

FCC PART 15.247

TEST REPORT

For

Voyetra Turtle Beach Inc

100 Summit Lake Drive, Suite 100, Valhalla, New York, United States 10595

FCC ID: XGB-TB2290

Report Type: Original Report	Product Type: EAR FORCE TANGO Wireless LAN CLIENT
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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. (Dongguan).

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Voyetra Turtle Beach Inc's* product, model number: TB300-4290-01 (*FCC ID: XGB-TB2290*) or ("EUT") in this report is an EAR FORCE TANGO Wireless LAN CLIENT, which was measured approximately: 22.0 cm (L) x 18.0 cm (W) x 9.0 cm (H), rated input voltage: DC 3.7V from Lithium battery or DC 5.0V from USB port of system.

Frequency Range:

Bluetooth: 2402-2480 MHz
2.4G wireless: 2462 MHz
5.2G wireless: 5180MHz-5240MHz.

Output Power:

Bluetooth: 3.88dBm
2.4G wireless: 0.02dBm
5.2G wireless: 6.80dBm

Antenna Gain:

Bluetooth: 2.8dBi
2.4G wireless: -6dBi
5.2G wireless: 0.5dBi.

** All measurement and test data in this report was gathered from production sample serial number: 120808001 (Assigned by BACL, Dongguan). The EUT was received on 2012-08-10.*

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 2.4G wireless of EUT compliance with FCC Part 15-Subpart C, section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

FCC Part 15C DSS submissions with FCC ID: *XGB-TB2290* for Bluetooth.
FCC Part 15E NII submissions with FCC ID: *XGB-TB2290* for 5.2G wireless.

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. (Dongguan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

The uncertainty of any RF tests which use conducted method measurement is ± 0.96 dB, the uncertainty of any radiation on emissions measurement is ± 4.0 dB

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) 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 February 02, 2012. 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.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The EUT was configured for testing in an engineering mode which was provided by the manufacturer. For 2.4G band, 1 channel was provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2462	/	/

EUT Exercise Software

Docklight Scripting.exe V1.8

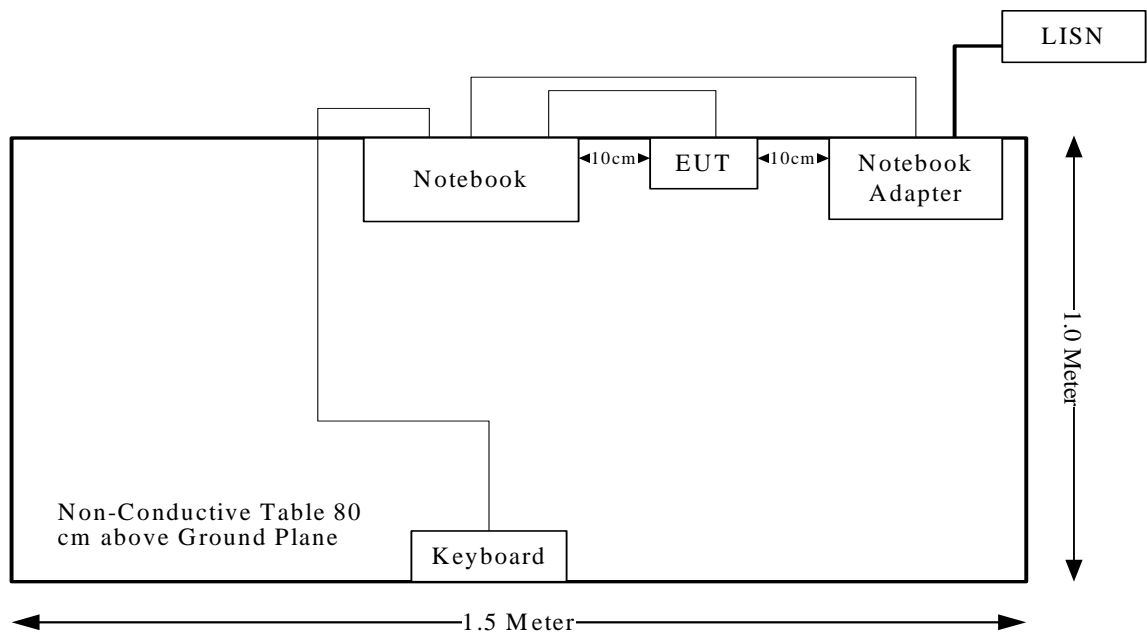
Equipment Modifications

No modification was made to the EUT.

Support Equipment

Manufacturer	Description	Model	Serial Number
Dell	Notebook	PP11L	N/A
DELL	Keyboard	L100	CNORH656658907BL05DC

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §1.1307 (b)(1), §2.1093	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line Conducted Emissions	Compliance
§15.247(d)	Spurious Emissions at Antenna Port	Compliance
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247 (a)(2)	6 dB Emission Bandwidth	Compliance
§15.247(b)(3)	Maximum Peak Output Power	Compliance
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliance
§15.247(e)	Power Spectral Density	Compliance

FCC §15.247 (i) & §1.1307 (b) (1) & §2.1093- RF EXPOSURE

Applicable Standard

According to §15.247 (i) 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.

Table 2 – Summary of SAR Evaluation Requirements for a Cell Phone with Multiple Transmitters

	Individual Transmitter	Simultaneous Transmission
Licensed Transmitters	<u>Routine evaluation required</u>	SAR not required: <u>Unlicensed only</u> <ul style="list-style-type: none"> when stand-alone 1-g SAR is not required and antenna is ≥ 5 cm from other antennas <u>Licensed & Unlicensed</u> <ul style="list-style-type: none"> when the sum of the 1-g SAR is < 1.6 W/kg for all simultaneous transmitting antennas when SAR to peak location separation ratio of simultaneous transmitting antenna pair is < 0.3 SAR required: <u>Licensed & Unlicensed</u> antenna pairs with SAR to peak location separation ratio ≥ 0.3 ; test is only required for the configuration that results in the highest SAR in stand-alone configuration for each wireless mode and exposure condition Note: simultaneous transmission exposure conditions for head and body can be different for different style phones; therefore, different test requirements may apply
Unlicensed Transmitters	<p><u>When there is no simultaneous transmission –</u></p> <ul style="list-style-type: none"> output ≤ 60 f: SAR not required output > 60 f: stand-alone SAR required <p><u>When there is simultaneous transmission –</u></p> <p><u>Stand-alone SAR not required when</u></p> <ul style="list-style-type: none"> output $\leq 2 \cdot P_{Ref}$ and antenna is ≥ 5.0 cm from other antennas output $\leq P_{Ref}$ and antenna is ≥ 2.5 cm from other antennas output $\leq P_{Ref}$ and antenna is < 2.5 cm from other antennas, each with either output power $\leq P_{Ref}$ or 1-g SAR < 1.2 W/kg <p><u>Otherwise stand-alone SAR is required</u></p> <p><u>When stand-alone SAR is required</u></p> <ul style="list-style-type: none"> test SAR on highest output channel for each wireless mode and exposure condition if SAR for highest output channel is $> 50\%$ of SAR limit, evaluate all channels according to normal procedures 	
Jaw, Mouth and Nose	<p><u>Flat phantom SAR required</u></p> <ul style="list-style-type: none"> when measurement is required in tight regions of SAM and it is not feasible or the results can be questionable due to probe tilt, calibration, positioning and orientation issues position rectangular and clam-shell phones according to flat phantom procedures and conduct SAR measurements for these specific locations 	When simultaneous transmission SAR testing is required, contact the FCC Laboratory for interim guidance.

Routine SAR evaluation refers to that specifically required by § 2.1093, using measurements or computer simulation. When routine SAR evaluation is not required, portable transmitters with output power greater than the applicable low threshold require SAR evaluation to qualify for TCB approval.

Measurement Result

The Bluetooth can transmit simultaneously with 2.4G wireless or 5.2G wireless.

The Output Power:

Bluetooth:3.88dBm
2.4G wireless: 0.02dBm
5.2G wireless:6.80dBm

The distance between Bluetooth and wireless antenna > 5cm. The max output power of wireless and Bluetooth < $2P_{Ref}$ (24mW). According to KDB648474, stand-alone SAR is not required for Wi-Fi antenna and simultaneous SAR evaluation is not required for Bluetooth and Wi-Fi antennas.

P_{Ref} is defined as the maximum conducted power available at the antenna according to source-based time-averaging requirements of Section 2.1093(d) (5).

So the SAR evaluation is not necessary.

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.

Antenna Connector Construction

The EUT has two ceramic antennas soldered on the printed circuit boards, which complied with 15.203, antenna A1 for receiving, antenna A2 for transmitting, and the maximum gain is -6 dBi for 2.4G band, please refer to the internal photos.

Result: Compliance.

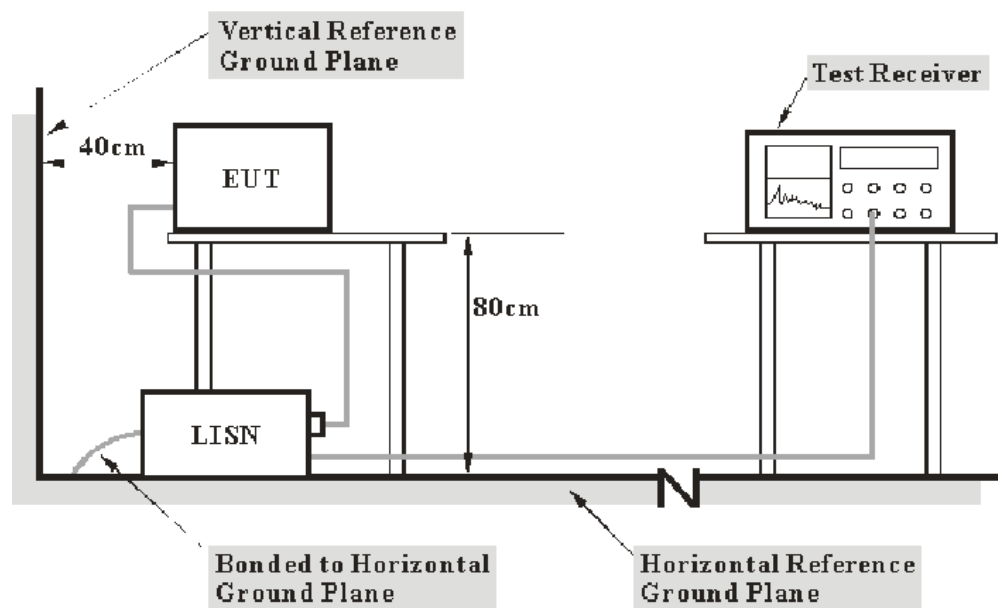
FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

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 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. (Dongguan) is ± 0.96 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 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:

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

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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS 30	830245/006	2011-10-8	2012-10-7
Rohde & Schwarz	LISN	ESH3-Z5	843331/015	2011-10-8	2012-10-7

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:

5.26 dB at 0.200 MHz in the Neutral line

Test Data

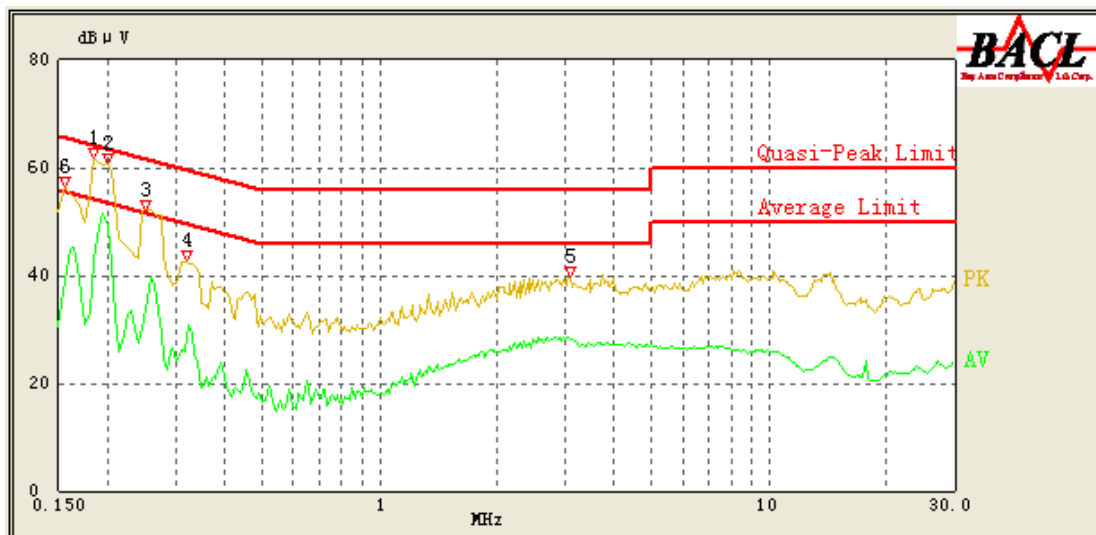
Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	48 %
ATM Pressure:	100.0 kPa

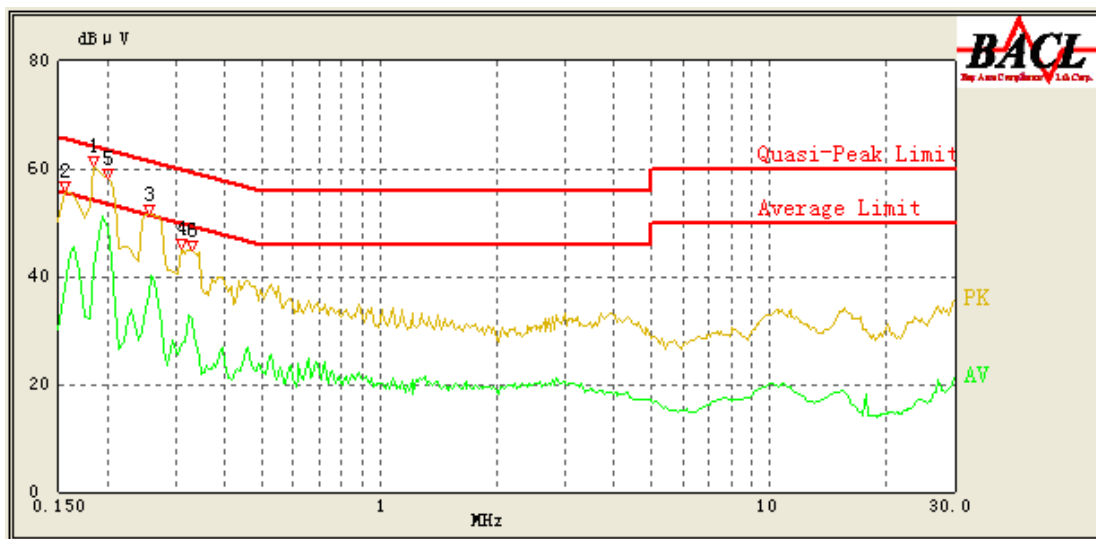
The testing was performed by Leon Chen on 2012-08-16.

Test Mode: Transmitting

120 V, 60 Hz, Line:



Frequency (MHz)	Corrected Result (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/QP/Ave.)
0.200	49.02	1.10	54.57	5.55	Ave.
0.185	57.78	1.10	65.00	7.22	QP
0.200	56.50	1.10	64.57	8.07	QP
0.185	42.82	1.10	55.00	12.18	Ave.
0.155	53.65	1.10	65.86	12.21	QP
0.250	47.71	1.10	63.14	15.43	QP
0.155	39.08	1.10	55.86	16.78	Ave.
3.100	28.33	1.10	46.00	17.67	Ave.
0.250	33.79	1.10	53.14	19.35	Ave.
0.320	39.44	1.10	61.14	21.70	QP
3.090	33.80	1.10	56.00	22.20	QP
0.320	28.46	1.10	51.14	22.68	Ave.

120V, 60 Hz, Neutral:

Frequency (MHz)	Corrected Result (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/QP/Ave.)
0.200	49.31	1.10	54.57	5.26	Ave.
0.185	57.64	1.10	65.00	7.36	QP
0.200	56.44	1.10	64.57	8.13	QP
0.155	53.69	1.10	65.86	12.17	QP
0.185	41.62	1.10	55.00	13.38	Ave.
0.255	48.37	1.10	63.00	14.63	QP
0.255	36.50	1.10	53.00	16.50	Ave.
0.155	37.84	1.10	55.86	18.02	Ave.
0.330	42.30	1.10	60.86	18.56	QP
0.330	32.20	1.10	50.86	18.66	Ave.
0.310	41.93	1.10	61.43	19.50	QP
0.310	27.41	1.10	51.43	24.02	Ave.

FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

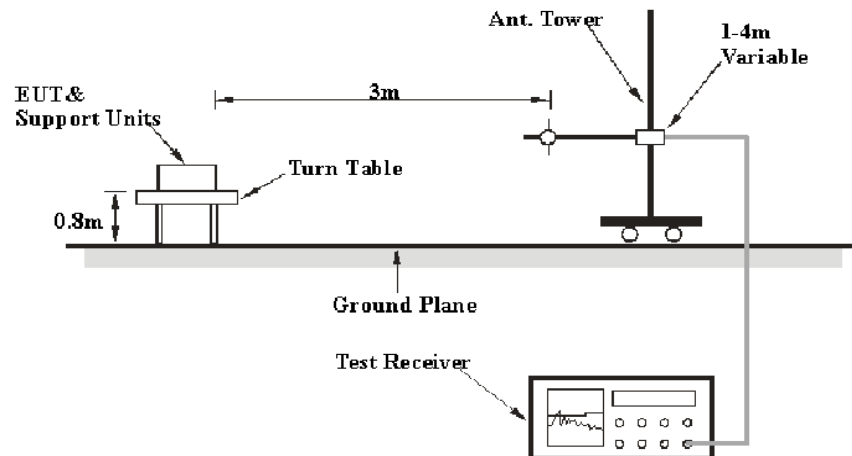
Measurement Uncertainty

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

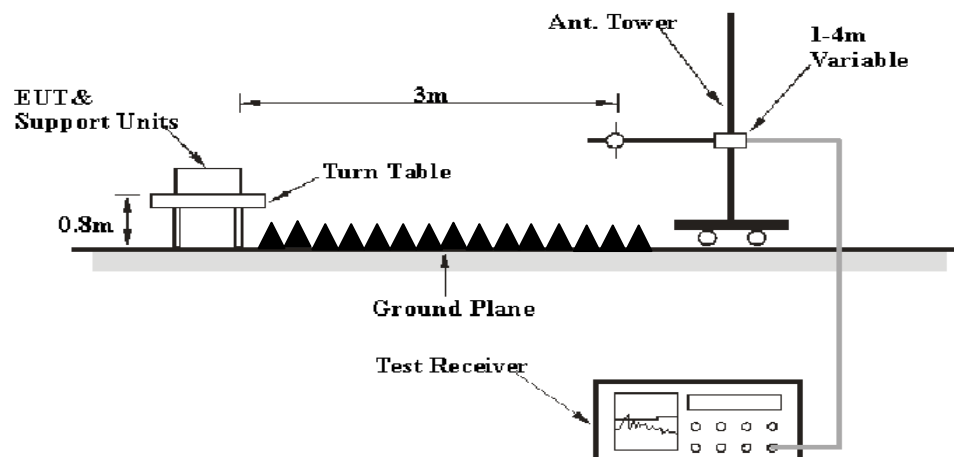
Based on CISPR 16-4-4, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Dongguan) is 4.0 dB(k=2, 95% level of confidence) .

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC 15.209, and FCC 15.247 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:

<i>Frequency Range</i>	<i>RBW</i>	<i>Video B/W</i>	<i>Detector</i>
30 MHz – 1000 MHz	100 kHz	300 kHz	QP
1000 MHz – 25 GHz	1 MHz	3 MHz	PK
1000 MHz – 25 GHz	1 MHz	10 Hz	Ave.

Test Procedure

During the radiated emission test, the adapter 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-1 GHz, peak and Average detection modes for frequencies above 1 GHz.

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 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2012-5-13	2013-5-12
Sunol Sciences	Hybrid Antennas	JB3	A060611-1	2011-9-6	2012-9-5
HP	Pre-amplifier	8447E	2434A02181	2011-10-8	2012-10-7
Rohde & Schwarz	Spectrum Analyzer	FSEM	1079 8500	2011-10-9	2012-10-8
Dayang	Horn Antenna	OMCDH10180	10279001B	2011-7-30	2013-7-29
mini-circuits	Wideband Amplifier	ZVA-183-S+	96901149	2012-4-24	2013-4-23
Electro-Mechanics Co.	Horn Antenna	3116	9510-2270	2010-10-14	2013-10-13

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Section 15.205, 15.209 and 15.247, with the worst margin reading of:

14.45 dB at 9848 MHz in the Vertical polarization

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	48 %
ATM Pressure:	100.0 kPa

The testing was performed by Leon Chen on 2012-08-11.

Mode: Transmitting

Frequency	Receiver		Rx Antenna		Cable loss	Amplifier Gain	Corrected Amplitude	15.247	
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)	(dB)	(dB)	(dBμV/m)	Limit (dBμV/m)	Margin (dB)
TX Channel:2462 MHz									
2462	66.65	AV	H	31.39	3.93	27.70	74.27	N/A	N/A
2462	77.54	PK	H	31.39	3.93	27.70	85.16	N/A	N/A
2462	65.38	AV	V	31.39	3.93	27.70	73.00	N/A	N/A
2462	76.29	PK	V	31.39	3.93	27.70	83.91	N/A	N/A
9848	18.69	AV	V	39.00	8.49	26.63	39.55	54	14.45
7386	17.71	AV	V	38.99	6.84	26.73	36.82	54	17.18
2306.1	29.39	AV	H	30.51	4.05	27.77	36.18	54	17.82
425.36	29.87	QP	V	16.72	2.49	21.83	27.25	46	18.75
9848	33.01	PK	V	39.00	8.49	26.63	53.87	74	20.13
4924	21.68	AV	V	33.43	4.70	27.17	32.65	54	21.35
7386	32.52	PK	V	38.99	6.84	26.73	51.63	74	22.37
2483.5	22.14	AV	H	31.51	3.80	27.76	29.68	54	24.32
2306.1	41.38	PK	H	30.51	4.05	27.77	48.17	74	25.83
4924	34.37	PK	V	33.43	4.70	27.17	45.34	74	28.66
2483.5	35.6	PK	H	31.51	3.80	27.76	43.14	74	30.86

Bluetooth and Wi-Fi transmitting simultaneously

Frequency	Receiver		Rx Antenna		Cable loss	Amplifier Gain	Corrected Amplitude	FCC 15.247	
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)	(dB)	(dB)	(dBμV/m)	Limit (dBμV/m)	Margin (dB)
Bluetooth (2441 MHz/BDR) + Wi-Fi (2462 MHz)									
2441	90.27	AV	H	31.27	3.99	27.69	97.84	N/A	N/A
2441	44.53	PK	H	31.27	3.99	27.69	52.10	N/A	N/A
2441	91.03	AV	V	31.27	3.99	27.69	98.60	N/A	N/A
2441	45.43	PK	V	31.27	3.99	27.69	53.00	N/A	N/A
2462	75.29	AV	H	31.39	3.93	27.70	82.91	N/A	N/A
2462	52.46	PK	H	31.39	3.93	27.70	60.08	N/A	N/A
2462	76.54	AV	V	31.39	3.93	27.70	84.16	N/A	N/A
2462	53.7	PK	V	31.39	3.93	27.70	61.32	N/A	N/A
4882	48.98	PK	V	33.34	4.75	27.04	60.03	74	13.97
4882	26.87	AV	V	33.34	4.75	27.04	37.92	54	16.08
2450.37	49.41	PK	V	31.32	4.01	27.67	57.07	74	16.93
2450.37	28.92	AV	V	31.32	4.01	27.67	36.58	54	17.42
4924	20.25	AV	V	33.43	4.7	27.17	31.21	54	22.79
4924	33.08	PK	V	33.43	4.7	27.17	44.04	74	29.96

Conducted Spurious Emissions at Antenna Port

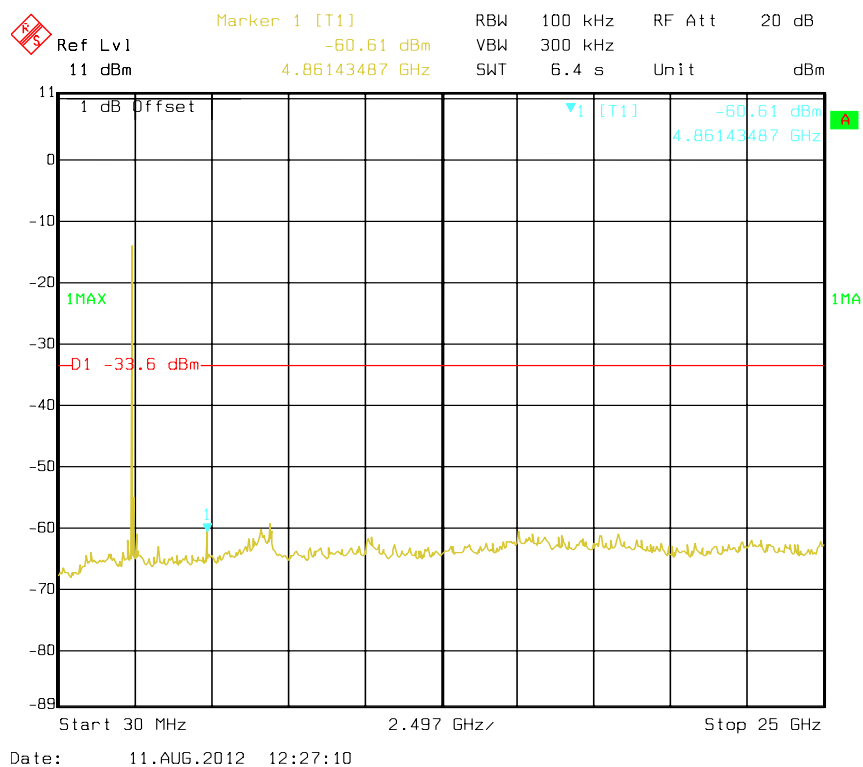
Test Procedure

Measurement Procedure – Reference Level

1. Set the RBW = 100 kHz.
2. Set the VBW \geq 300 kHz.
3. Set the span to 5-30 % greater than the EBW.
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW. Next, determine the power in 100 kHz band segments outside of the authorized frequency band using the following measurement:

Measurement Procedure - Unwanted Emissions

1. Set RBW = 100 kHz.
2. Set VBW \geq 300 kHz.
3. Set span to encompass the spectrum to be examined.
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.
7. Allow the trace to stabilize (this may take some time, depending on the extent of the span).



FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

Applicable Standard

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Test Procedure

1. Set resolution bandwidth (RBW) = 1-5 % of the emission bandwidth (EBW).
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission. Compare the resultant bandwidth with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is 1-5 %.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSEM	1079 8500	2011-10-9	2012-10-8

Test Data

Environmental Conditions

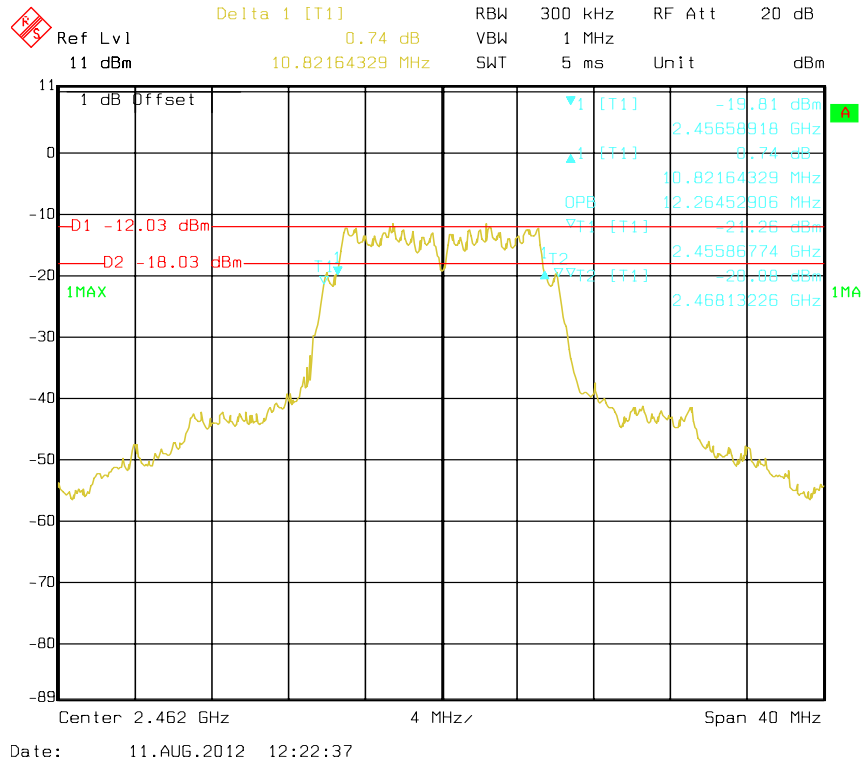
Temperature:	25 ° C
Relative Humidity:	48 %
ATM Pressure:	100.0kPa

The testing was performed by Leon Chen on 2012-08-11.

Test Result: Pass.

Please refer to the following tables and plots.

Frequency (MHz)	6dB Bandwidth (MHz)	Limit (kHz)
2462	10.85	>500



FCC §15.247(b) (3) - MAXIMUM PEAK OUTPUT POWER

Applicable Standard

According to FCC §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

Test Procedure

1. This procedure provides an integrated measurement alternative when the maximum available $RBW < EBW$
2. Set the $RBW = 1$ MHz
3. Set the $VBW = 3$ MHz
4. Set the span to a value that is 5-30 % greater than the EBW .
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the spectrum analyzer's integrated band power measurement function with band limits set equal to the EBW band edges (for some analyzers, this may require a manual override to ensure use of peak detector). If the spectrum analyzer does not have a band power function, sum the spectrum levels (in linear power units) at 1 MHz intervals extending across the EBW of the spectrum.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSEM	1079 8500	2011-10-9	2012-10-8

Test Data

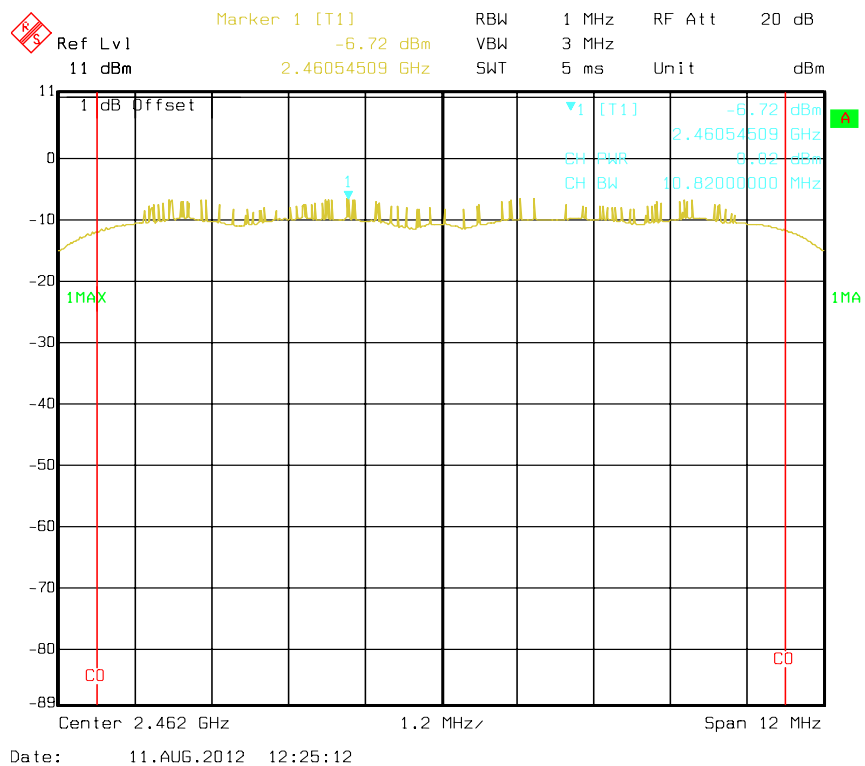
Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	48 %
ATM Pressure:	100.0 kPa

The testing was performed by Leon Chen on 2012-08-11.

Test Mode: Transmitting

Frequency (MHz)	Conducted Output Power (dBm)	Limit (dBm)	Result
2462	0.02	30	pass



FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE**Applicable Standard**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Procedure

1. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge;
2. Measure the highest amplitude appearing on spectral display and set it as a reference level;
3. Repeat above procedures until all measured frequencies were complete.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSEM	1079 8500	2011-10-9	2012-10-8

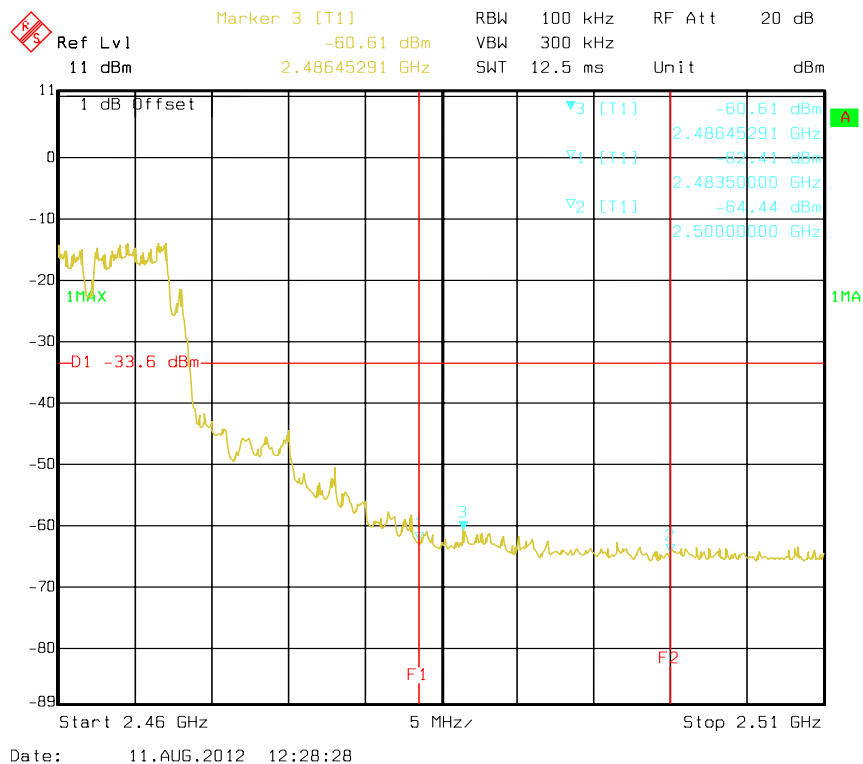
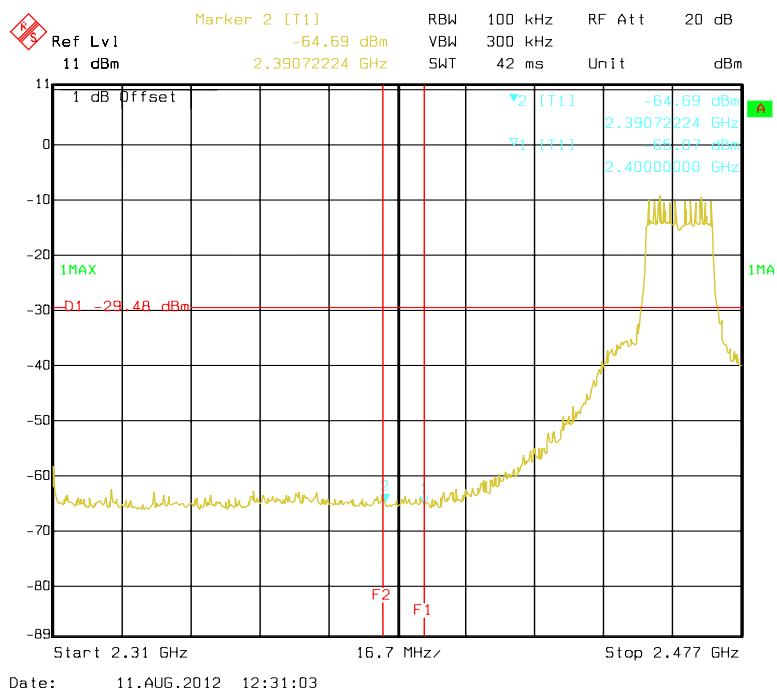
Test Data**Environmental Conditions**

Temperature:	25 ° C
Relative Humidity:	48 %
ATM Pressure:	100.0 kPa

The testing was performed by Leon Chen on 2012-08-11.

Test Result: *Compliance*

Please refer to following plots.



FCC §15.247(e) - POWER SPECTRAL DENSITY**Applicable Standard**

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Test Procedure

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW = 100 kHz.
3. Set the VBW \geq 300 kHz.
4. Set the span to 5-30 % greater than the EBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
10. Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(3\text{ kHz}/100\text{ kHz}) = -15.2\text{ dB}$.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSEM	1079 8500	2011-10-9	2012-10-8

Test Data**Environmental Conditions**

Temperature:	25 ° C
Relative Humidity:	48 %
ATM Pressure:	100.0 kPa

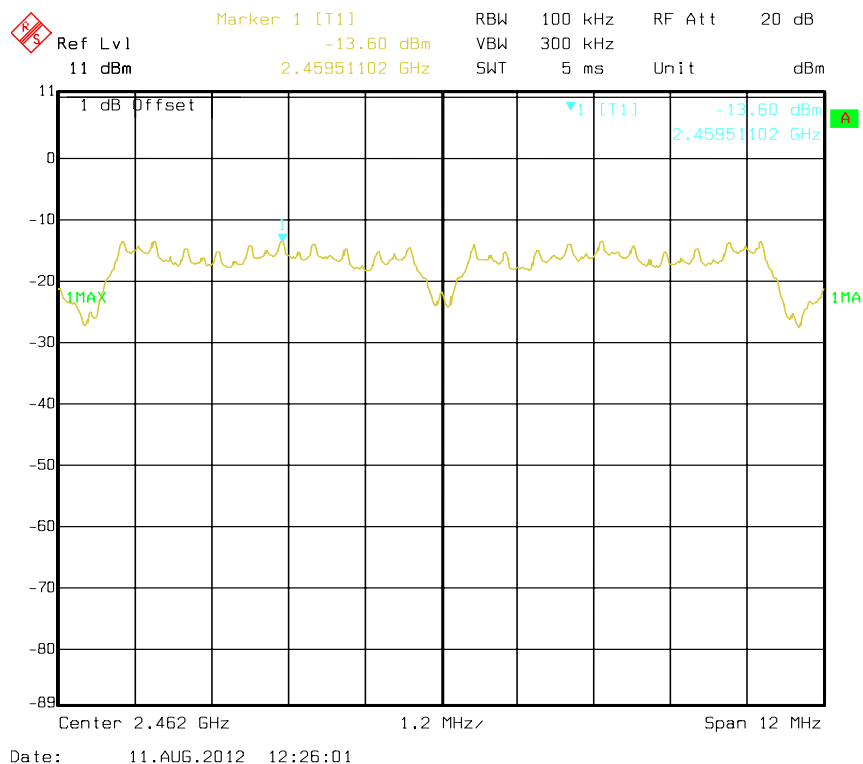
The testing was performed by Leon Chen on 2012-08-11.

Test Mode: Transmitting

Test Result: Pass

Frequency (MHz)	Reading Level (dBm/100kHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
2462	-13.6	-28.8	8	pass

Please refer to the following plots



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