

FCC PART 15.247

TEST REPORT

For

Circus World Displays Ltd.

4080 Montrose Rd, Niagara Falls, Ontario L2H 1J9 Canada

FCC ID: SMH22307

Report Type: Original Report	Product Type: 2.4GHz Wireless Security Camera with Dual Channel Receiver (Camera unit)
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Report Number: RSZ130925002-00	
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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.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Circus World Displays Ltd.*'s product, model number: 22306 (FCC ID: SMH22307) or the "EUT" in this report was a 2.4GHz Wireless Security Camera with Dual Channel Receiver (Camera unit), which was measured approximately: 13.0 cm (L) x 8.5 cm (W) x 20.0 cm (H), rated input voltage: DC 6V from Adapter.

Adapter Information: AC ADAPTER
Model: 5E-AD060080-U
Input: 100-240V~50/60H, 0.15A
Output: DC 6V, 0.8A

Note: The series product, models 22304, 22305, 22306, 22307, 12304, 12305, 12306, 12307, SC1628GMR2T1R-USA-BK00, SC1628GMR4T2R-USA-BK00, SC1628GMR1T1R-USA-BK00, SC1628GMR1T-USA-BK00, SC1628GMR2T1R-USA-BK01, SC1628GMR4T2R-USA-BK01, SC1628GMR1T1R-USA-BK01 and SC1628GMR1T-USA-BK01, they share the same product only named differently due to different combination. Model 22306 was selected for testing, the detailed information can be referred to the attached declaration letter that stated and guaranteed by the applicant.

**All measurement and test data in this report was gathered from production sample serial number: 1309073 (Assigned by BAACL, Shenzhen). The EUT supplied by the applicant was received on 2013-09-25.*

Objective

This report is prepared on behalf of *Circus World Displays 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 EUT with FCC Part 15, Subpart C, section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

Submitted with the monitor unit of a system with FCC ID: SMH22302.

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.

Measurement uncertainty with radiated emission is 5.91 dB for 30MHz-1GHz and 4.92 dB for above 1GHz, 1.95dB for conducted measurement.

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.

FINAL

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.

External I/O Cable

Cable Description	Length (m)	From/Port	To
DC Power Cable	3.0	EUT	Adapter

Block Diagram of Test Setup

For Conducted Emission:



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)	20 dB 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

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), 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/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/cm ²)	MPE Limit (mW/cm ²)
	(dBi)	(numeric)	(dBm)	(mW)			
2436	2.2	1.66	11.93	15.60	20	0.00515	1.0

Note: To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby 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 use one external omni-directional antenna (with reversed SMA-J connector) arrangement and the maximum gain is 2.2 dBi, fulfill the requirement of this section. Please refer to the internal photos.

Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207

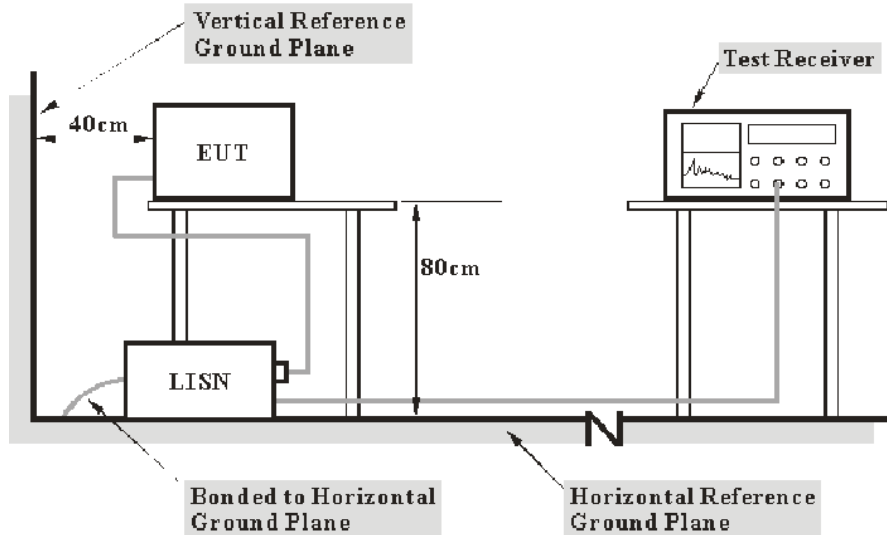
Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements maybe receiver reading, attenuation of the connection between AMN/ISN and receiver, AMN/ISN voltage division factor, AMN/ISN VDF frequency interpolation and receiver related input quantities, etc.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of conducted disturbance test at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown as below. And the uncertainty will not be taken into consideration for the test data recorded in the report

Port	Measurement uncertainty
AC Mains	3.26 dB (k=2, 95% level of confidence)
CAT 3	3.70 dB (k=2, 95% level of confidence)
CAT 5	3.86 dB (k=2, 95% level of confidence)
CAT 6	4.64 dB (k=2, 95% level of confidence)

EUT Setup



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

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

The 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 connected to the outlet of the LISN.

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

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2013-06-17	2014-06-17
Rohde & Schwarz	LISN	ENV216	3560.6650.12-101613-Yb	2013-05-07	2014-05-07
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2013-08-09	2014-08-09
Rohde & Schwarz	CE Test software	EMC 32	V8.53	-	-

* **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 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:

16.4 dB at 0.326000 MHz in the Neutral conducted mode

Test Data

Environmental Conditions

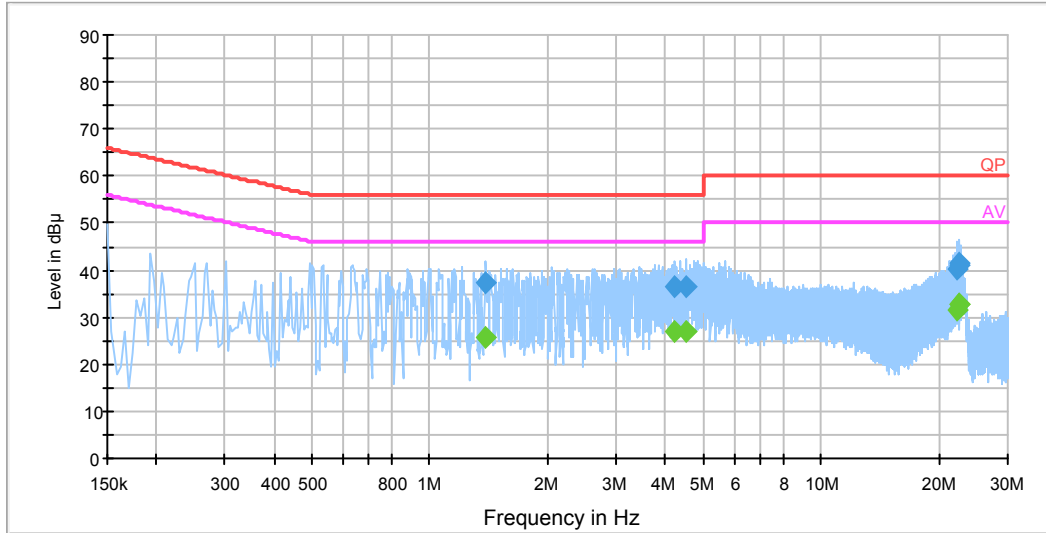
Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

The testing was performed by Candy Li on 2013-10-27.

Test Mode: Transmitting

AC 120 V, 60 Hz, Line:

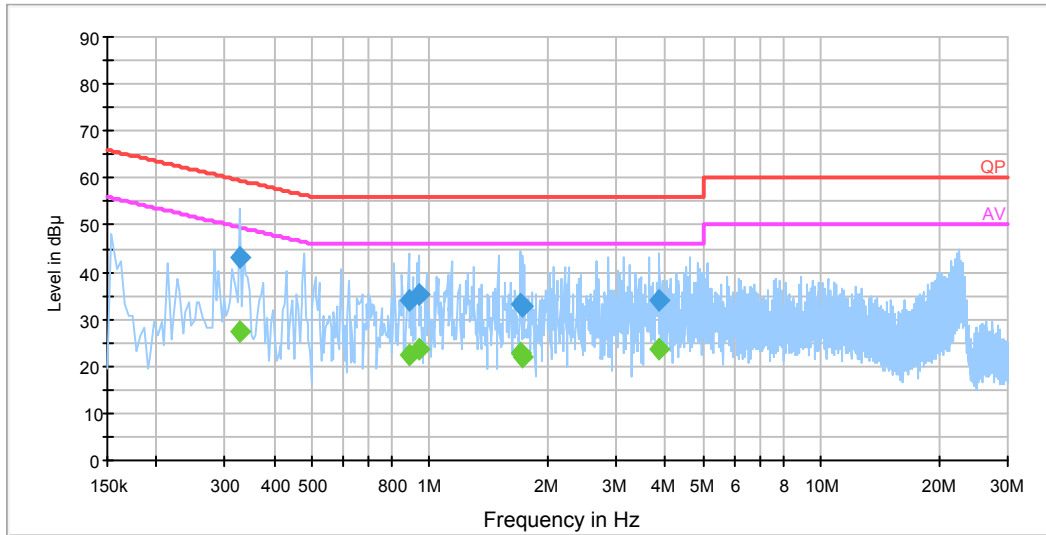
EMI Auto Test L



Frequency (MHz)	Corrected Amplitude (dBµV)	Corrected Factor (dB)	Limit (dBµV)	Margin (dB)	Remark (PK/QP/Ave)
1.394000	37.4	19.5	56.0	18.6	QP
1.394000	25.6	19.5	46.0	20.4	Ave.
4.242000	36.5	19.6	56.0	19.5	QP
4.242000	27.1	19.6	46.0	18.9	Ave.
4.526000	36.4	19.6	56.0	19.6	QP
4.526000	27.0	19.6	46.0	19.0	Ave.
22.318000	40.4	20.1	60.0	19.6	QP
22.318000	31.6	20.1	50.0	18.4	Ave.
22.566000	41.3	20.1	60.0	18.7	QP
22.566000	32.6	20.1	50.0	17.4	Ave.
22.642000	41.2	20.1	60.0	18.8	QP
22.642000	32.8	20.1	50.0	17.2	Ave.

AC 120V, 60 Hz, Neutral:

EMI Auto Test N



Frequency (MHz)	Corrected Amplitude (dBµV)	Corrected Factor (dB)	Limit (dBµV)	Margin (dB)	Remark (PK/QP/Ave)
0.326000	43.1	19.5	59.6	16.4	QP
0.326000	27.3	19.5	49.6	22.3	Ave.
0.886000	33.9	19.5	56.0	22.1	QP
0.886000	22.3	19.5	46.0	23.7	Ave.
0.938000	35.2	19.5	56.0	20.8	QP
0.938000	23.8	19.5	46.0	22.2	Ave.
1.706000	33.2	19.5	56.0	22.8	QP
1.706000	22.7	19.5	46.0	23.3	Ave.
1.734000	32.8	19.5	56.0	23.2	QP
1.734000	22.1	19.5	46.0	23.9	Ave.
3.834000	34.0	19.6	56.0	22.0	QP
3.834000	23.8	19.6	46.0	22.2	Ave.

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

Applicable Standard

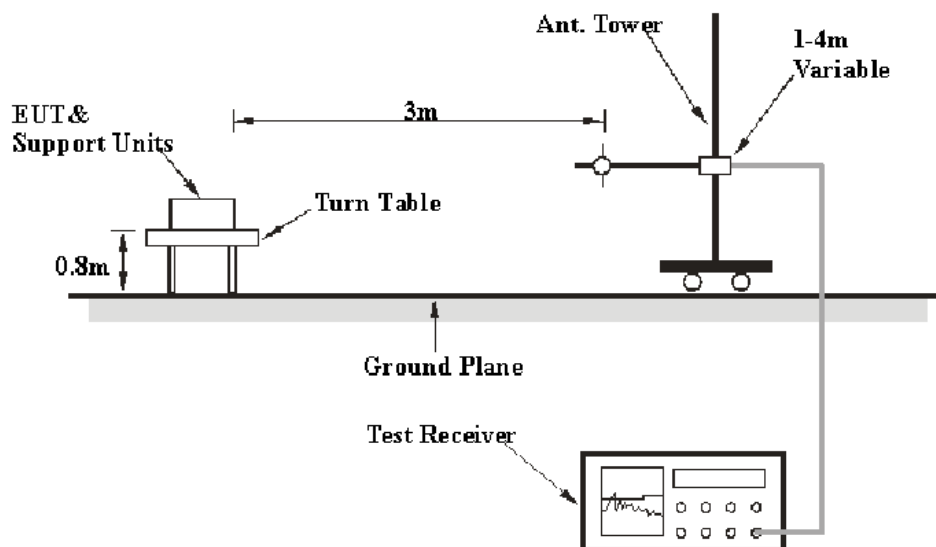
FCC §15.247 (d); §15.209; §15.205;

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 16-4-2:2011, the expended combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Shenzhen) 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.

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

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

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

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave.

Test Procedure

For the radiated emissions test, the adapter was connected to the outlet of the LISN.

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

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz 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	2013-09-30	2014-09-30
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2013-09-17	2014-09-17
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2011-11-28	2014-11-27
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2013-04-03	2014-04-03
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
the electro-Mechanics Co.	Horn Antenna	3116	9510-2270	2013-10-14	2016-10-13

* **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:

6.19 dB at 2483.8 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 Candy Li on 2013-10-27.

EUT operation mode: Transmitting

30 MHz -25 GHz:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBµV/m)	FCC Part 15.247/205/209	
	Reading (dBµV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBµV/m)	Margin (dB)
Low Channel (2408 MHz)									
144.01	43.46	QP	268	1.7	H	-14.5	28.96	43.5	14.54
2408	100.22	PK	294	1.2	H	6.13	106.35	/	/
2408	94.79	Ave.	294	1.2	H	6.13	100.92	/	/
2408	104.04	PK	53	1.8	V	6.13	110.17	/	/
2408	98.17	Ave.	53	1.8	V	6.13	104.30	/	/
2389.8	47.07	PK	313	1.5	V	6.13	53.20	74	20.80
2389.8	37.16	Ave.	313	1.5	V	6.13	43.29	54	10.71
2388.1	46.18	PK	160	1.3	V	6.13	52.31	74	21.69
2388.1	35.33	Ave.	160	1.3	V	6.13	41.46	54	12.54
2487.9	40.34	PK	249	2.1	H	7.21	47.55	74	26.45
2487.9	26.31	Ave.	249	2.1	H	7.21	33.52	54	20.48
4816	40.68	PK	42	1.2	H	12.40	53.08	74	20.92
4816	25.85	Ave.	42	1.2	H	12.40	38.25	54	15.75
7224	39.75	PK	210	1.9	H	16.62	56.37	74	17.63
7224	24.45	Ave.	210	1.9	H	16.62	41.07	54	12.93
9632	39.34	PK	315	1.3	V	19.28	58.62	74	15.38
9632	24.40	Ave.	315	1.3	V	19.28	43.68	54	10.32
Middle Channel (2436 MHz)									
144.01	43.37	QP	212	1.9	H	-14.5	28.87	43.5	14.63
2436	100.69	PK	244	1.8	H	6.13	106.82	/	/
2436	95.11	Ave.	244	1.8	H	6.13	101.24	/	/
2436	104.37	PK	324	1.7	V	6.13	110.50	/	/
2436	98.72	Ave.	324	1.7	V	6.13	104.85	/	/
2373.8	41.48	PK	348	1.3	H	6.13	47.61	74	26.39
2373.8	26.86	Ave.	348	1.3	H	6.13	32.99	54	21.01
2381.3	41.03	PK	251	1.6	H	6.13	47.16	74	26.84
2381.3	26.08	Ave.	251	1.6	H	6.13	32.21	54	21.79
2499.6	40.66	PK	105	1.1	V	7.21	47.87	74	26.13
2499.6	25.99	Ave.	105	1.1	V	7.21	33.20	54	20.80
4872	41.17	PK	125	1.2	H	12.46	53.63	74	20.37
4872	26.11	Ave.	125	1.2	H	12.46	38.57	54	15.43
7308	39.64	PK	156	1.3	H	16.49	56.13	74	17.87
7308	24.42	Ave.	156	1.3	H	16.49	40.91	54	13.09
9744	39.62	PK	310	1.4	V	19.40	59.02	74	14.98
9744	24.44	Ave.	310	1.4	V	19.40	43.84	54	10.16

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBµV/m)	FCC Part 15.247/205/209	
	Reading (dBµV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBµV/m)	Margin (dB)
High Channel (2468 MHz)									
144.01	43.42	QP	284	2.1	H	-14.5	28.92	43.5	14.58
2468	99.44	PK	118	1.9	H	7.21	106.65	/	/
2468	93.23	Ave.	118	1.9	H	7.21	100.44	/	/
2468	103.83	PK	37	1.8	V	7.21	111.04	/	/
2468	98.25	Ave.	37	1.8	V	7.21	105.46	/	/
2388.4	41.40	PK	137	1.6	V	6.13	47.53	74	26.47
2388.4	27.66	Ave.	137	1.6	V	6.13	33.79	54	20.21
2483.8	50.07	PK	140	1.3	V	7.21	57.28	74	16.72
2483.8	40.60	Ave.	140	1.3	V	7.21	47.81	54	6.19
2484.4	49.43	PK	20	1.3	V	7.21	56.64	74	17.36
2484.4	39.92	Ave.	20	1.3	V	7.21	47.13	54	6.87
4936	41.36	PK	308	1.2	H	12.50	53.86	74	20.14
4936	26.17	Ave.	308	1.2	H	12.50	38.67	54	15.33
7404	39.89	PK	34	1.5	H	15.91	55.80	74	18.20
7404	24.52	Ave.	34	1.5	H	15.91	40.43	54	13.57
9872	39.26	PK	329	1.1	H	19.39	58.65	74	15.35
9872	24.37	Ave.	329	1.1	H	19.39	43.76	54	10.24

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 Candy Li on 2013-10-27.

Test Result: Compliance.

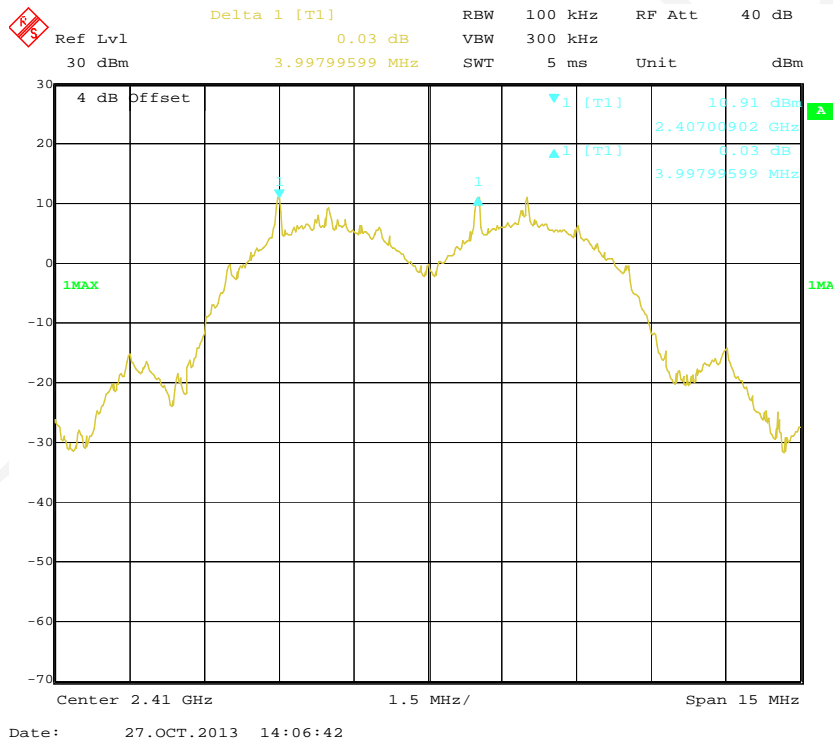
Please refer to following tables and plots

Test Mode: Transmitting

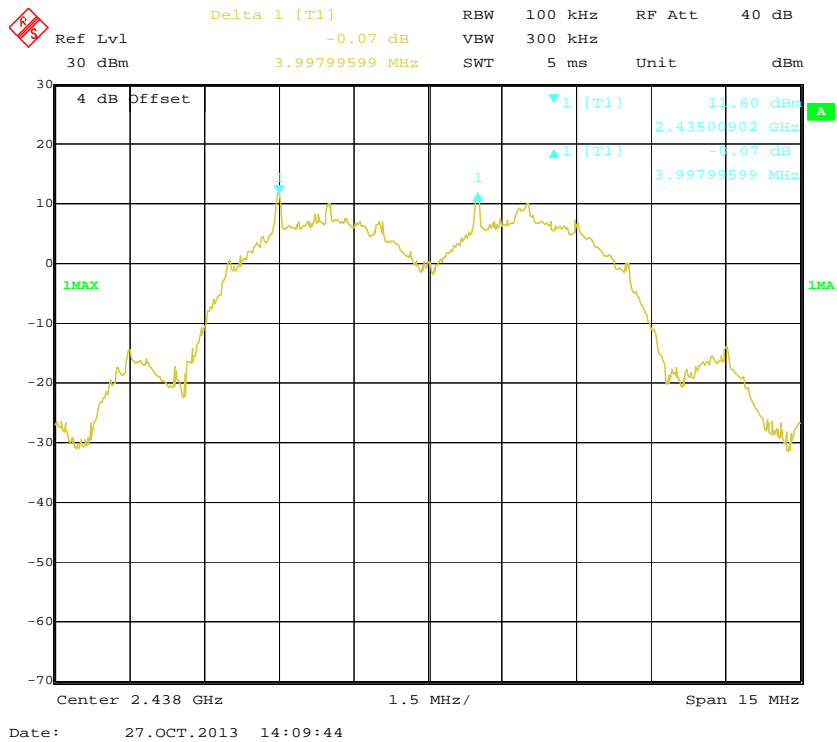
Channel	Channel Frequency (MHz)	Channel Separation (MHz)	>Limit (MHz)	Result
Channel 1	2408	3.998	3.220	Pass
Channel 2	2412			
Channel 8	2436			
Channel 9	2440	3.998	3.193	
Channel 15	2464			
Channel 16	2468	3.998	3.233	

Note: the limit = 2/3 of 20 dB bandwidth

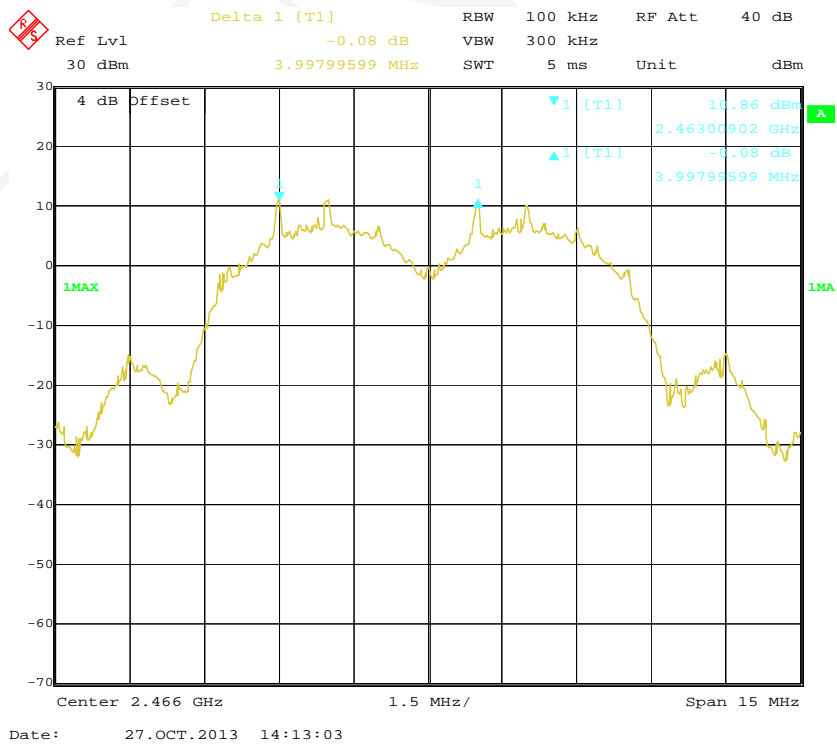
Low Channel



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 Candy Li on 2013-10-27.

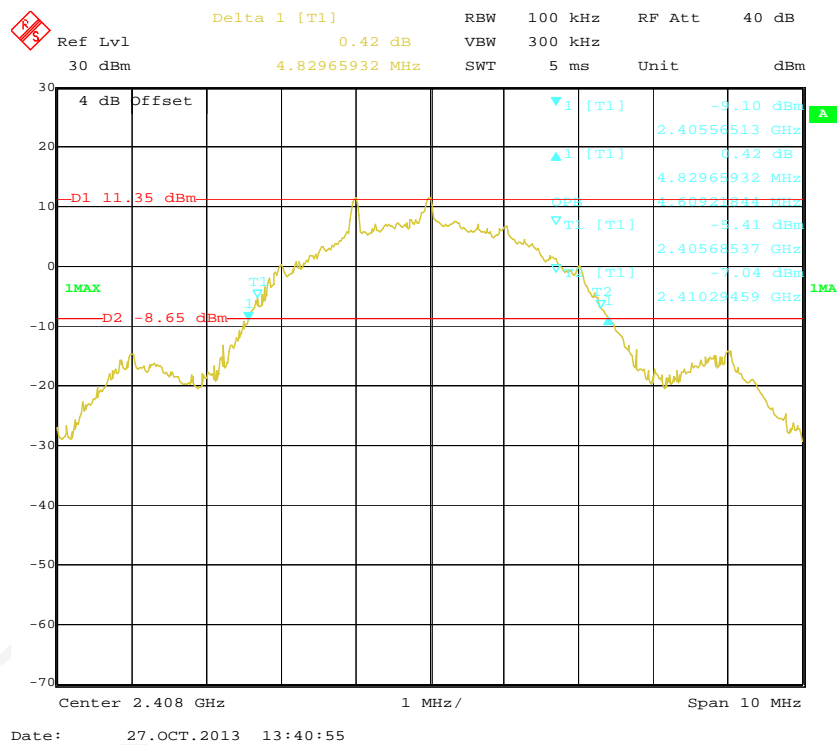
Test Result: Compliance.

Please refer to following tables and plots

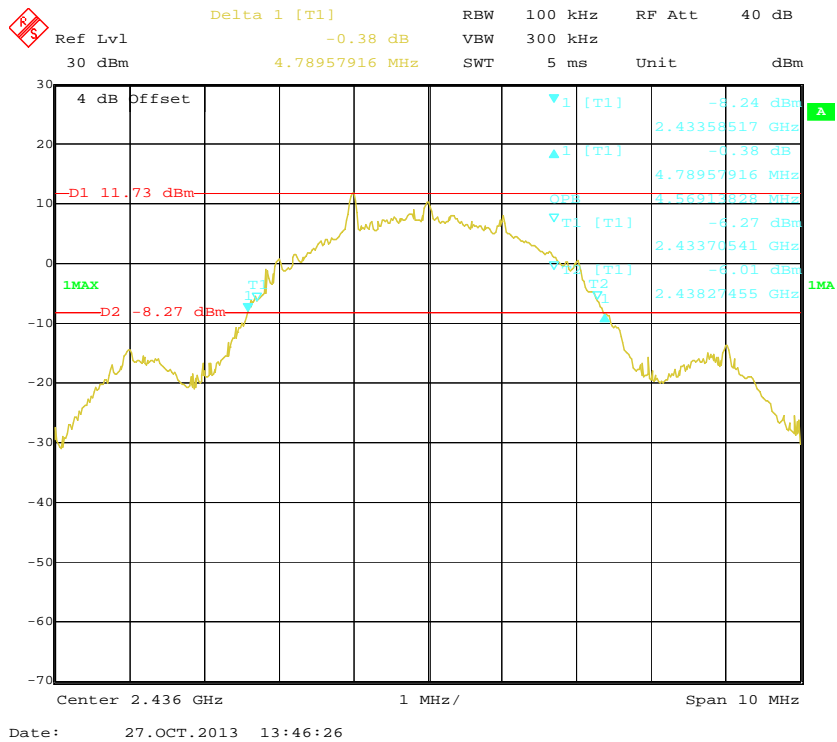
Test Mode: Transmitting

Channel	Frequency (MHz)	20 dB Emission Bandwidth (MHz)
Low	2408	4.830
Middle	2436	4.790
High	2468	4.850

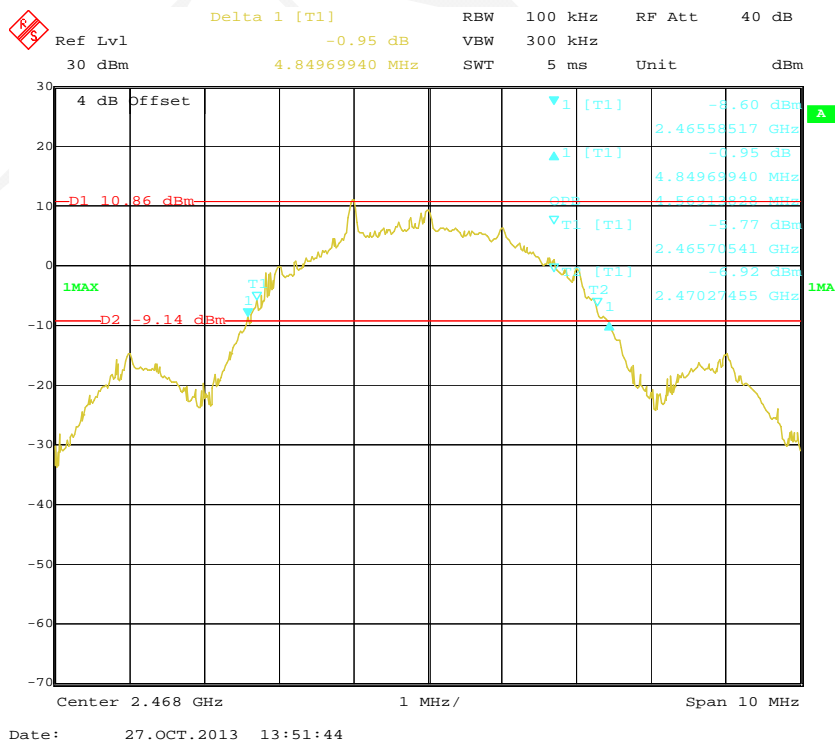
Low Channel



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 Candy Li on 2013-10-27.

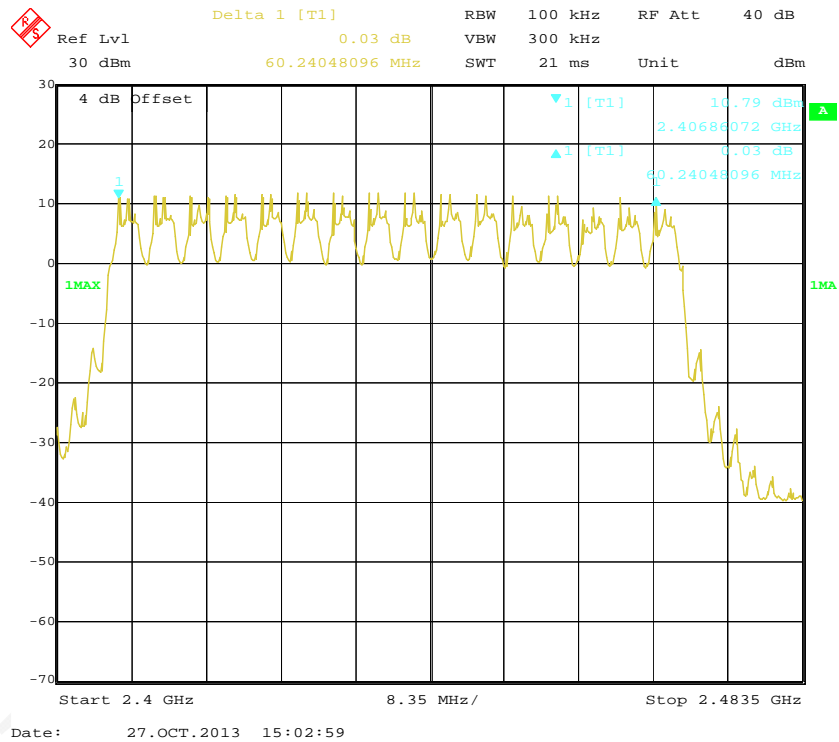
Test Result: Compliance.

Please refer to following tables and plots

Test Mode: Transmitting

Frequency Range (MHz)	Number of Hopping Channel	Limit
2400-2483.50	16	≥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 Candy Li on 2013-10-27.

Test Result: Compliance.

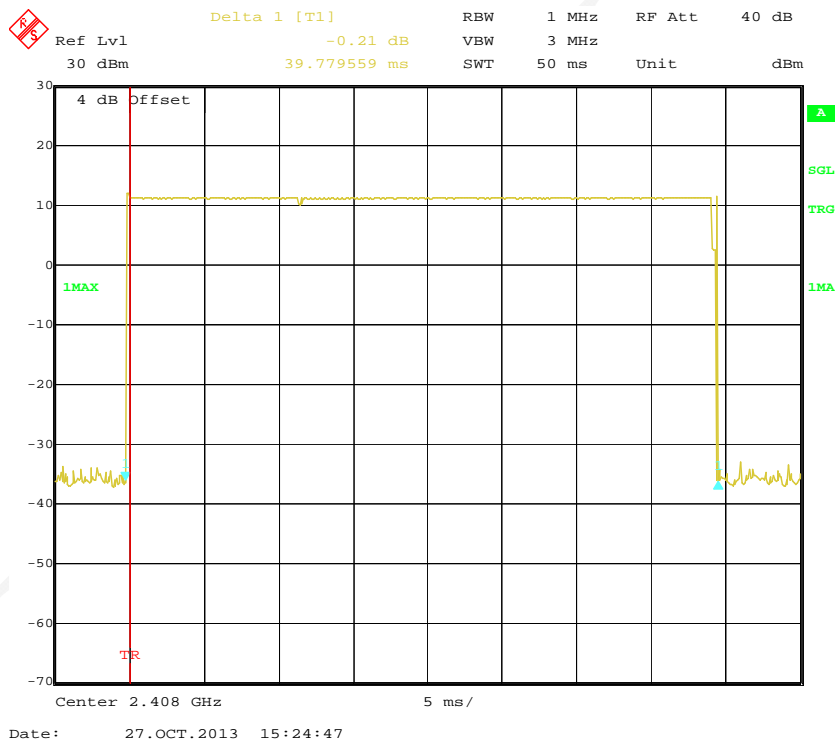
Please refer to following tables and plots

Test Mode: Transmitting

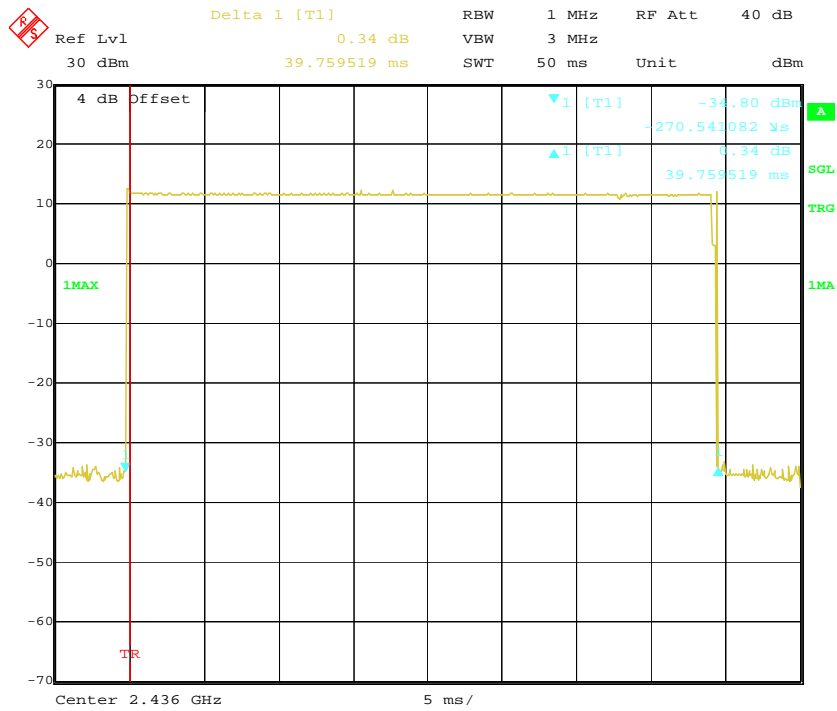
Channel	Pulse Width (ms)	Dwell Time (S)	Limit (S)	Result
Low	39.780	0.318	0.4	Pass
Middle	39.760	0.318	0.4	Pass
High	39.880	0.320	0.4	Pass

Note: Dwell time= Pulse time(20/16)*0.4*16*

Low Channel

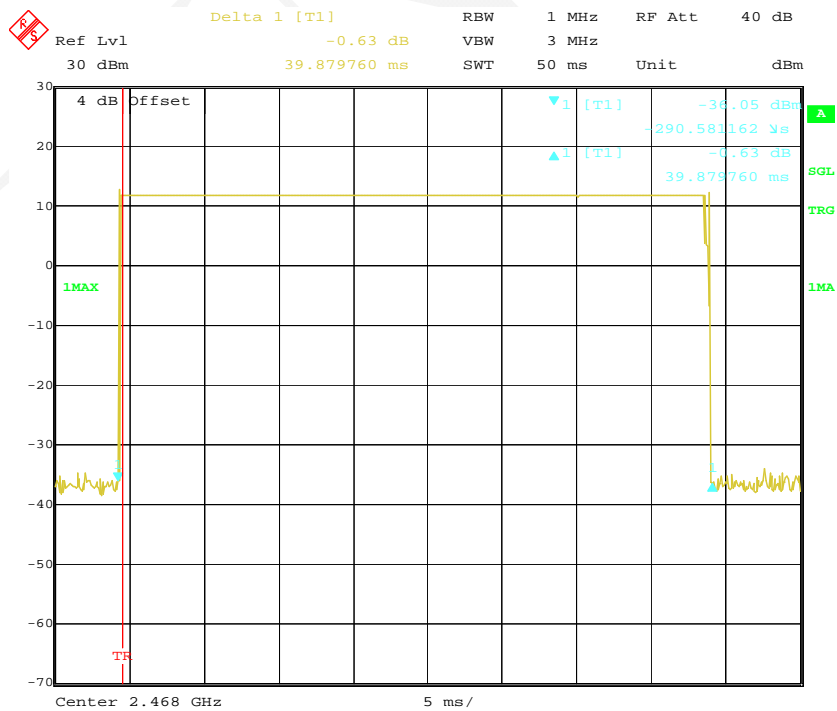


Middle Channel



Date: 27.OCT.2013 15:32:36

High Channel



Date: 27.OCT.2013 15:40:21

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:	100.0 kPa

* The testing was performed by Candy Li on 2013-10-27.

Test Result: Compliance.

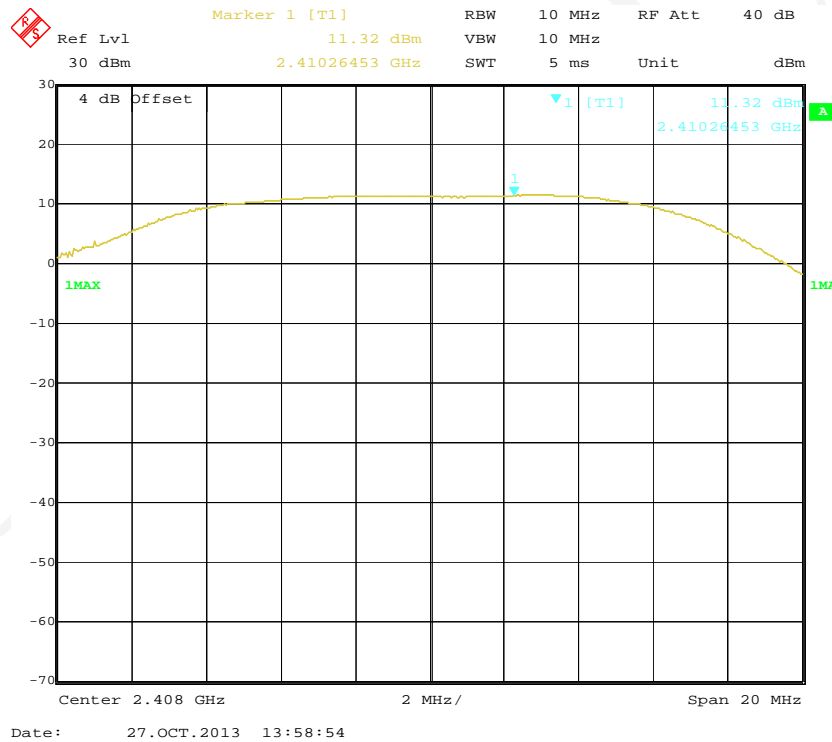
Test Mode: Transmitting

Please refer to following tables and plots

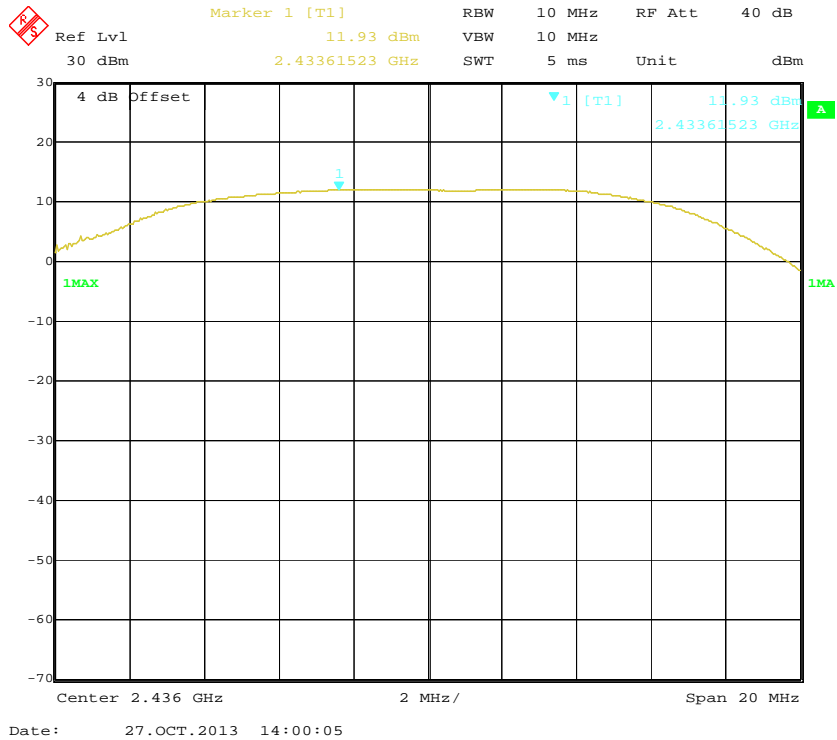
Channel	Channel frequency (MHz)	Conducted Peak output power (dBm)	Conducted Power output (mW)	Limit (mW)
Low	2408	11.32	13.55	125
Middle	2436	11.93	15.60	125
High	2468	11.19	13.15	125

Note: The data above was tested in conducted mode.

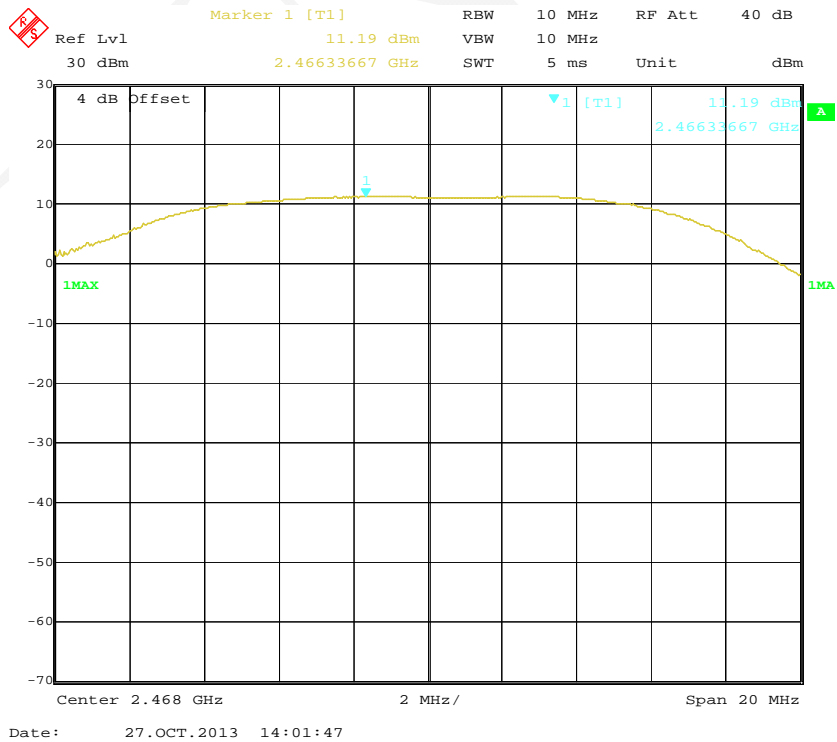
Low Channel



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:	100.0 kPa

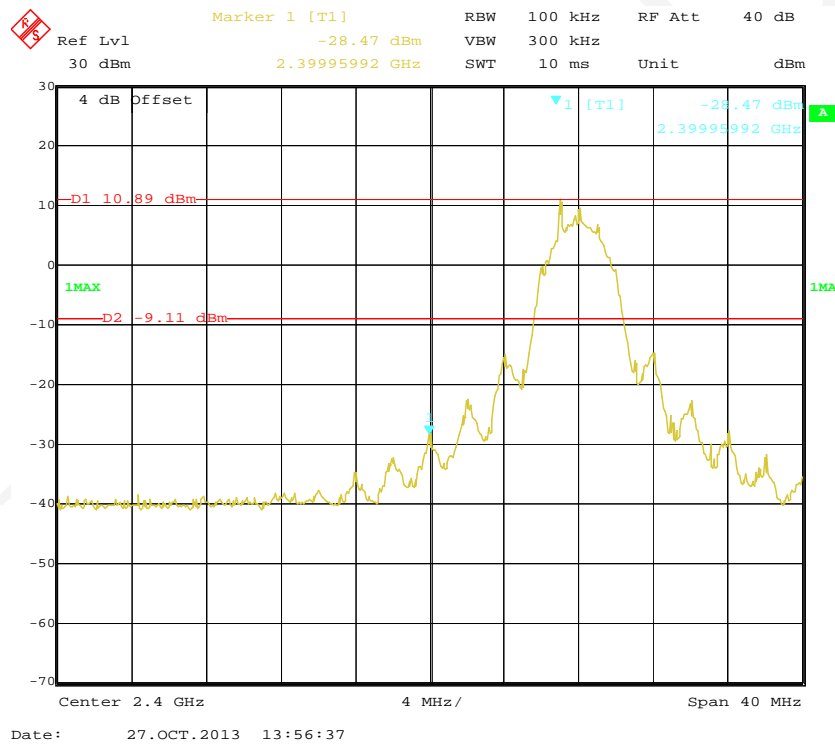
*The testing was performed by Candy Li on 2013-10-27.

Test Result: Compliance.

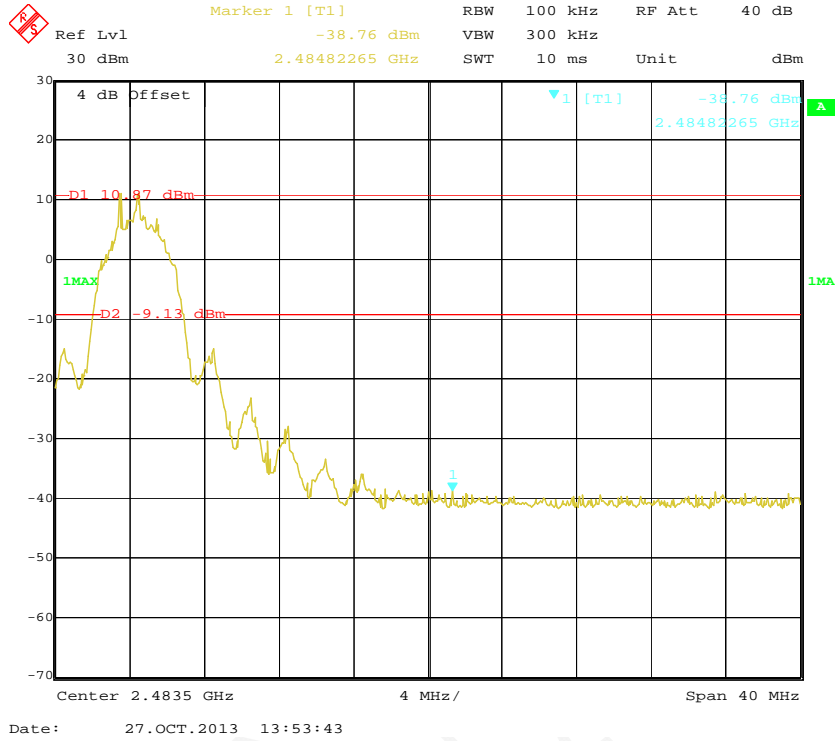
Test Mode: Transmitting

Please refer to follow plots:

Band Edge: Left Side



Band Edge: Right Side



PRODUCT SIMILARITY DECLARATION LETTER

Date: 2015-4-14

Product Similarity Declaration

To Whom It May Concern,

We, CIRCUS WORLD DISPLAYS LTD., hereby declare that we have a product named as 2.4GHz Wireless Security Camera with Dual Channel Receiver (Camera unit), Model :22306 was tested by BACL, meanwhile, for our marketing purpose, we would like to list a series models as below on reports and certificate, all the models are identical schematics. Only named differently due to different combination:

model number	description
22304, 12304, SC1628GMR2T1R-USA-BK00 SC1628GMR2T1R-USA-BK01	2 x DW Security Camera, 1 x DW Security Receiver 3 x cUL Power Adaptor, 2 x Mounting Hardware 1 x Quick Start Guide (8.5x11 Colour)
22305, 12305, SC1628GMR4T2R-USA-BK00 SC1628GMR4T2R-USA-BK01	4 x DW Security Camera, 2 x DW Security Receiver 6 x cUL Power Adaptor, 4 x Mounting Hardware 1 x Quick Start Guide (8.5x11 Colour)
22306, 12306, SC1628GMR1T1R-USA-BK00 SC1628GMR1T1R-USA-BK01	1 x DW Security Camera, 1 x DW Security Receiver 2 x cUL Power Adaptor, 1 x Mounting Hardware 1 x Quick Start Guide (8.5x11 Colour)
22307, 12307, SC1628GMR1T-USA-BK00 SC1628GMR1T-USA-BK01	1 x DW Security Camera, 1 x cUL Power Adaptor 1 x Mounting Hardware 1 x Quick Start Guide (8.5x11 Colour)

No other changes are made to them.

We confirm that all information above is true, and we'll be responsible for all the consequences. Please contact me if you have any question.

Sincerely,

Signature:

Raj Jain
President

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