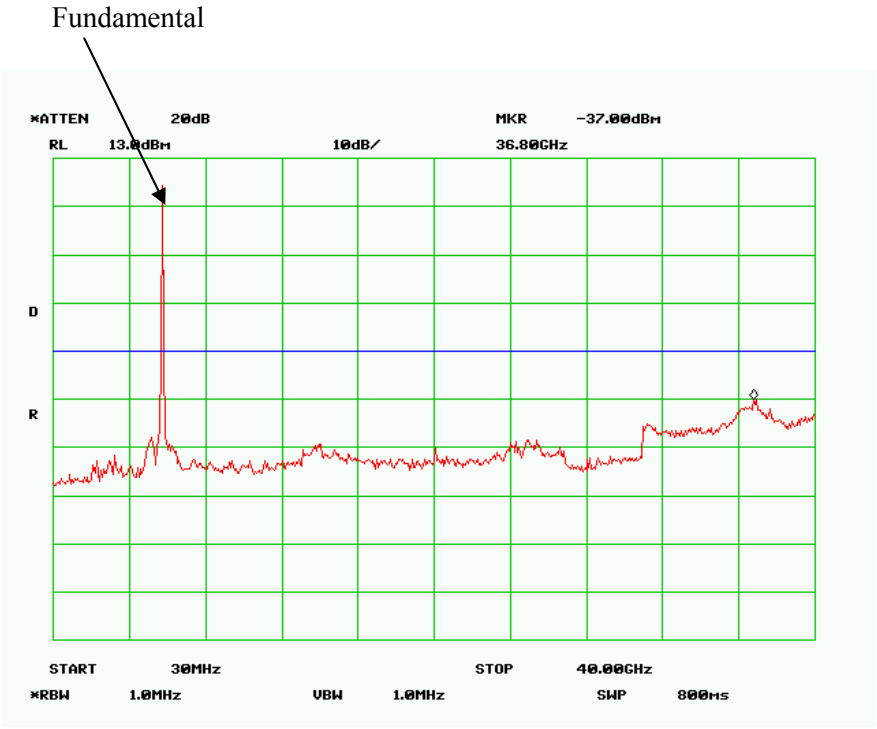
Frequency Band (MHz)	Frequency (MHz)	Corrected Reading (dBm)	Antenna Gain (dBi)	Calculated Value (dBm/MHz)	Limited (dBm/MHz)	Margin (dB)
5725-5825	36940	-37.0	1.5	-35.5	-27	8.5
	36800	-37.0	1.5	-35.5	-27	8.5

Please refer to the following plots.

5755 MHz

Fundamental

5795 MHz



Band Edge Testing

Test Procedure

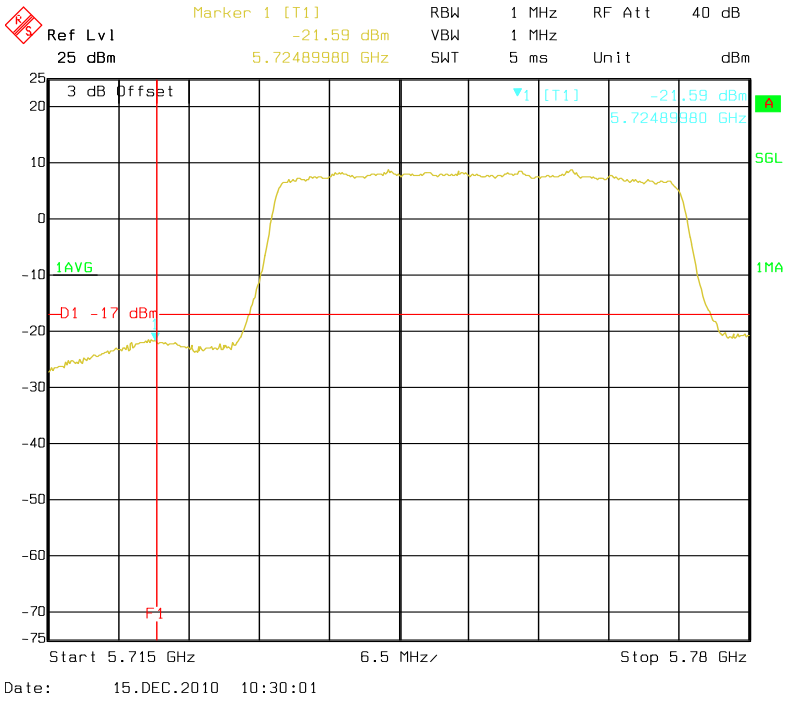
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 1 MHz and VBW of spectrum analyzer to 1 MHz with a convenient frequency span including 10 MHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

Test data

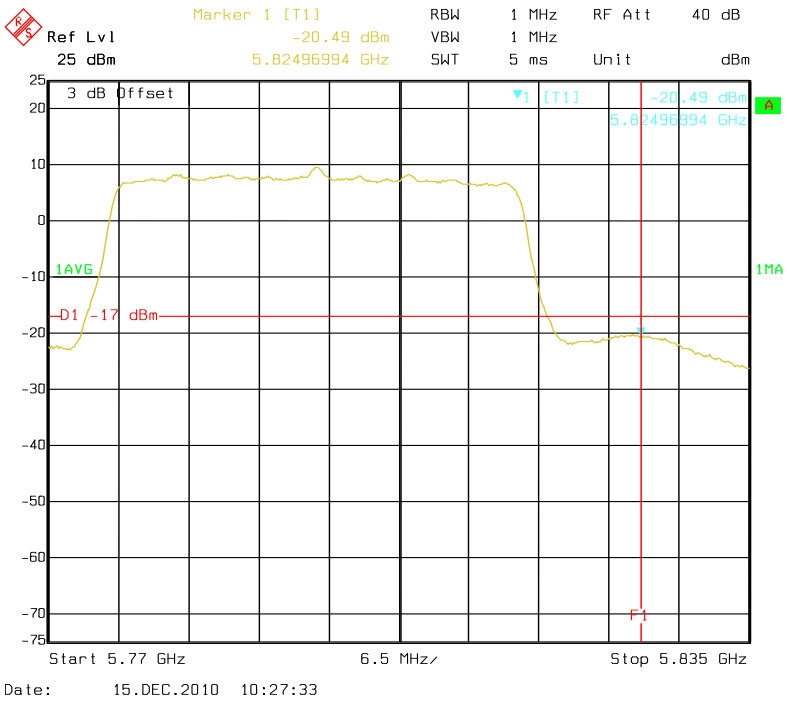
Frequency (MHz)	Delta Peak to band emission (dBm/MHz)	Antenna Gain (dBi)	Calculated Value (dB m)	Limit (dBm/MHz)	Margin (dB)
5723.30	-21.59	1.5	-20.09	-17	3.09
5826.50	-20.49	1.5	-18.99	-17	1.99

Please refer to following plots.

Band Edge, Left Side



Band Edge, Right Side



FCC §15.407(a) (3) – 26 dB OCCUPIED BANDWIDTH

Applicable Standard

For the band 5.725–5.825 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 1 W or 17 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 17 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain up to 23 dBi without any corresponding reduction in the transmitter peak output power or peak power spectral density. For fixed, point-to-point U-NII transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in peak transmitter power and peak power spectral density for each 1 dB of antenna gain in excess of 23 dBi would be required. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

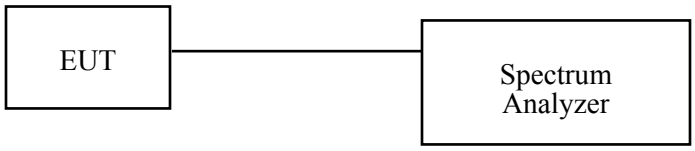
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2010-07-08	2011-07-08

*** 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. Use a RBW = approximately 1% of the emission bandwidth.Set the VBW > RBW. Use a peak detector.Do not use the Max Hold function. Rather, use the viewbutton to capture the emission. Measure maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat, measurement as needed until the RBW/EBW ratio is approximately 1%.
4. Repeat above procedures until all frequencies measured were complete.



Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56%
ATM Pressure:	100.0kPa

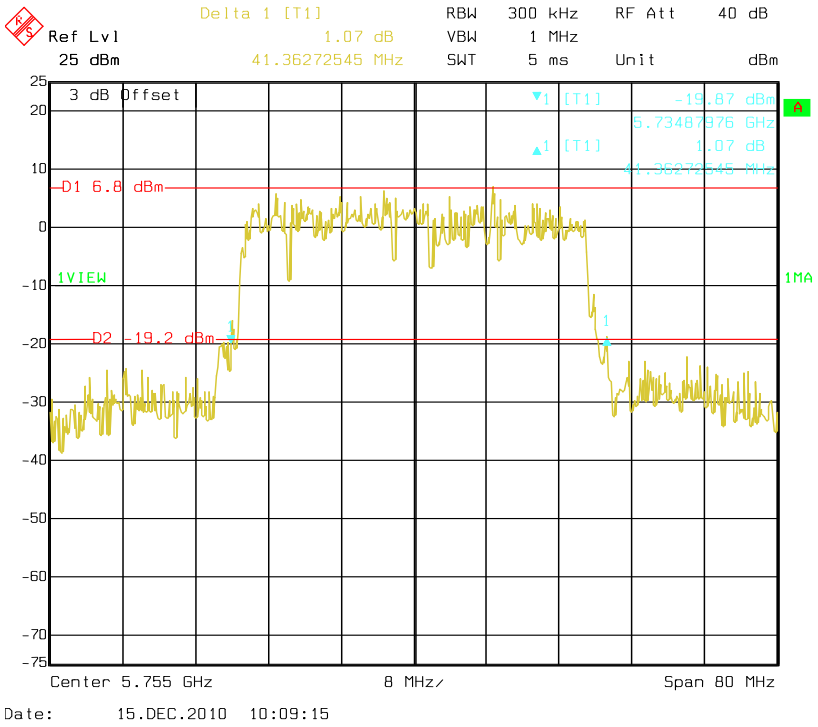
The testing was performed by Felix Li on 2010-12-12.

Test Result: Pass.

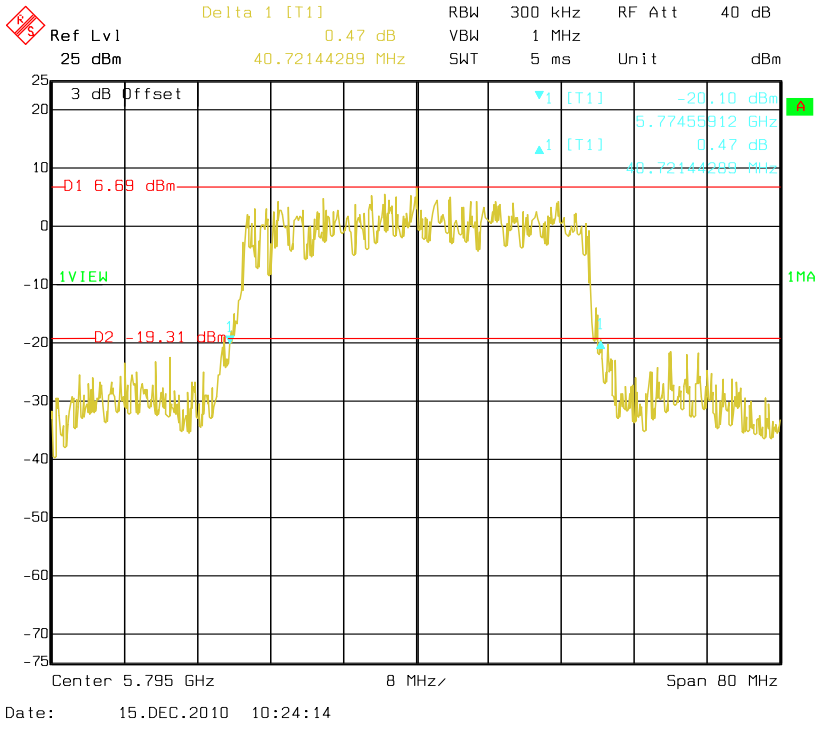
Please refer to the following tables and plots.

Frequency Band (MHz)	Channel Frequency (MHz)	26 dB Bandwidth (MHz)
5725-5825	5755	41.3627
	5795	40.7214

5755 MHz



5795 MHz


Delta 1 [T1]
RBW 300 kHz
RF Att 40 dB
Ref Lvl
0.47 dB
VBW 1 MHz
25 dBm
40.72144289 MHz
SWT 5 ms
Unit dBm
3 dB Offset
1 [T1] -20.10 dBm
5.77455912 GHz
1 [T1] 0.47 dB
40.72144289 MHz
D1 6.69 dBm
1VIEW
1MA
D2 -19.31 dBm
25
20
10
0
-10
-20
-30
-40
-50
-60
-70
-75
Center 5.795 GHz
8 MHz/
Span 80 MHz
Date: 15.DEC.2010 10:24:14

FCC §15.407(a)(3) – CONDUCTED TRANSMITTER OUTPUT POWER

Applicable Standard

For the band 5.725–5.825 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 1 W or 17 dBm+ 10 log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain up to 23 dBi without any corresponding reduction in the transmitter peak output power or peak power spectral density. For fixed, point-to-point U-NII transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in peak transmitter power and peak power spectral density for each 1 dB of antenna gain in excess of 23 dBi would be required. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2010-07-08	2011-07-08

*** 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

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 was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set span = 80MHz (to encompass the entire emission bandwidth (EBW) of the signal). Set RBW = 1 MHz.Set VBW ≥ 3 MHz. Use sample detector mode Use a video trigger with the trigger level set to enable triggering only on full power pulses.Transmitter must operate at full control power for entire sweep of every sweep.If the device transmits continuously, with no off intervals or reduced power intervals, the trigger may be set to “free run”. Trace average 100 traces in power averaging mode.Compute power by integrating the spectrum across the 26 dB EBW of the signal. The integration can be performed using the spectrum analyzer’s band power measurement function with band limits set equal to the EBW band edges or by summing power levels in each 1 MHz band in linear power terms. The 1 MHz band power levels to be summed can be obtained by averaging, in linear power terms, power levels in each frequency bin across the 1 MHz.
4. Repeat above procedures until all frequencies measured were complete.

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The testing was performed by Felix Li on 2010-12-15.

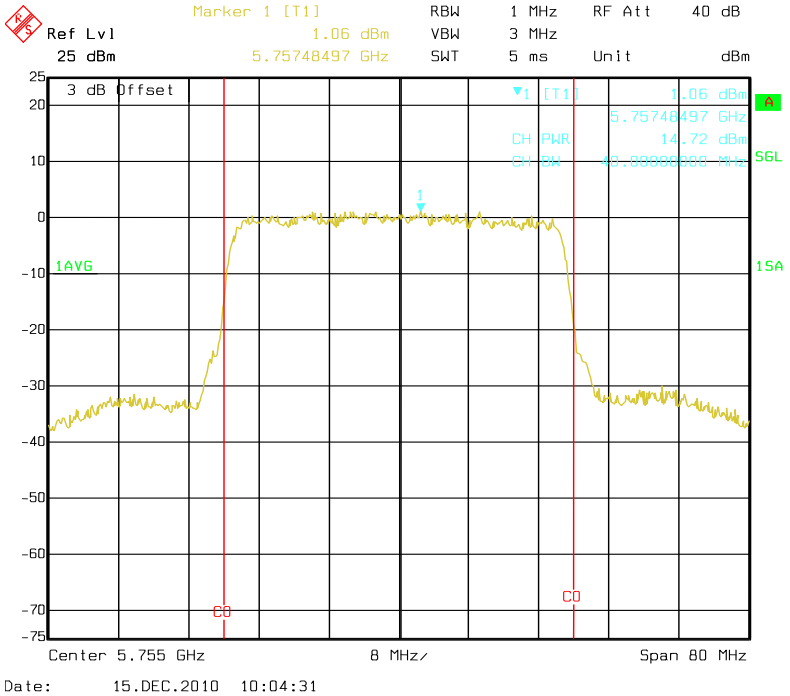
Test Mode: Transmitting

Test Result: Pass

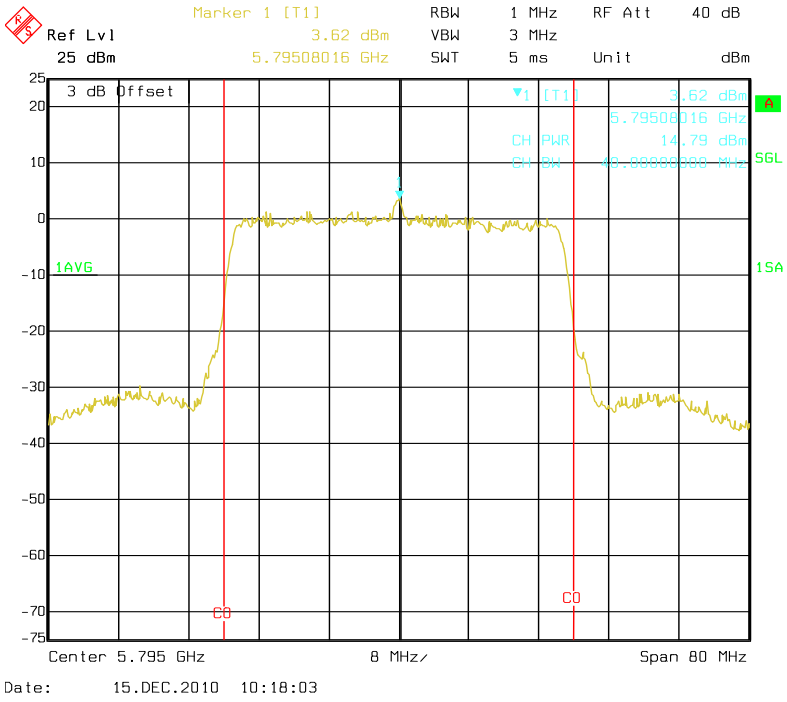
Please refer to the following tables and plots.

Frequency Band (MHz)	Frequency (MHz)	Reading Power		Limit (mW)
		(dBm)	(mW)	
5725-5825	5755	14.72	29.648	1000
	5795	14.79	30.130	1000

5755 MHz



5795 MHz


Marker 1 [T1]
Ref Lvl
25 dBm
3.62 dBm
5.79508016 GHz
RBW 1 MHz
VBW 3 MHz
SWT 5 ms
RF Att 40 dB
Unit dBm
3 dB Offset
1 [T1] 3.62 dBm
5.79508016 GHz
CH PWR 14.79 dBm
CW BW 40.000000000 MHz
A
SGL
1AVG
1SA
25
20
10
0
-10
-20
-30
-40
-50
-60
-70
-75
C0
C0
Center 5.795 GHz
8 MHz/
Span 80 MHz
Date: 15.DEC.2010 10:18:03

FCC §15.407(a) (3),(5) - POWER SPECTRAL DENSITY

Applicable Standard

For the band 5.725–5.825 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 1 W or 17 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 17 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain up to 23 dBi without any corresponding reduction in the transmitter peak output power or peak power spectral density. For fixed, point-to-point U-NII transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in peak transmitter power and peak power spectral density for each 1 dB of antenna gain in excess of 23 dBi would be required. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations

The peak power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A resolution bandwidth less than the measurement bandwidth can be used, provided that the measured power is integrated to show total power over the measurement bandwidth. If the resolution bandwidth is approximately equal to the measurement bandwidth, and much less than the emission bandwidth of the equipment under test, the measured results shall be corrected to account for any difference between the resolution bandwidth of the test instrument and its actual noise bandwidth.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2010-07-08	2011-07-08

*** 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

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 was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Use sample detector and power averaging (not video averaging) mode. Set RBW= 1 MHz*, VBW > 1 MHz. The PPSD is the highest level found across the emission in any 1-MHz band after 100 sweeps of averaging. This method is permitted only if the transmission pulse or sequence of pulses remains at maximum transmits power throughout each of the 100 sweeps of averaging and that the interval between pulses is not included in any of the sweeps.
4. Repeat above procedures until all frequencies measured were complete.

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The testing was performed by Felix Li on 2010-12-15.

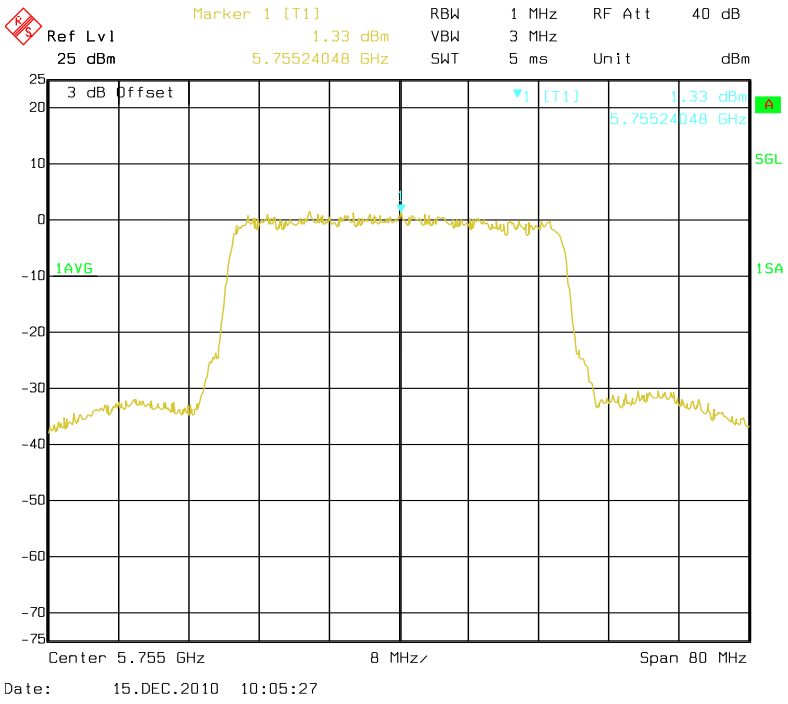
Test Mode: Transmitting

Test Result: Pass

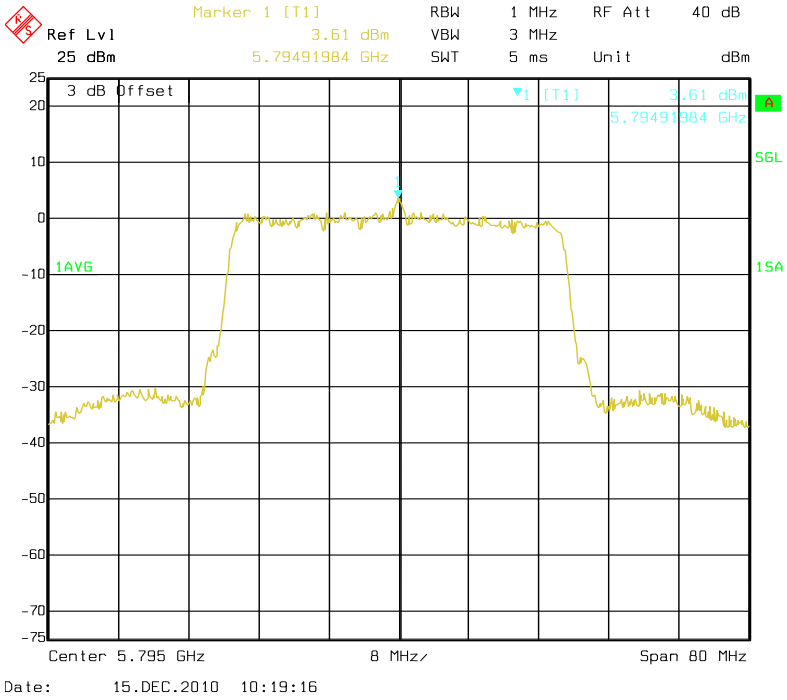
Please refer to the following tables and plots.

Frequency Band (MHz)	Frequency (MHz)	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)
5725-5825	5755	1.33	17
	5795	3.61	17

5755 MHz



5795 MHz


Marker 1 [T1]
RBW 1 MHz
RF Att 40 dB
Ref Lvl
3.61 dBm
VBW 3 MHz
25 dBm
5.79491984 GHz
SWT 5 ms
Unit dBm
3 dB Offset
1 [T1] 3.61 dBm
5.79491984 GHz
SGL
1AVG
1SA
25
20
10
0
-10
-20
-30
-40
-50
-60
-70
-75
Center 5.795 GHz
8 MHz/
Span 80 MHz
Date: 15.DEC.2010 10:19:16

FCC §15.407(a) (6) – PEAK EXCURSION RATIO

Applicable Standard

According to §15.407(a) (6), the ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

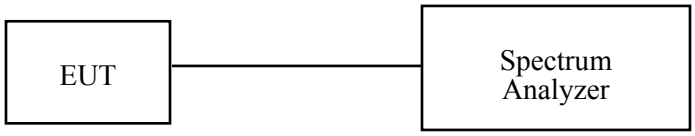
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2010-07-08	2011-07-08

*** 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

Set the spectrum analyzer span to view the entire emission bandwidth.
The largest difference between the following two traces must be ≤ 13 dB for all frequencies across the emission bandwidth. Submit a plot.
1st Trace:
• Set RBW = 1 MHz, VBW ≥ 3 MHz with peak detector and maxhold settings.
2nd Trace:
• create the 2nd trace using the settings described in Method #1.



Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The testing was performed by Felix Li on 2010-12-15.

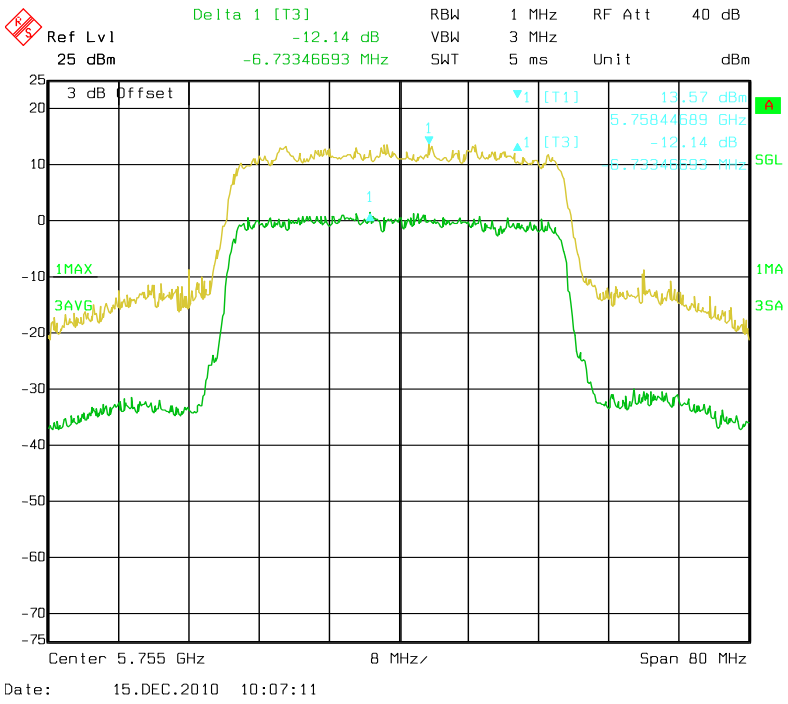
Test Mode: Transmitting

Test Result: Pass

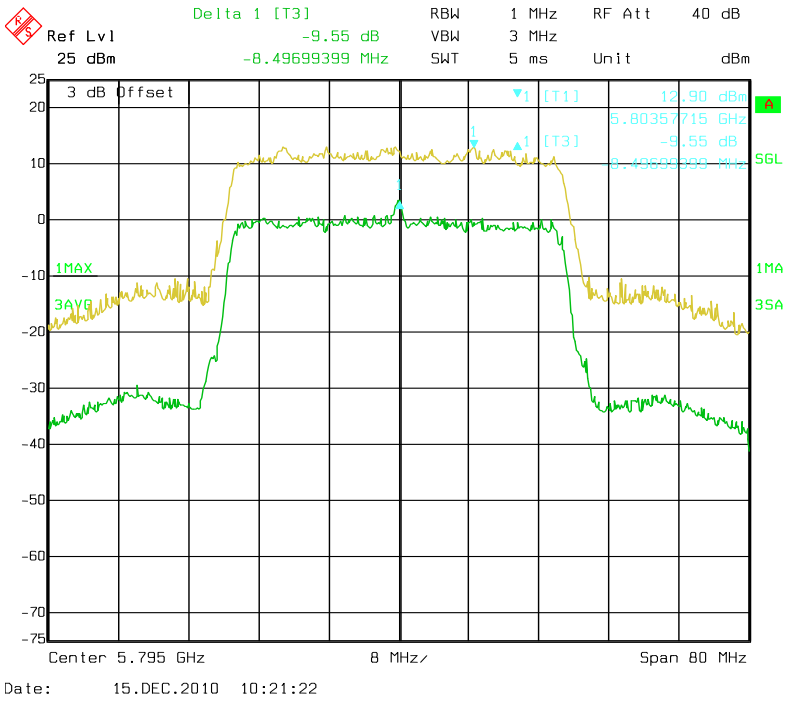
Please refer to the following tables and plots.

Frequency Band (MHz)	Frequency (MHz)	Peak Excursion Ratio (dB)	Limit (dB)
5725-5825	5755	12.14	13
	5795	9.55	13

5755 MHz



5795 MHz


Delta 1 [T3]
RBW 1 MHz
RF Att 40 dB
Ref Lvl
-9.55 dB
VBW 3 MHz
25 dBm
-8.49699399 MHz
SWT 5 ms
Unit dBm
3 dB Offset
1 [T1] 12.90 dBm
5.80357715 GHz
1 [T3] -9.55 dB
-8.49699399 MHz
A
SGL
1MAX
1MA
AVG
3SA
25
20
10
0
-10
-20
-30
-40
-50
-60
-70
-75
Center 5.795 GHz
8 MHz/
Span 80 MHz
Date: 15.DEC.2010 10:21:22

FCC §407(g) - FREQUENCY STABILITY

Applicable Standards

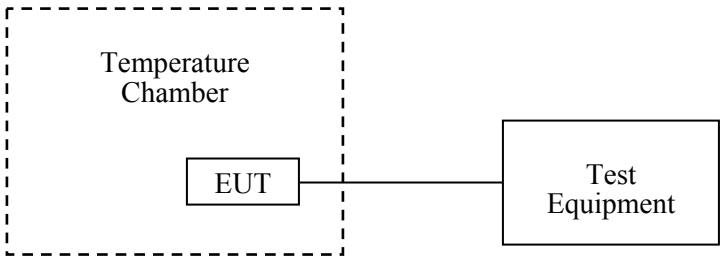
FCC §407(g), manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external AC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The AC 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 communication test set.

Frequency Stability vs. Voltage: An external variable AC power supply was connected to the adaptor terminals of the equipment under test. The voltage was set to 80% and 115% of the nominal value and was then decreased until the transmitter light no longer illuminated. The output frequency was recorded for each voltage.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
WUHUAN	Temperature & Humidity Chamber	HTP205	20021115	2010-06-04	2011-06-03
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2010-07-08	2011-07-08

*** 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 Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The testing was performed by Felix Li on 2010-12-20.

Test Mode: Transmitting

Frequency Band (MHz)	Frequency (MHz)	Temperature (^{O}C)	Power Supply (V_{AC})	Measurement Frequency (MHz)
5725-5825	5755	55	138	5754.95781
			120	5755.04335
			102	5755.05756
		25	138	5754.99756
			120	5755.05012
			102	5755.05033
		-10	138	5754.98588
			120	5755.04010
			102	5755.05256
	5795	55	138	5794.98792
			120	5795.05035
			102	5795.05578
		25	138	5794.98931
			120	5795.05452
			102	5795.00534
		-10	138	5794.97562
			120	5795.03576
			102	5795.05457

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