

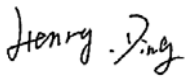

FCC PART 15.247
TEST REPORT

For

Hobbico, Inc.

2904 Research Road, Champaign, Illinois, USA

FCC ID: IYFTTX403

Report Type: Original Report	Product Type: RADIO SYSTEM TRANSMITTER
Test Engineer: Henry Ding	
Report Number: RSZ130407002-00	
Report Date: 2013-04-23	
Reviewed By: RF Leader	
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008 www.baclcorp.com.cn

Note: This test report is prepared for the customer shown above and for the equipment described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

TABLE OF CONTENTS

GENERAL INFORMATION.....	4
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT).....	4
OBJECTIVE	4
RELATED SUBMITTAL(S)/GRANT(S).....	4
TEST METHODOLOGY	4
TEST FACILITY	4
SYSTEM TEST CONFIGURATION.....	5
DESCRIPTION OF TEST CONFIGURATION	5
EUT EXERCISE SOFTWARE	5
EQUIPMENT MODIFICATIONS	5
BLOCK DIAGRAM OF TEST SETUP	5
SUMMARY OF TEST RESULTS	6
FCC §15.247 (i) & §1.1307 (b) (1) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE).....	7
APPLICABLE STANDARD	7
FCC §15.203 – ANTENNA REQUIREMENT	8
APPLICABLE STANDARD	8
ANTENNA CONNECTOR CONSTRUCTION	8
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS.....	9
APPLICABLE STANDARD	9
MEASUREMENT UNCERTAINTY	9
EUT SETUP	9
EMI TEST RECEIVER & SPECTRUM ANALYZER SETUP	10
TEST PROCEDURE	10
TEST EQUIPMENT LIST AND DETAILS.....	10
CORRECTED AMPLITUDE & MARGIN CALCULATION	10
TEST RESULTS SUMMARY	11
TEST DATA	11
FCC §15.247(a) (1)-CHANNEL SEPARATION	14
APPLICABLE STANDARD	14
TEST PROCEDURE	14
TEST EQUIPMENT LIST AND DETAILS.....	14
TEST DATA	14
FCC §15.247(a) (1) – 20 dB EMISSION BANDWIDTH.....	17
APPLICABLE STANDARD	17
TEST PROCEDURE	17
TEST EQUIPMENT LIST AND DETAILS.....	17
TEST DATA	17
FCC §15.247(a) (1) (iii)-QUANTITY OF HOPPING CHANNEL	20
APPLICABLE STANDARD	20
TEST PROCEDURE	20
TEST EQUIPMENT LIST AND DETAILS.....	20
TEST DATA	20
FCC §15.247(a) (1) (iii) -TIME OF OCCUPANCY (DWELL TIME).....	22

APPLICABLE STANDARD22
TEST PROCEDURE22
TEST EQUIPMENT LIST AND DETAILS.....22
TEST DATA22

FCC §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT25

APPLICABLE STANDARD25
TEST PROCEDURE25
TEST EQUIPMENT LIST AND DETAILS.....25
TEST DATA25

FCC §15.247(d) - BAND EDGES28

APPLICABLE STANDARD28
TEST PROCEDURE28
TEST EQUIPMENT LIST AND DETAILS.....28
TEST DATA28

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Hobbico, Inc.*'s product, model number: *Tactic TTX403 (FCC ID: IYFTTX403)* (the "EUT") in this report was a transmitter unit of *RADIO SYSTEM TRANSMITTER*, which was measured approximately: 17.0 cm (L) x 14.5 cm (W) x 8.0 cm (H), rated with input voltage: 5 × 1.5V battery.

** All measurement and test data in this report was gathered from production sample serial number: 1304026 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2013-04-07.*

Objective

This report is prepared on behalf of *Hobbico, 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 compliance with FCC Part 15, Subpart C, section 15.203, 15.205, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

No related Submittal

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.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in an engineering mode which was selected by manufacturer.

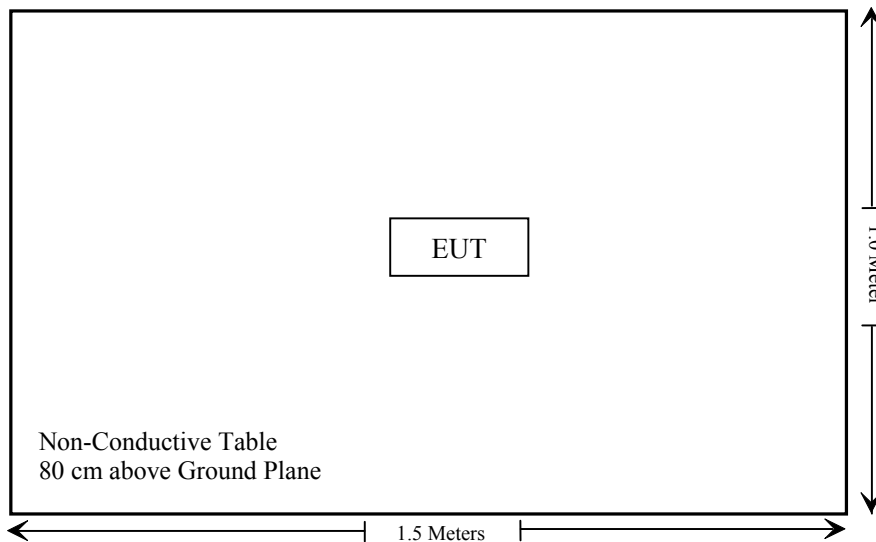
EUT Exercise Software

No exercise software was used.

Equipment Modifications

No modification was made to the EUT tested.

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §1.1307 (b)(1), §2.1091	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line Conducted Emissions	Not Applicable
§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	Compliance
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliance
§15.247(a)(1)(iii)	Quantity of hopping channel	Compliance
§15.247(b)(1)	Peak Output Power Measurement	Compliance
§15.247(d)	Band Edges	Compliance

Not Applicable: the product was powered by battery

FCC §15.247 (i) & §1.1307 (b) (1) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 15.247(i) and subpart §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.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm²)	Averaging Time (minutes)
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

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

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

Calculated Formulary:

Predication of MPE limit at a given distance

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

S = power density (in appropriate units, e.g. mW/cm²)

P = power input to the antenna (in appropriate units, e.g., mW).

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

Calculated Data:

Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm²)	MPE Limit (mW/cm²)
	(dBi)	(numeric)	(dBm)	(mW)			
2403	2	1.58	16.16	41.30	20	0.013	1.0

Note: To maintain compliance with the FCC’s RF exposure guidelines, place the equipment at least 20cm from nearby person’s body.

Result: Compliance

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.

Antenna Connector Construction

The EUT has a monopole antenna connected to RF board, which is in accordance to section 15.203, the maximum gain is 2 dBi; please refer to the internal photos.

Result: Compliance.

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

Applicable Standard

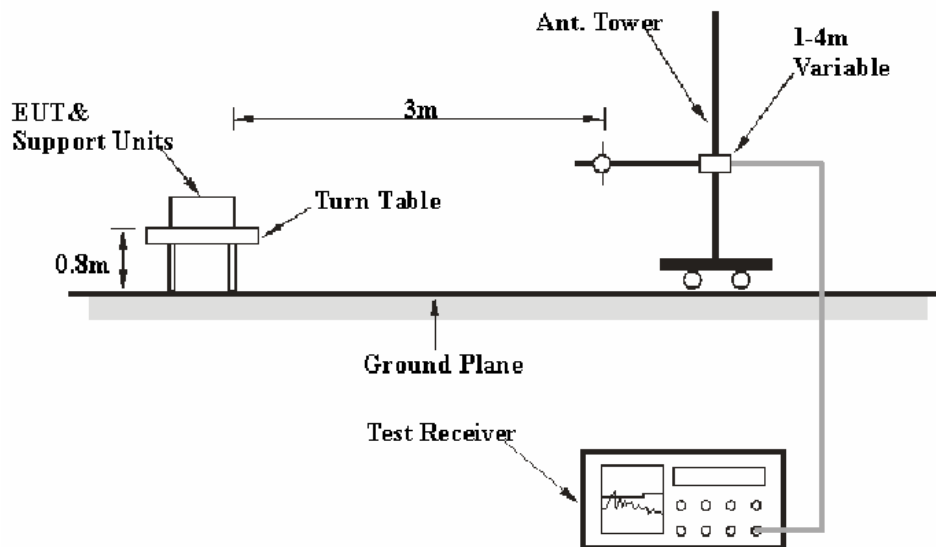
FCC §15.247 (d); §15.209; §15.205;

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 CISPR 16-4-4, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is 4.0 dB (k=2, 95% level of confidence), and the uncertainty will not be taken into consideration for the test data recorded in the report.

EUT Setup



The radiated emission tests were performed in the 3 meters 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.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

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

Frequency Range	RBW	Video B/W	IF B/W	Detector
30MHz – 1000 MHz	100 kHz	300 kHz	120kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK

Test Procedure

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 to 1GHz and peak and Average detection modes for frequencies above 1GHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	8447E	1937A01046	2012-11-24	2013-11-23
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2012-08-08	2013-08-07
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2011-11-28	2014-11-27
SUPER ULTRA	Amplifier	ZVA-213+	N/A	2012-11-24	2013-11-23
Sunol Sciences	Horn Antenna	DRH-118	A052304	2011-12-01	2014-11-30
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23
Agilent	Spectrum Analyzer	8564E	3943A01781	2012-05-17	2013-05-16
the electro-Mechanics Co.	Horn Antenna	3116	9510-2270	2010-10-14	2013-10-13

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

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 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:

2.65 dB at 2483.5 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 Henry Ding on 2013-04-18.

Test Mode: Transmitting

30 MHz -25 GHz:

Frequency (MHz)	Receiver		Turn table Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBuV/m)	FCC Part 15.247/205/209	
	Reading (dBuV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBuV/m)	Margin (dB)
Low Channel (2403 MHz)									
2403.0	110.03	PK	44	1.2	H	6.13	116.16	/	/
2403.0	100.82	PK	103	1.1	V	6.13	106.95	/	/
4806.0	52.38	PK	69	1.0	V	12.40	64.78	74	9.22
7209.0	47.33	PK	201	1.1	H	17.06	64.39	74	9.61
9612.0	43.02	PK	39	1.1	H	19.28	62.30	74	11.70
2328.3	52.33	PK	58	1.3	H	5.48	57.81	74	16.19
2389.0	50.34	PK	76	1.2	H	6.13	56.47	74	17.53
2490.1	38.53	PK	133	1.1	V	7.21	45.74	74	28.26
Middle Channel (2441 MHz)									
2441.0	110.31	PK	77	1.1	H	7.21	117.52	/	/
2441.0	99.60	PK	101	1.2	V	7.21	106.81	/	/
7323.0	50.24	PK	101	1.0	H	16.49	66.73	74	7.27
4882.0	51.50	PK	24	1.1	H	12.46	63.96	74	10.04
9764.0	39.71	PK	75	1.2	H	19.40	59.11	74	14.89
2364.9	50.60	PK	13	1.0	H	5.48	56.08	74	17.92
2384.5	42.27	PK	58	1.5	H	6.13	48.40	74	25.60
2489.2	39.43	PK	63	1.1	V	7.21	46.64	74	27.36
High Channel (2480 MHz)									
2480.0	106.07	PK	38	1.2	H	7.21	113.28	/	/
2480.0	94.62	PK	11	1.3	V	7.21	101.83	/	/
2483.5	64.14	PK	17	1.2	V	7.21	71.35	74	2.65*
2492.3	48.51	PK	135	1.3	V	7.21	55.72	74	18.28
9920.0	32.17	PK	11	1.4	V	19.38	51.55	74	22.45
7440.0	34.03	PK	63	1.1	V	15.90	49.93	74	24.07
4960.0	35.22	PK	87	1.2	V	12.50	47.72	74	26.28
2325.4	39.54	PK	138	1.1	V	5.48	45.02	74	28.98

Field Strength of Radiated Emission Average							
Freq. (MHz)	Peak Corrected Amplitude. @3m (dB μ V/m)	Polar (H/V)	Duty Cycle Factor (dB)	Corrected Amplitude. (dB μ V/m)	FCC 15.247/205/209		Comment
					Limit (dB μ V/m)	Margin	
Low Channel (2403 MHz)							
2403.0	116.16	H	-21.6	94.56	/	/	Fundamental
2403.0	106.95	V	-21.6	85.35	/	/	Fundamental
4806.0	64.78	V	-21.6	43.18	54	10.82	Harmonic
7209.0	64.39	H	-21.6	42.79	54	11.21	Harmonic
9612.0	62.30	H	-21.6	40.70	54	13.30	Harmonic
2328.3	57.81	H	-21.6	36.21	54	17.79	Spurious
2389.0	56.47	H	-21.6	34.87	54	19.13	Spurious
2490.1	45.74	V	-21.6	24.14	54	29.86	Spurious
Middle Channel (2441 MHz)							
2441.0	117.52	H	-21.6	95.92	/	/	Fundamental
2441.0	106.81	V	-21.6	85.21	/	/	Fundamental
7323.0	66.73	H	-21.6	45.13	54	8.87	Harmonic
4882.0	63.96	H	-21.6	42.36	54	11.64	Harmonic
9764.0	59.11	H	-21.6	37.51	54	16.49	Harmonic
2364.9	56.08	H	-21.6	34.48	54	19.52	Spurious
2384.5	48.40	H	-21.6	26.80	54	27.20	Spurious
2489.2	46.64	V	-21.6	25.04	54	28.96	Spurious
High Channel (2480 MHz)							
2480.0	113.28	H	-21.6	91.68	/	/	Fundamental
2480.0	101.83	V	-21.6	80.23	/	/	Fundamental
2483.5	71.35	V	-21.6	49.75	54	4.25	Spurious
2492.3	55.72	V	-21.6	34.12	54	19.88	Spurious
9920.0	51.55	V	-21.6	29.95	54	24.05	Harmonic
7440.0	49.93	V	-21.6	28.33	54	25.67	Harmonic
4960.0	47.72	V	-21.6	26.12	54	27.88	Harmonic
2325.4	45.02	V	-21.6	23.42	54	30.58	Spurious

Note:

Corrected Amplitude = Corrected Factor + Reading

Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor

Margin = Limit- Corr. Amplitude

Duty Cycle = Ton/Tp*100%, Duty cycle factor = 20lg (Duty Cycle) = -21.6

Ave. = PK+20* lg (Duty Cycle)

FCC §15.247(a) (1)-CHANNEL SEPARATION

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 operating mode, RBW was set at 100 kHz, VBW \geq 3RBW maxhold the channel.
2. Set the adjacent channel of the EUT maxhold another trace
3. Measure the channel separation.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

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

The testing was performed by Henry Ding on 2013-04-11.

Test Result: Compliance.

Please refer to following tables and plots

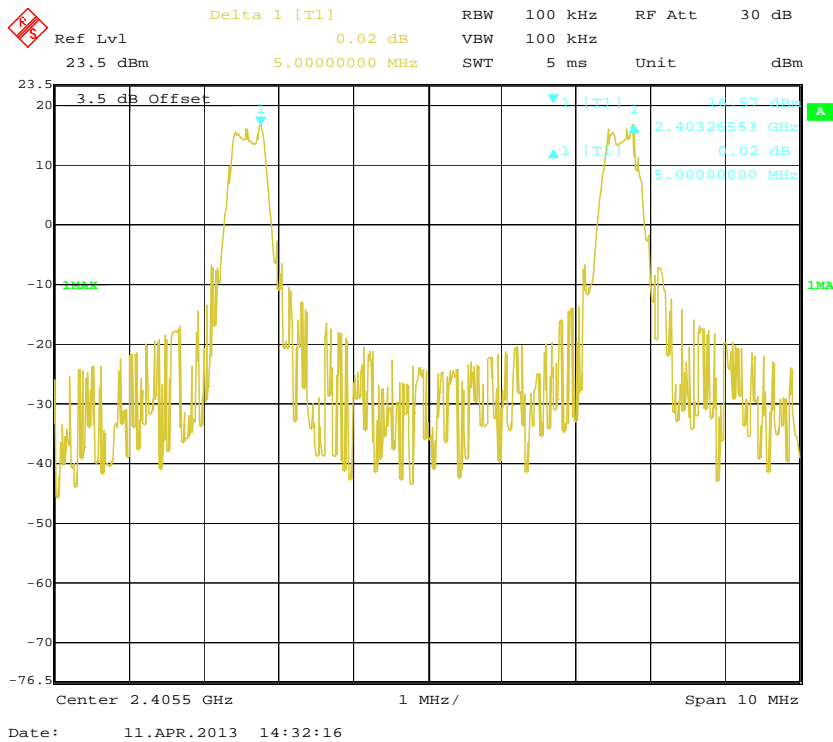
Test Mode: Transmitting

Channel	Channel Frequency (MHz)	Channel Separation (MHz)	>Limit (MHz)	Result
Low	2403	5.000	0.757	Pass
Adjacent	2408			
Middle	2441	5.000	0.805	
Adjacent	2436			
High	2480	6.000	0.805	
Adjacent	2474			

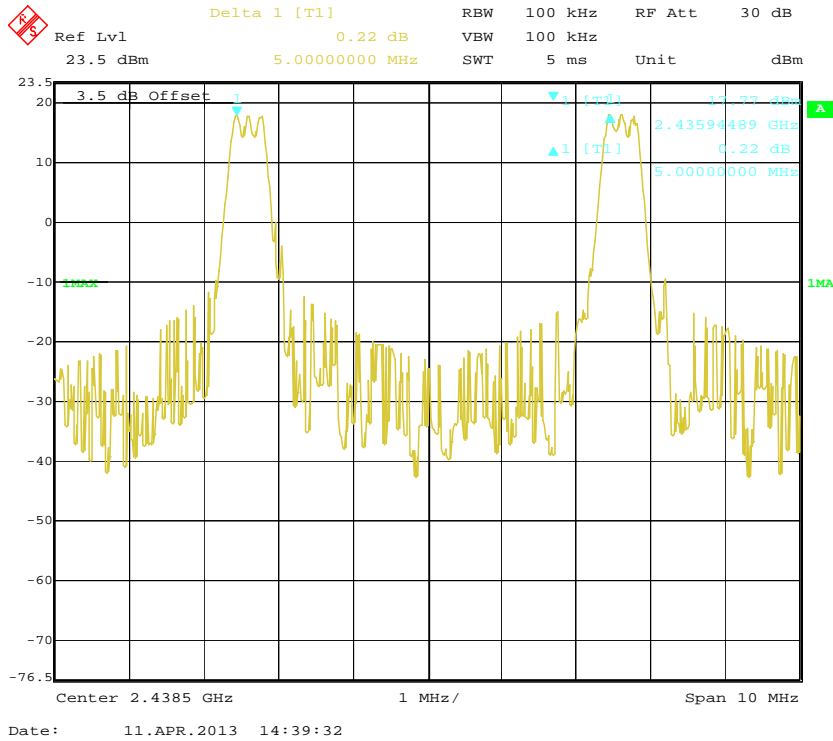
Note: limit =2/3 of bandwidth

Please refer to the following plots.

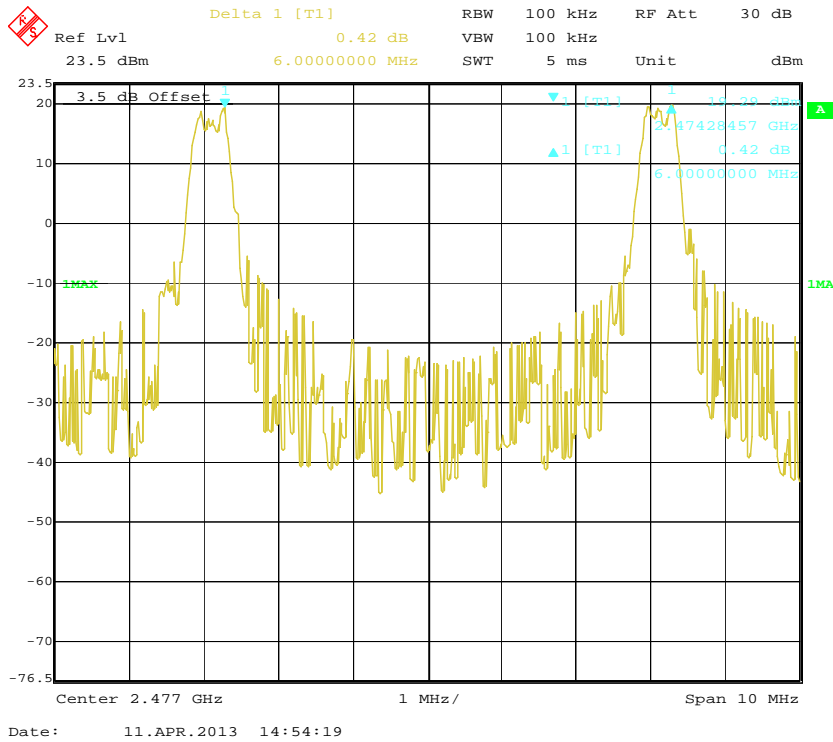
Low Channel



Middle Channel



High Channel



FCC §15.247(a) (1) – 20 dB EMISSION BANDWIDTH

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 125mW.

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	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

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

The testing was performed by Henry Ding on 2013-04-15.

Test Result: Compliance.

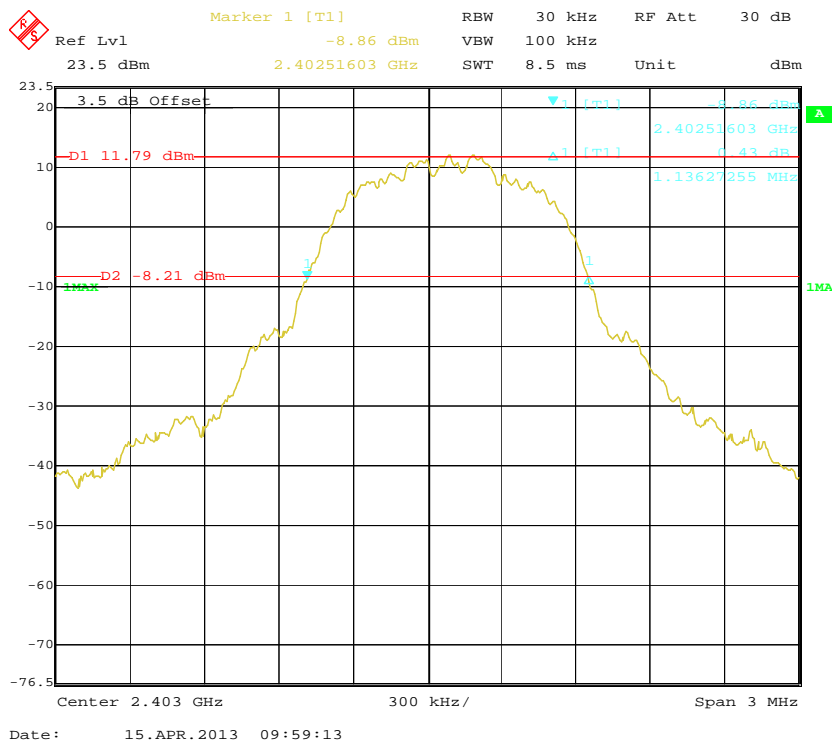
Please refer to following tables and plots

Test Mode: Transmitting

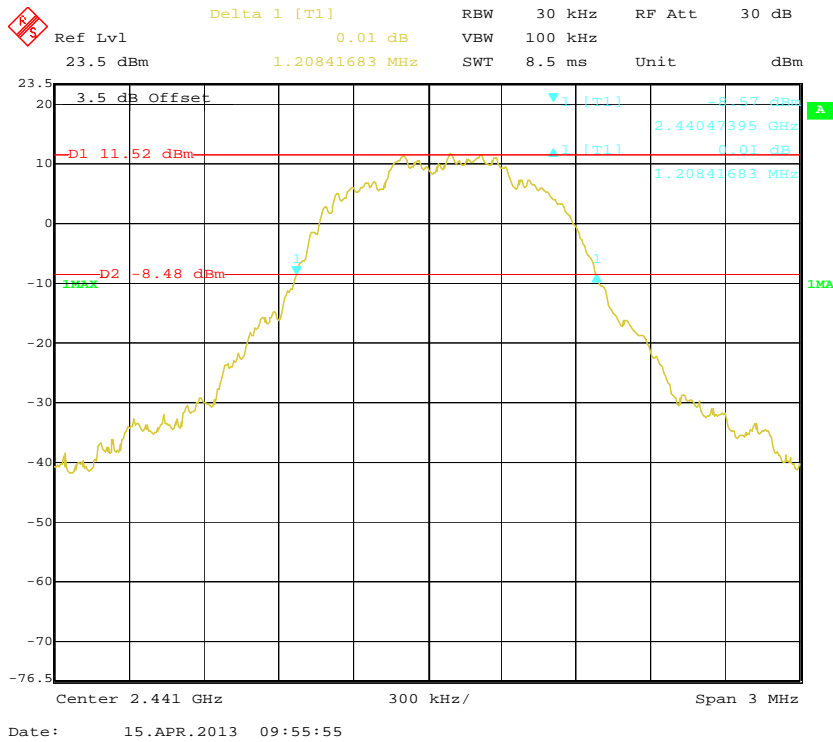
Channel	Frequency (MHz)	20 dB Emission Bandwidth (MHz)
Low	2403	1.136
Middle	2441	1.208
High	2480	1.208

Please refer to the following plots.

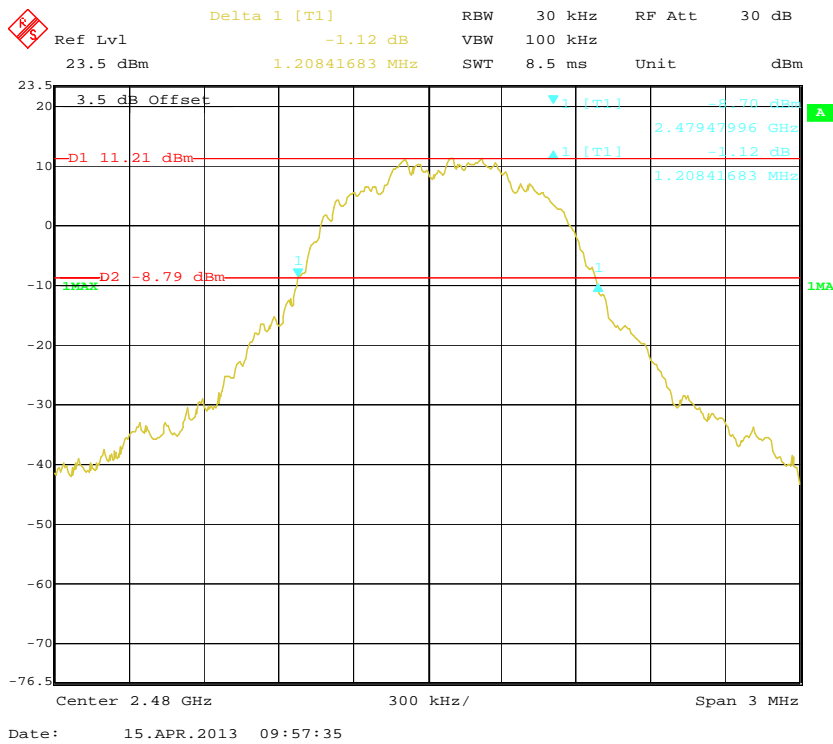
Low Channel



Middle Channel



High Channel



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

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	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

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

The testing was performed by Henry Ding on 2013-04-11.

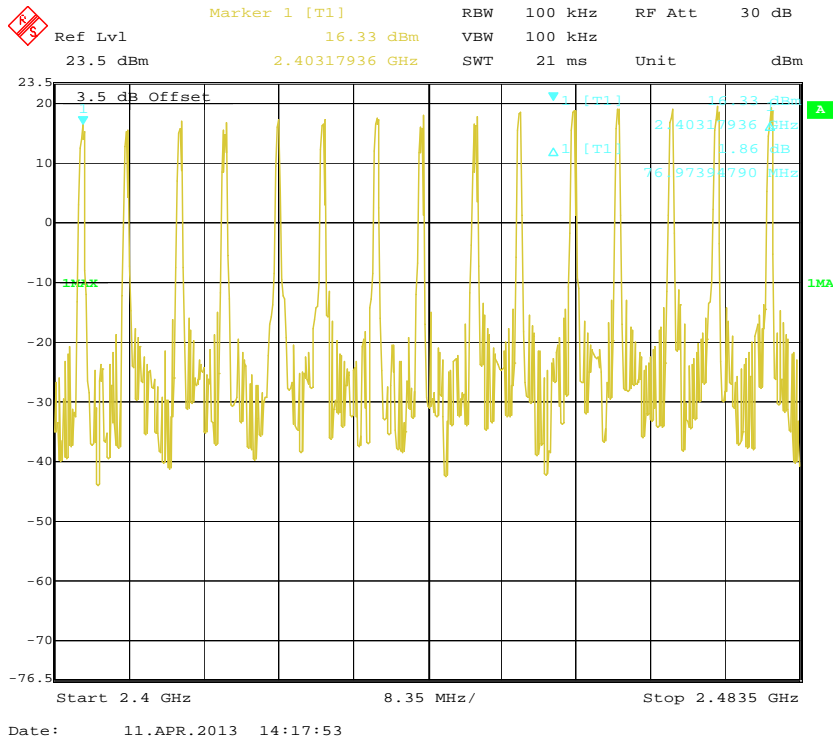
Test Result: Compliance.

Please refer to following tables and plots

Test Mode: Transmitting

Frequency Range (MHz)	Number of Hopping Channel	Limit
2400-2483.50	15	≥ 15

Number of Hopping Channels



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 X channel no. (s), the quantity of pulse was get from single sweep. In addition, the time of single pulses was tested.

Dwell Time= Pulse time (ms) * hope rate/ number of hopping channels * hopping No.*0.4 s

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Data**Environmental Conditions**

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

The testing was performed by Henry Ding on 2013-04-11.

Test Result: Compliance.

Please refer to following tables and plots

Test Mode: Transmitting

Channel	Pulse Width (ms)	Dwell Time (S)	Limit (S)	Result
Low	0.491	0.033	0.4	Pass
Middle	0.491	0.033	0.4	Pass
High	0.491	0.033	0.4	Pass

Note:

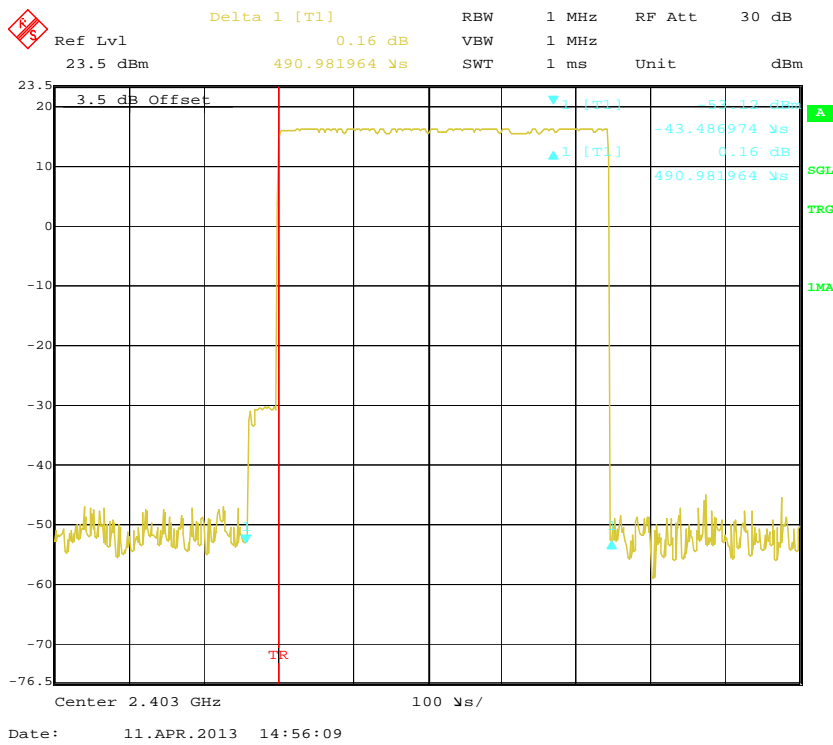
1:Dwell time = Pulse time*3*(56/15)*15*0.4s

2:Every transmit chain contain three pulse

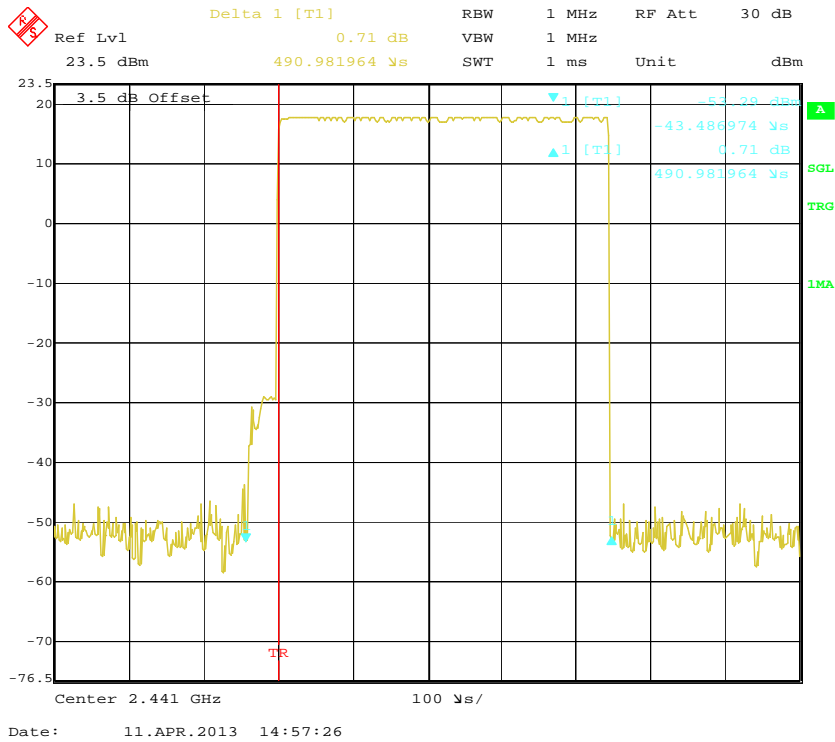
3:Hopping rate is 56 times/per second

Please refer to the following plots.

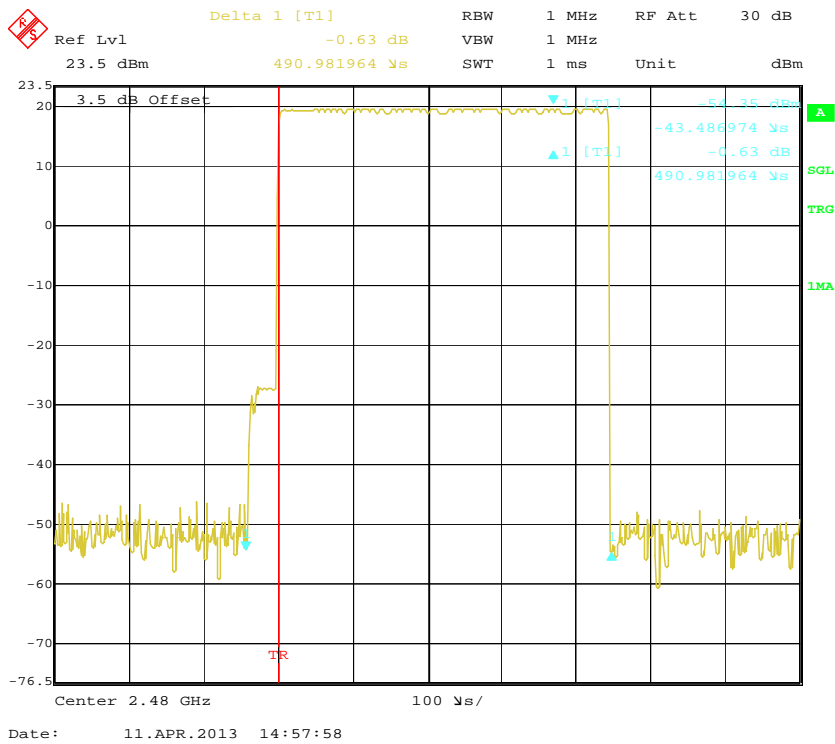
Low Channel



Middle Channel



High Channel



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. 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 it 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	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

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

The testing was performed by Henry Ding on 2013-04-12 and 2013-04-18.

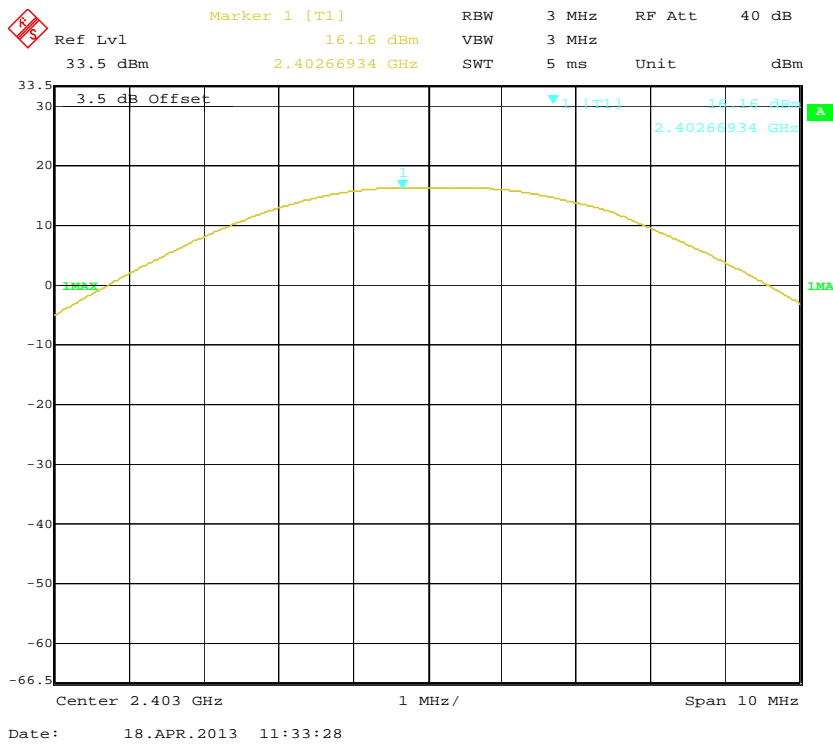
Test Result: Compliance.

Test Mode: Transmitting

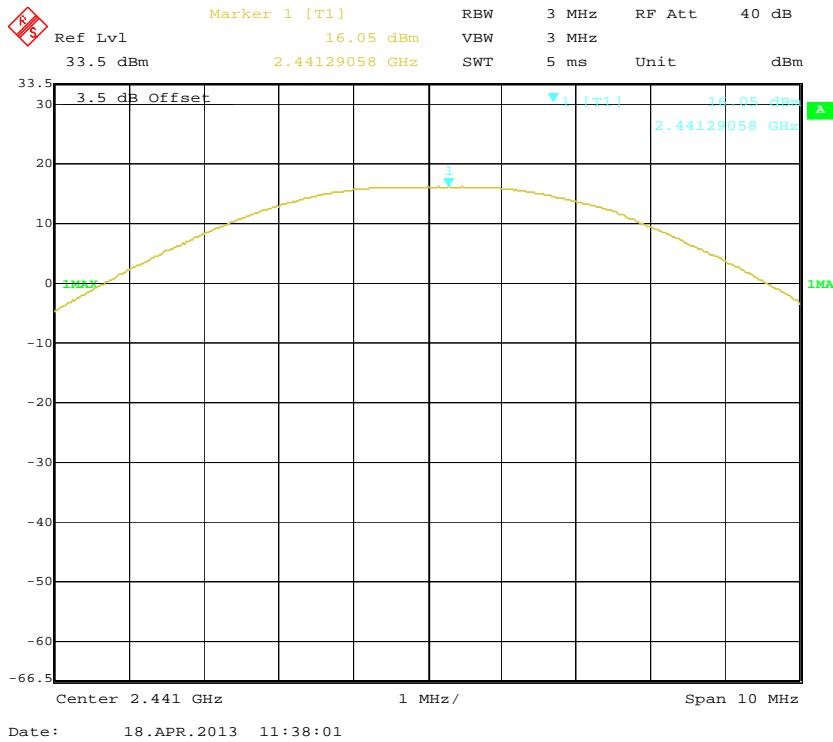
Channel	Channel Frequency (MHz)	Peak Output Power (dBm)	Power Output (mW)	Limit (mW)
Low channel	2403	16.16	41.305	125
Middle channel	2441	16.05	40.272	125
High channel	2480	10.34	10.814	125

Note: The data above was tested in conducted mode.

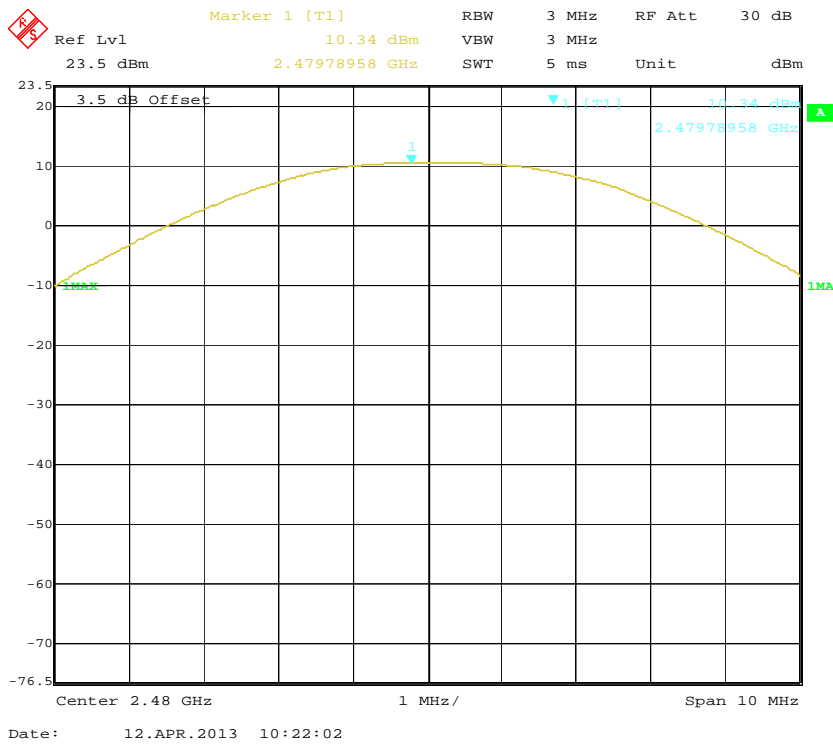
Low Channel



Middle Channel



High Channel



FCC §15.247(d) - BAND EDGES

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 Operating 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. 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.
4. 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	Signal Analyzer	FSIQ26	8386001028	2012-11-24	2013-11-23

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

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

The testing was performed by Henry Ding on 2013-04-12 and 2013-04-18.

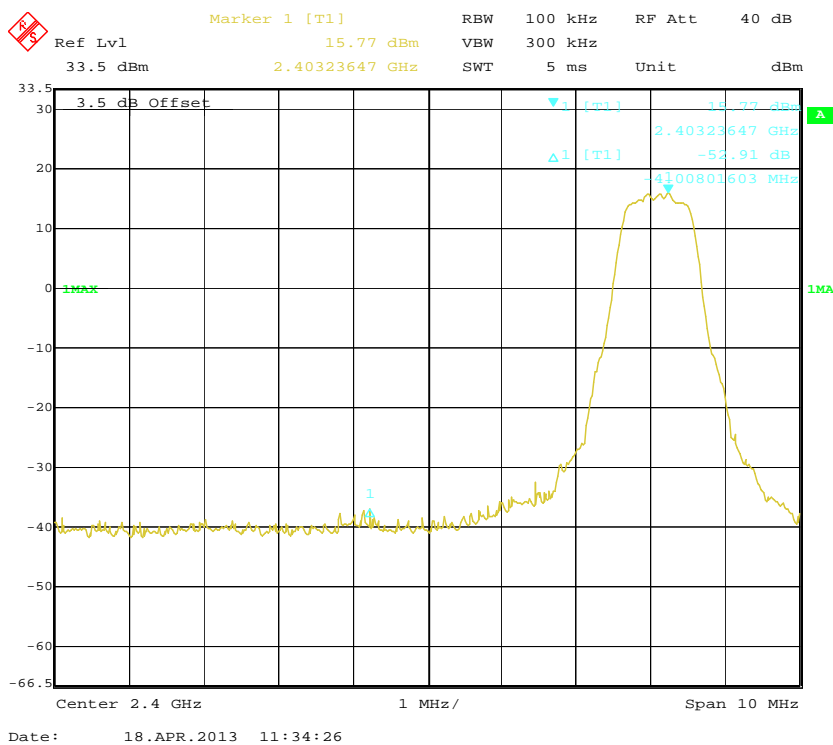
Test Result: Compliance.

Test Mode: Transmitting

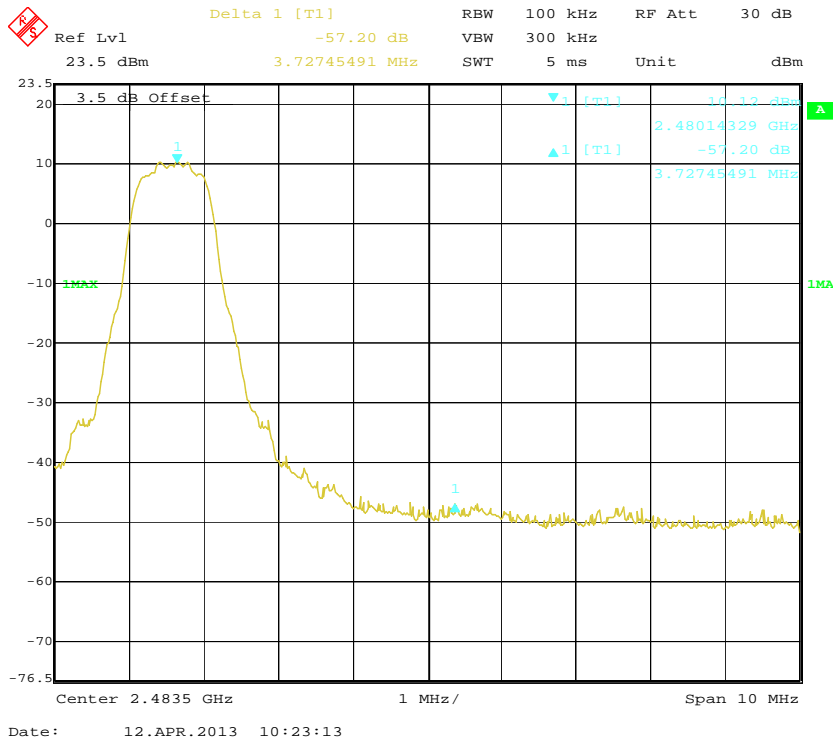
Frequency Band	Delta Peak to Band Emission (dBc)	>Limit (dBc)
Left Band	52.91	20
Right Band	57.20	20

Please refer to follow plots:

Band Edge: Left Side



Band Edge: Right Side



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