



FCC PART 15.247

TEST REPORT

For

Rodsum Wireless (Shenzhen) Ltd.

Unit 407, Block 404, Shangbu Industrial Park, Futian District,
Shenzhen, Guangdong 518028, China

FCC ID: ZY7AC-RFR-020

Report Type: Original Report	Product Type: RFID Reader Box
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Report Number: RSZ110806001-00	
Report Date: 2011-09-19	
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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. This report **must not** be used by the customer to claim product certification, approval, or endorsement by NVLAP*, or any agency of the Federal Government.

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

TABLE OF CONTENTS

GENERAL INFORMATION.....4

 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT).....4

 OBJECTIVE5

 RELATED SUBMITTAL(S)/GRANT(S).....5

 TEST METHODOLOGY5

 TEST FACILITY5

SYSTEM TEST CONFIGURATION.....6

 DESCRIPTION OF TEST CONFIGURATION6

 EUT EXERCISE SOFTWARE6

 EQUIPMENT MODIFICATIONS6

 LOCAL SUPPORT EQUIPMENT LIST AND DETAILS6

 EXTERNAL I/O CABLE.....6

 CONFIGURATION OF TEST SETUP7

 BLOCK DIAGRAM OF TEST SETUP7

SUMMARY OF TEST RESULTS8

FCC §15.247 (i) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE).....9

 APPLICABLE STANDARD9

FCC §15.203 - ANTENNA REQUIREMENT.....10

 APPLICABLE STANDARD10

 ANTENNA CONNECTOR CONSTRUCTION10

FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS.....11

 APPLICABLE STANDARD11

 MEASUREMENT UNCERTAINTY11

 EUT SETUP11

 EMI TEST RECEIVER & SPECTRUM ANALYZER SETUP12

 TEST PROCEDURE12

 TEST EQUIPMENT LIST AND DETAILS.....12

 CORRECTED AMPLITUDE & MARGIN CALCULATION12

 TEST RESULTS SUMMARY13

 TEST DATA13

FCC §15.247(a) (1) - CHANNEL SEPARATION TEST16

 APPLICABLE STANDARD16

 TEST EQUIPMENT LIST AND DETAILS.....16

 TEST PROCEDURE16

 TEST DATA16

FCC §15.247(a) (1) (i) – 20 dB BANDWIDTH TESTING19

 APPLICABLE STANDARD19

 TEST EQUIPMENT LIST AND DETAILS.....19

 TEST PROCEDURE19

 TEST DATA19

FCC §15.247(a) (1) (i) - QUANTITY OF HOPPING CHANNEL TEST22

 APPLICABLE STANDARD22

 TEST EQUIPMENT LIST AND DETAILS.....22

TEST PROCEDURE22
TEST DATA22

FCC §15.247(a) (1) (i) - TIME OF OCCUPANCY (DWELL TIME).....24

APPLICABLE STANDARD24
TEST EQUIPMENT LIST AND DETAILS.....24
TEST PROCEDURE24
TEST DATA24

FCC §15.247(b) (2) - PEAK OUTPUT POWER MEASUREMENT29

APPLICABLE STANDARD29
TEST EQUIPMENT LIST AND DETAILS.....29
TEST PROCEDURE29
TEST DATA29

FCC §15.247(d) - BAND EDGES TESTING32

APPLICABLE STANDARD32
TEST PROCEDURE32
TEST EQUIPMENT LIST AND DETAILS.....32
TEST DATA33

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Rodsum Wireless (Shenzhen) Ltd.*'s product, model number: *AC-RFR-020 (FCC ID: ZY7AC-RFR-020)* (the "EUT") in this report is a *RFID Reader Box*, which was measured approximately: 400 mm (L) x 178 mm (W) x 50 mm (H), DC 9-36V.

For RFID mode, 50 channels, Start from frequency: 902.5 MHz, Stop frequency: 927 MHz.

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	902.5	18	911.0	35	919.5
2	903.0	19	911.5	36	920.0
3	903.5	20	912.0	37	920.5
4	904.0	21	912.5	38	921.0
5	904.5	22	913.0	39	921.5
6	905.0	23	913.5	40	922.0
7	905.5	24	914.0	41	922.5
8	906.0	25	914.5	42	923.0
9	906.5	26	915.0	43	923.5
10	907.0	27	915.5	44	924.0
11	907.5	28	916.0	45	924.5
12	908.0	29	916.5	46	925.0
13	908.5	30	917.0	47	925.5
14	909.0	31	917.5	48	926.0
15	909.5	32	918.0	49	926.5
16	910.0	33	918.5	50	927.0
17	910.5	34	919.0		

* All measurement and test data in this report was gathered from production sample serial number: 1108013 (Assigned by BACL). The EUT was received on 2011-08-06.

Objective

This Type approval report is prepared on behalf of *Rodsum Wireless (Shenzhen) Ltd.* in accordance with Part 2, Subpart J, Part 15, Subparts A, B and C of the Federal Communication Commissions rules.

The tests were performed in order to determine the compliance of the EUT with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

N/A

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

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

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

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is an ISO/IEC 17025 accredited laboratory, and is accredited by National Voluntary Laboratory Accredited Program (Lab Code 200707-0).



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

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user).

EUT Exercise Software

“RFID.exe” is provided by manufacture.

Equipment Modifications

No modification was made to the unit tested.

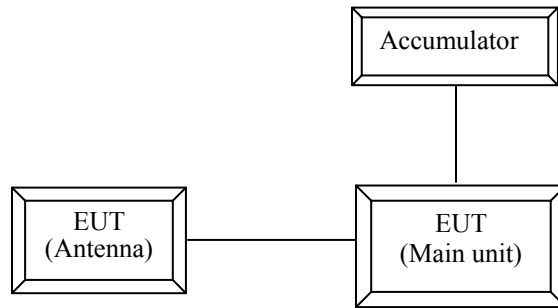
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	Laptop	D600	S2-B011
SHENZHEN RITAR POWER CO., LTD.	Accumulator	R71250	1H11FBU

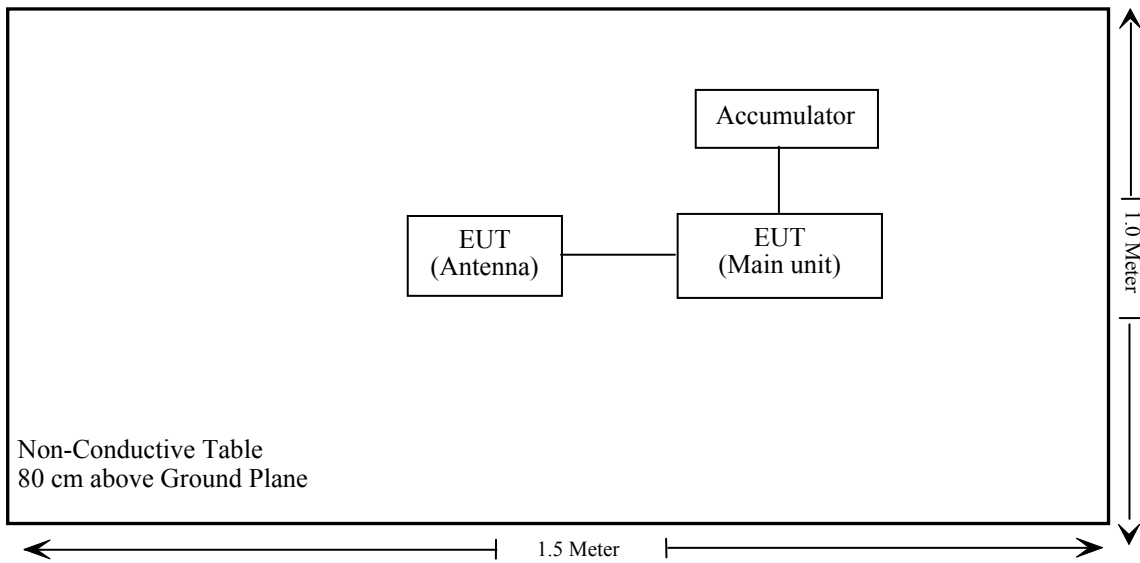
External I/O Cable

Cable Description	Length (m)	From Port	To
Unshielded Undetachable Power line	0.2	Accumulator	EUT

Configuration of Test Setup



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	Compliant
§15.203	Antenna Requirement	Compliant
§15.207 (a)	AC Line Conducted Emissions	N/A
§15.205, §15.209, §15.247(d)	Radiated Emissions	Compliant
§15.247 (a)(1) (i)	20 dB Bandwidth	Compliant
§15.247(a)(1)	Channel Separation Test	Compliant
§15.247(a)(1)(i)	Time of Occupancy (Dwell Time)	Compliant
§15.247(a)(1)(i)	Quantity of hopping channel Test	Compliant
§15.247(b)(2)	Peak Output Power Measurement	Compliant
§15.247(d)	Band Edges	Compliant

Note: The EUT operates with a 24 VDC from battery.

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

Applicable Standard

According to FCC §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.

MPE Calculation

Predication of MPE limit at a given distance

$$S = PG/4\pi R^2$$

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);

Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm²)	MPE Limit (mW/cm²)
	(dBi)	(numeric)	(dBm)	(mW)			
927	8.0	6.3	20.59	114.6	20	0.144	0.618

Result: The device meets FCC MPE limit at 20 cm distance.

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to FCC §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

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

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

And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in 1 dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The device has the external N-connector for antenna connection, the device must be professionally installed, the antenna's maximum gain is 8.0 dBi, please refer to the internal photos.

Result: Compliance.

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

Applicable Standard

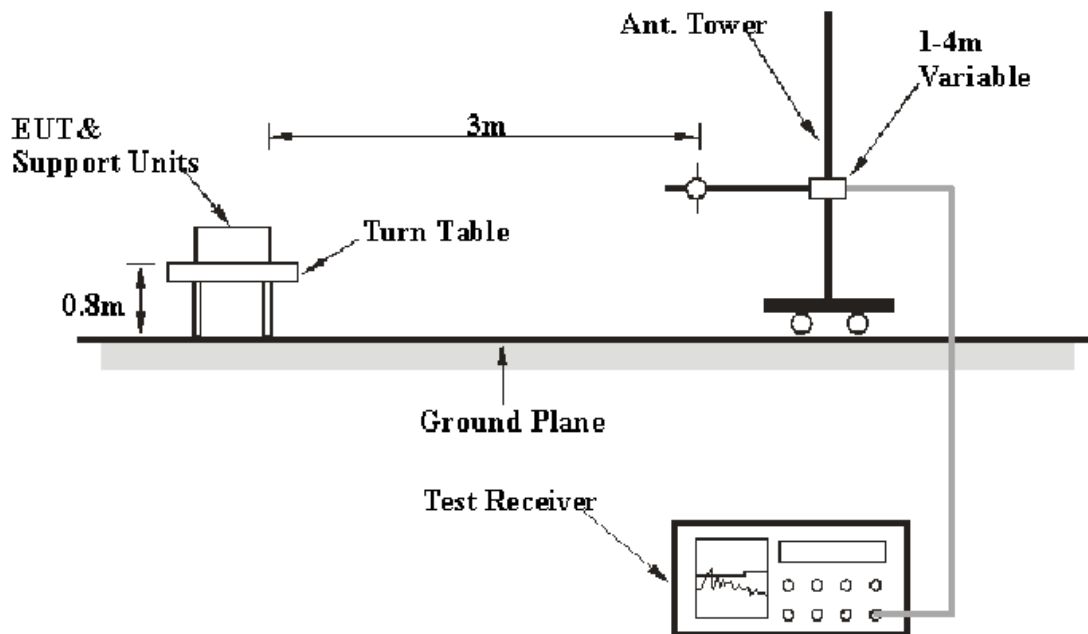
FCC §15.247 (d); §15.209; §15.205;

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

EUT Setup



The radiated emission tests were performed in the 3 meters chamber B 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 spacing between the peripherals was 10 cm.

EMI Test Receiver & Spectrum Analyzer Setup

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

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-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	HP8447D	2944A09795	2011-08-02	2012-08-01
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-11	2011-11-10
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2011-07-05	2012-07-04
Mini-Circuits	Amplifier	ZVA-213+	T-E27H	2011-03-08	2012-03-07
Sunol Sciences	Horn Antenna	DRH-118	A052604	2011-05-05	2012-05-04
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2011-07-08	2012-07-07

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

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, 15.205, 15.209 and 15.247, with the worst margin reading of:

30 -1000 MHz:

11.3 dB at 30.485000 MHz in the **Horiaontal** polarization

Above 1 GHz:

High Channel: **1.66 dB at 2781.0 MHz** in the **Vertical** polarization

Test Data

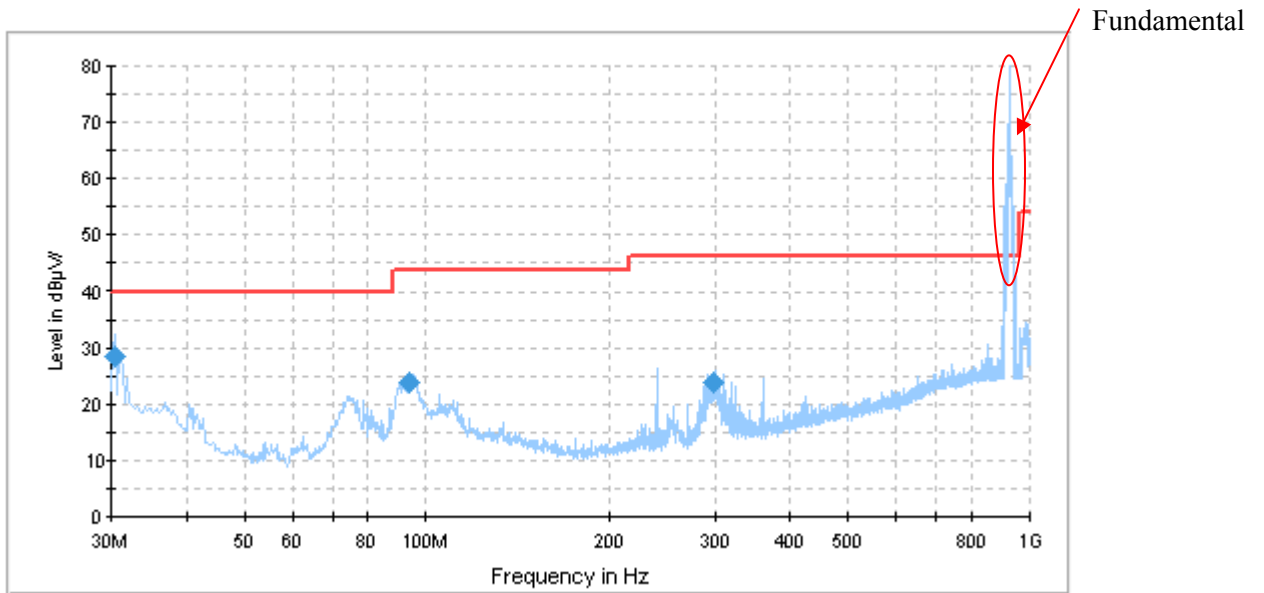
Environmental Conditions

Temperature:	24 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The testing was performed by Back Huang on 2011-08-30.

Test Mode: Transmitting (Worst case)

1) 30-1000 MHz:



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Test Antenna		Turntable Position (degree)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
		Height (cm)	Polarity (H/V)				
30.485000	28.7	143.0	H	350.0	-9.1	40.0	11.3
94.231500	24.1	144.0	H	207.0	-14.3	43.5	19.4
298.932500	23.9	144.0	H	195.0	-11.1	46.0	22.1

2) Above 1 GHz:

Indicated		Detector (PK/AV)	Table Angle Degree	Test Antenna		Correction Factor			FCC Part 15.247/15.205/15.209		
Frequency (MHz)	S.A. Reading (dBµV/m)			Height (m)	Polar (H/V)	Antenna Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
Low Channel (902.5 MHz)											
2707.5	64.83	PK	0	1.5	V	30.8	3.13	26.85	71.91	74	2.09*
2707.5	62.74	PK	0	1.4	H	31.3	3.13	26.85	70.32	74	3.68*
2707.5	34.41	Ave.	0	1.2	V	30.8	3.13	26.85	41.49	54	12.51
2707.5	33.75	Ave.	0	1.4	H	31.3	3.13	26.85	41.33	54	12.67
1805.0	46.87	PK	0	1.5	V	27.9	2.53	26.67	50.63	74	23.37
1805.0	44.06	PK	0	1.3	H	28.1	2.53	26.67	48.02	74	25.98
1805.0	23.87	Ave.	0	1.5	V	27.9	2.53	26.67	27.63	54	26.37
1805.0	23.13	Ave.	0	1.3	H	28.1	2.53	26.67	27.09	54	26.91
1134.26	22.23	Ave.	0	1.2	H	25.3	2.03	26.49	23.07	54	30.93
1134.26	22.25	Ave.	0	1.2	V	24.1	2.03	26.49	21.89	54	32.11
1134.26	37.63	PK	0	1.2	H	25.3	2.03	26.49	38.47	74	35.53
1134.26	37.87	PK	0	1.2	V	24.1	2.03	26.49	37.51	74	36.49
Middle Channel (914.5 MHz)											
2743.5	64.95	PK	0	1.5	V	30.9	3.13	26.85	72.13	74	1.87*
2743.5	62.86	PK	0	1.3	H	31.4	3.13	26.85	70.54	74	3.46*
2743.5	34.67	Ave.	0	1.5	V	30.9	3.13	26.85	41.85	54	12.15
2743.5	33.92	Ave.	0	1.3	H	31.4	3.13	26.85	41.60	54	12.40
1829.0	47.24	PK	0	1.6	V	28.0	2.53	26.67	51.10	74	22.90
1829.0	44.32	PK	0	1.3	H	28.2	2.53	26.67	48.38	74	25.62
1829.0	24.01	Ave.	0	1.6	V	28.0	2.53	26.67	27.87	54	26.13
1829.0	23.15	Ave.	0	1.3	H	28.2	2.53	26.67	27.21	54	26.79
1260.52	22.26	Ave.	0	1.3	H	25.8	2.06	26.53	23.59	54	30.41
1260.52	22.27	Ave.	0	1.3	V	24.9	2.06	26.53	22.70	54	31.30
1260.52	37.52	PK	0	1.3	H	25.8	2.06	26.53	38.85	74	35.15
1260.52	37.61	PK	0	1.3	V	24.9	2.06	26.53	38.04	74	35.96
High Channel (927.0 MHz)											
2781.0	65.06	PK	0	1.5	V	31.0	3.13	26.85	72.34	74	1.66*
2781.0	63.12	PK	0	1.4	H	31.5	3.13	26.85	70.90	74	3.10*
2781.0	34.85	Ave.	0	1.5	V	31.0	3.13	26.85	42.13	54	11.87
2781.0	34.03	Ave.	0	1.4	H	31.5	3.13	26.85	41.81	54	12.19
1854.0	47.85	PK	0	1.5	V	28.1	2.53	26.67	51.81	74	22.19
1854.0	44.96	PK	0	1.3	H	28.3	2.53	26.67	49.12	74	24.88
1854.0	24.13	Ave.	0	1.5	V	28.1	2.53	26.67	28.09	54	25.91
1854.0	23.23	Ave.	0	1.3	H	28.3	2.53	26.67	27.39	54	26.61
1450.9	22.35	Ave.	0	1.3	H	26.4	2.24	26.66	24.33	54	29.67
1450.9	22.42	Ave.	0	1.3	V	25.9	2.24	26.66	23.90	54	30.1
1450.9	37.56	PK	0	1.3	H	26.4	2.24	26.66	39.54	74	34.46
1450.9	37.87	PK	0	1.3	V	25.9	2.24	26.66	39.35	74	34.65

*within measurement uncertainty!

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.

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 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 Data

Environmental Conditions

Temperature:	26 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

* *The testing was performed by Back Huang on 2011-08-17.*

Test Result: Compliant.

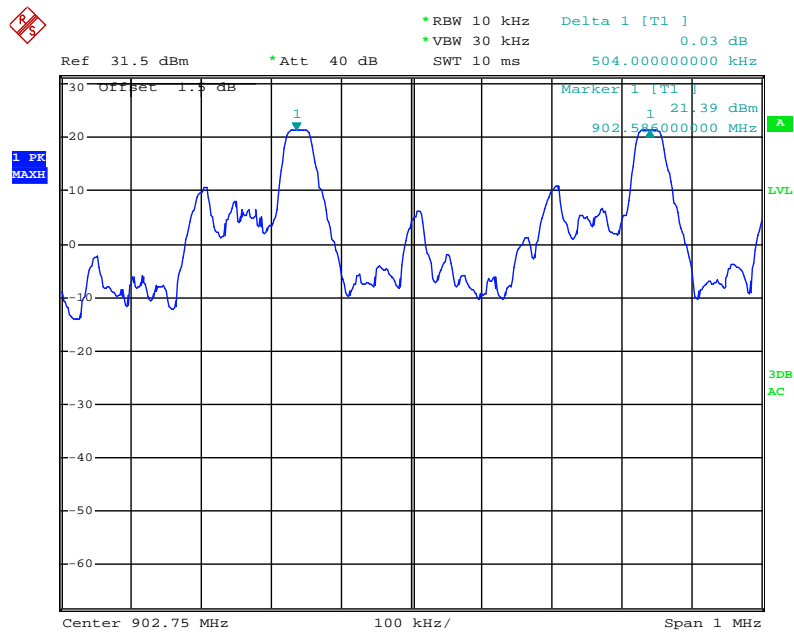
Please refer to following tables and plots

Test Mode: Transmitting

Channel	Channel Separation (kHz)	Limit>(20dB Bandwidth) (kHz)	Result
Low Channel	504	344	Pass
Adjacent Channel			
Mid Channel	504	342	Pass
Adjacent Channel			
High Channel	504	336	Pass
Adjacent Channel			

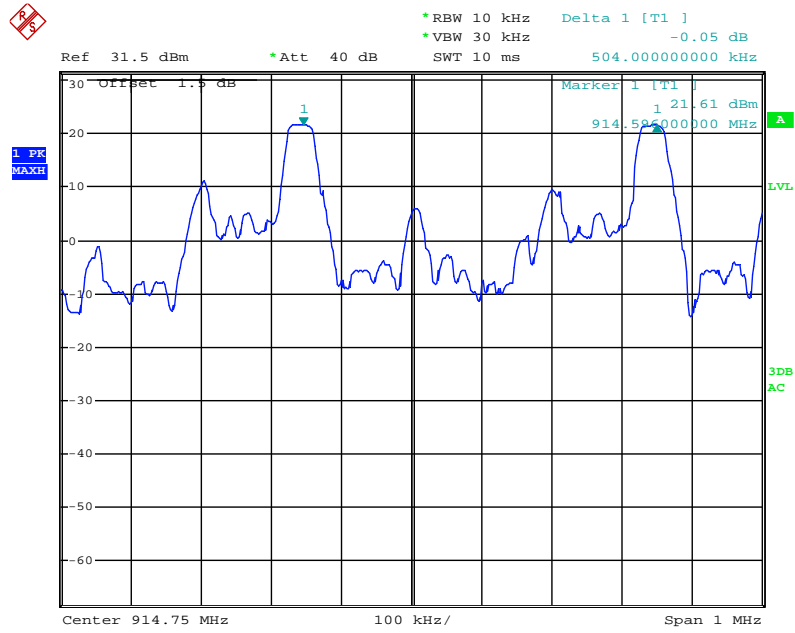
Please refer to the following plots.

Low Channel



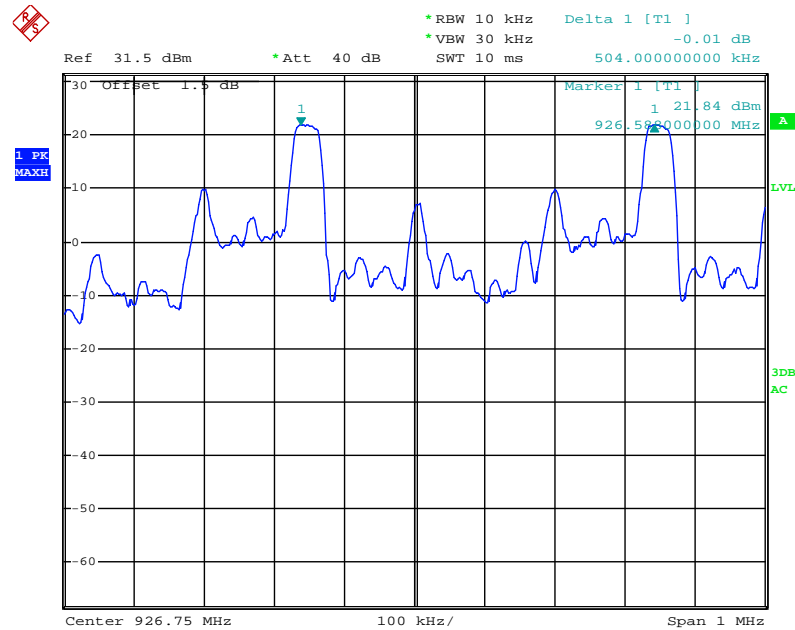
Date: 17.AUG.2011 04:19:19

Middle Channel



Date: 17.AUG.2011 04:23:52

High Channel



Date: 17.AUG.2011 04:26:38

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

Applicable Standard

The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

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 Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. 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 Data

Environmental Conditions

Temperature:	26 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

* *The testing was performed by Back Huang on 2011-09-18*

Test Result: Compliant.

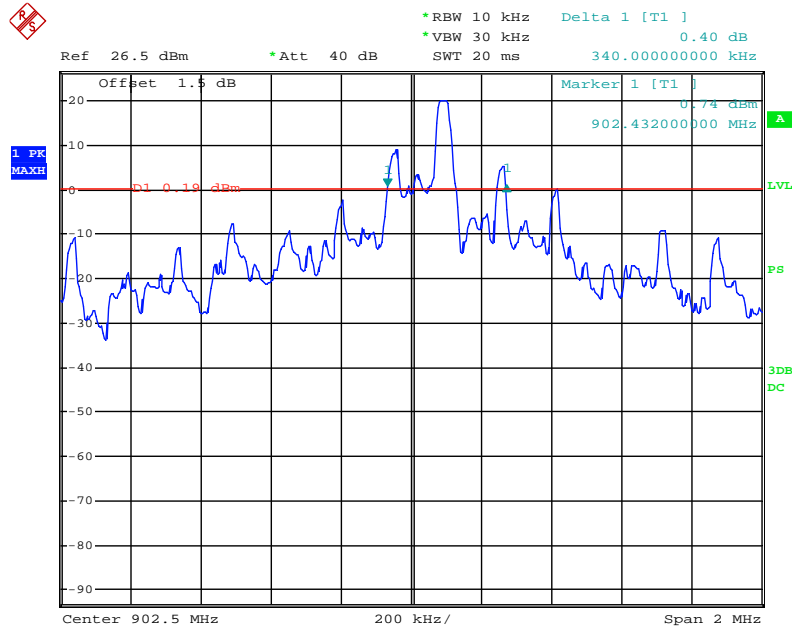
Please refer to following tables and plots

Test Mode: Transmitting

Channel	Frequency (MHz)	20 dB Bandwidth (kHz)	Limit (kHz)
Low	902.5	340	< 500
Middle	914.5	340	< 500
High	927.0	332	< 500

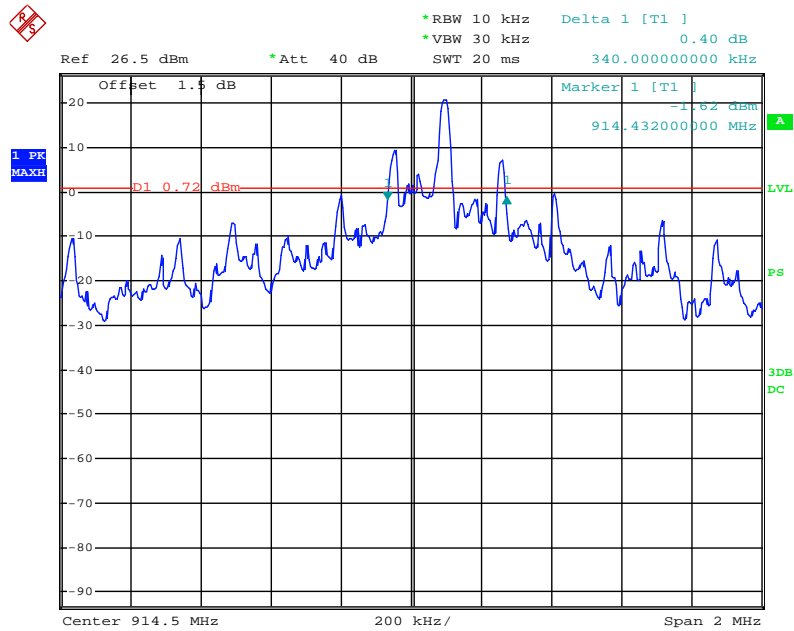
Please refer to the following plots.

Low Channel



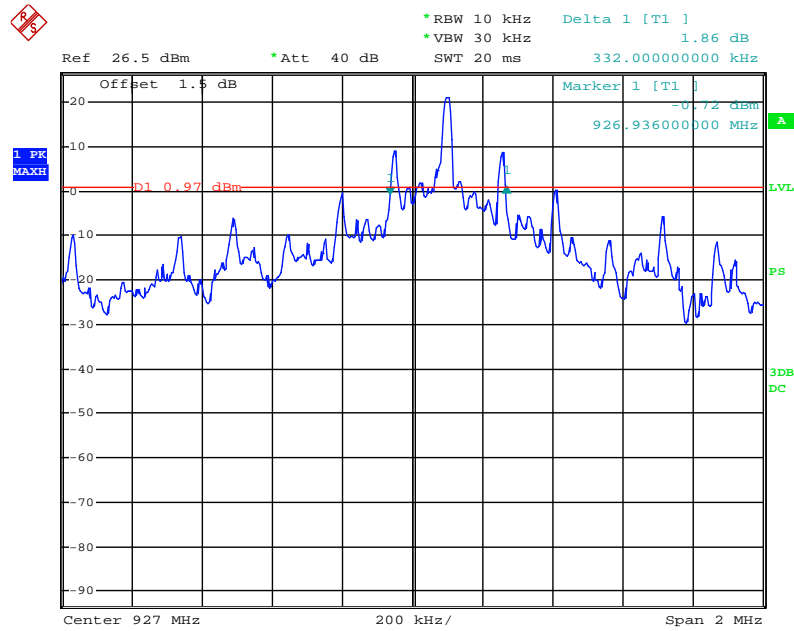
Date: 18.SEP.2011 14:54:34

Middle Channel



Date: 18.SEP.2011 14:53:02

High Channel



Date: 18.SEP.2011 14:56:32

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

Applicable Standard

For frequency hopping systems operating in the 902 – 928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period;

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 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 Data

Environmental Conditions

Temperature:	26 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

The testing was performed by Back Huang on 2011-08-29.

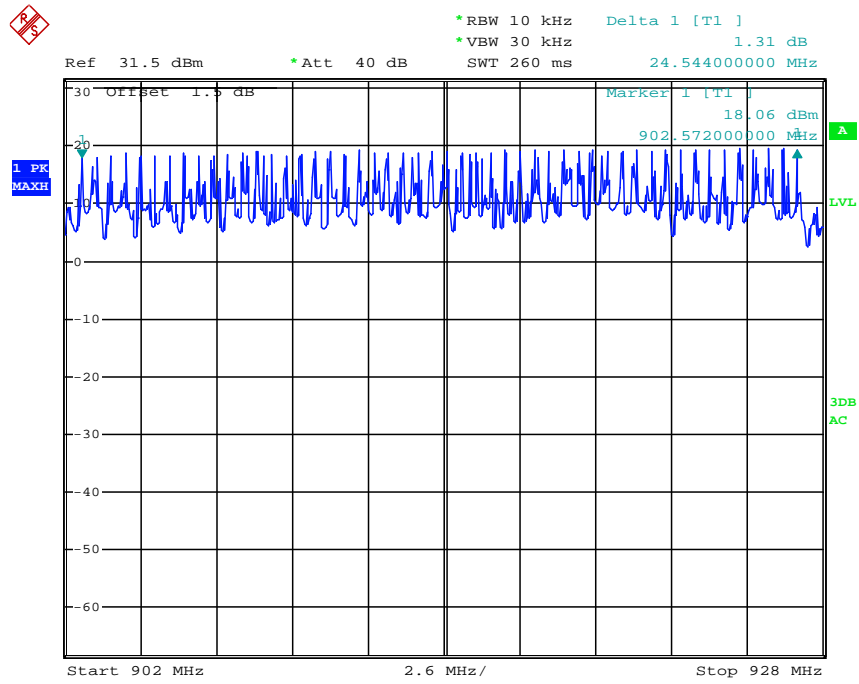
Test Result: Compliant.

Please refer to following tables and plots

Test Mode: Transmitting

Frequency Range (MHz)	Number of Hopping Channel	Limit
902-928	50	≥ 25

Number of Hopping Channels



Date: 29.AUG.2011 10:16:38

FCC §15.247(a) (1) (i) - TIME OF OCCUPANCY (DWELL TIME)

Applicable Standard

For frequency hopping systems operating in the 902 – 928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period;

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 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.

Test Data

Environmental Conditions

Temperature:	26 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

* The testing was performed by Back Huang on 2011-08-29.

Test Result: Compliant.

Please refer to following tables and plots

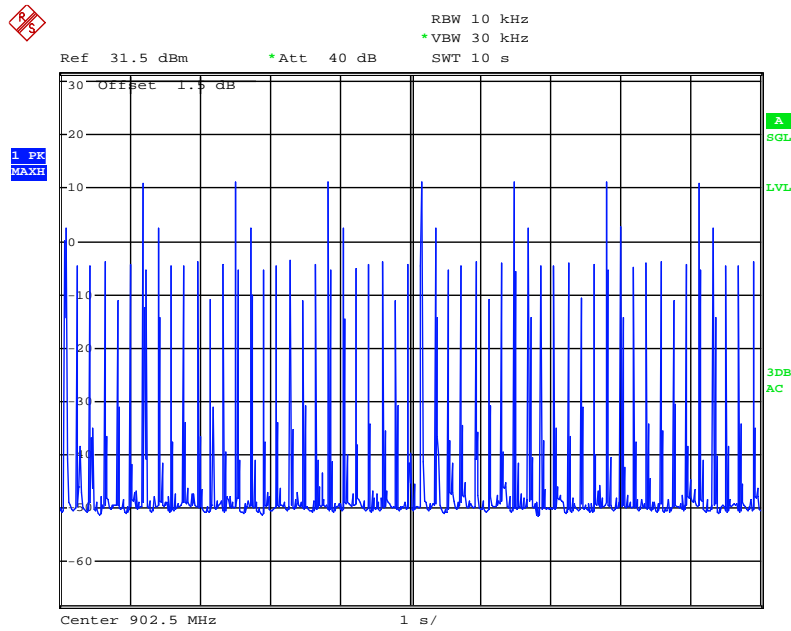
Test Mode: Transmitting

Channel	Pulse Width (ms)	Pulse Quantity Per 10 Sec	Dwell Time(Sec)	Limit (Sec)
Low	3.42	7	0.02394	0.4
Middle	3.42	7	0.02394	0.4
High	3.42	7	0.02394	0.4

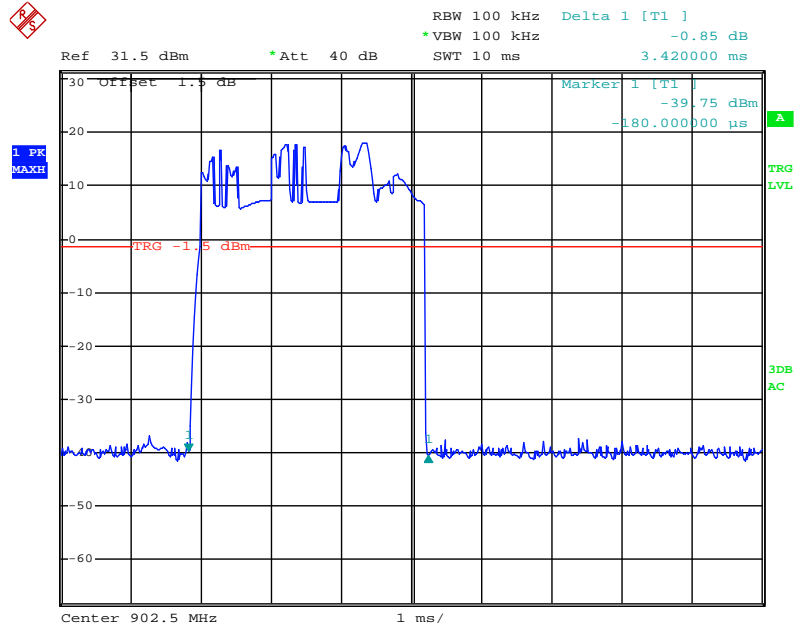
*Note: Dwell time = Pulse time*Pulse Quantity*

Please refer to the following plots.

Low Channel

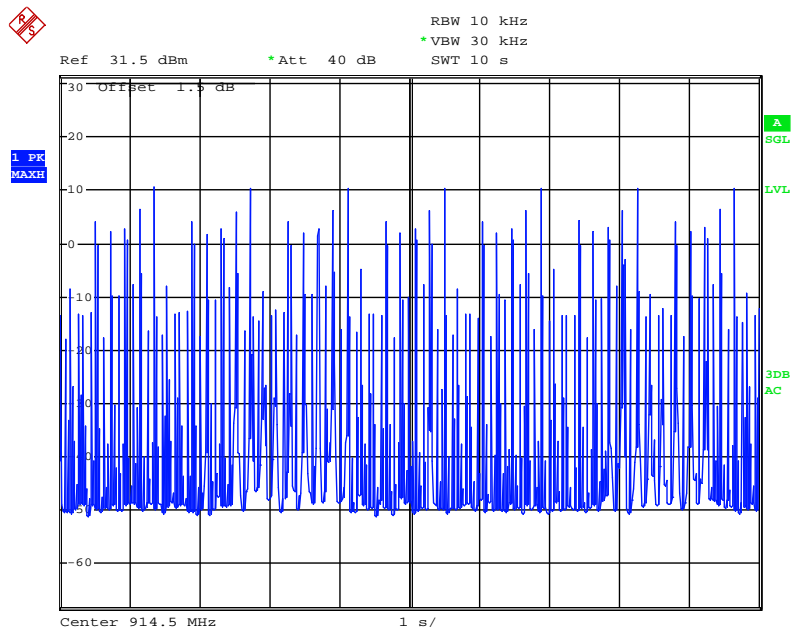


Date: 8.SEP.2011 15:35:24

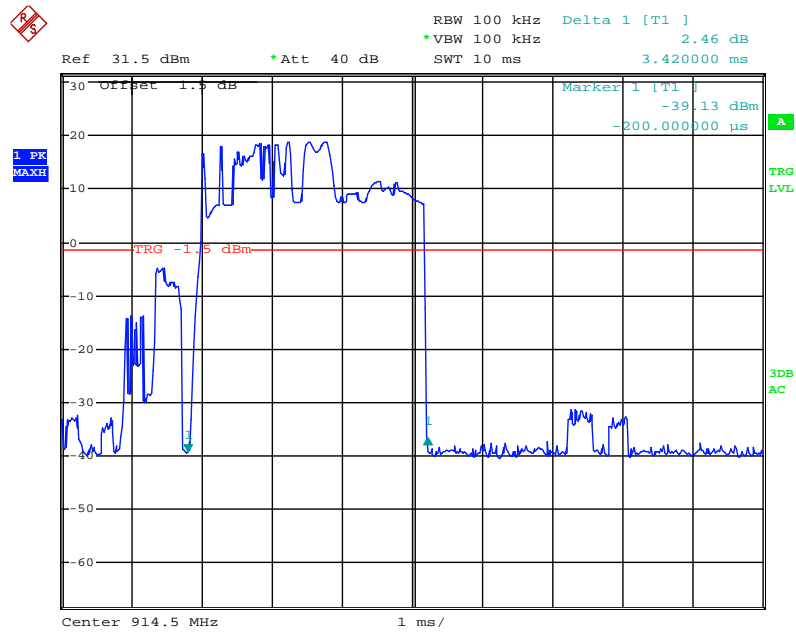


Date: 29.AUG.2011 11:48:36

Middle Channel

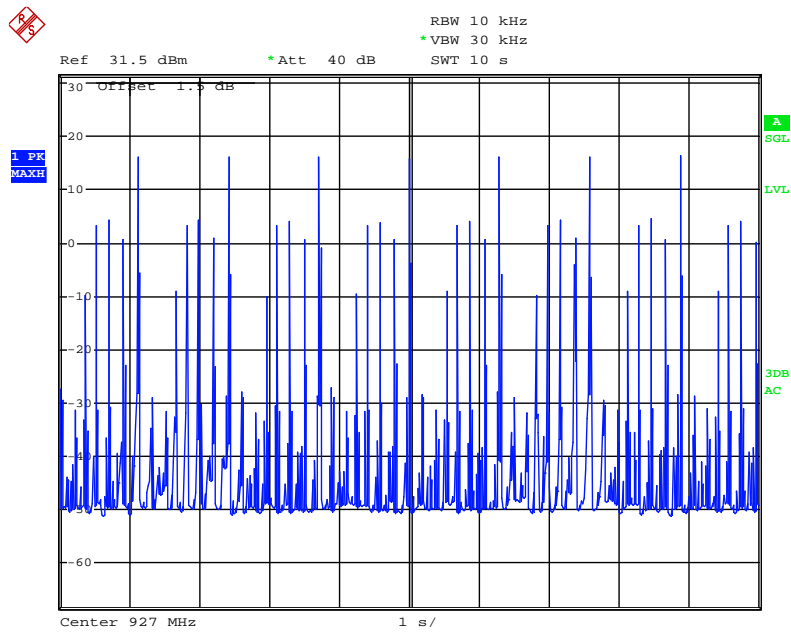


Date: 8.SEP.2011 15:39:56

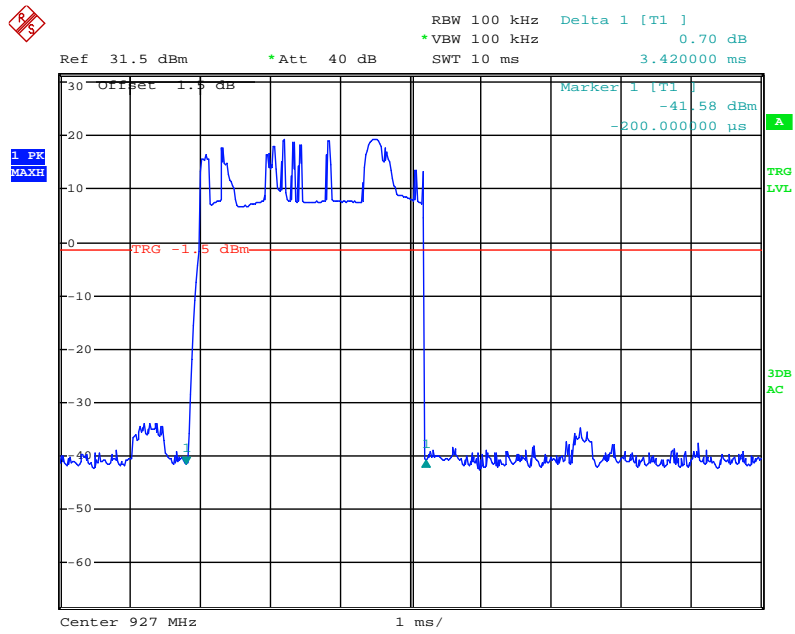


Date: 29.AUG.2011 11:52:40

High Channel



Date: 8.SEP.2011 15:32:33



Date: 29.AUG.2011 11:54:39

FCC §15.247(b) (2) - PEAK OUTPUT POWER MEASUREMENT

Applicable Standard

For frequency hopping systems operating in the 902 – 928 MHz band: 1 watt for systems employing at least 50 hopping channels;

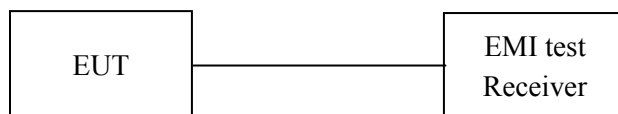
Test Equipment List and Details

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 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 Data

Environmental Conditions

Temperature:	26 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

* The testing was performed by Back Huang on 2011-09-18.

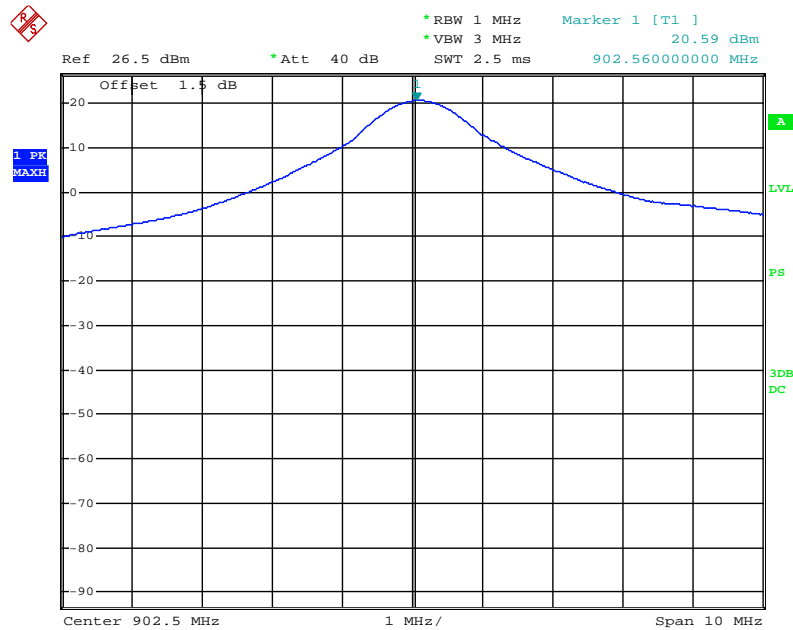
Test Result: Compliant.

Test Mode: Transmitting

Channel	Frequency (MHz)	Conducted Output Power (dBm)	Limit (dBm)
Low	902.5	20.59	29
Middle	914.5	20.07	29
High	927.0	20.59	29

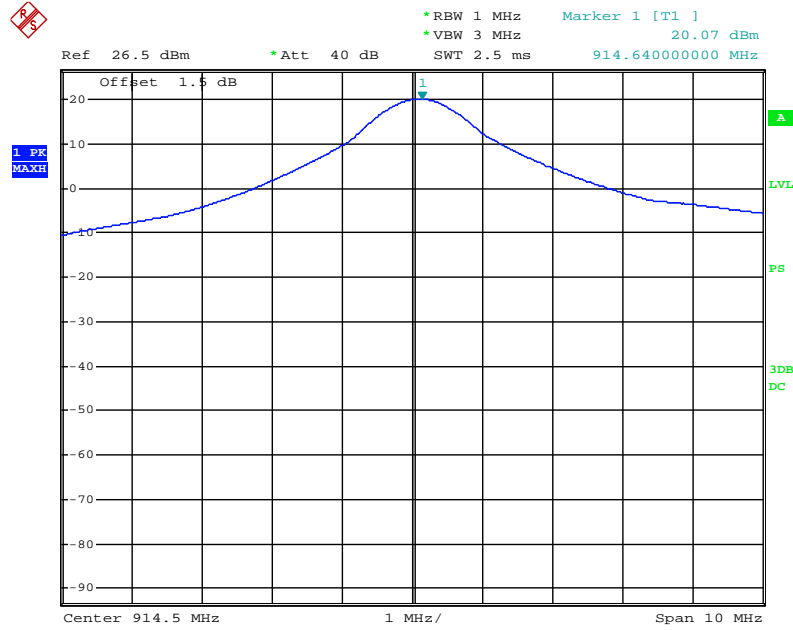
Note: Limit=30 dBm-(Antenna Gain-6) = 30-(8-6) = 28 dBm

Low Channel



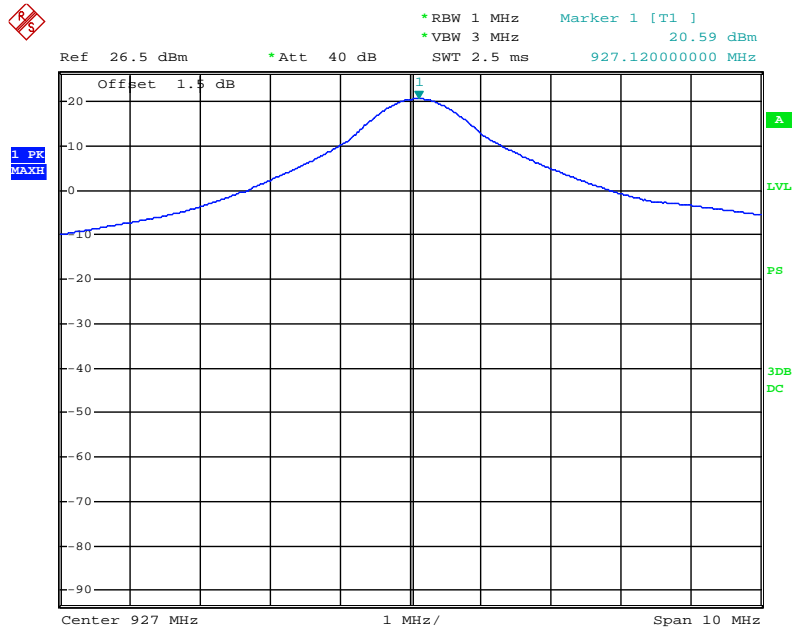
Date: 18.SEP.2011 14:36:32

Middle Channel



Date: 18.SEP.2011 14:51:04

High Chanel



Date: 18.SEP.2011 14:39:14

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. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a EMI test receiver, then 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:	26 °C
Relative Humidity:	56 %
ATM Pressure:	100.9 kPa

*The testing was performed by Back Huang on 2011-08-29.

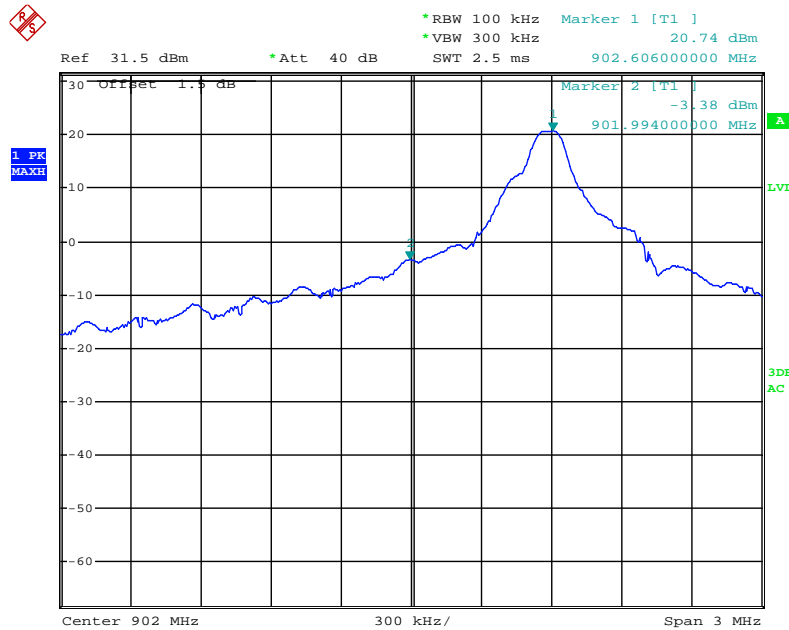
Test Result: Compliant

Test Mode: Transmitting

Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)
901.994	24.12	20
928.006	31.74	20

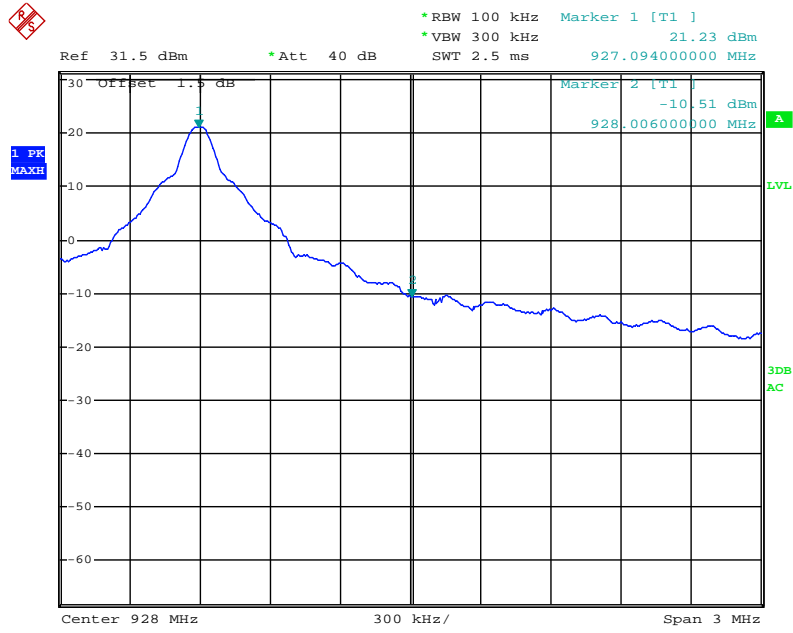
Please refer to following plots:

Band Edge: Left Side



Date: 29.AUG.2011 12:13:33

Band Edge: Right Side



Date: 29.AUG.2011 12:17:34

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