Lab Code: 200707-0

FCC PART 15.407

TEST REPORT

For

Voyetra Turtle Beach, Inc.

50 Clearbrook Rd., Suite 162, Elmsford, New York 10523, USA

FCC ID: XGB-TB2276

Report Type:	Product Type:
Original Report	Portable Wi-Fi & Bluetooth Radio Transceiver

Test Engineer:	Felix Li
Report Number:	R1DG120114002-00C
Report Date:	2012-03-07
Reviewed By:	Alvin Huang EMC Engineer
Test Laboratory:	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 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Voyetra Turtle Beach, Inc.*'s product, model number: *TB300-2276-01(FCC ID: XGB-TB2276)* ("EUT") in this report was a *Portable Wi-Fi & Bluetooth Radio Transceiver, named as EAR FORCE XP400 RX*, which was measured approximately: 18.0 cm (L) x 21.0 cm (W) x 10.0 cm (H), rated input voltage: DC 3.7V battery.

Specification	
Frequency Range	5150~5250 MHz
Operation Channel	CH36: 5180 MHz, CH40: 5200 MHz CH44: 5220 MHz, CH48: 5240 MHz
Channel Seperation	20 MHz
Antennas(soldered on the PCB)	1.5 dBi
RF Output Power	< 10 dBm
Modulation	OFDM

** All measurement and test data in this report was gathered from production sample serial number: 1201142 (Assigned by Shenzhen BACL). The EUT was received on 2012-01-14.*

Objective

This report is prepared on behalf of *Voyetra Turtle Beach, Inc.* 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 the compliance of the EUT with FCC Part 15-Subpart C, section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

15.247 DSS and 15.247 DTS submissions with ID: XGB-TB2276
Transmitter parts submission with ID: XGB-TB2271

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 on 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 an ISO/IEC 17025 accredited laboratory, and is accredited by 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.

The EUT transmit at antenna 0(Chain 0) and antenna 1(Chain 1) individually. And the two RF ports of the circuit are the same; we select antenna 0 port to test.

EUT Exercise Software

Test software: ActivePerl 5.4.810 & bluetooth software

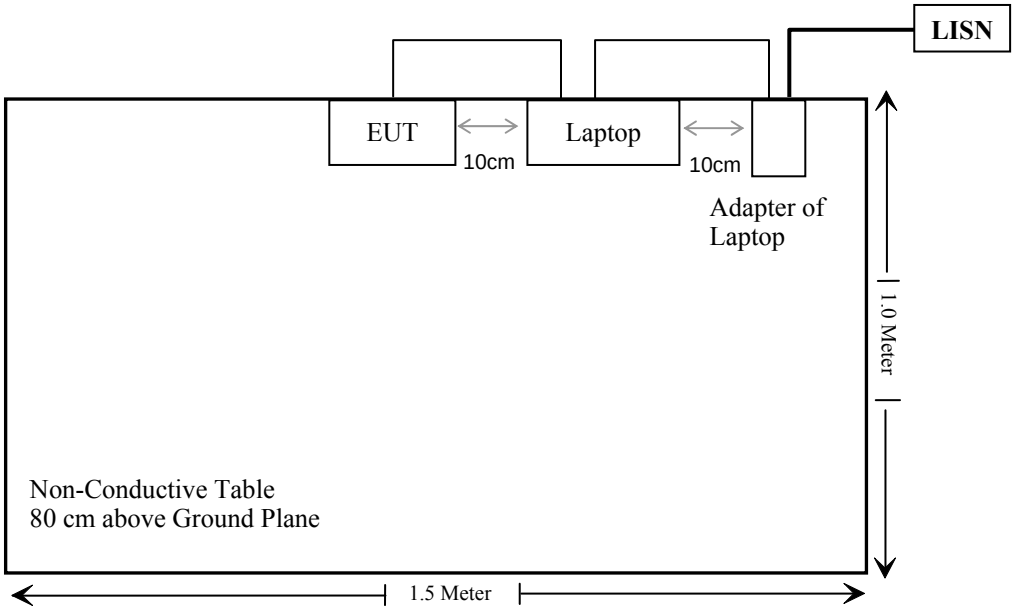
Equipment Modifications

No modification was made to the EUT tested.

Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
IBM	Laptop	T40	N/A

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§2.1093, §15.407(f)	RF Exposure	Compliance
§15.407, §15.203	Antenna Requirement	Compliance
§15.407(b)(6)& §15.207(a)	AC Line Conducted Emissions	Compliance
§15.205& §15.209 &§15.407(b) (1),(6),(7)	Undesirable Emission& Restricted Bands	Compliance
§15.407(a) (1)	26 dB Bandwidth	Compliance
§15.407(a)(1),	Conducted Transmitter Output Power	Compliance
§15.407 (a)(1),(5)	Power Spectral Density	Compliance
§15.407(a)(6)	Peak Excursion Ratio	Compliance
§15.407(g)	Frequency Stability	Compliance

FCC §15.407(f) & §2.1093 - RF EXPOSURE

Applicable Standard

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

According to KDB 447498 D01 Mobile Portable RF Exposure v03r03, no SAR required if power is lower than the flowing threshold:

When routine evaluation is required for SAR and the output power is ≤ 60/f(GHz) mW, the test reduction and test exclusion procedures given herein, or in KDB 616217 or KDB 648474, are applicable.

A device may be used in portable exposure conditions with no restrictions on host platforms when either the source-based time-averaged output power is ≤ 60/f(GHz) mW or all measured 1-g SAR are < 0.4 W/kg.10 When SAR evaluation is required, the most conservative exposure conditions for all expected operating configurations must be tested.

Measurement Result:

Average output power at antenna port: 6.66 dBm

Antenna Gain: 1.5 dBi

EIRP = 6.66 + 1.5 = 8.16 dBm = 6.55 mW

SAR exclusion threshold: $60/f_{GHz}$ = 60/5.18 = 11.58 mW

The SAR measurement is not necessary.

FCC §15.203 – ANTENNA REQUIREMENT

Applicable Standard

According to FCC §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.

According to § 15.407, 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.

Antenna Connector Construction

The EUT has two patch ceramic antennas on the PCB, which in accordance to section 15.203, the maximum gain is 1.5 dBi; please refer to the internal photos.

Result: Compliance.

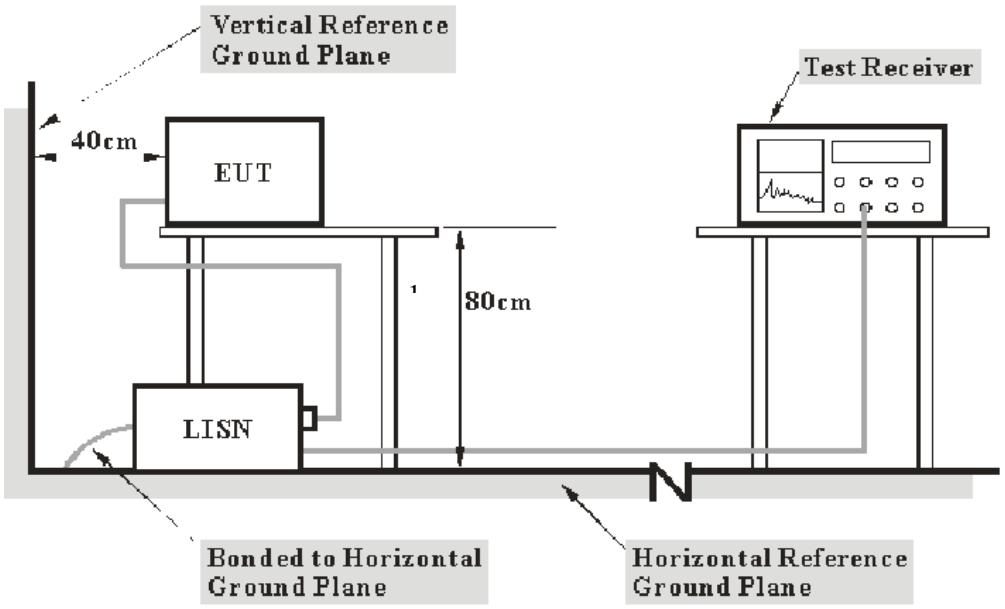
FCC §15.207 – AC LINE CONDUCTED EMISSIONS

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 CISPR 16-4-4, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is 2.4 dB (k=2, 95% level of confidence).

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 15.207 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 of laptop was connected to an AC 120V/50 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 Procedure

During the conducted emission test, the adapter of laptop was connected to the outlet of 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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	830245/006	2011-03-03	2012-03-02
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2011-03-09	2012-03-08
Rohde & Schwarz	Pulse limiter	ESH3Z2	DE25985	2011-07-08	2012-07-07

*** 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 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:

8.75 dB at **8.845 MHz** in the **Line** conducted mode.

Test Data

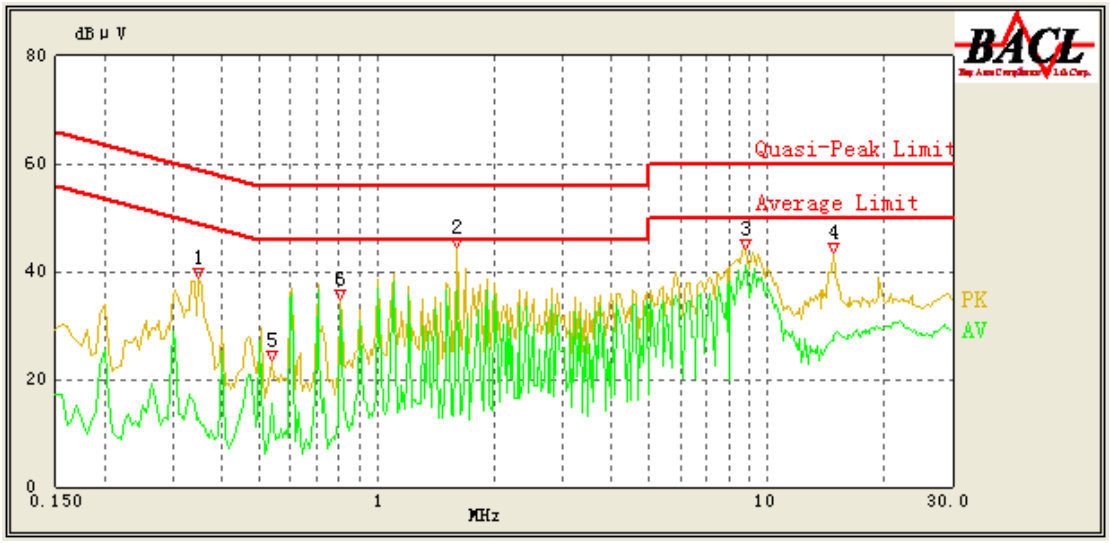
Environmental Conditions

Temperature:	20 ° C
Relative Humidity:	48 %
ATM Pressure:	100.0 kPa

The testing was performed by Felix li on 2012-02-01.

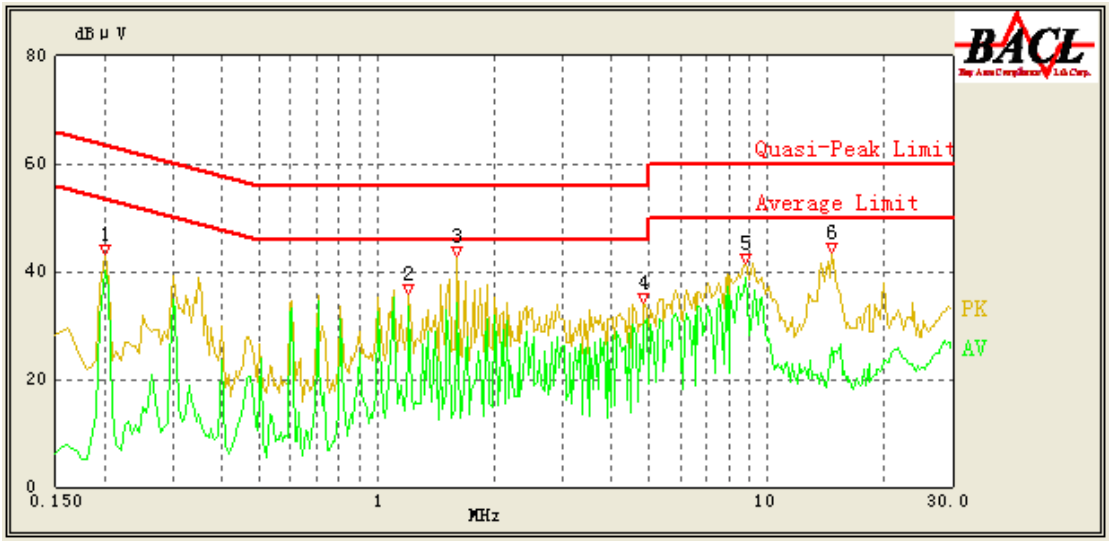
EUT Operation Mode: Charging &Transmitting

AC 120V/60 Hz, Line



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/ QP/Ave.)
8.845	41.25	10.10	50.00	8.75	Ave.
1.610	36.61	10.10	46.00	9.39	Ave.
0.805	32.96	10.10	46.00	13.04	Ave.
1.610	42.79	10.10	56.00	13.21	QP
8.845	41.32	10.10	60.00	18.68	QP
0.805	33.60	10.10	56.00	22.40	QP
14.770	27.25	10.10	50.00	22.75	Ave.
14.815	29.89	10.10	60.00	30.11	QP
0.540	15.38	10.10	46.00	30.62	Ave.
0.350	25.09	10.10	60.29	35.20	QP
0.350	12.76	10.10	50.29	37.53	Ave.
0.540	17.75	10.10	56.00	38.25	QP

AC 120V/60 Hz, Neutral



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/ QP/Ave.)
8.845	38.79	10.10	50.00	11.21	Ave.
1.610	34.26	10.10	46.00	11.74	Ave.
1.205	33.41	10.10	46.00	12.59	Ave.
0.200	40.33	10.10	54.57	14.24	Ave.
1.610	39.86	10.10	56.00	16.14	QP
4.825	29.72	10.10	46.00	16.28	Ave.
8.845	38.58	10.10	60.00	21.42	QP
1.205	33.33	10.10	56.00	22.67	QP
0.200	40.91	10.10	64.57	23.66	QP
4.825	30.73	10.10	56.00	25.27	QP
14.865	23.32	10.10	50.00	26.68	Ave.
14.745	28.91	10.10	60.00	31.09	QP

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

Applicable Standard

FCC §15.407 (b) (1), (6), (7); §15.209; §15.205;

For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz.

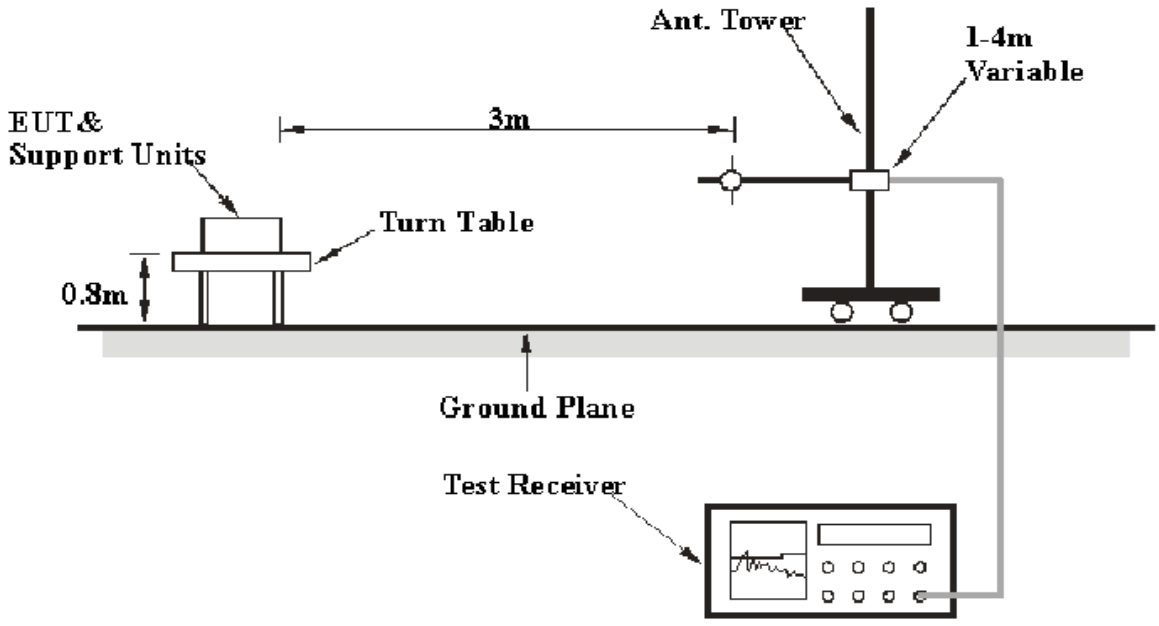
Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

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 CISPR 16-4-4, 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 of laptop was connected to a 120 VAC/60 Hz power source,

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 40 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***	***Detector***
30 MHz – 1000 MHz	100 kHz	300 kHz	QP
1000 MHz – 40 GHz	1 MHz	3 MHz	PK
1000 MHz – 40 GHz	1 MHz	10 Hz	Ave.

Test Procedure

During the radiated emission test, the adapter of laptop 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.

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

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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	HP8447D	2944A09795	2011-08-02	2012-08-01
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2011-11-11	2012-11-10
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2011-07-05	2012-07-04
Mini-circuits	Amplifier	ZVA-213+	T-E27H	2011-03-08	2012-03-07
Sunol Sciences	Horn Antenna	DRH-118	A052604	2011-05-05	2012-05-04
Rohde & Schwarz	Signal Analyzer	FSIQ 26	609358	2011-07-08	2012-07-07
Electro-Mechanics	Horn antenna	3116	9510-2270	2011-10-11	2012-11-10
HP	Spectrum Analyzer	8593A	51475684	2011-07-08	2012-07-07
Electro-Mechanics	Horn antenna	3116	9510-2270	2011-10-11	2012-11-10

*** 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 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:

9.83 dB at **10481 MHz** in the **Vertical** polarization

Test Data

Environmental Conditions

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

The testing was performed by Felix Li on 2012-01-30.

1): Test Mode: Wi-Fi Transmitting (worst data as below)

30 MHz - 40 GHz:

Indicated		Detector PK/QP/Ave.	Table Angle Degree	Antenna		Correction Factor			FCC Part 15.407/15.205/15.209			
Frequency (MHz)	Receiver 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 (5180 MHz)												
10360	43.39	PK	115	1.6	V	38.4	6.38	26.23	61.94	74	12.06	harmonic
10360	23.24	Ave.	115	1.6	V	38.4	6.38	26.23	41.79	54	12.21	harmonic
10360	22.03	Ave.	125	1.6	H	38.4	6.38	26.23	40.58	54	13.42	harmonic
10360	42.00	PK	125	1.6	H	38.4	6.38	26.23	60.55	74	13.45	harmonic
Middle channel (5200 MHz)												
10400	45.35	PK	125	1.3	V	38.4	6.40	26.23	63.92	74	10.08	harmonic
10400	44.35	PK	22	1.2	H	38.4	6.40	26.23	62.92	74	11.08	harmonic
10400	23.42	Ave.	125	1.3	V	38.4	6.40	26.23	41.99	54	12.01	harmonic
10400	23.25	Ave.	22	1.2	H	38.4	6.40	26.23	41.82	54	12.18	harmonic
High channel (5240 MHz)												
10481	45.62	PK	125	1.8	V	38.4	6.38	26.23	64.17	74	9.83	harmonic
10481	44.37	PK	250	1.8	H	38.4	6.38	26.23	62.92	74	11.08	harmonic
10481	23.61	Ave.	125	1.8	V	38.4	6.38	26.23	42.16	54	11.84	harmonic
10481	23.54	Ave.	250	1.8	H	38.4	6.38	26.23	42.09	54	11.91	harmonic
5398	48.25	PK	110	1.3	V	35.4	4.3	27.51	60.44	74	13.56	spurious
5398	46.82	PK	130	1.4	H	36.3	4.3	27.51	59.91	74	14.09	spurious
5398	24.95	Ave.	130	1.4	H	36.3	4.3	27.51	38.04	54	15.96	spurious
5398	24.81	Ave.	110	1.3	V	35.4	4.3	27.51	37.00	54	17.00	spurious

2): Wi-Fi transmits simultaneously with Bluetooth-worst data as below)

30 MHz - 40 GHz:

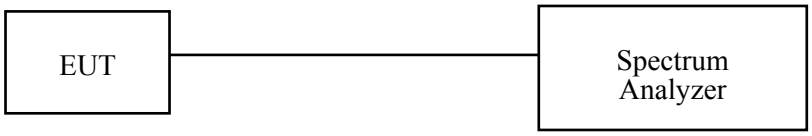
Indicated		Detector PK/QP/Ave.	Table Angle Degree	Antenna		Correction Factor			FCC Part 15.407/15.205/15.209			
Frequency (MHz)	Receiver Reading (dBμV)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Comment
10360.00	43.26	PK	157	1.7	V	38.4	6.38	26.23	61.81	74	12.19	Harmonic
10360.00	22.35	Ave.	54	1.5	H	38.4	6.38	26.23	40.9	54	13.1	Harmonic
10360.00	42.26	PK	54	1.5	H	38.4	6.38	26.23	60.81	74	13.19	Harmonic
10360.00	22.24	Ave.	157	1.7	V	38.4	6.38	26.23	40.79	54	13.21	Harmonic
4882.00	46.30	PK	214	1.5	V	35.4	3.97	26.78	58.89	74	15.11	Harmonic
4882.00	44.59	PK	125	1.5	H	36.3	3.97	26.78	58.08	74	15.92	Harmonic
4991.98	44.48	PK	354	1.4	V	35.4	3.97	26.78	57.07	74	16.93	Spurious
4991.98	43.25	PK	224	1.6	H	36.5	3.97	26.76	56.96	74	17.04	Spurious
4882.00	21.95	Ave.	125	1.5	H	36.3	3.97	26.78	35.44	54	18.56	Harmonic
5328.66	41.66	PK	236	1.6	V	36.3	4.3	27.51	54.75	74	19.25	Spurious
4991.98	21.03	Ave.	224	1.6	H	36.5	3.97	26.76	34.74	54	19.26	Spurious
4882.00	22.15	Ave.	214	1.5	V	35.4	3.97	26.78	34.74	54	19.26	Harmonic
5328.66	40.63	PK	26	1.5	H	36.8	4.3	27.51	54.22	74	19.78	Spurious
4991.98	21.45	Ave.	354	1.4	V	35.4	3.97	26.78	34.04	54	19.96	Spurious
5328.66	20.17	Ave.	26	1.5	H	36.8	4.3	27.51	33.76	54	20.24	Spurious
5328.66	20.53	Ave.	236	1.6	V	36.3	4.3	27.51	33.62	54	20.38	Spurious

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. Use a combiner combine all the transmit chains (antenna outputs) into a single test point, then 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.

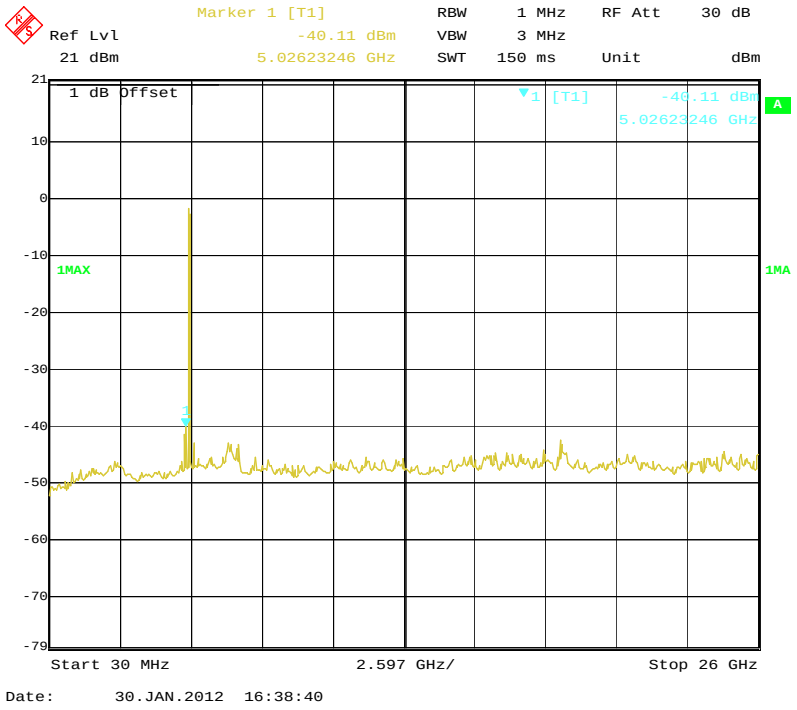
Offset value =attenuation +combiner loss +cable loss



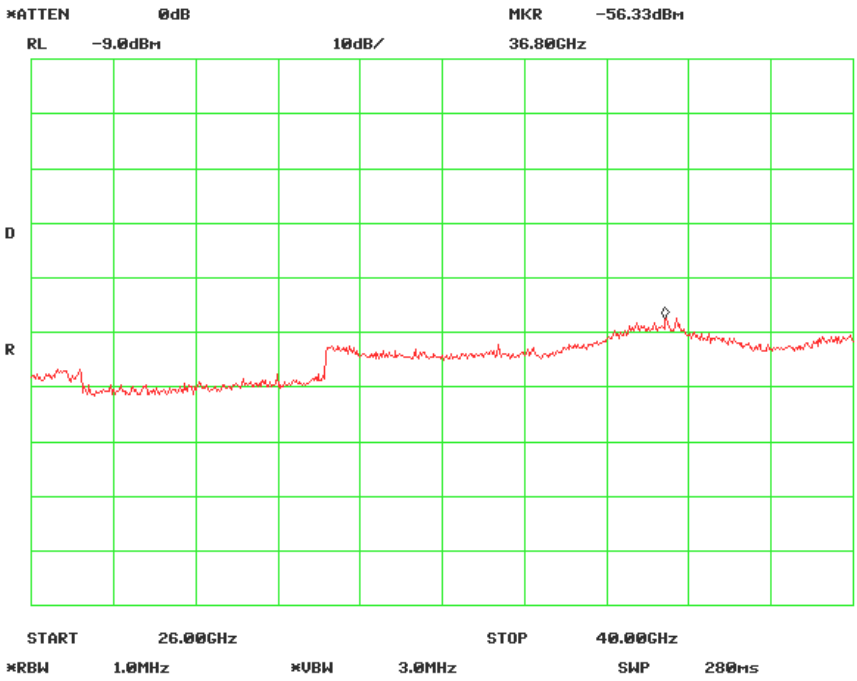
Test data

Channel Frequency (MHz)	Frequency (MHz)	Corrected reading (dB m)	Antenna Gain (dBi)	Calculated Value (ERIP) (dB m)	Limited (dB m)	Margin (dB)
5180	5026.23	-40.11	1.5	-38.61	-27	11.61
5200	5026.23	-41.16	1.5	-39.66	-27	12.66
5240	5026.23	-41.55	1.5	-40.05	-27	13.05

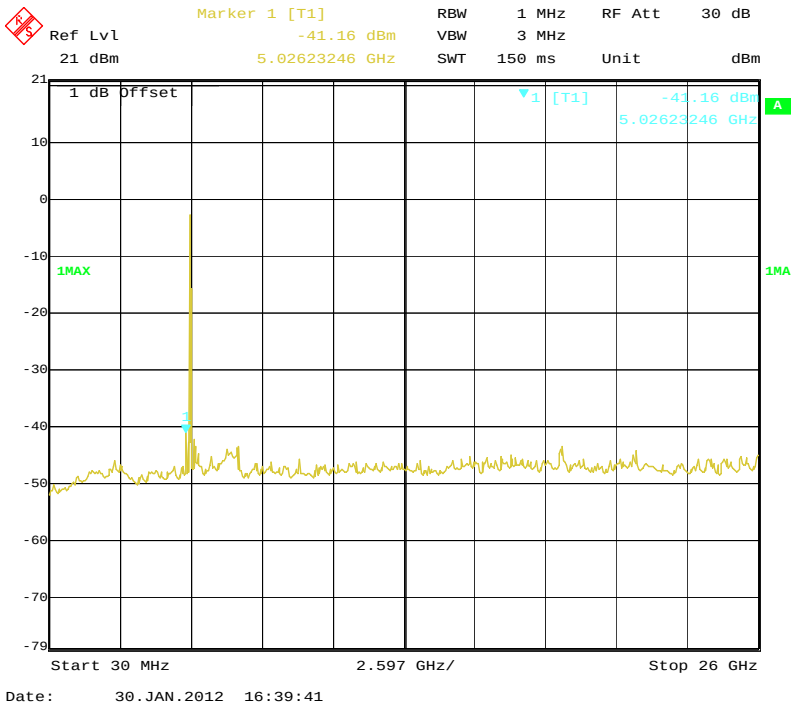
30~26000 MHz at frequency 5180 MHz



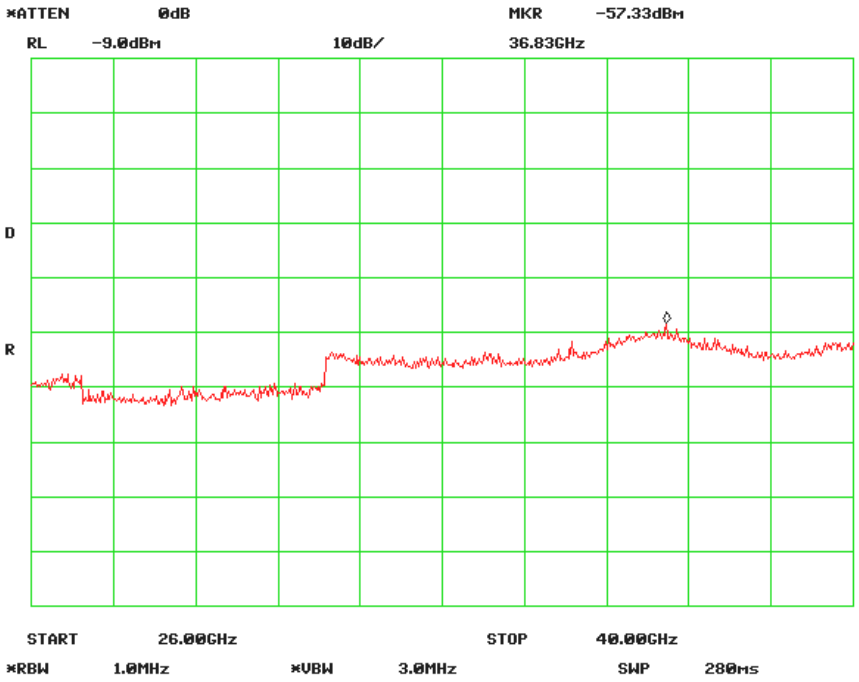
26000~40000 MHz at frequency 5180 MHz



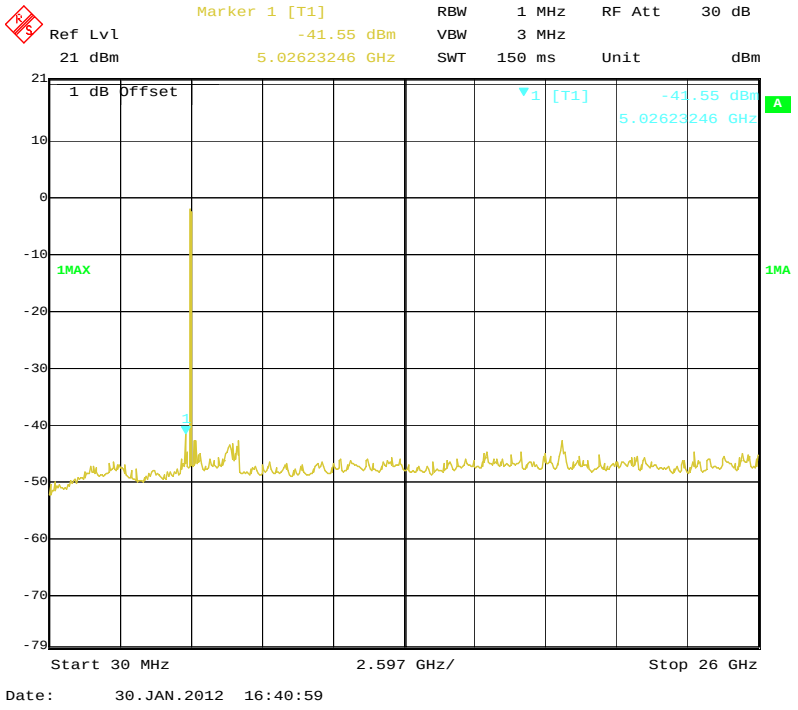
30~26000 MHz at frequency 5200 MHz



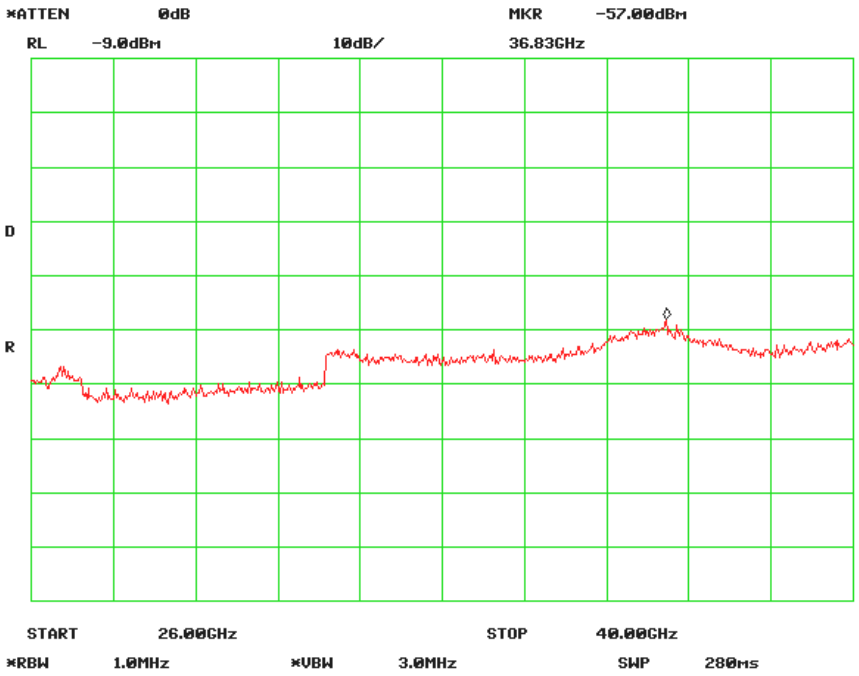
26000~40000 MHz at frequency 5200 MHz



30~26000 MHz at frequency 5240 MHz



26000~40000 MHz at frequency 5240 MHz



FCC §15.407(a) (1) – 26 dB BANDWIDTH

Applicable Standard

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For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 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.

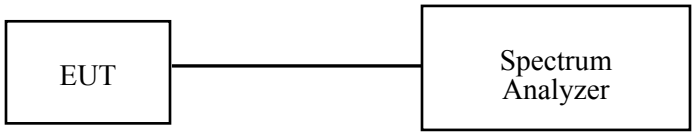
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ 26	609358	2011-07-08	2012-07-07

*** 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

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

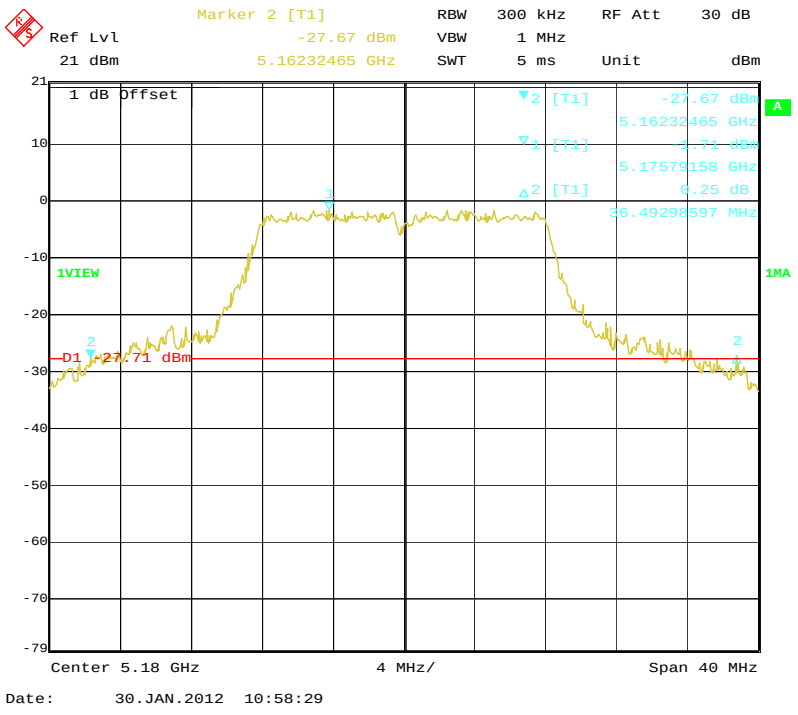
The testing was performed by Felix Li on 2012-01-30

Test Result: Pass.

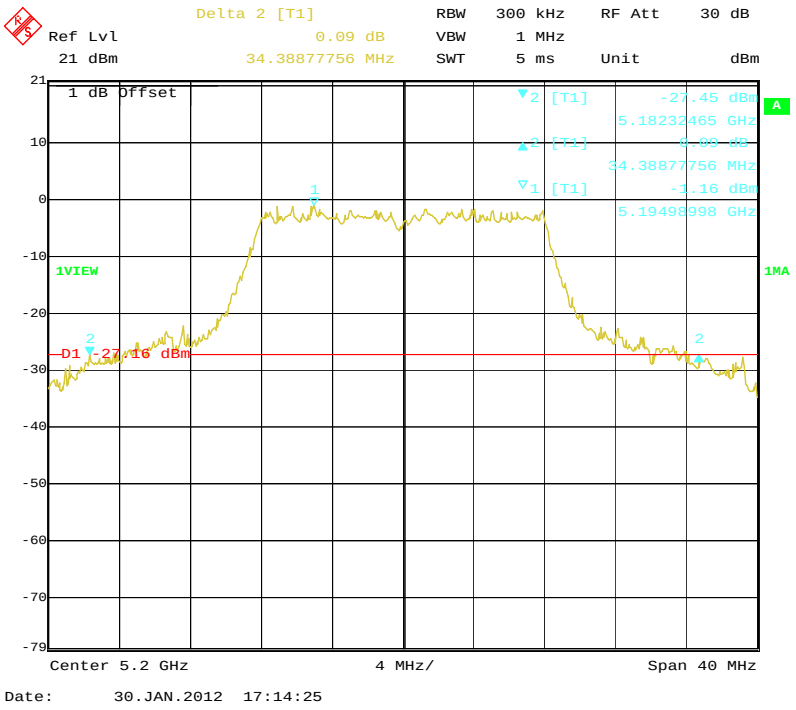
Please refer to the following tables and plots.

Channel Frequency (MHz)	26 dB Bandwidth (MHz)
5180	36.49
5200	34.39
5240	36.39

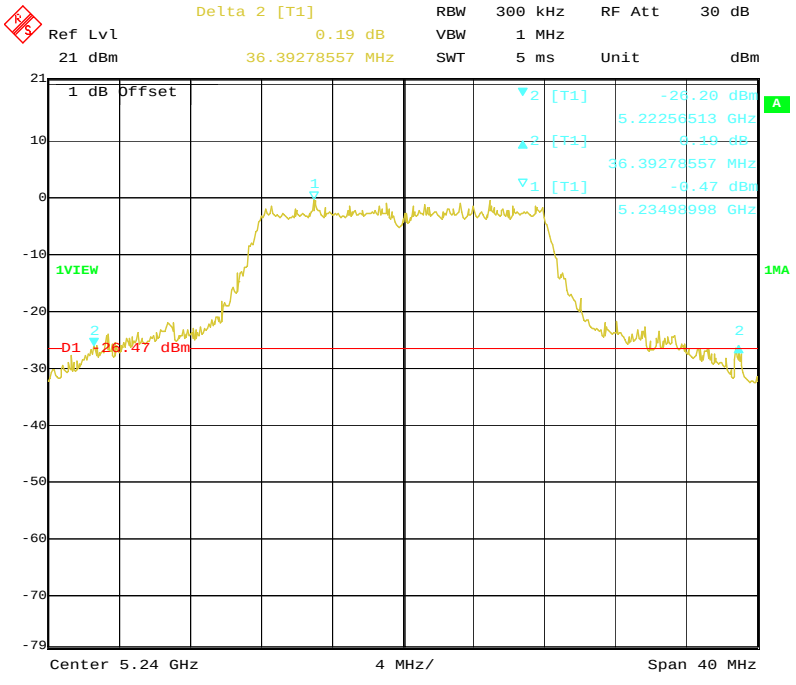
Channel Frequency 5180 MHz



Channel Frequency 5200 MHz



Channel Frequency 5240 MHz



FCC §15.407(a) (1) – CONDUCTED TRANSMITTER OUTPUT POWER

Applicable Standard

For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 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.

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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ 26	609358	2011-07-08	2012-07-07

*** 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 Data

Environmental Conditions

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

The testing was performed by Felix Li on 2012-02-03.

Test Mode: Transmitting

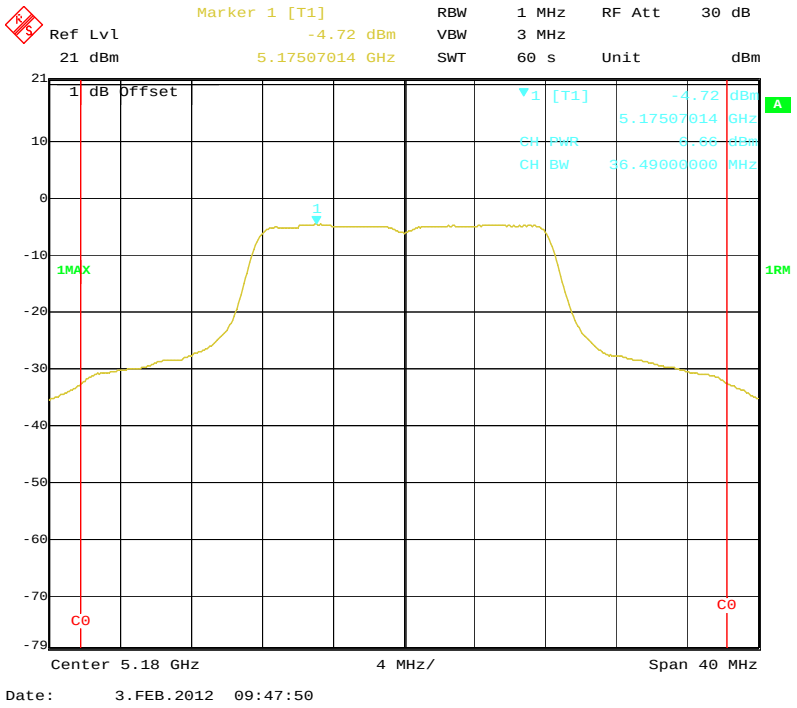
Test Result: Pass

Please refer to the following tables and plots.

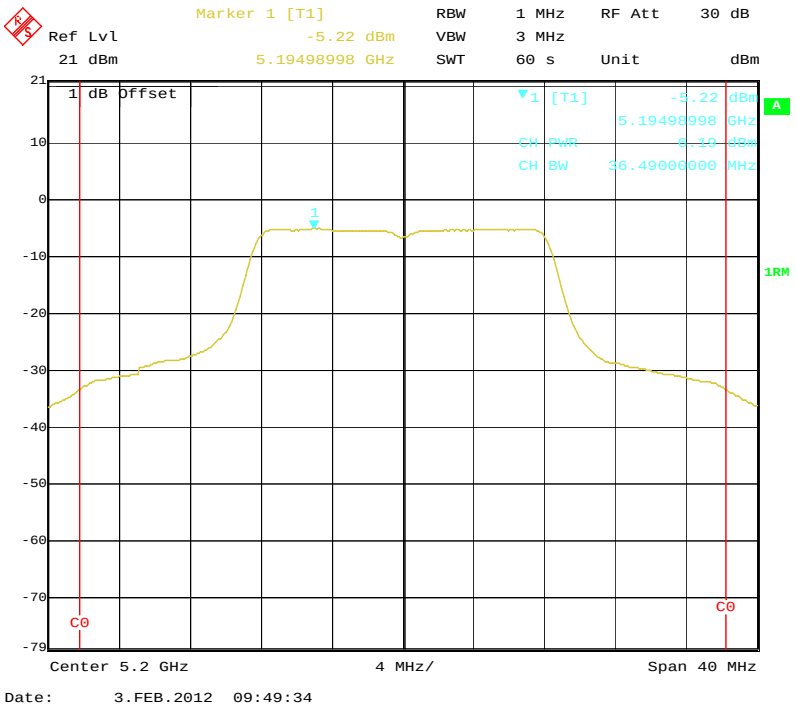
Frequency (MHz)	Ave. Output Power at Ant. Port (dBm)	Max.Output Power at Ant. Port (dBm)	Limit (dBm)
5180	6.66	9.00	17
5200	6.19	8.53	17
5240	6.25	8.59	17

Note: 1. The EUT shall be operated at its maximum power control level with the transmit duration as long as possible
2. The manufacturer declared that the duty cycle (58.33%) as high as possible.
3. 10 log (1/x) =2.34, where x is the duty cycle,x=2.805611/4.769539=0.5833
4. Max.Output Power at Ant.Port= Ave. Output Power at Ant.Port + 10 log (1/x)

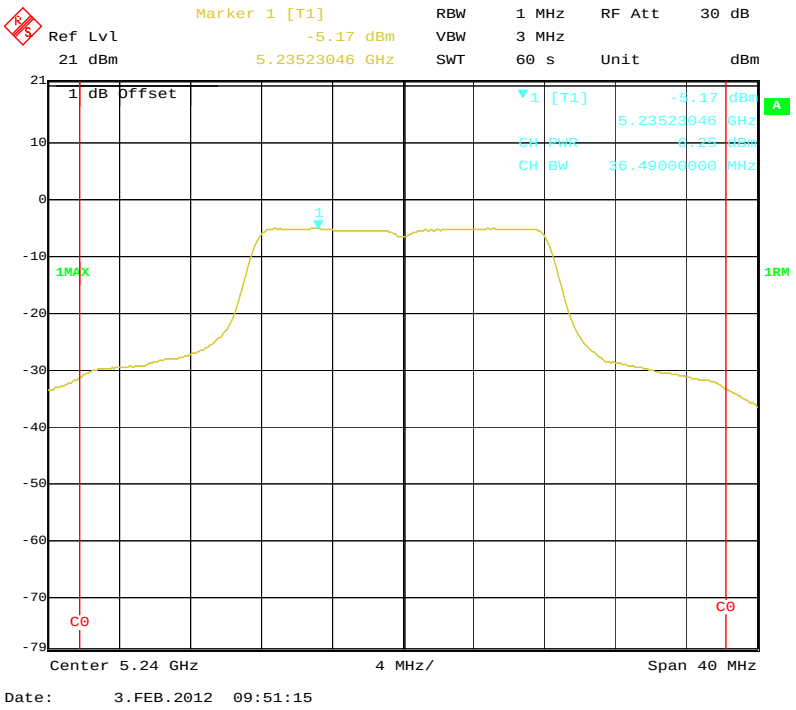
Output Power - 5180 MHz



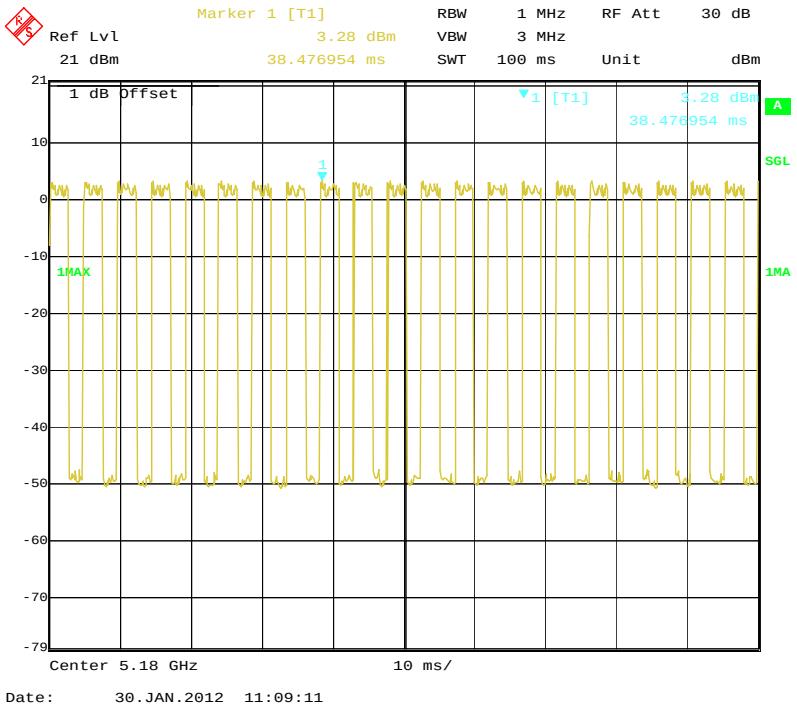
Output Power - 5200 MHz



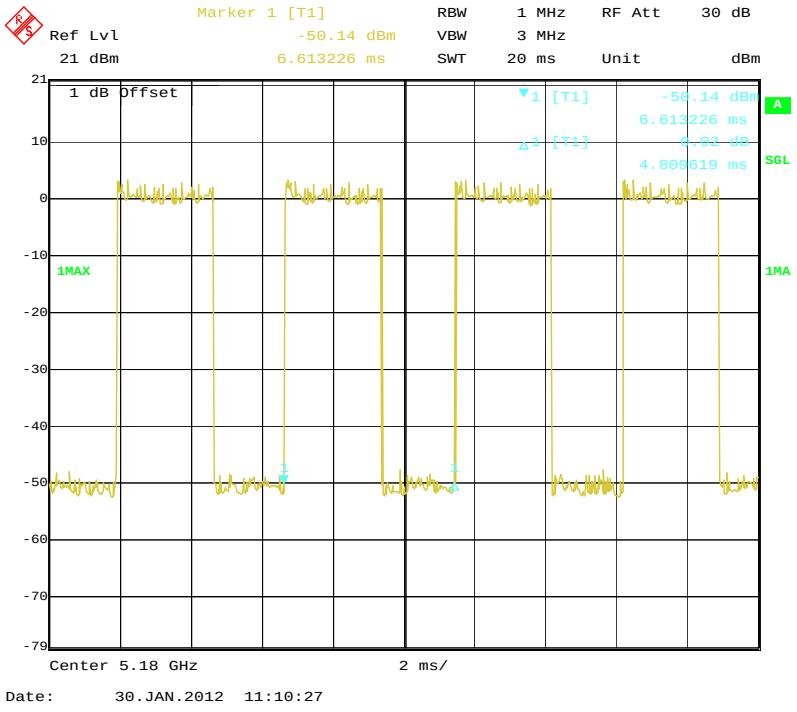
Output Power - 5240 MHz



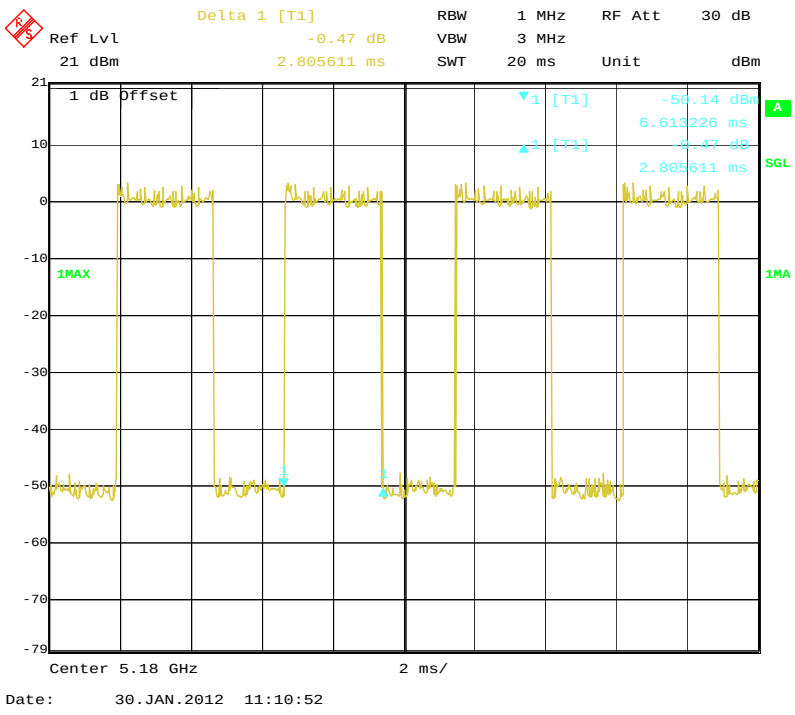
Duty Cycle 1



Duty Cycle 2



Duty Cycle 3


Delta 1 [T1]
RBW 1 MHz
RF Att 30 dB
Ref Lvl
-0.47 dB
VBW 3 MHz
21 dBm
2.805611 ms
SWT 20 ms
Unit dBm
1 dB Offset
1 [T1]
-50.14 dBm
6.613226 ms
1 [T1]
-0.47 dB
2.805611 ms
A
SGL
1MAX
1MA
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
Center 5.18 GHz
2 ms/
Date: 30.JAN.2012 11:10:52

FCC §15.407(a) (1) (5) - POWER SPECTRAL DENSITY

Applicable Standard

For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 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.

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 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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ 26	609358	2011-07-08	2012-07-07

*** 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 Data

Environmental Conditions

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

The testing was performed by Felix Li on 2012-02-03.

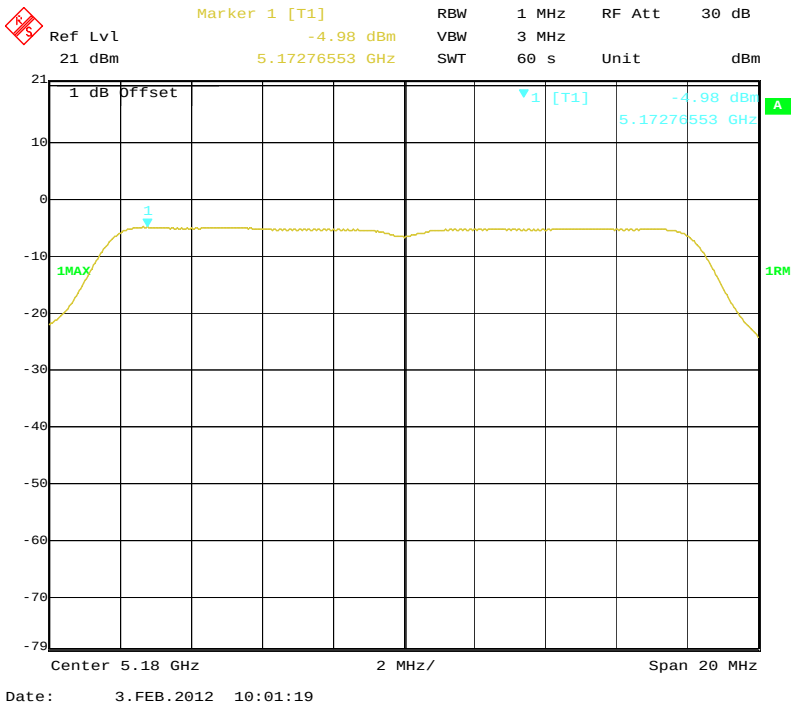
Test Mode: Transmitting

Test Result: Pass

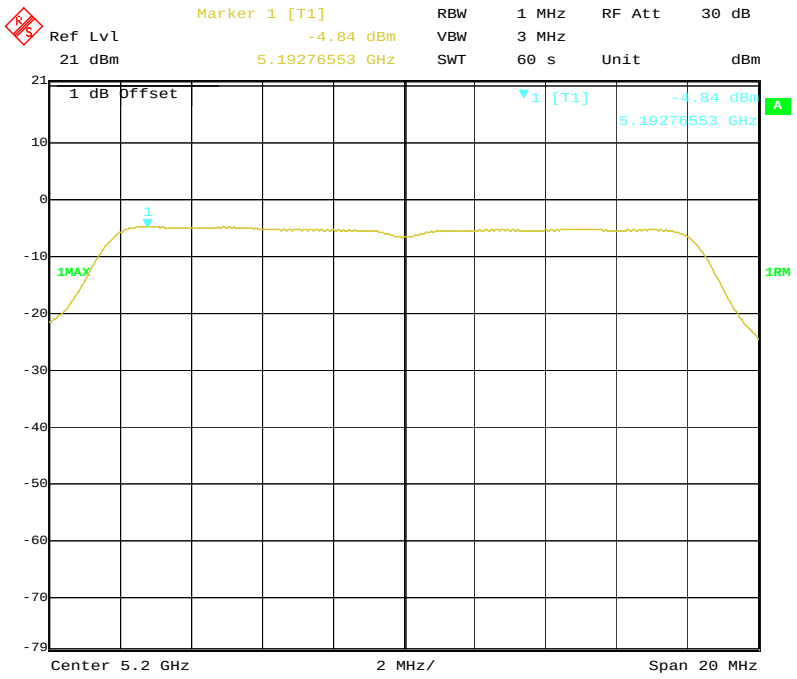
Frequency (MHz)	Power Spectral Density at Ant.Port (dBm/MHz)	Max.Power Spectral Density at Ant.Port (dBm/MHz)	Limit (dBm/MHz)
5180	-4.98	-2.64	4
5200	-4.84	-2.50	4
5240	-5.47	-3.13	4

Note: 1. 10 log (1/x) =2.34, where x is the duty cycle,x=2.805611/4.769539=0.5833.
2. Max. Power Spectral Density at Ant.Port= Power Spectral Density at Ant.Port + 10 log (1/x)

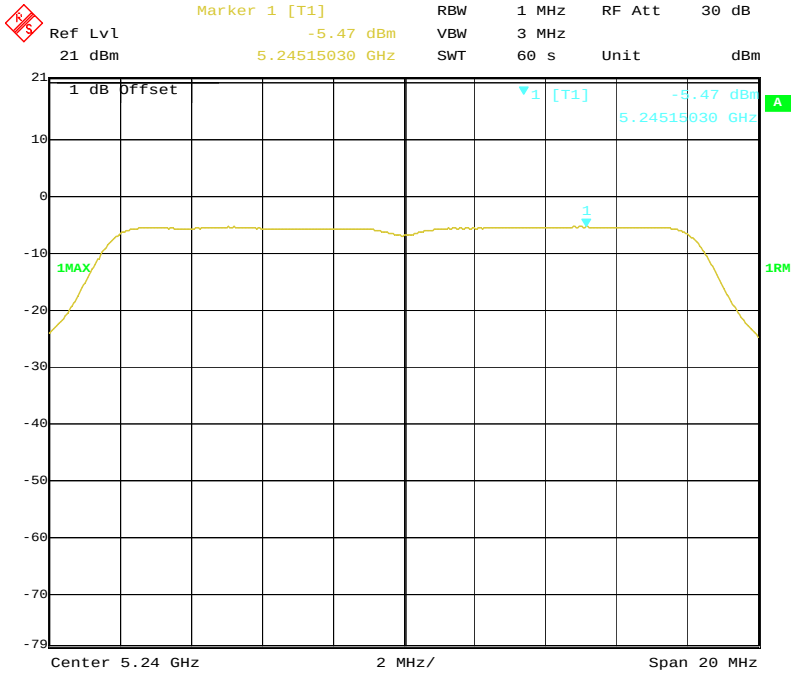
Channel Frequency 5180 MHz



Channel Frequency 5200 MHz



Channel Frequency 5240 MHz



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 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 the setion "FCC §15.407(a)(1)(2) – Conducted Transmitter Output Power".

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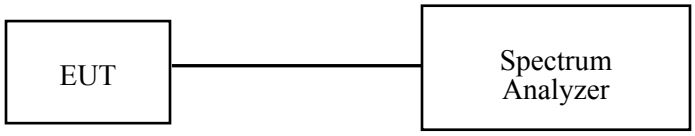


Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ 26	609358	2011-07-08	2012-07-07

*** 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 Data

Environmental Conditions

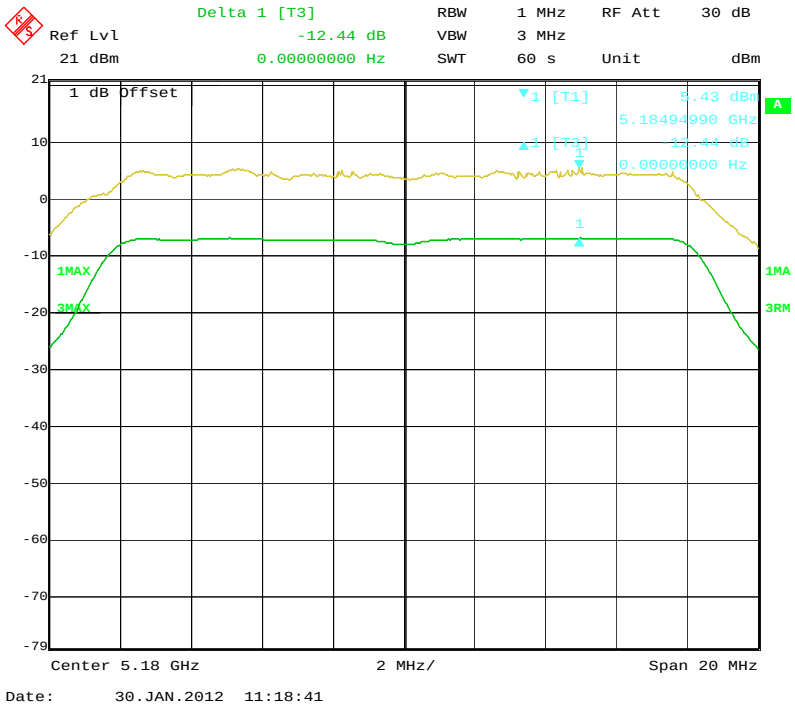
Temperature:	25 ° C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

The testing was performed by Felix Li on 2012-01-30.

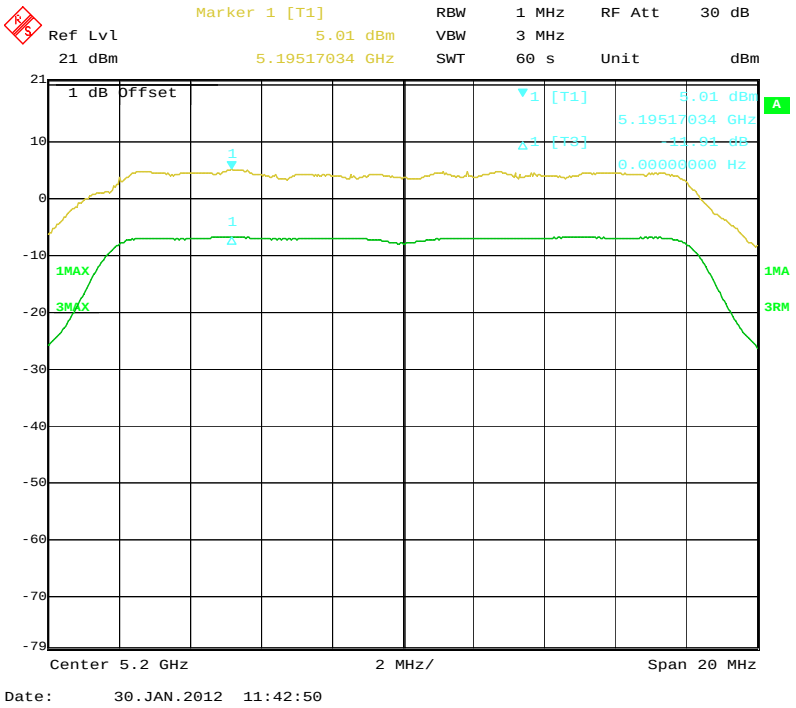
Test Mode: Transmitting

Frequency (MHz)	Peak Excursion Ratio (dB)	Limit (dB)
5180	12.44	13
5200	11.91	13
5240	12.47	13

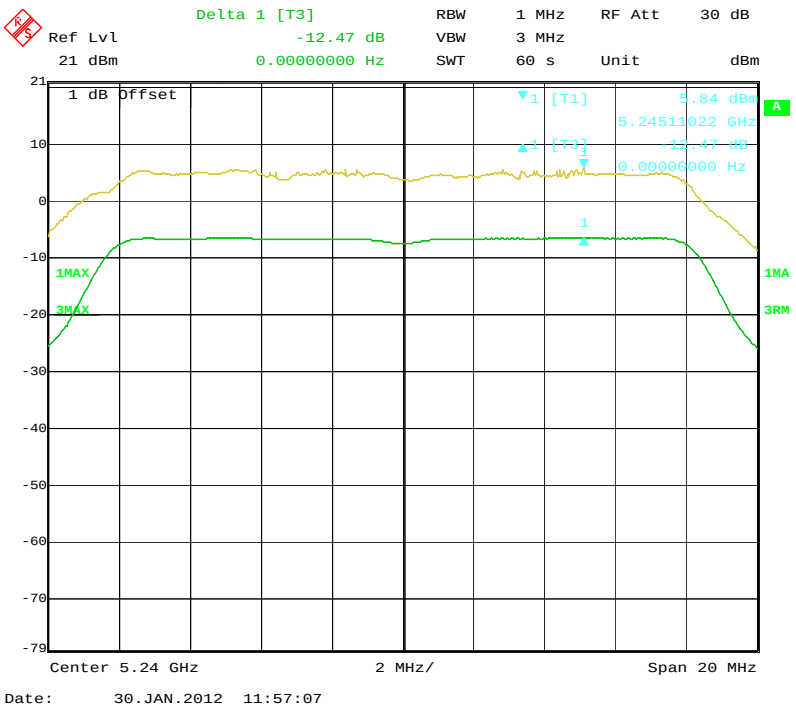
Channel Frequency 5180 MHz



Channel Frequency 5200 MHz



Channel Frequency 5230 MHz



FCC §407(g) - FREQUENCY STABILITY

Applicable Standards

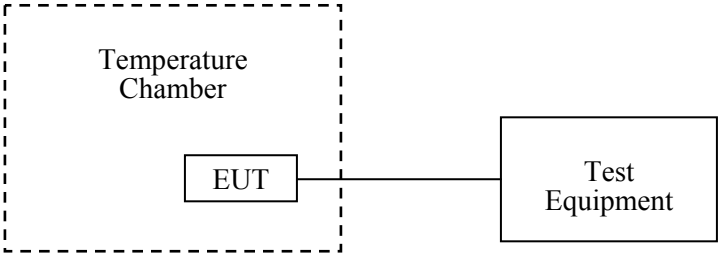
FCC§407(g), manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.

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	2011-06-04	2012-06-03
HP	Microwave frequency counter	5342A	2317A08289	2011-04-22	2012-04-21

*** 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:	100.0 kPa

The testing was performed by Felix Li on 2012-01-30.

Test Mode: Transmitting

Frequency (MHz)	Power supply (V_{DC})	Temperature (^{O}C)	Measurement Frequency (MHz)
5180	3.7	+50	5180.00004
		+40	5180.00022
		+30	5180.00016
		+20	5180.00005
		+10	5180.00003
		0	5180.00014
		-10	5180.00020
		-20	5180.00013
		-30	5180.00014
5200	3.7	+50	5200.00017
		+40	5200.00009
		+30	5200.00010
		+20	5200.00005
		+10	5200.00007
		0	5200.00011
		-10	5200.00003
		-20	5200.00001
		-30	5200.00011
5240	3.7	+50	5240.00012
		+40	5240.00024
		+30	5240.00032
		+20	5240.00028
		+10	5240.00021
		0	5240.00005
		-10	5240.00016
		-20	5240.00020
		-30	5240.00017

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