



## FCC PART 15.247



### TEST REPORT

For

### SVAT Electronics

4080 Montrose Rd, Niagara Falls, ON, Canada

**FCC ID: SMH-LVTW502P**

<b>Report Type:</b> Original Report	<b>Product Name:</b> Levana Twinkle502 <b>Product Type:</b> 2.4 GHz Digital Video Parent Monitor
<b>Test Engineer:</b> <u>Kvass Yang</u>	
<b>Report Number:</b> <u>RSZ110608002-00</u>	
<b>Report Date:</b> <u>2011-08-24</u>	
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\* 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

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### Product Description for Equipment under Test (EUT)

The *SVAT Electronics*'s product, model number: *LV-TW502P (FCC ID: SMH-LVTW502P)* (the "EUT") in this report is a parent unit of *Levana Twinkle502*, which was measured approximately: 8.9 cm (L) x 7.6 cm (W) x 13.4 cm (H), rated input voltage: DC 3.7V rechargeable battery or DC 6.0V adapter.

Adapter information:

Model: GPE060A-060080-1

Input: AC 100-240V, 50/60Hz, 0.2A

Output: DC 6.0V, 800mA, 4.8W

*\* All measurement and test data in this report was gathered from production sample serial number: 1106006 (Assigned by BACL, Shenzhen). The EUT was received on 2011-06-08.*

### Objective

This report is prepared on behalf of *SVAT Electronics* 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)

Submitted with the Part of a system FCC ID: SMH-LVTW502B

### 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.

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

### 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 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 manufacturer.

### EUT Exercise Software

N/A

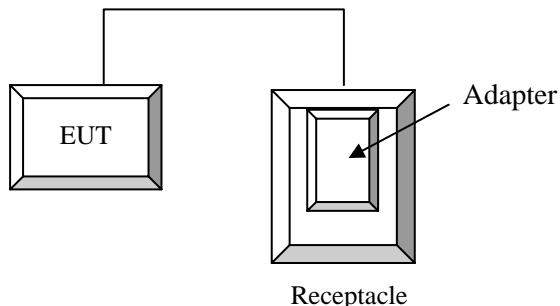
### Equipment Modifications

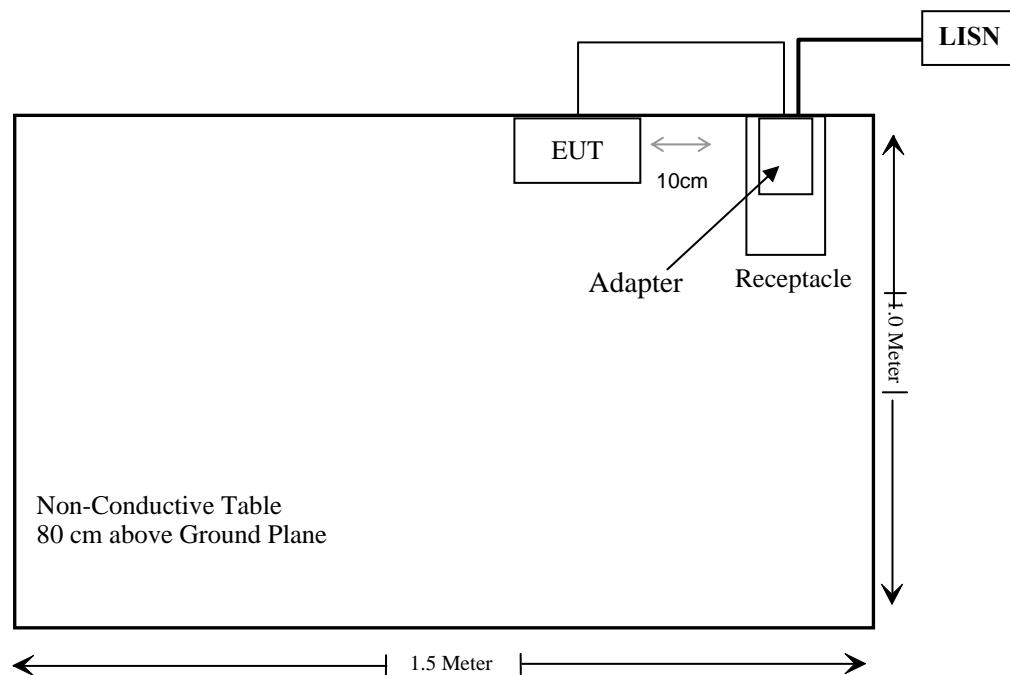
No modification was made to the unit tested.

### External I/O Cable

Cable Description	Length (m)	From/Port	To
Unshielded Detachable Power Cable	1.9	Adapter	EUT

### Configuration of Test Setup



**Block Diagram of Test Setup**

## SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307, §2.1093	RF Exposure Information (SAR)	Compliance*
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Radiated Emissions	Compliance
§15.247 (a)(1)	20 dB Emission Bandwidth	Compliance
§15.247(a)(1)	Channel Separation Test	Compliance
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliance
§15.247(a)(1)(iii)	Quantity of hopping channel Test	Compliance
§15.247(b)(1)	Peak Output Power Measurement	Compliance
§15.247(d)	Band Edges	Compliance

Note: \* Please refer to SAR report released by BACL, report number: R1107076-SAR

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## FCC §1.1307 & §2.1093 - RF EXPOSURE INFORMATION

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### Applicable Standard

FCC §1.1307 and §2.1093.

### Test Result

Compliance, please refer to the SAR report: R1107076-SAR

## 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 use 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 §15.247 (b), 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 the integrated antenna, which is complied with section 15.203, the antenna's maximum gain is 2.0 dBi as declared by client, please refer to the internal photos.

**Result:** Compliance.

## FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

### Applicable Standard

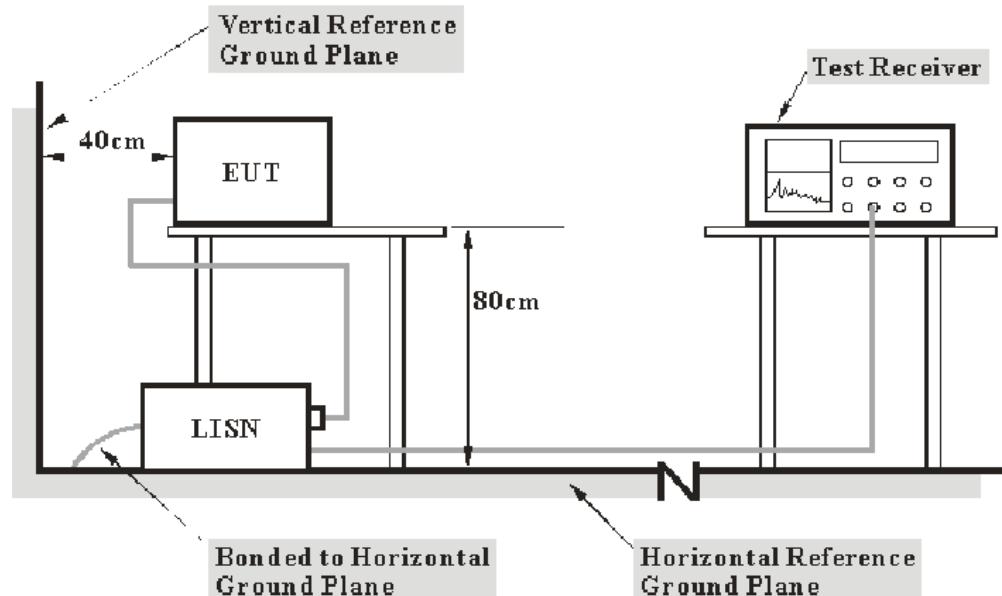
FCC§15.207

### 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  $\pm 2.4$  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 C63.4-2003 measurement procedure. The specification used was with the FCC Part 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 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:

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

## Test Procedure

During the conducted emission test, the adapter 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

<b>Manufacturer</b>	<b>Description</b>	<b>Model</b>	<b>Serial Number</b>	<b>Calibration Date</b>	<b>Calibration Due Date</b>
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

**\* 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 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:

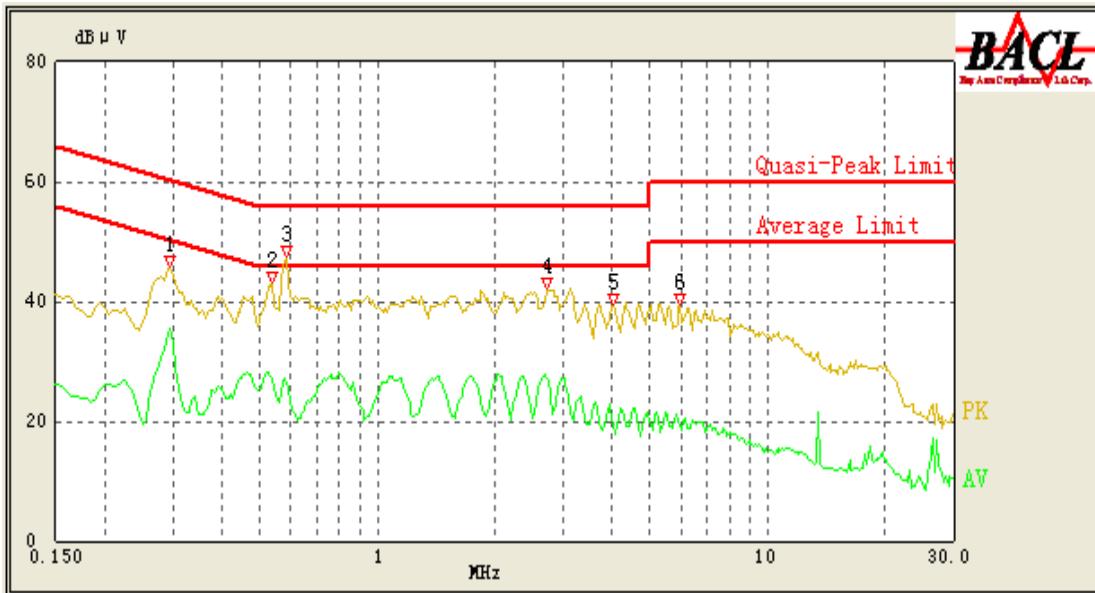
**5.16 dB at 0.290 MHz in the Neutral conducted mode**

## Test Data

### Environmental Conditions

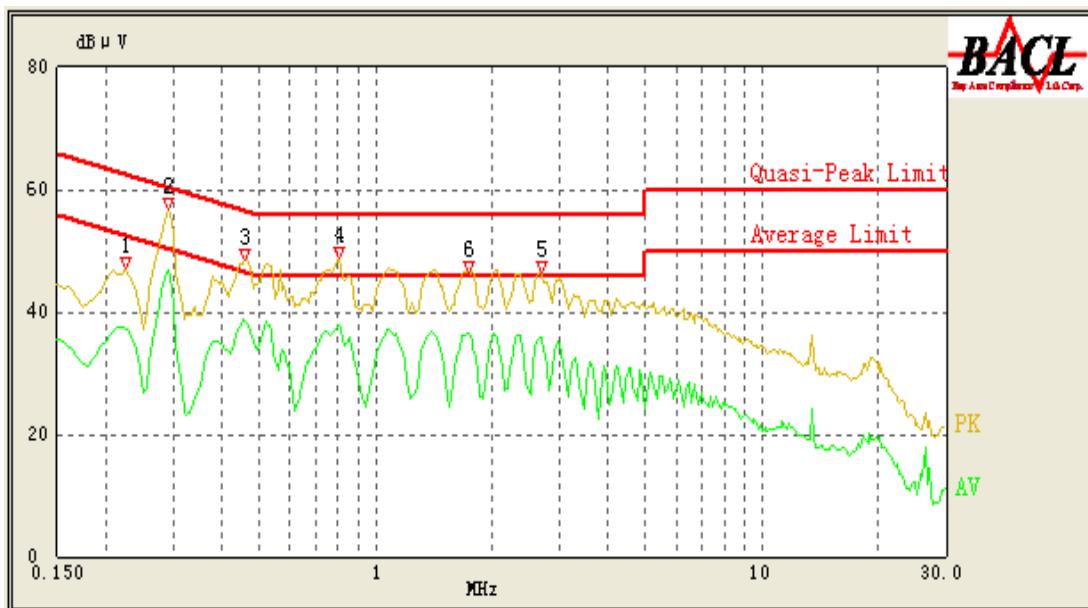
<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	100.0kPa

\* The testing was performed by Kvass Yang on 2011-06-22.

*EUT Operation Mode: Charging and transmitting***120 V, 60 Hz, Line:**

Conducted Emissions FCC Part 15.207					
Frequency (MHz)	Corrected Amplitude (dB $\mu$ V)	Correction Factor (dB)	Limit (dB $\mu$ V)	Margin (dB)	Detector (PK/Ave./QP)
0.295	35.34	10.10	51.86	16.52	Ave.
2.700	27.43	10.15	46.00	18.57	Ave.
0.535	27.10	10.10	46.00	18.90	Ave.
0.580	27.01	10.10	46.00	18.99	Ave.
0.295	42.19	10.10	61.86	19.67	QP
0.585	35.51	10.10	56.00	20.49	QP
2.710	35.50	10.15	56.00	20.50	QP
0.540	35.45	10.10	56.00	20.55	QP
4.020	32.31	10.18	56.00	23.69	QP
4.025	19.49	10.18	46.00	26.51	Ave.
5.975	31.80	10.20	60.00	28.20	QP
6.035	18.57	10.20	50.00	31.43	Ave.

**120V, 60 Hz, Neutral:**



Conducted Emissions FCC Part 15.207					
Frequency (MHz)	Corrected Amplitude (dB $\mu$ V)	Correction Factor (dB)	Limit (dB $\mu$ V)	Margin (dB)	Detector (PK/Ave./QP)
0.290	46.84	10.10	52.00	5.16	Ave.
0.800	37.95	10.11	46.00	8.05	Ave.
0.290	53.69	10.10	62.00	8.31	QP
0.460	38.44	10.10	47.14	8.70	Ave.
1.735	36.57	10.13	46.00	9.43	Ave.
2.680	35.73	10.15	46.00	10.27	Ave.
0.805	44.71	10.11	56.00	11.29	QP
0.460	45.81	10.10	57.14	11.33	QP
1.735	42.94	10.13	56.00	13.06	QP
2.680	42.33	10.15	56.00	13.67	QP
0.225	37.11	10.10	53.86	16.75	Ave.
0.225	44.02	10.10	63.86	19.84	QP

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

### Applicable Standard

FCC §15.247 (d); §15.209; §15.205;

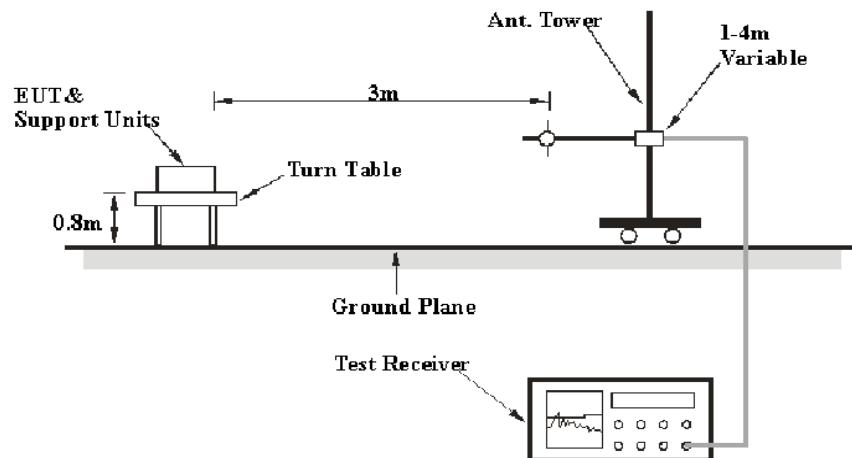
### Measurement Uncertainty

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.

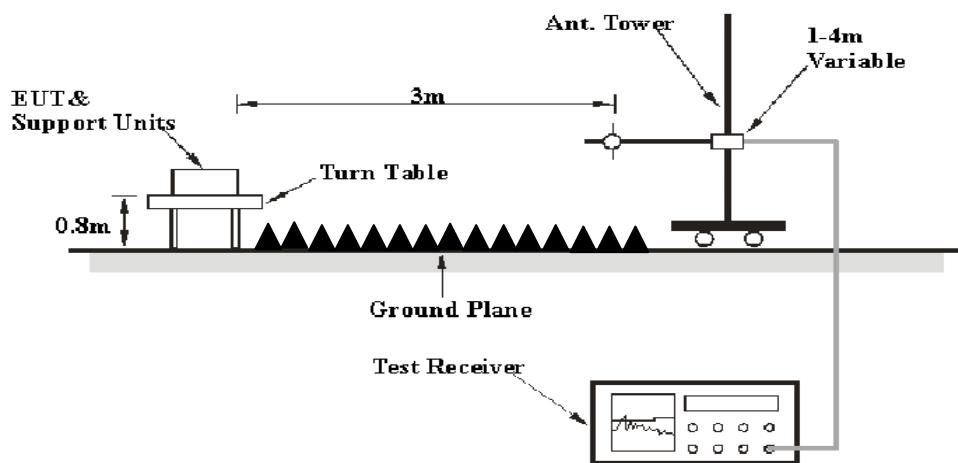
Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is  $\pm 4.0$  dB (k=2, 95% level of confidence).

### EUT Setup

#### Below 1 GHz:



#### Above 1 GHz:



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2003. 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 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:

<b><i>Frequency Range</i></b>	<b><i>RBW</i></b>	<b><i>Video B/W</i></b>	<b><i>Detector</i></b>
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 conducted emission test, the adapter was connected to the outlet of the LISN.

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
HP	Amplifier	HP8447D	2944A09795	2010-08-02	2011-08-01
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-11	2011-11-10
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2011-03-11	2012-03-10
HP	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	Spectrum Analyzer	FSEM30	849720/019	2010-07-08	2011-07-07

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

## Test 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 15.247, with the worst margin reading of:

### Below 1 GHz:

**5.6 dB at 31.079500 MHz** in the **Vertical** polarization

### Above 1 GHz:

**0.03 dB at 4956 MHz** in the **Horizontal** polarization at High channel

## Test Data

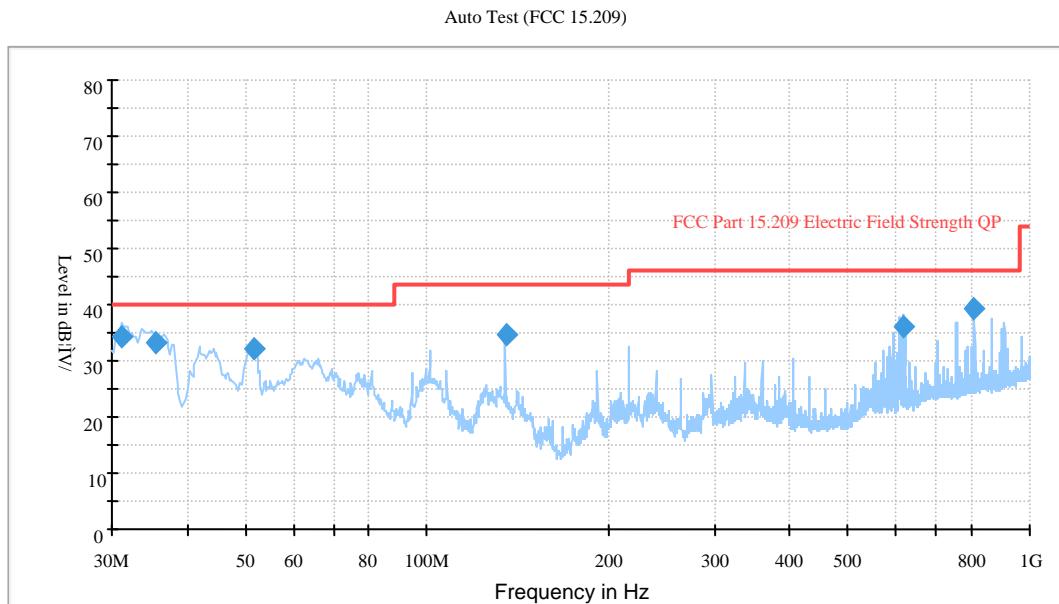
### Environmental Conditions

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	100.0kPa

*The testing was performed by Kvass Yang on 2011-07-03.*

*EUT Operation Mode: Charging and transmitting*

## 1) Below 1 GHz



Frequency (MHz)	Corrected Amplitude (dB $\mu$ V/m)	Test Antenna		Turntable Position (degree)	Correction Factor (dB)	Limit (dB $\mu$ V/m)	Margin (dB)
		Height (cm)	Polarity (H/V)				
31.079500	34.4	100.0	V	106.0	-6.2	40.0	5.6
810.006750	39.4	170.0	V	271.0	-1.7	46.0	6.6
35.461250	33.3	100.0	V	64.0	-9.1	40.0	6.7
51.492500	32.3	101.0	V	91.0	-17.5	40.0	7.7
617.842000	35.9	151.0	V	271.0	-6.0	46.0	10.1
135.247100	34.5	252.0	V	127.0	-0.6	46.0	11.5

## 2) Above 1 GHz: (worst case)

Indicated		Detector (PK/Ave.)	Table Angle Degree	Test Antenna		Correction Factor			FCC Part 15.247/15.209			
Frequency (MHz)	S.A. Reading (dB $\mu$ V)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre- Amp. (dB)	Cord. Amp. (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Comment
Low Channel (2404 MHz)												
4808	42.69	Ave.	160	1.0	H	33.5	4.30	26.80	53.69	54	0.31*	harmonic
4808	42.32	Ave.	150	1.2	V	32.8	4.30	26.80	52.62	54	1.38*	harmonic
4808	52.82	PK	180	1.0	H	33.5	4.30	26.80	63.82	74	10.18	harmonic
4808	52.45	PK	180	1.2	V	32.8	4.30	26.80	62.75	74	11.25	harmonic
1148.26	40.53	Ave.	12	1.0	H	24.2	2.02	26.49	40.26	54	13.74	spurious
1148.26	38.50	Ave.	35	1.2	V	24.3	2.02	26.49	38.33	54	15.67	spurious
1148.26	50.66	PK	20	1.0	H	24.2	2.02	26.49	50.39	74	23.61	spurious
1148.26	48.63	PK	20	1.2	V	24.3	2.02	26.49	48.46	74	25.54	spurious
Middle Channel (2440 MHz)												
4880	42.57	Ave.	175	1.0	H	33.7	4.36	26.78	53.85	54	0.15*	harmonic
4880	41.21	Ave.	185	1.1	V	33.0	4.36	26.78	51.79	54	2.21*	harmonic
4880	52.70	PK	180	1.2	H	33.7	4.36	26.78	63.98	74	10.02	harmonic
4880	51.54	PK	180	1.2	V	33.0	4.36	26.78	62.12	74	11.88	harmonic
1160.52	37.94	Ave.	30	1.0	H	24.5	2.06	26.52	37.98	54	16.02	spurious
1248.89	35.92	Ave.	45	1.0	V	24.6	2.06	26.52	36.06	54	17.94	spurious
1160.52	48.07	PK	45	1.2	H	24.5	2.06	26.52	48.11	74	25.89	spurious
1248.89	46.05	PK	30	1.0	V	24.6	2.06	26.52	46.19	74	27.81	spurious
High Channel (2478 MHz)												
4956	41.62	Ave.	20	1.0	V	34.7	4.40	26.75	53.97	54	0.03*	spurious
4956	40.19	Ave.	0	1.0	H	34.6	4.40	26.75	52.44	54	1.56*	spurious
4956	51.75	PK	0	1.2	V	34.7	4.40	26.75	64.1	74	9.9	spurious
4956	51.32	PK	20	1.2	H	34.6	4.40	26.75	63.57	74	10.43	spurious
1250.9	37.74	Ave.	30	1.0	H	25.3	2.24	26.58	38.7	54	15.3	harmonic
1250.9	36.11	Ave.	0	1.0	V	25.5	2.24	26.58	37.27	54	16.73	spurious
1250.9	47.87	PK	0	1.2	H	25.3	2.24	26.58	48.83	74	25.17	harmonic
1250.9	46.24	PK	30	1.0	V	25.5	2.24	26.58	47.4	74	26.6	spurious

\* Within measurement uncertainty!

## 3) Spurious Emissions in the Restrict Bands:

Indicated		Detector (PK/Ave.)	Table Angle Degree	Test Antenna		Correction Factor			FCC Part 15.247/15.209/15.205			
Frequency (MHz)	S.A. Reading (dB $\mu$ V)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre- Amp. (dB)	Cord. Amp. (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Comment
2483.952	33.30	Ave.	0	1.0	V	29.1	3.00	26.84	38.56	54	15.44	spurious
2386.816	33.65	Ave.	0	1.1	H	28.7	3.00	26.84	38.51	54	15.49	spurious
2483.952	32.59	Ave.	0	1.1	H	28.7	3.00	26.84	37.45	54	16.55	spurious
2388.580	31.74	Ave.	0	1.0	V	29.1	3.00	26.84	37.00	54	17.00	spurious
2483.952	43.43	PK	0	1.2	V	29.1	3.00	26.84	48.69	74	25.31	spurious
2386.816	43.78	PK	20	1.2	H	28.7	3.00	26.84	48.64	74	25.36	spurious
2388.580	42.87	PK	30	1.2	V	29.1	3.00	26.84	48.13	74	25.87	spurious
2483.952	42.72	PK	10	1.1	H	28.7	3.00	26.84	47.58	74	26.42	spurious

## FCC §15.247(a) (1) - CHANNEL SEPARATION TEST

### Applicable Standard

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater provided the systems operate with an output power no greater than 125 mW.

### Test Procedure

1. Set the EUT in transmitting mode, spectrum Bandwidth was set at 100 kHz, maxhold the channel.
2. Set the adjacent channel of the EUT maxhold another truce
3. Measure the channel separation.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-11	2011-11-10

\* **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 Data

#### Environmental Conditions

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

\* The testing was performed by Kvass Yang on 2011-06-16.

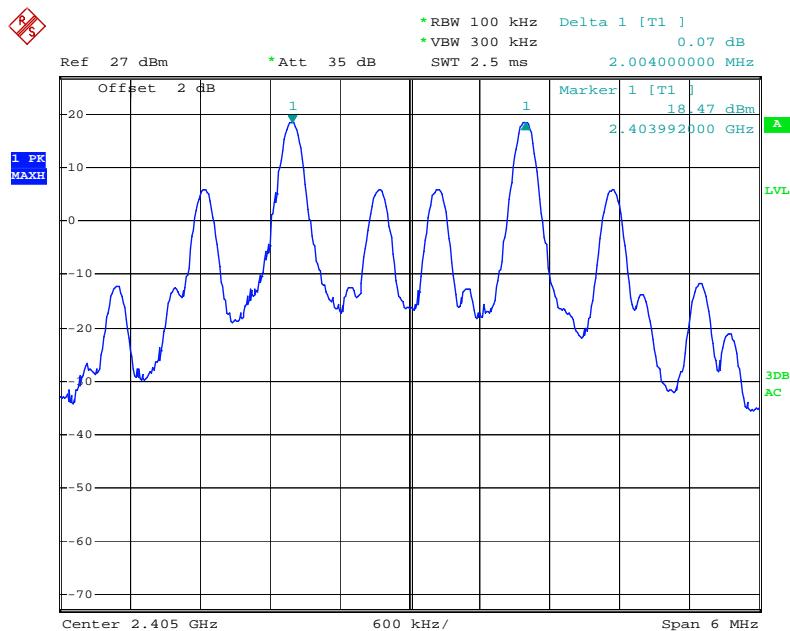
**Test Result:** Compliant.

Please refer to following tables and plots

*EUT Operation Mode: Transmitting*

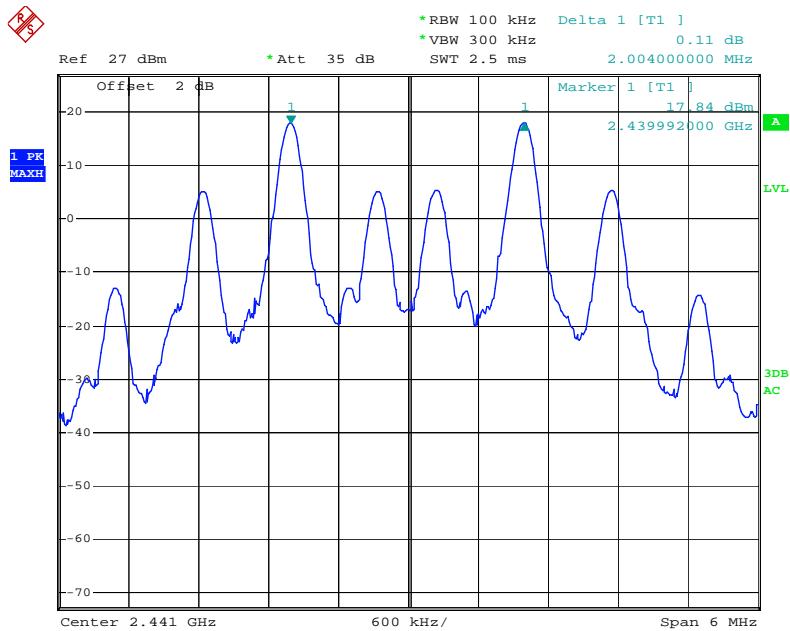
Channel	Frequency (MHz)	Channel Separation (MHz)	Requirement (MHz)	Result
Channel 1	2404	2.004	> 1.045	Pass
Channel 2	2406			
Channel 18	2440	2.004	> 1.045	Pass
Channel 19	2442			
Channel 36	2478	2.004	> 1.045	Pass
Channel 35	2476			
Channel 11	2424	4.008	> 1.045	Pass
Channel 12	2428			
Channel 22	2448	4.008	> 1.045	Pass
Channel 23	2452			

Please refer to the following plots.

**Channel 1 & 2**

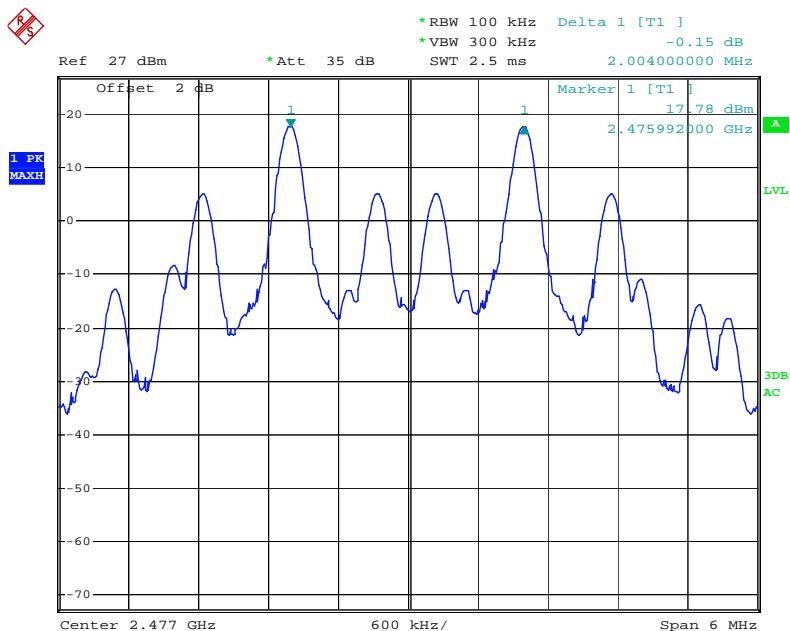
Date: 15.JUN.2011 16:13:10

## Channel 18 &amp; 19



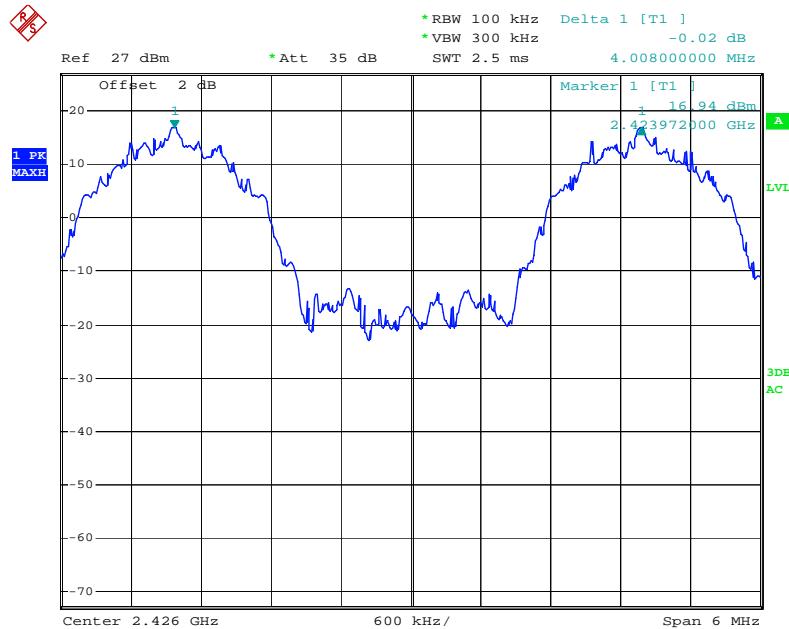
Date: 15.JUN.2011 16:46:21

## Channel 35 &amp; 36



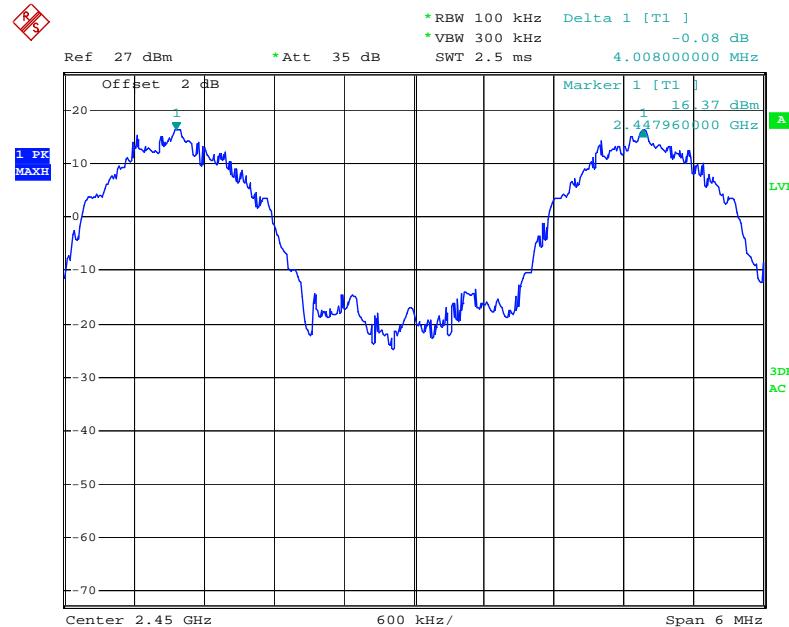
Date: 15.JUN.2011 17:06:35

## Channel 11 &amp; 12



Date: 16.JUN.2011 10:53:16

## Channel 22 &amp; 23



Date: 16.JUN.2011 10:54:46

## FCC §15.247(a) (1) – 20 dB BANDWIDTH TESTING

### Applicable Standard

Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

### 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 on the test table without connection to measurement instrument. Turn on the EUT. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
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	EMI Test Receiver	ESCI	100035	2010-11-11	2011-11-10

\* **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 Data

#### Environmental Conditions

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

\* The testing was performed by Kvass Yang on 2011-06-15.

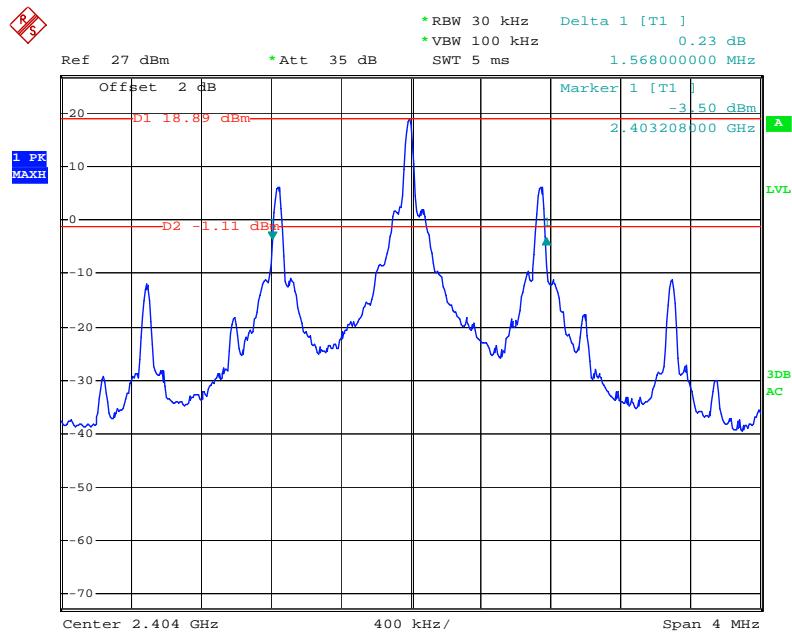
**Test Result:** Compliance.

Please refer to following tables and plots

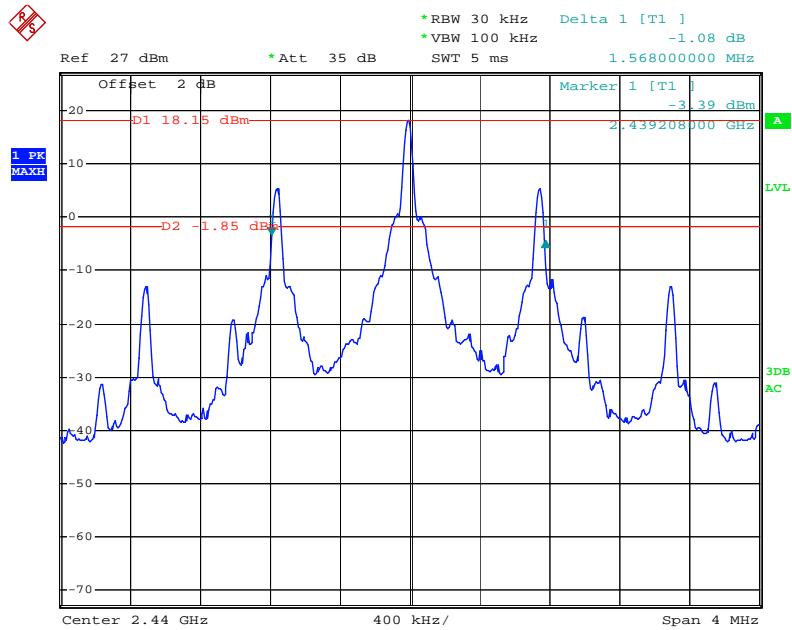
*EUT Operation Mode: Transmitting*

Channel	Frequency (MHz)	20 dB Bandwidth (kHz)
Low	2404	1568
Middle	2440	1568
High	2478	1568

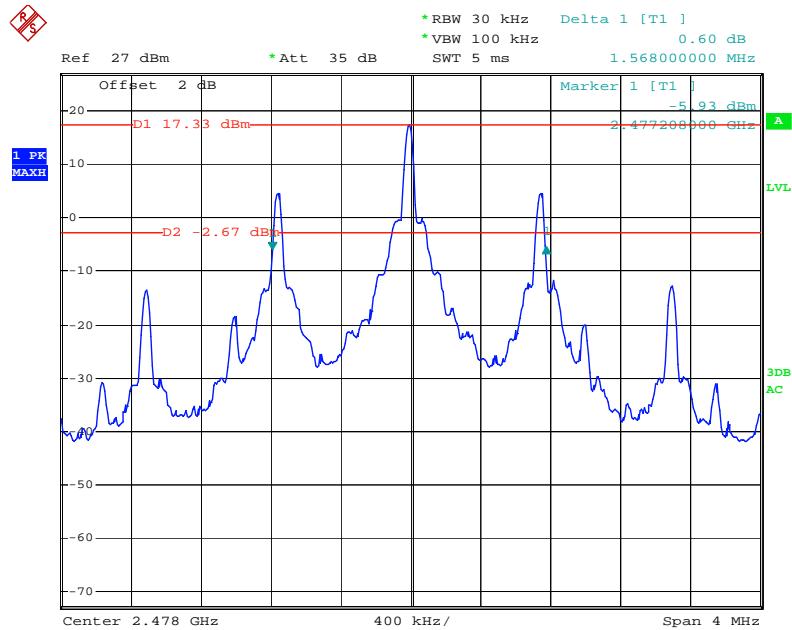
Please refer to the following plots.

**Low Channel**

Date: 15.JUN.2011 15:59:35

**Middle Channel**

Date: 15.JUN.2011 16:30:33

**High Channel**

Date: 15.JUN.2011 16:52:14

## FCC §15.247(a) (1) (iii) - QUANTITY OF HOPPING CHANNEL TEST

### Applicable Standard

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

### Test Procedure

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Set the EUT in hopping mode from first channel to last.
3. By using the Max-Hold function record the Quantity of the channel.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-11	2011-11-10

\* **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 Data

#### Environmental Conditions

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

*The testing was performed by Kvass Yang on 2011-06-16.*

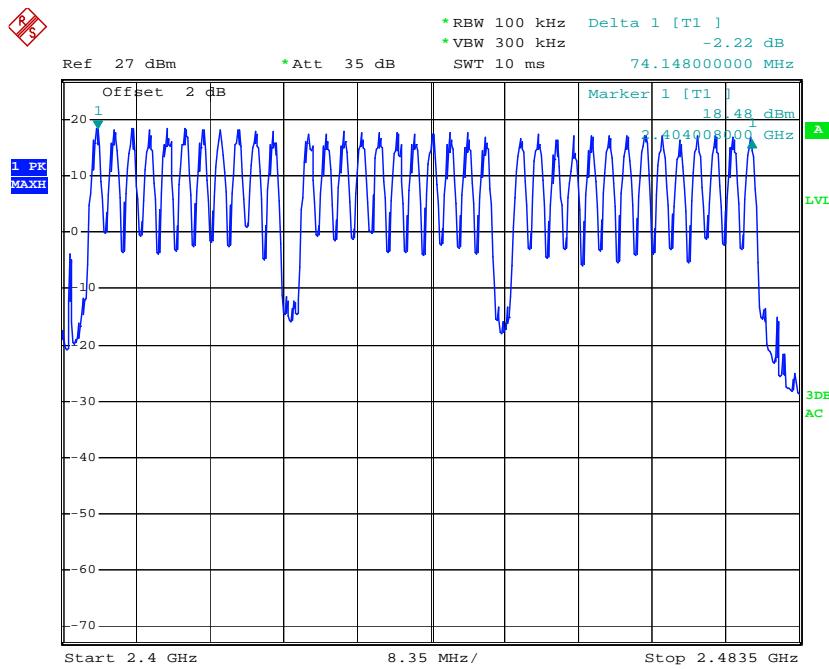
**Test Result:** Compliance.

Please refer to following tables and plots

Mode: Transmitting

Frequency Range (MHz)	Number of Hopping Channel	Requirement
2400-2483.5	36	> 15

### Number of Hopping Channels



Date: 16.JUN.2011 10:51:30

**FCC §15.247(a) (1) (iii) - TIME OF OCCUPANCY (DWELL TIME)****Applicable Standard**

Frequency hopping systems in the 2400-2483.5 MHz shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

**Test Procedure**

The EUT was worked in channel hopping; Spectrum SPAN was set as 0. Sweep was set as 0.4 \* channel no. (s), the quantity of pulse was get from single sweep. In addition, the time of single pulses was tested.

Dwell Time= time slot length \* hope rate/ number of hopping channels \* 31.6s

Hop rate=1600/s

**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-11	2011-11-10

\* **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 Data****Environmental Conditions**

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

\* The testing was performed by Kvass Yang on 2011-06-15.

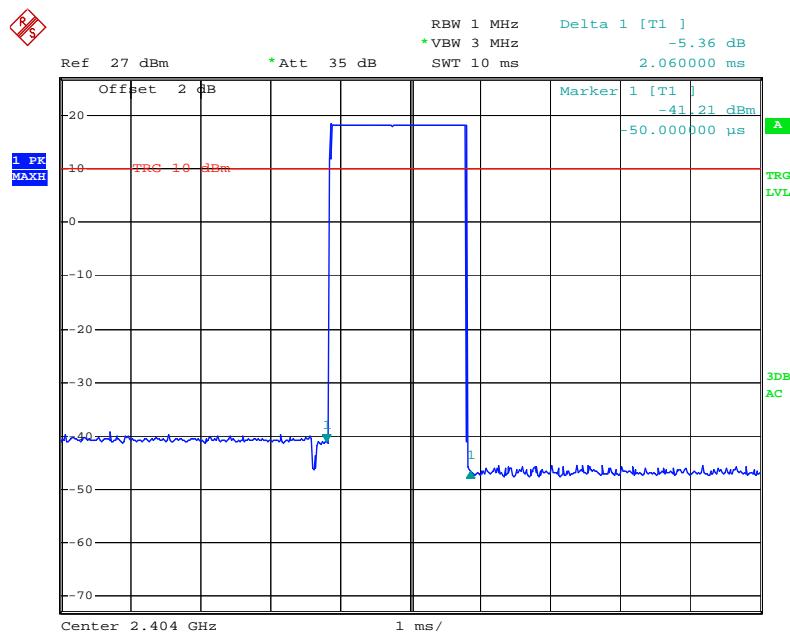
**Test Result:** Compliance.

Please refer to following tables and plots

Mode: Transmitting

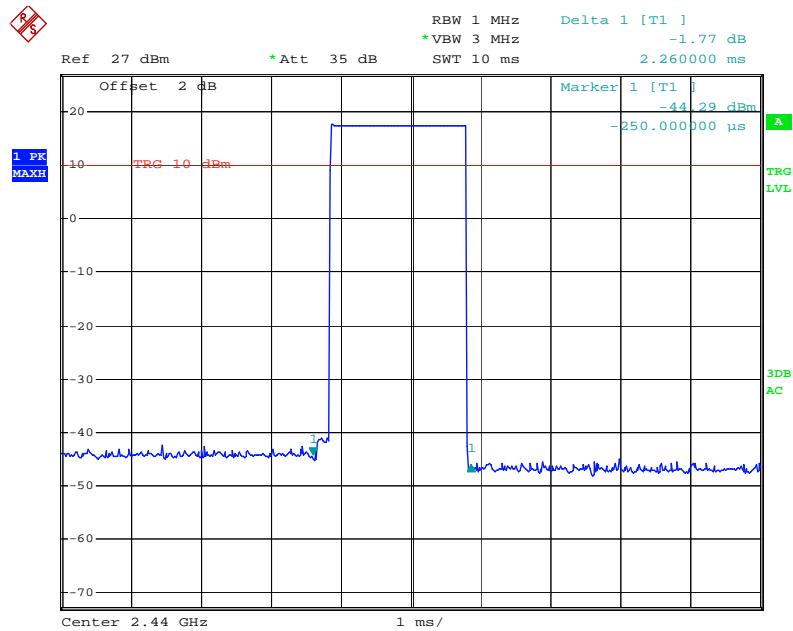
Channel	Pulse Width (ms)	Dwell Time (S)	Limit (S)	Result
Low	2.06	0.059328	0.4	Pass
Middle	2.26	0.065088	0.4	Pass
High	2.04	0.058752	0.4	Pass
Note: Dwell time = Pulse time*(144/2/36)*36*0.4S				

### Low Channel



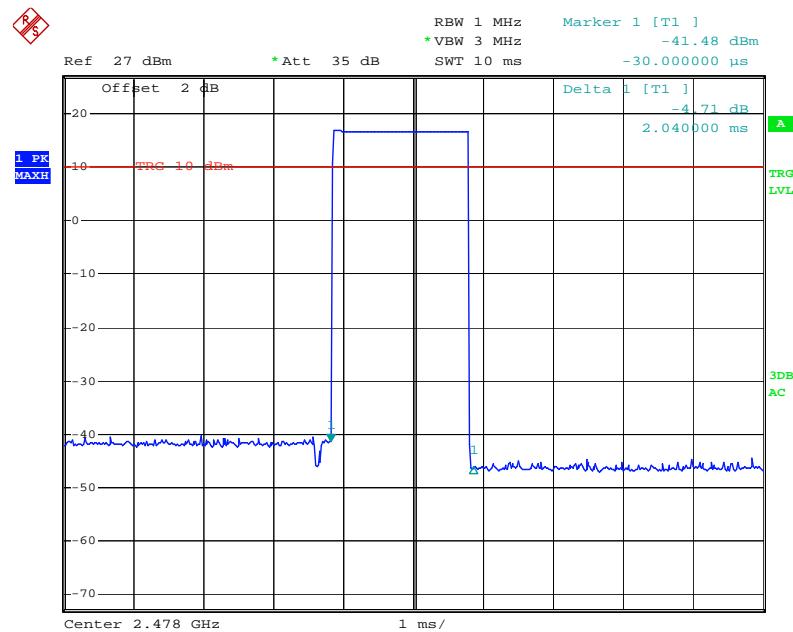
Date: 15.JUN.2011 17:48:20

## Middle Channel



Date: 15.JUN.2011 17:40:13

## High Channel



Date: 15.JUN.2011 17:39:40

## FCC §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT

### Applicable Standard

According to §15.247(b) (1), for frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. And for all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

### Test Procedure

1. Place the EUT on a bench and set in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to an EMI test receiver.
3. Add a correction factor to the display.



### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-11	2011-11-10

\* **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 Data

#### Environmental Conditions

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

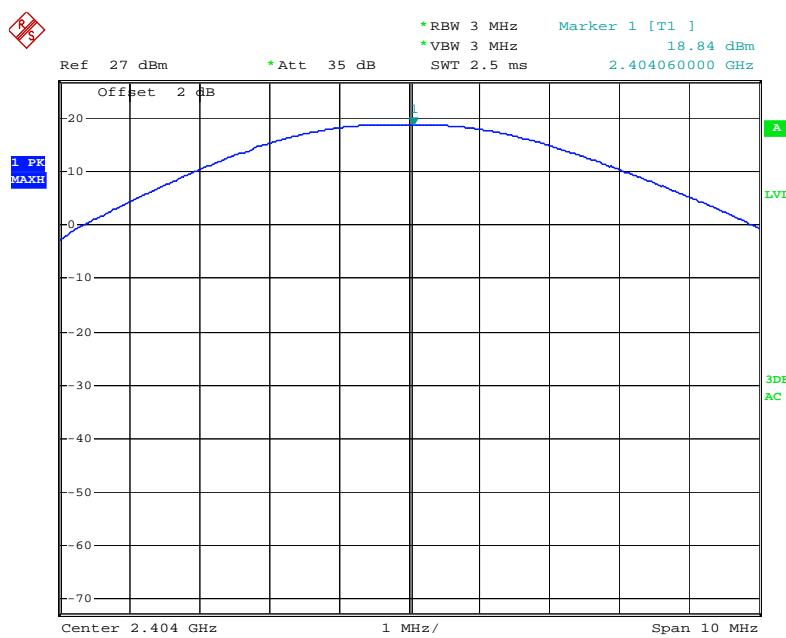
\* The testing was performed by Kvass Yang on 2011-06-15.

**Test Result:** Compliance.

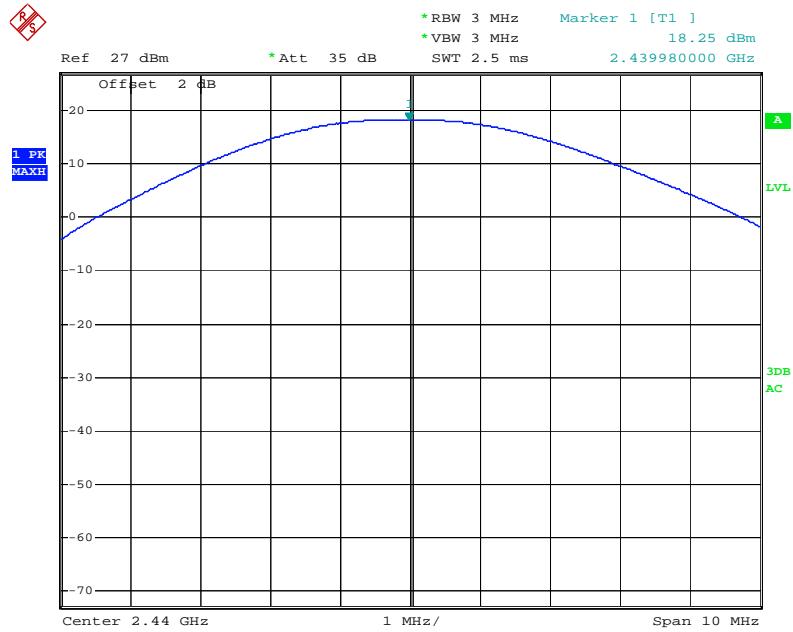
Mode: Transmitting

Channel	Frequency (MHz)	Conducted Output Power		Limit (mW)
		(dBm)	(mW)	
Low	2404	18.84	76.56	125
Middle	2440	18.25	66.83	125
High	2478	17.53	56.62	125

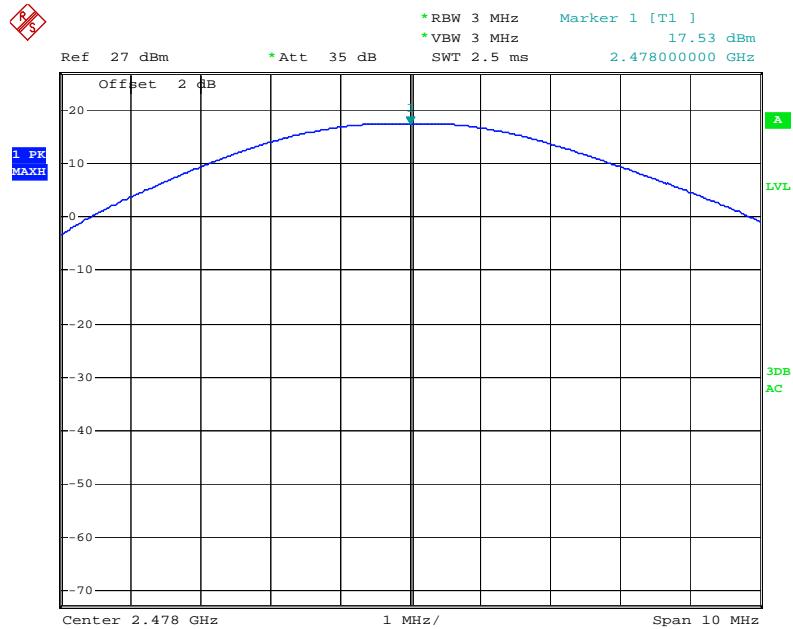
### Low Channel



Date: 15.JUN.2011 16:02:56

**Middle Channel**

Date: 15.JUN.2011 16:31:45

**High Chanle**

Date: 15.JUN.2011 16:56:06

## FCC §15.247(d) - BAND EDGES TESTING

### 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. 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. Put it on the Rotated table and turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge, for Radiated emissions restricted band RBW=1MHz, VBW=3MHz.
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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-11	2011-11-10

\* **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 Data

### Environmental Conditions

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

\*The testing was performed by Kvass Yang on 2011-06-15.

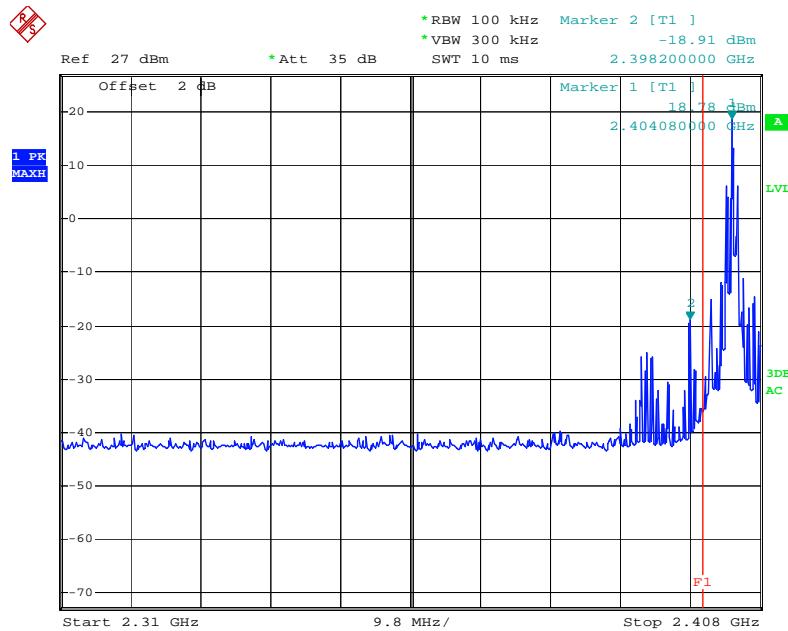
### Test Result: Compliance

Please refer to follow plots:

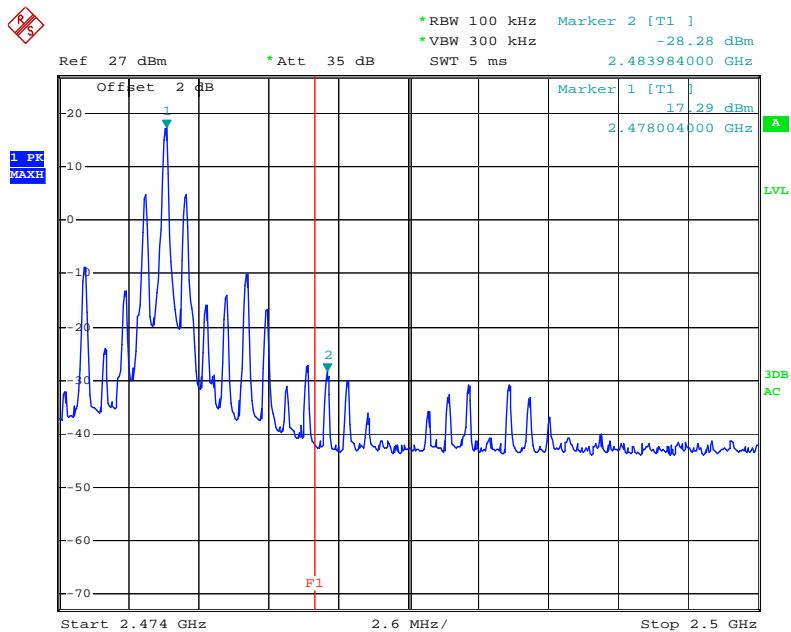
*EUT Operation Mode: Transmitting*

Frequency (MHz)	Delta Peak to Band Emission (dBc)	Requirement (dBc)
2399.820	37.69	>20
2483.984	45.57	>20

### Band Edge: Left Side



Date: 15.JUN.2011 16:05:19

**Band Edge: Right Side**

Date: 15.JUN.2011 17:07:26

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