Lab Code: 200707-0

FCC PART 15.247

TEST REPORT

For

Wingsafe Technology Inc.

2F., No.26, Aly.22, Ln.99, Zili Rd., Zhonghe Dist., New Taipei City 23580, Taiwan

FCC ID: PCAWBU-900A

Report Type:	Product Type:
Original Report	900MHz Long Range Reader

Test Engineer:	Eric Lee
Report Number:	RSZ120628010-00
Report Date:	2012-09-05
Reviewed By:	Alvin Huang RF Leader
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Wingsafe Technology Inc.*'s product, model number: *WBU-900A (FCC ID: PCAWBU-900A)* (the "EUT") in this report was a camera unit of *900MHz Long Range Reader*, which was measured approximately: 37.0 cm (L) x 36.0 cm (W) x 9.6 cm (H), rated input voltage: DC 12V.

** All measurement and test data in this report was gathered from production sample serial number: 1206134 (Assigned by BACL, Shenzhen). The EUT was received on 2012-06-28.*

Objective

This report is prepared on behalf of *Wingsafe Technology 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, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

No related submittal(s)

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

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

Test Facility

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

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

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

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

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

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

EUT Exercise Software

Winmoxa V2.0 by client.

Equipment Modifications

No modification was made to the EUT tested.

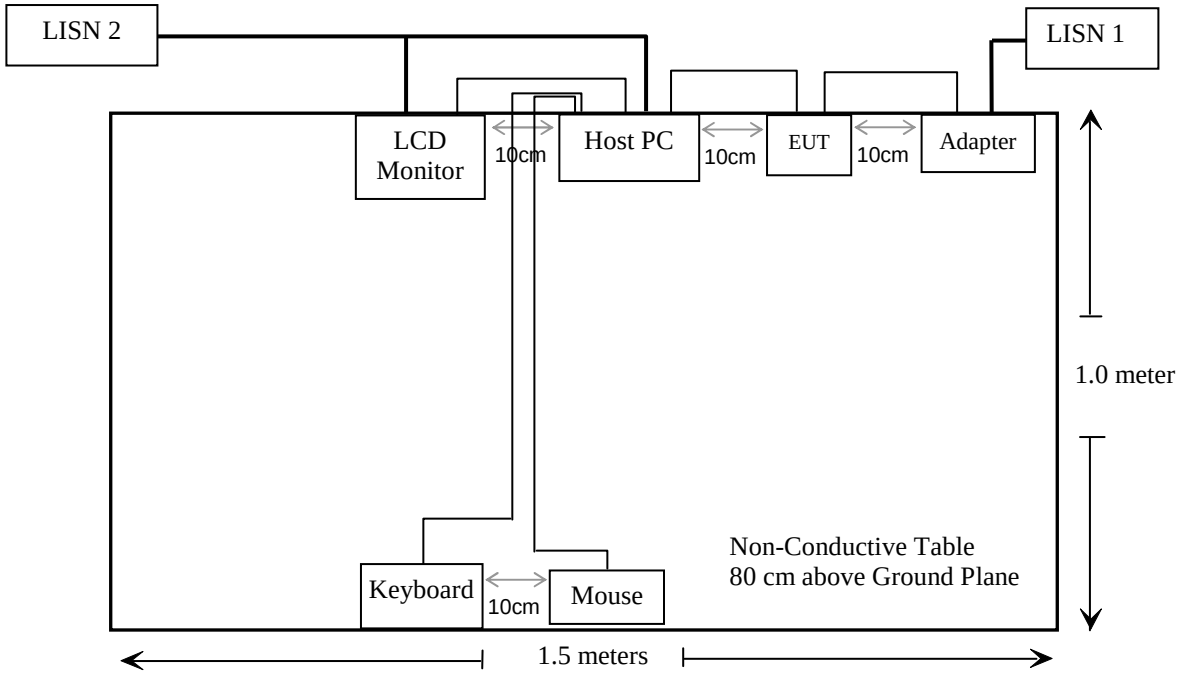
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	PC	127BP2X	127BP2X
DELL	LCD Monitor	E178WFPC	CN-OWY564-64180-7C4-2SQH
DELL	Keyboard	L100	CNORH656658907BL05DC
Logitech	Mouse	M-SAW83A	HCA33800404
CLICK	AC/DC Adapter (Input: AC 100-240 V, 50/60 Hz, 1.0A; Output: DC 12V, 3.0A)	CPS036A120300	N/A

External I/O Cable

Cable Description	Length (m)	From/Port	To
Shielded Detachable K/B Cable	1.5	Host PC	Keyboard
Shielded Detachable USB Cable	1.5	Host PC	Mouse
Shielded Detachable Serial Cable	1.5	EUT	Host PC
Shielded Detachable VGA Cable	1.5	Host PC	LCD Monitor
Unshielded Undetachable AC Cable	1.5	Adapter	LISN

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §1.1307 (b)(1), §2.1091	Maximum Permissible Exposure (MPE)	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Radiated Emissions	Compliance
§15.247 (a)(1)(i)	20 dB Bandwidth	Compliance
§15.247(a)(1)(i)	Channel Separation Test	Compliance
§15.247(a)(1)(i)	Time of Occupancy (Dwell Time)	Compliance
§15.247(a)(1)(i)	Quantity of hopping channel Test	Compliance
§15.247(b)(2)	Peak Output Power Measurement	Compliance
§15.247(d)	Band Edges	Compliance

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

Standard Applicable

According to subpart 15.247 (i) and subpart 1.1307 (b)(1), 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mw/cm^2)**	**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

MPE Calculation

Predication of MPE limit at a given distance

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

Where:

S = power density (in appropriate units, e.g. mW/cm^2)
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/cm^2)**	**MPE Limit (mW/cm^2)**
	(dBi)	**(numeric)**	**(dBm)**	**(mW)**			
902.5	10	10	23.99	250.61	20	0.4988	0.6017

Note: To comply with FCC RF exposure compliance requirements,a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons.

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 an integral antenna connect to RF board, which in accordance to section 15.203, it is a fixed point-to-point antenna, and the maximum gain is 10 dBi, Please refer to the internal photos.

Note: According with FCC 15.247(b) (4), the conducted output power at antenna limits should be reduced 4 dB, so the limits is 26dBm.

Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

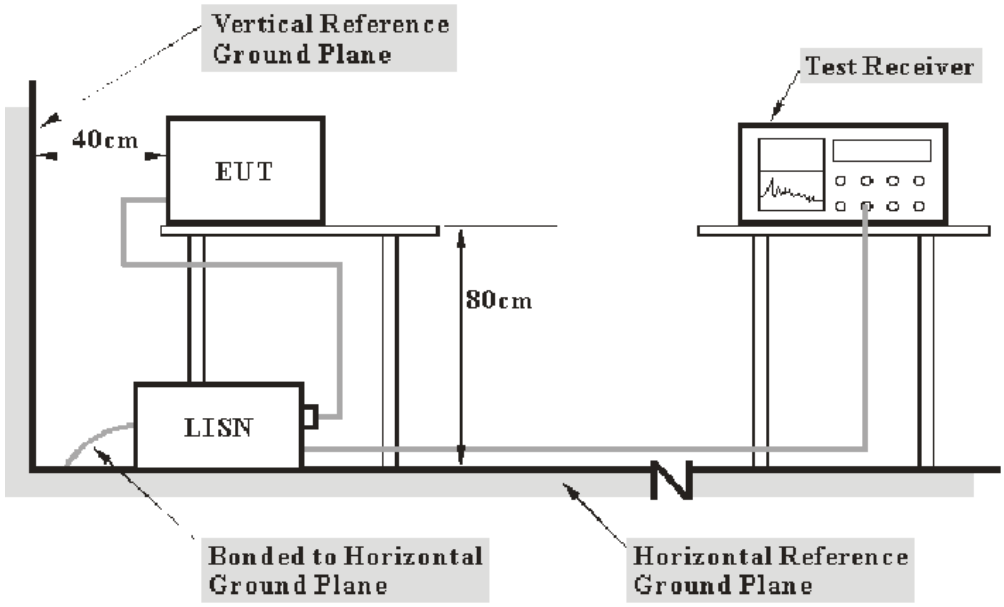
FCC §15.207

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 CISPR-16-4-4, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Laboratory Corp. (Shenzhen) is 2.4 dB (k=2, 95% level of confidence), and the uncertainty will not be taken into consideration for all the test data recorded in the report.

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2009 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

The adapter was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	***IF B/W***
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the adapter was conncected to the outlet of the first LISN, and the other relevant equipments were connected to the second LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2011-11-24	2012-11-23
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2011-11-17	2012-11-16
Com-Power	L.I.S.N.	LI-200	12005	N/A	N/A
Com-Power	L.I.S.N.	LI-200	12208	N/A	N/A
Rohde & Schwarz	Pulse limiter	ESH3Z2	DE25985	2012-07-08	2013-07-07
BACL	CE Test software	BACL-CE	V1.0	-	-

*** 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:

15.47 dB at **26.550 MHz** in the **Line** conducted mode

Test Data

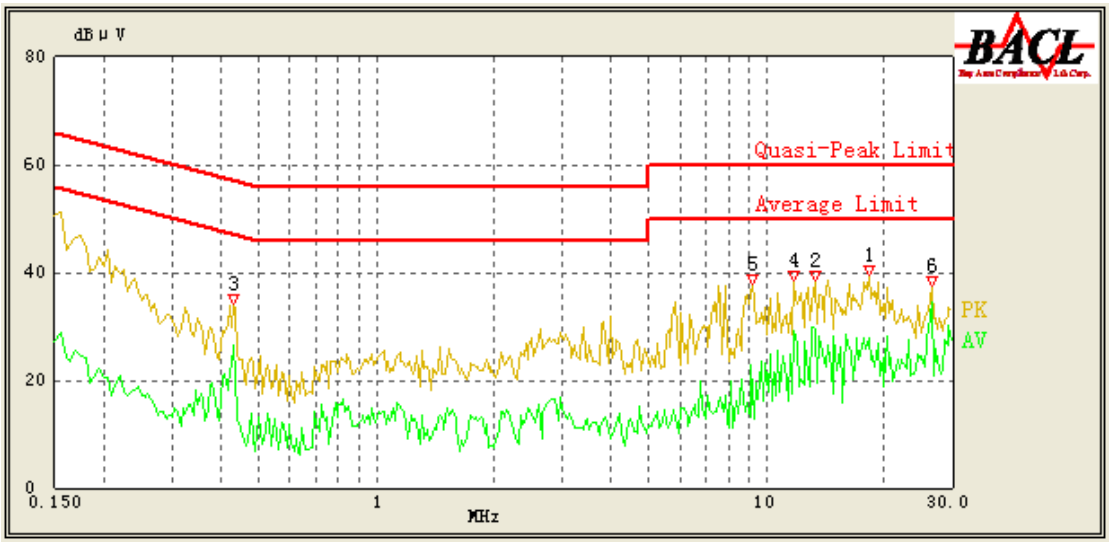
Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

The testing was performed by Eric Lee on 2012-08-01.

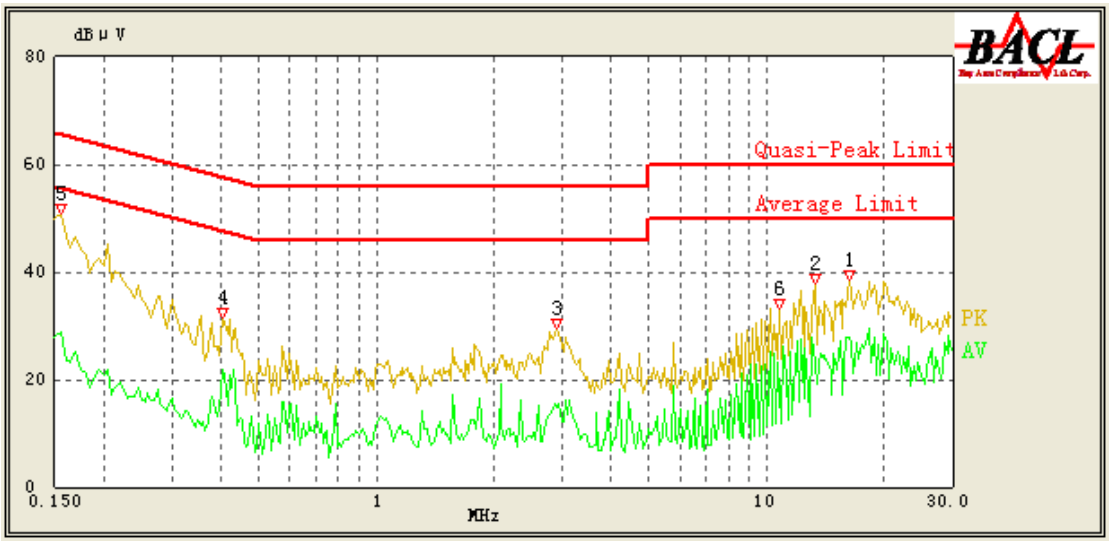
Test Mode: Transmitting

AC 120 V, 60 Hz, Line:



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/QP/Ave.)
26.550	34.53	11.87	50.00	15.47	Ave.
13.350	29.49	11.05	50.00	20.51	Ave.
11.780	29.05	10.79	50.00	20.95	Ave.
0.430	26.62	10.26	48.00	21.38	Ave.
18.325	27.95	12.30	50.00	22.05	Ave.
26.550	34.94	11.87	60.00	25.06	QP
18.325	32.90	12.30	60.00	27.10	QP
9.140	22.83	10.46	50.00	27.17	Ave.
13.350	32.37	11.05	60.00	27.63	QP
11.780	32.25	10.79	60.00	27.75	QP
0.430	29.08	10.26	58.00	28.92	QP
9.170	26.60	10.46	60.00	33.40	QP

AC 120V, 60 Hz, Neutral:



Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/QP/Ave.)
0.155	43.83	10.24	65.86	22.03	QP
16.230	27.87	11.57	50.00	22.13	Ave.
13.355	33.56	10.99	60.00	26.44	QP
10.710	23.15	10.60	50.00	26.85	Ave.
0.155	28.99	10.24	55.86	26.87	Ave.
13.355	23.08	10.99	50.00	26.92	Ave.
0.405	21.78	10.25	48.71	26.93	Ave.
16.230	30.34	11.57	60.00	29.66	QP
2.900	14.73	10.23	46.00	31.27	Ave.
10.740	27.62	10.60	60.00	32.38	QP
0.405	25.97	10.25	58.71	32.74	QP
2.895	21.85	10.23	56.00	34.15	QP

Note: the adapter is ancillary equipment, the information list at the report Page 6 "Support equipment list and details".

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

Applicable Standard

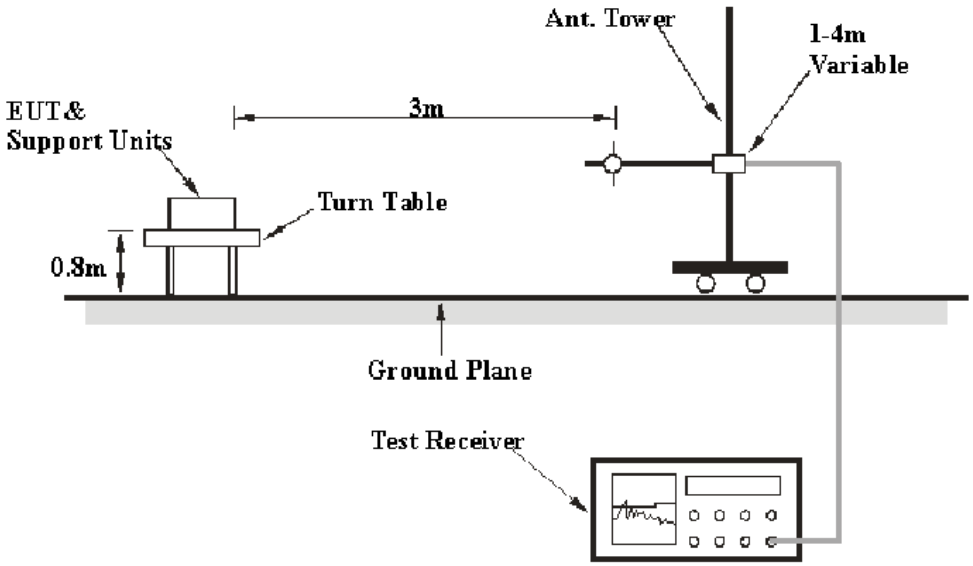
FCC §15.247 (d); §15.209; §15.205;

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 a 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 all 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.

The spacing between the peripherals was 10 cm.

The adapter was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 10 GHz.

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

Frequency Range	***RBW***	***Video B/W***	***Detector***
30 MHz – 1000 MHz	100 kHz	300 kHz	QP
1000 MHz – 10 GHz	1 MHz	3 MHz	PK

Test Procedure

For the radiated emissions test, the adapter was connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz 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
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2011-11-17	2012-11-16
HP	Amplifier	8447E	1937A01046	2011-11-24	2012-11-23
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2011-11-28	2012-11-27
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2011-11-24	2012-11-23
Mini-Circuits	Amplifier	ZVA-213+	T-E27H	2012-03-08	2013-03-08
Sunol Sciences	Horn Antenna	DRH-118	A052304	2011-12-01	2012-11-30
R&S	Auto test Software	EMC32	V6.30	-	-

*** 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:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – 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:

1.26 dB at **3660.0 MHz** in the **Horizontal** polarization

Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The testing was performed by Eric Lee on 2012-09-05.

Test mode: Transmitting

30 MHz- 10 GHz (worst case data as below)

Frequency (MHz)	Receiver		Turn table Degree	Rx Antenna			Cable Loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBuV/m)	FCC Part 15.247	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)	Factor (dB)				Limit (dBuV/m)	Margin (dB)
Low Channel (902.5 MHz)											
902.5	81.65	Ave.	13	1.1	H	22.00	3.88	0	107.53	/	/
902.5	77.58	Ave.	162	1.3	V	22.00	3.88	0	103.46	/	/
902.5	98.65	PK	13	1.1	H	22.00	3.88	0.00	124.53	/	/
902.5	94.58	PK	162	1.3	V	22.00	3.88	0.00	120.46	/	/
3610	42.31	Ave.	25	1.2	H	32.50	3.68	26.5	51.99	54.00	2.01*
82.1	57.66	QP	314	1.0	V	5.70	0.43	25.89	37.90	40.00	2.10*
4512.5	39.55	Ave.	16	1.1	H	34.40	4.24	26.5	51.69	54.00	2.31*
1805	47.71	Ave.	33	1.3	H	26.60	2.53	26.5	50.34	54.00	3.66*
3610.0	59.31	PK	25	1.2	H	32.50	3.68	26.50	68.99	74.00	5.02
4512.5	56.55	PK	16	1.1	H	34.40	4.24	26.50	68.69	74.00	5.32
1805.0	64.71	PK	33	1.3	H	26.60	2.53	26.50	67.34	74.00	6.66
575.0	45.31	QP	26	1.2	H	16.80	3.43	26.40	39.14	46.00	6.86
2707.5	38.06	Ave.	14	1.2	H	31.30	3.13	26.5	45.99	54.00	8.01
5415	31.95	Ave.	8	1.2	H	34.00	4.49	26.5	43.94	54.00	10.06
2707.5	55.06	PK	14	1.2	H	31.30	3.13	26.50	62.99	74.00	11.01
5415.0	48.95	PK	8	1.2	H	34.00	4.49	26.50	60.94	74.00	13.06
2336.2	23.32	Ave.	22	1.2	H	29.00	2.98	26.5	28.8	54.00	25.2
2336.2	40.32	PK	22	1.2	H	29.00	2.98	26.50	45.80	74.00	28.20

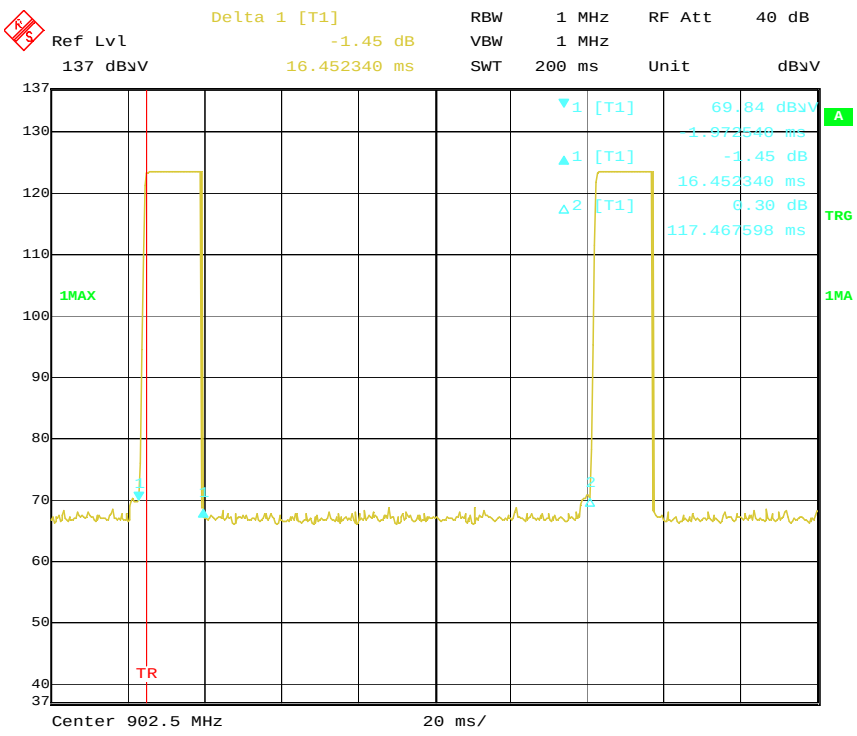
Frequency (MHz)	Receiver		Turn table Degree	Rx Antenna			Cable Loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBuV/m)	FCC Part 15.247	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)	Factor (dB)				Limit (dBuV/m)	Margin (dB)
Middle Channel (915 MHz)											
915.0	80.69	Ave.	19	1.2	H	22.00	3.95	0.00	106.64	/	/
915.0	77.15	Ave.	21	1.1	V	22.00	3.95	0.00	103.10	/	/
915.0	97.69	PK	19	1.2	H	22.00	3.95	0.00	123.64	/	/
915.0	94.15	PK	21	1.1	V	22.00	3.95	0.00	120.10	/	/
3660.0	42.95	Ave.	11	1.1	H	32.50	3.79	26.50	52.74	54.00	1.26*
1830.0	49.73	Ave.	43	1.1	H	26.60	2.53	26.50	52.36	54.00	1.64*
4575.0	39.39	Ave.	8	1.2	H	34.60	4.11	26.50	51.60	54.00	2.40*
36.1	45.03	QP	182	1.1	V	16.90	0.30	25.88	36.35	40.00	3.65*
3660.0	59.95	PK	11	1.1	H	32.50	3.79	26.50	69.74	74.00	4.27
1830.0	66.73	PK	43	1.1	H	26.60	2.53	26.50	69.36	74.00	4.64
2745.0	40.79	Ave.	67	1.2	H	31.30	3.13	26.50	48.72	54.00	5.28
4575.0	56.39	PK	8	1.2	H	34.60	4.11	26.50	68.60	74.00	5.40
325.0	51.36	QP	79	1.2	H	12.50	1.55	25.23	40.18	46.00	5.82
2745.0	57.79	PK	67	1.2	H	31.30	3.13	26.50	65.72	74.00	8.28
5490.0	32.26	Ave.	67	1.1	H	34.00	4.49	26.50	44.25	54.00	9.75
5490.0	49.26	PK	67	1.1	H	34.00	4.49	26.50	61.25	74.00	12.75
2335.4	22.68	Ave.	77	1.2	H	29.00	2.98	26.50	28.16	54.00	25.84
2335.4	39.68	PK	77	1.2	H	29.00	2.98	26.50	45.16	74.00	28.84
High Channe l(927.5 MHz)											
927.5	81.55	Ave.	25	1.2	H	22.30	3.95	0.00	107.8	/	/
927.5	78.05	Ave.	18	1.2	V	22.30	3.95	0.00	104.3	/	/
927.5	98.55	PK	25	1.2	H	22.30	3.95	0.00	124.80	/	/
927.5	95.05	PK	18	1.2	V	22.30	3.95	0.00	121.30	/	/
4637.5	40.26	Ave.	22	1.2	H	34.60	4.12	26.50	52.48	54.00	1.52*
1855.0	49.19	Ave.	13	1.1	H	26.60	2.53	26.50	51.82	54.00	2.18*
3710.0	41.99	Ave.	61	1.2	H	32.50	3.77	26.50	51.76	54.00	2.24*
2782.5	42.11	Ave.	38	1.1	H	31.80	3.32	26.50	50.73	54.00	3.27*
4637.5	57.26	PK	22	1.2	H	34.60	4.12	26.50	69.48	74.00	4.52
1855.0	66.19	PK	13	1.1	H	26.60	2.53	26.50	68.82	74.00	5.18
3710.0	58.99	PK	61	1.2	H	32.50	3.77	26.50	68.76	74.00	5.24
700.0	44.24	QP	138	1.2	H	18.30	3.62	26.25	39.91	46.00	6.09
2782.5	59.11	PK	38	1.1	H	31.80	3.32	26.50	67.73	74.00	6.27
400.1	49.82	QP	247	1.2	H	13.80	1.68	25.92	39.38	46.00	6.62
5565.0	30.05	Ave.	34	1.1	H	33.60	4.61	26.50	41.76	54.00	12.24
5565.0	47.05	PK	34	1.1	H	33.60	4.61	26.50	58.76	74.00	15.24
2337.6	22.61	Ave.	23	1.1	H	29.00	2.98	26.50	28.09	54.00	25.91
2337.6	39.61	PK	23	1.1	H	29.00	2.98	26.50	45.09	74.00	28.91

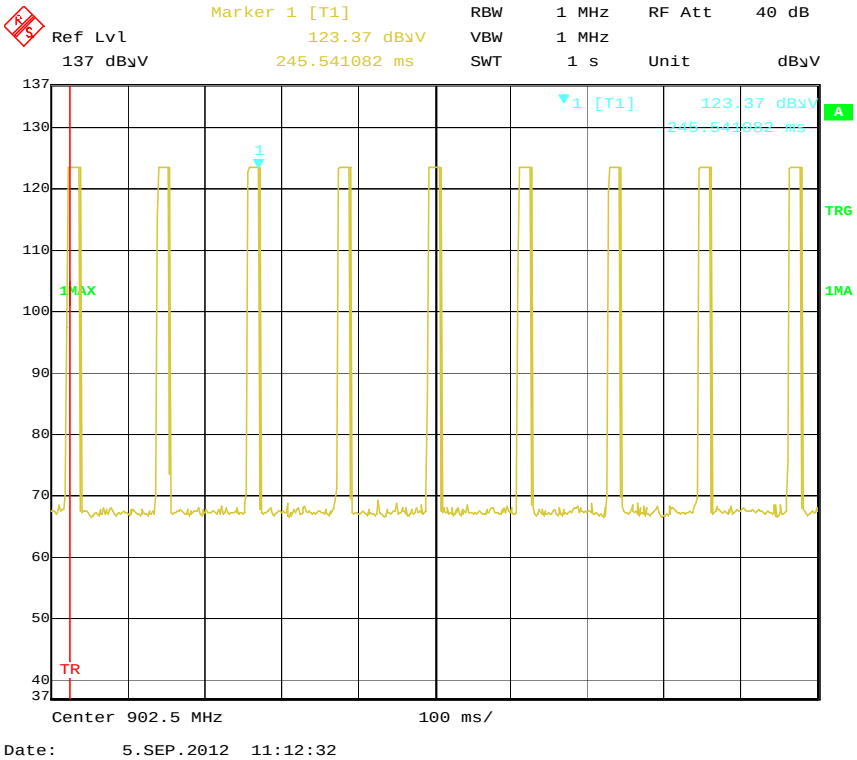
Note:

*Within measurement uncertainty.
Duty Cycle Factor=20* lg (Duty Cycle) =-17
Ave. = PK+ Duty Cycle Factor =PK-17dB

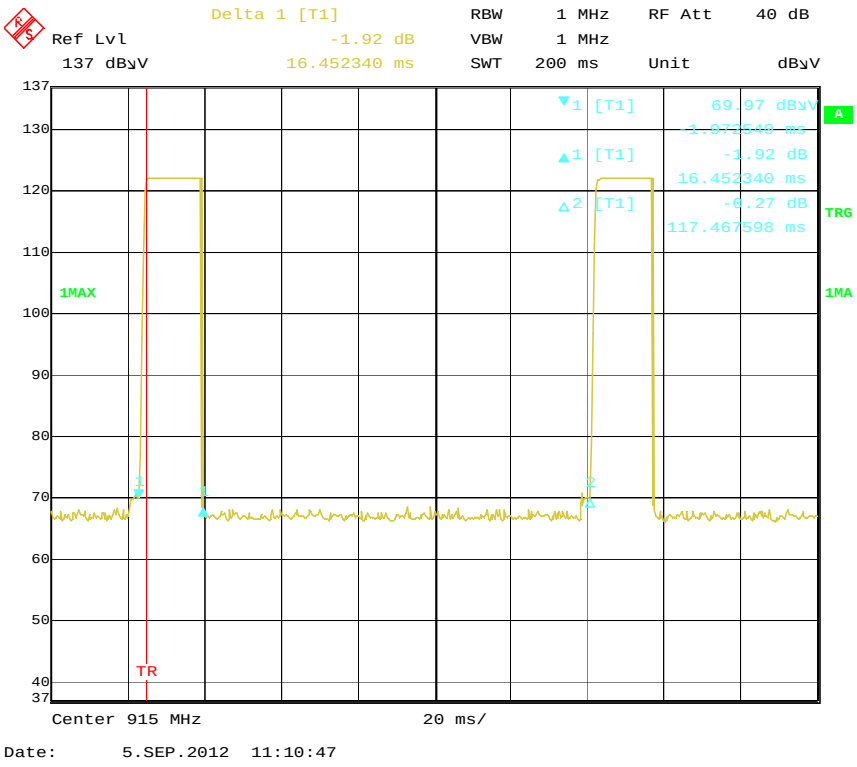
Duty cycle plots:

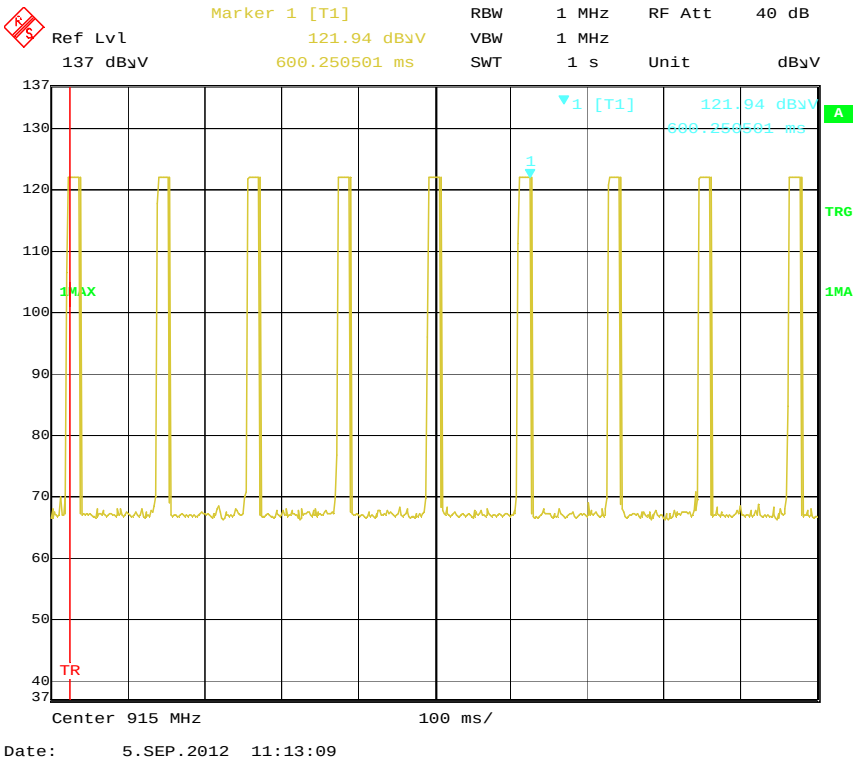
Low Channel



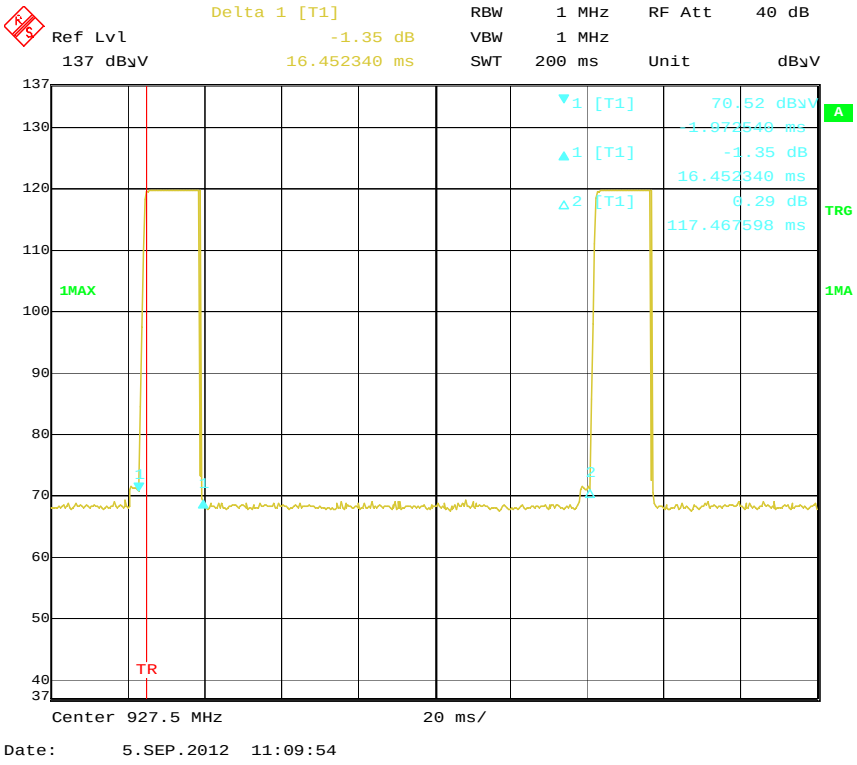


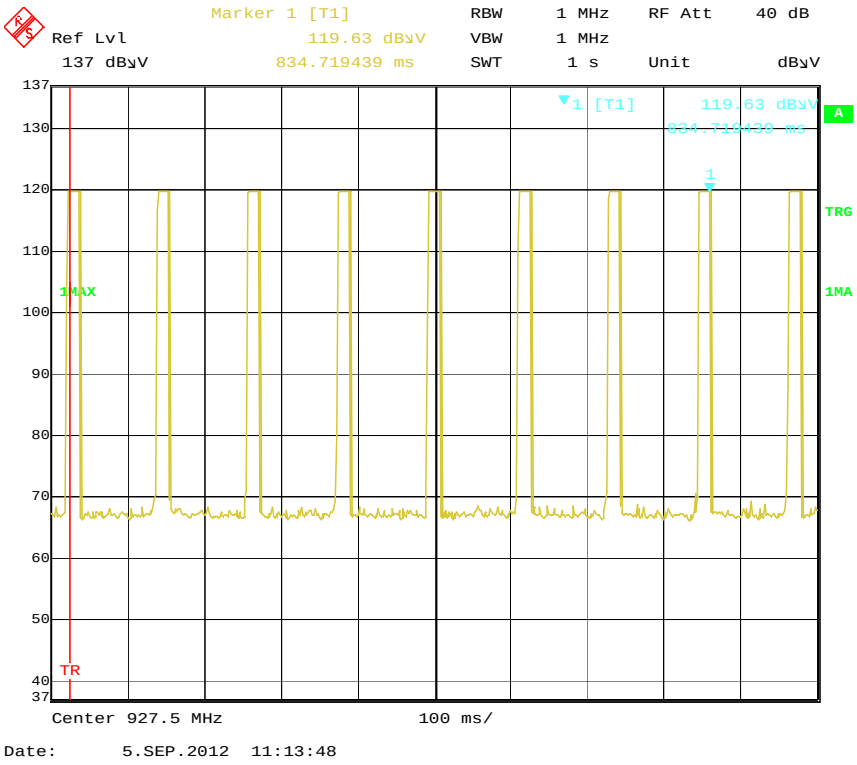
Middle Channel





High Channel





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

Applicable Standard

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

Test Procedure

1. Set the EUT in Operating mode, radio spectrum Bandwidth was set at 10 kHz, 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	EMI Test Receiver	ESCI	101122	2011-11-17	2012-11-16

*** 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 ℃
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

** The testing was performed by Eric Lee on 2012-07-24.*

Test Result: Compliance.

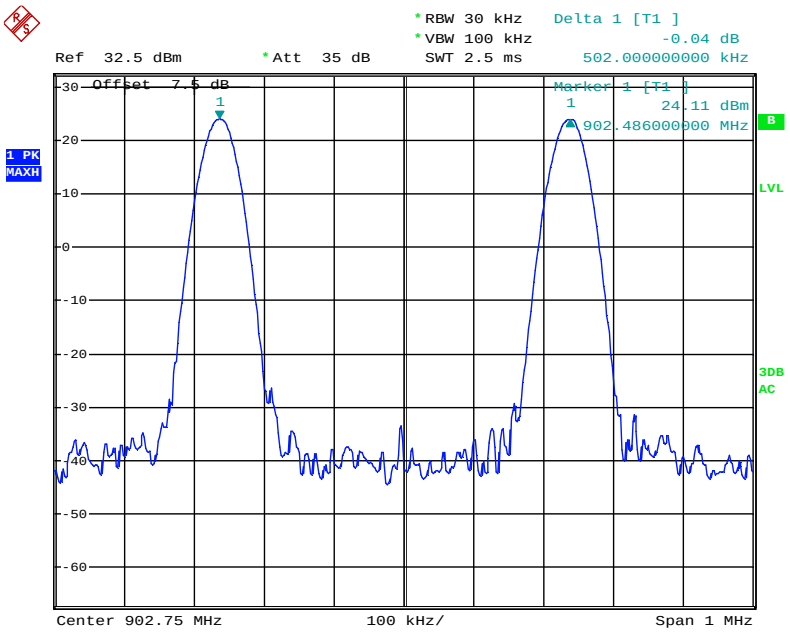
Please refer to following tables and plots

Test Mode: Transmitting

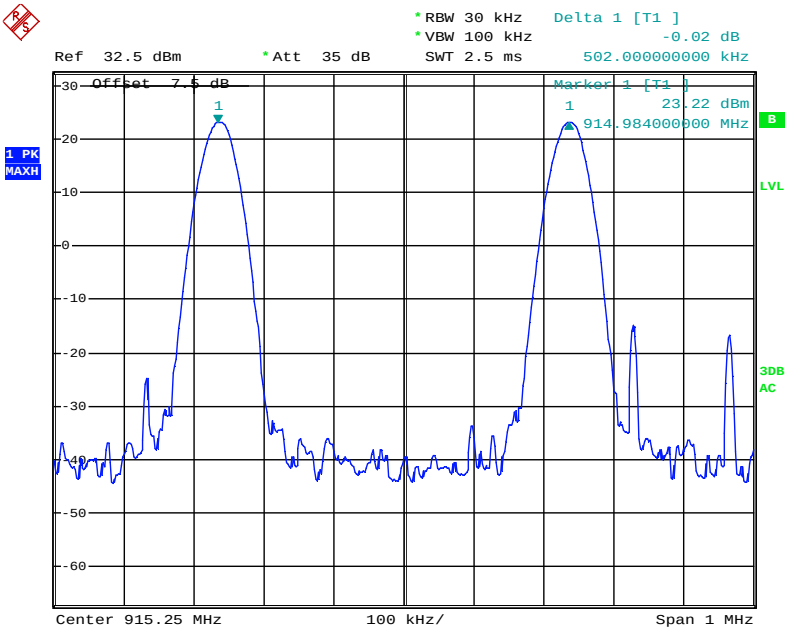
Channel	Channel Frequency (MHz)	Channel Separation (kHz)	Limit (kHz)	Result
Low	902.5	502	25	Pass
Adjacent	903.0			
Middle	915.0	502	25	
Adjacent	915.5			
High	927.5	502	25	
Adjacent	927.0			

Please refer to the following plots.

Low Channel

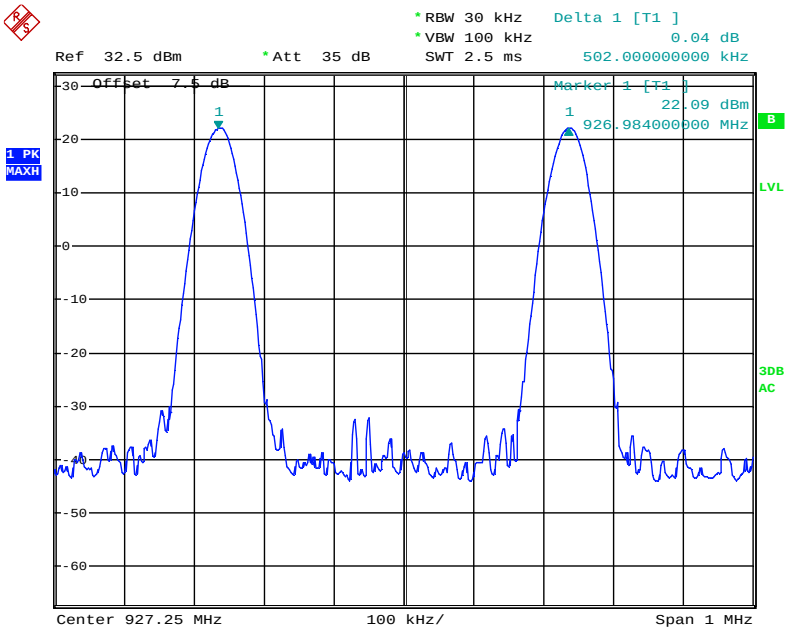


Middel Channel



Date: 24.JUL.2012 10:18:44

High Channel



Date: 24.JUL.2012 10:19:53

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

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; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

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	101122	2011-11-17	2012-11-16

*** 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 ℃
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

** The testing was performed by Eric Lee on 2012-09-03.*

Test Result: Compliance.

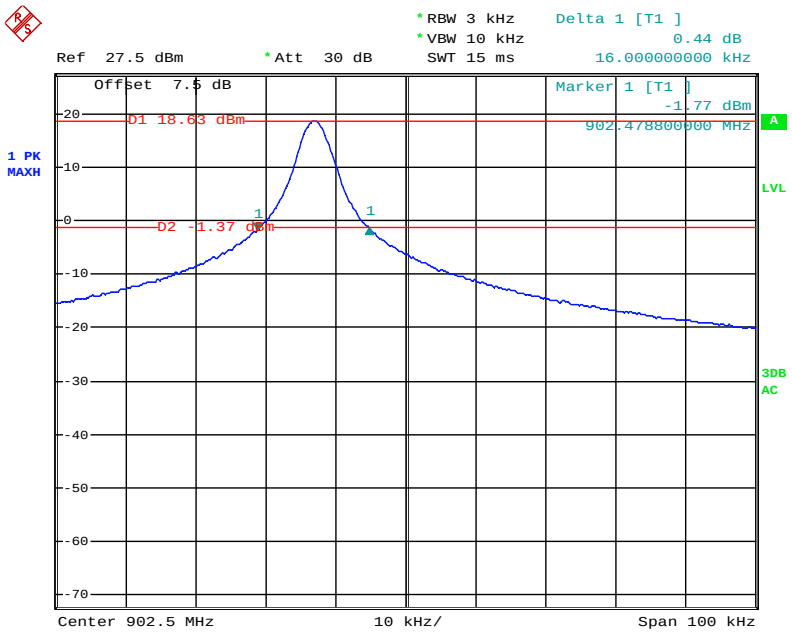
Please refer to following tables and plots

Test Mode: Transmitting

Channel	Frequency (MHz)	20 dB Bandwidth (kHz)	Limit (kHz)
Low	902.5	16.0	<250
Middle	915.0	16.0	<250
High	927.5	16.0	<250

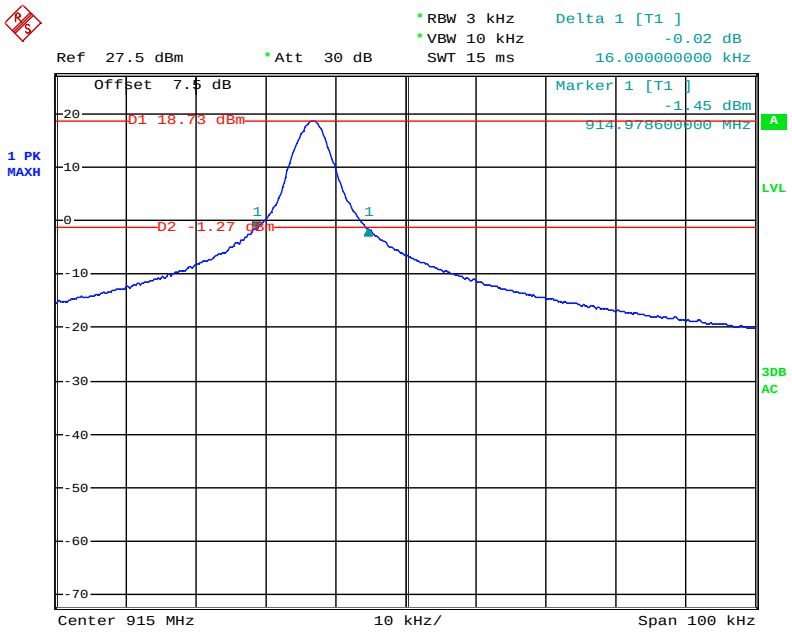
Please refer to the following plots.

Low Channel



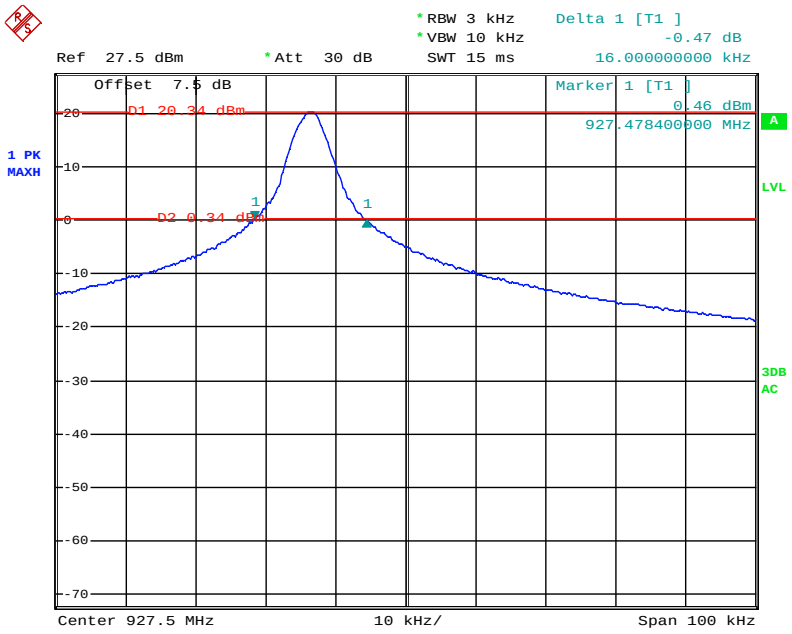
Date: 3.SEP.2012 10:20:06

Middle Channel



Date: 3.SEP.2012 10:41:56

High Channel



Date: 3.SEP.2012 10:49:25

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; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

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	101122	2011-11-17	2012-11-16

*** 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 ℃
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The testing was performed by Eric Lee on 2012-07-24.

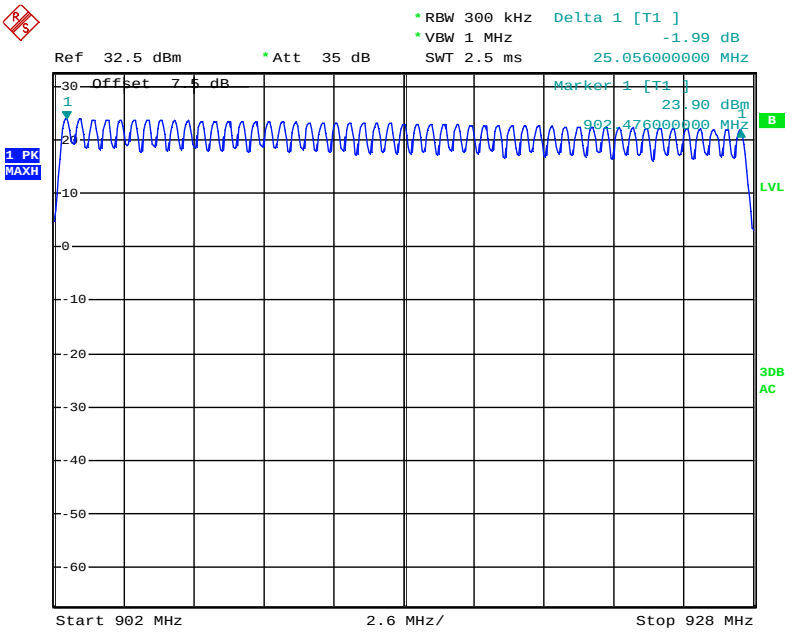
Test Result: Compliance.

Please refer to following tables and plots

Test Mode: Transmitting

Frequency Range (MHz)	Number of Hopping Channel	Limit
902-928	51	≥ 50

Number of Hopping Channels



Date: 24.JUL.2012 09:58:26

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; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

Test Procedure

Dwell Time= single duration (s) * repetition

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2011-11-17	2012-11-16

*** 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 ℃
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The testing was performed by Eric Lee on 2012-07-24.

Test Result: Compliance.

Please refer to following tables and plots

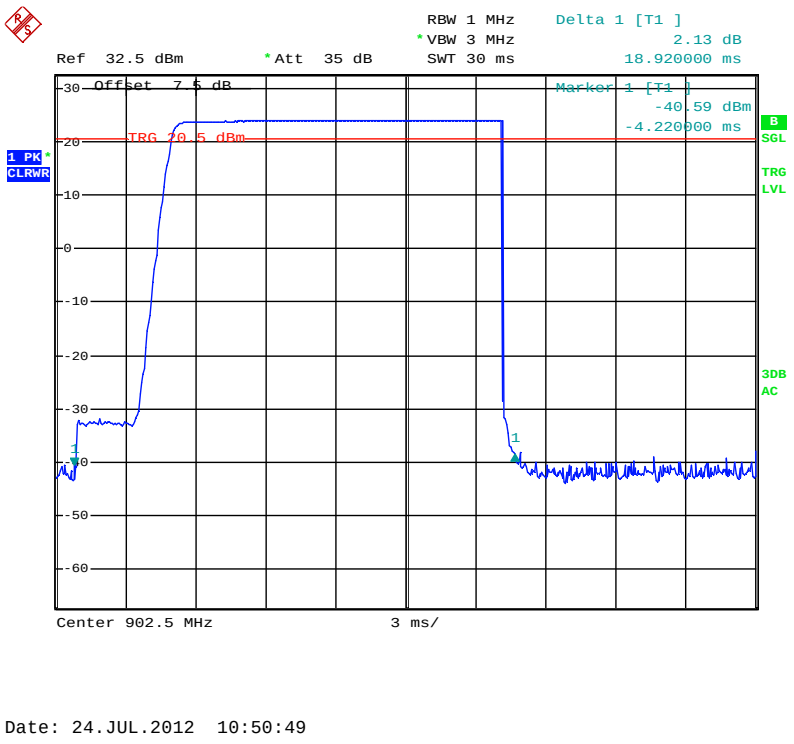
Test Mode: Transmitting

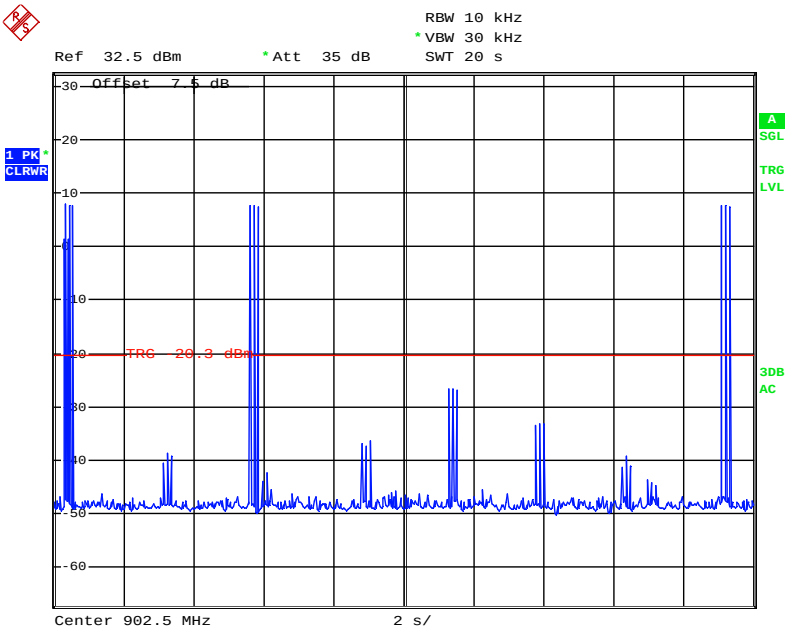
Channel	Single Duration (s)	Repetition	Time of Occupancy (s)	Limit (s)	Result
Low	0.01892	9	0.17028	0.4	Pass
Middle	0.01892	6	0.11352	0.4	Pass
High	0.01892	6	0.11352	0.4	Pass

Note: Time of Occupancy within a 20 second period.
Time of occupancy = (single duration) x (repetition)

Please refer to the following plots.

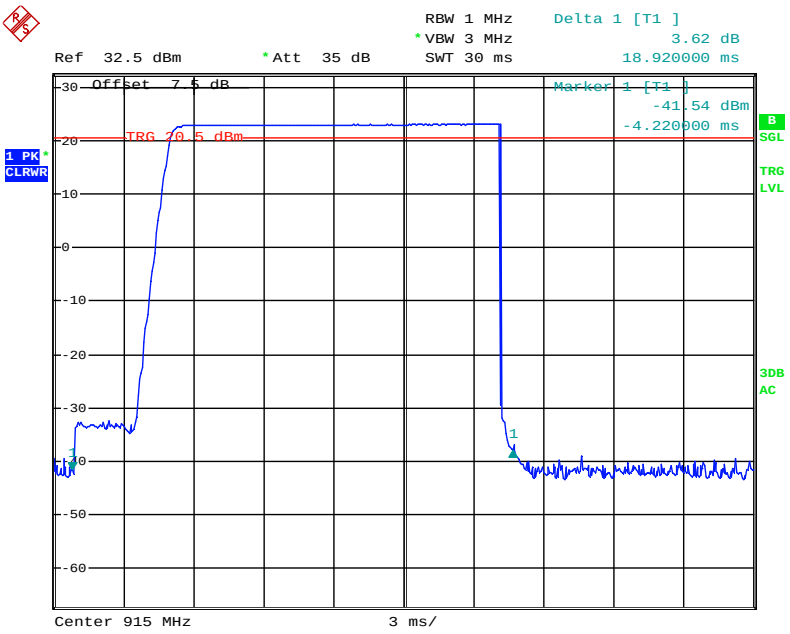
Low Channel



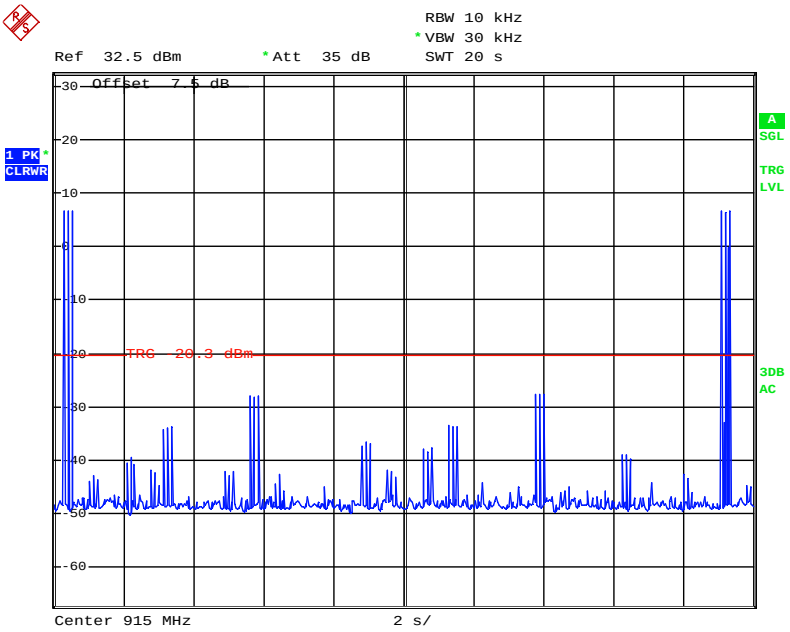


Date: 24.JUL.2012 13:56:20

Middle Channel

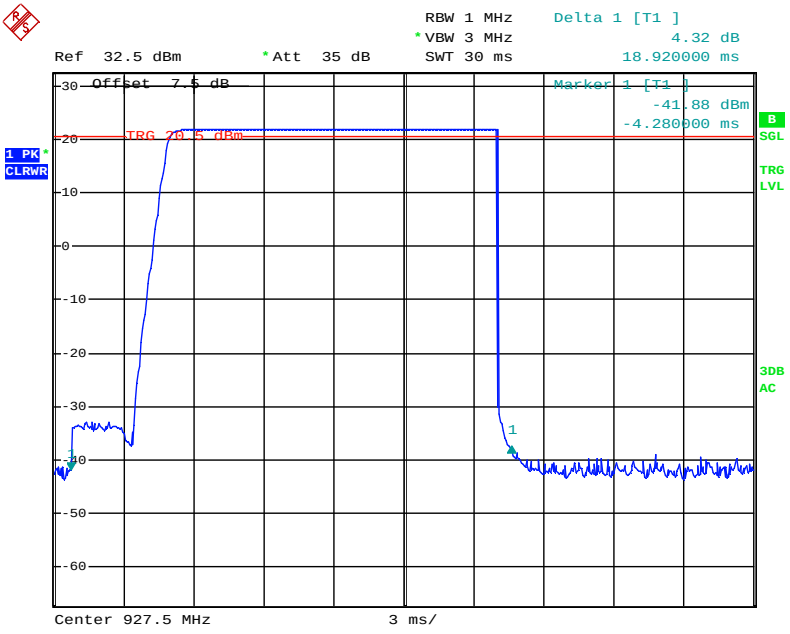


Date: 24.JUL.2012 10:52:09

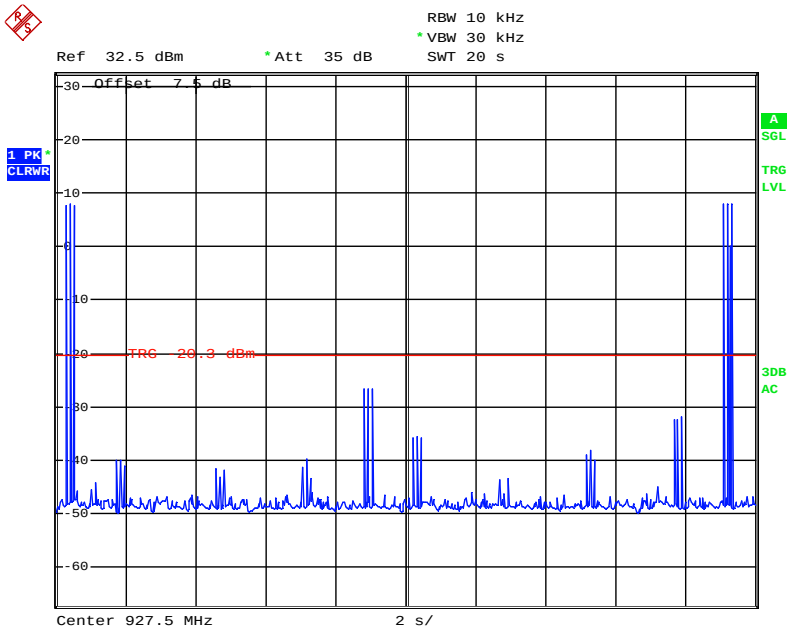


Date: 24.JUL.2012 13:58:15

High Channel



Date: 24.JUL.2012 10:53:32



Date: 24.JUL.2012 13:59:33

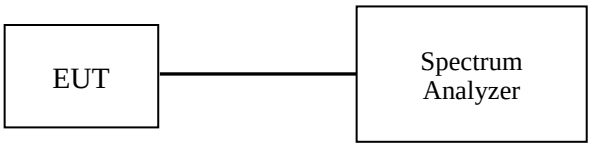
FCC §15.247(b) (2) - PEAK OUTPUT POWER MEASUREMENT

Applicable Standard

According to §15.247(b) (2), for frequency hopping systems operating in the 902–928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

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	EMI Test Receiver	ESCI	101122	2011-11-17	2012-11-16

*** 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 ℃
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

** The testing was performed by Eric Lee on 2012-07-24.*

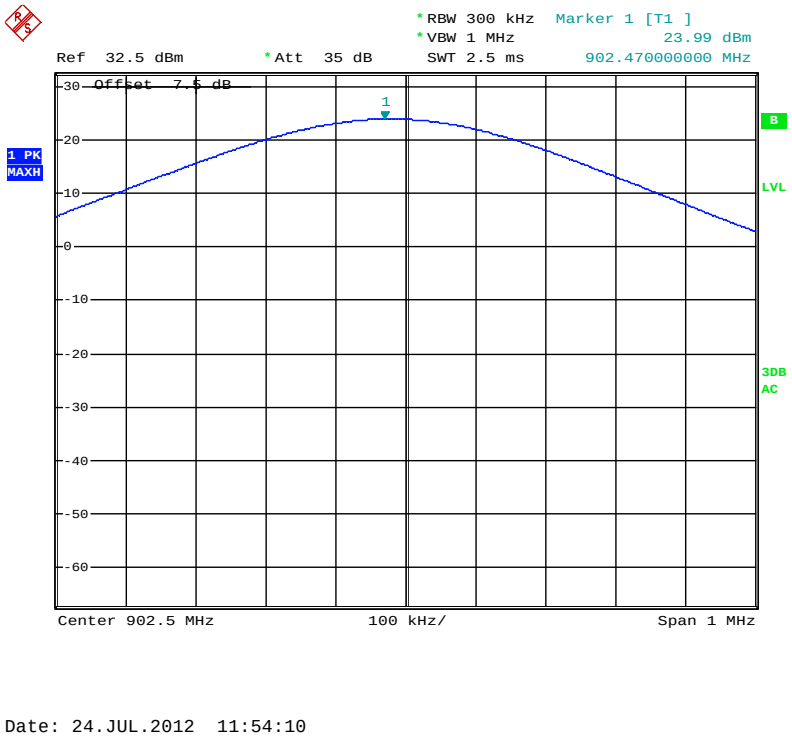
Test Result: Compliance.

Test Mode: Transmitting

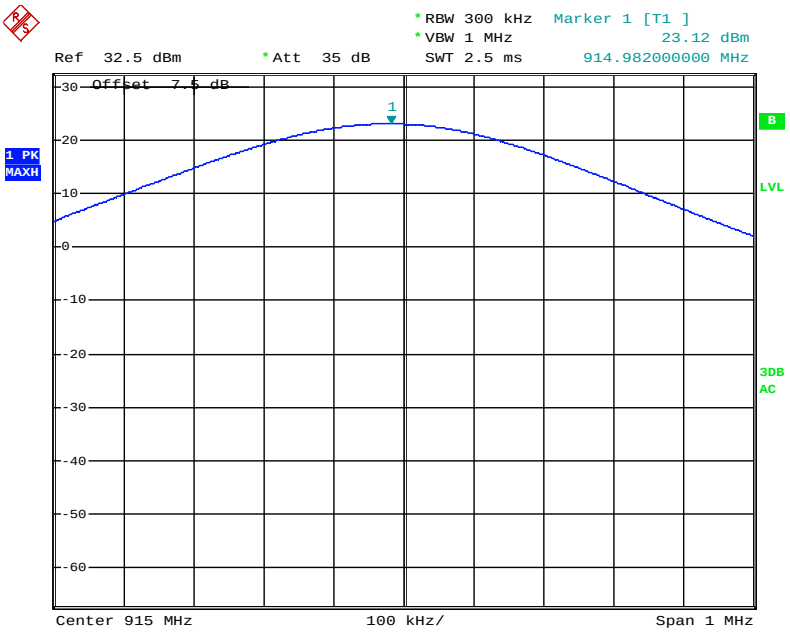
Channel	Channel frequency (MHz)	Peak output power (dBm)	Limit (dBm)
Low channel	902.5	23.99	26
Middle channel	915.0	23.12	26
High channel	927.5	22.00	26

Note: The data above was tested in conducted mode.
The antenna gain is 10 dBi, so the limit should be reduce 4dB, that's 26 dBm.

Low Channel

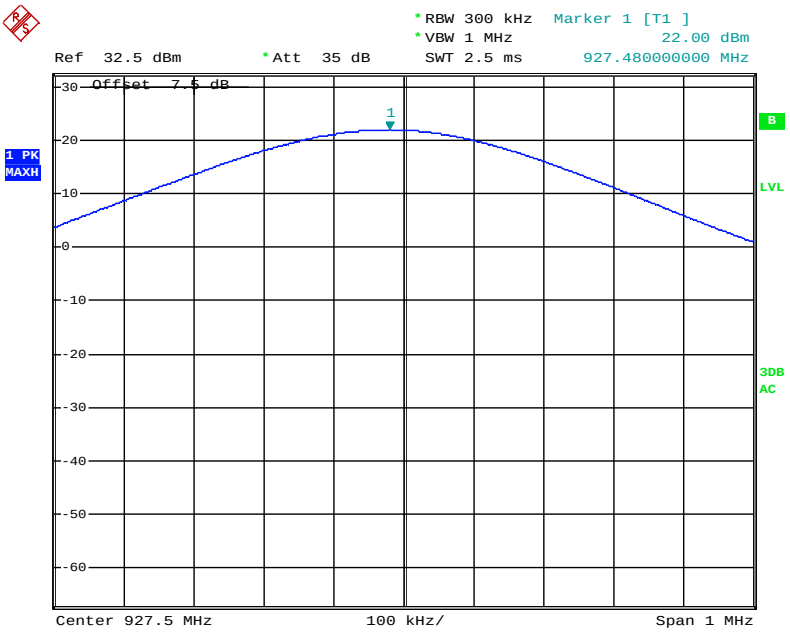


Middle Channel



Date: 24.JUL.2012 11:54:44

High Channel



Date: 24.JUL.2012 11:55:19

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 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. Set RBW of spectrum analyzer to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
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	101122	2011-11-17	2012-11-16

*** 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 ℃
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

**The testing was performed by Eric Lee on 2012-07-24.*

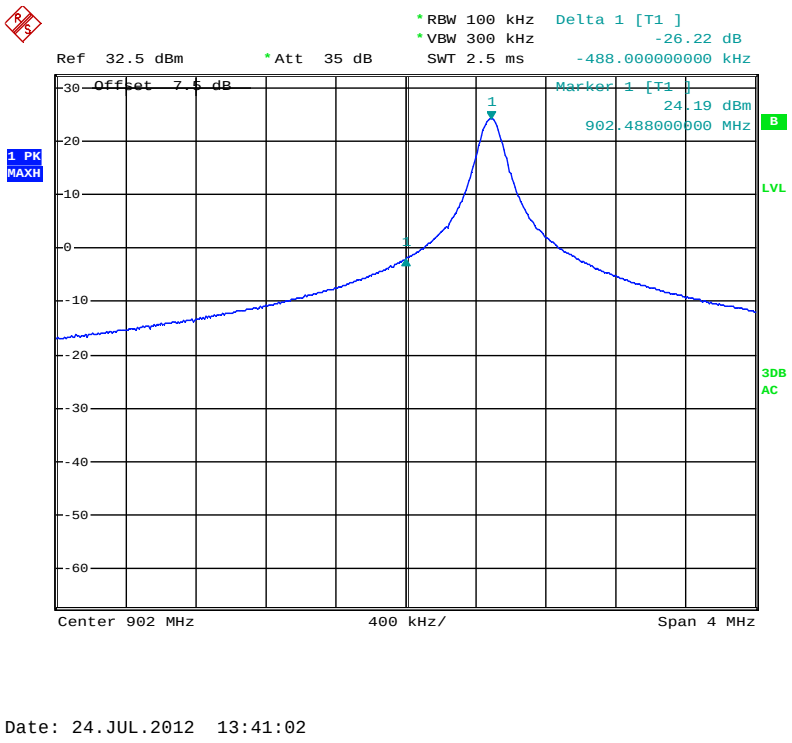
Test Result: Compliance.

Test Mode: Transmitting

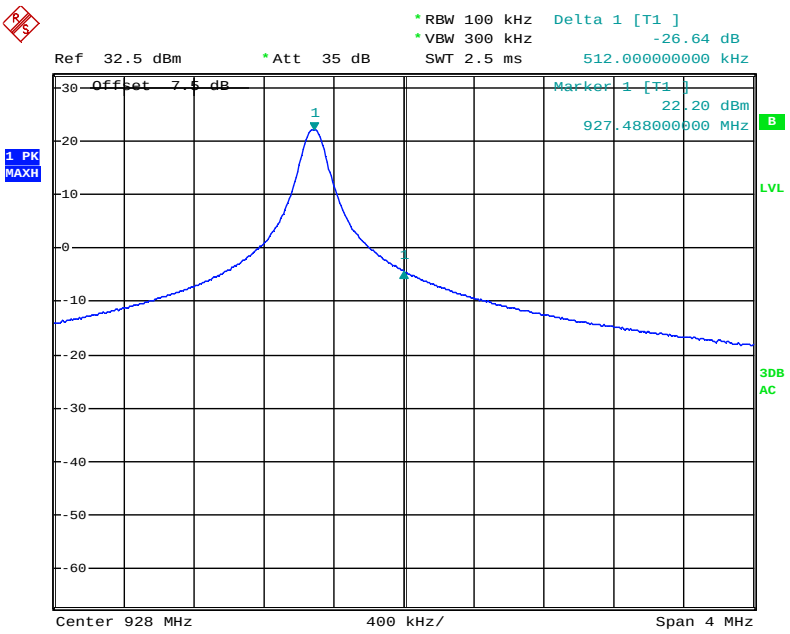
Frequency (MHz)	Delta Peak to Band Emission (dBc)	⩾Limit (dBc)
902	26.22	20
928	26.64	20

Please refer to follow plots:

Band Edge: Left Side



Band Edge: Right Side



Date: 24.JUL.2012 13:09:03

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