FCC PART 15.247

TEST REPORT

For

Hyndsight Vision Systems Inc

59 Pine Street, Peterborough, NH 03458,United States

FCC ID: 2ACT7-CJTX

Report Type:	**Product Type:**
Original Report	Hyndsight Vision System Camera

Test Engineer:	leon Chen
Report Number:	RDG140725002-00A
Report Date:	2014-09-01
Reviewed By:	Sula Huang RF Engineer
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Hyndsight Vision Systems Inc's* product, model number: *HVS-001C (FCC ID: 2ACT7-CJTX) or* ("EUT") in this report is a *Hyndsight Vision System Camera,* rated input voltage: DC 5V from adapter.

Adapter information: KUANTEN
Model: SSA021F050100USU
Input: AC 100-240V, 50/60Hz, 0.2A
Output: DC 5V, 1A

** All measurement and test data in this report was gathered from production sample serial number: 140725002(Assigned by BACL. Dongguan).The EUT was received on 2014-07-25.*

Objective

This report is prepared on behalf of *Hyndsight Vision Systems Inc* in accordance with Part 2, Subpart J, Part 15, Subparts A, B and C of the Federal Communications Commission's rules.

The tests were performed in order to determine the EUT compliance 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)

No related submittal(s).

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. (Dongguan). 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. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) 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 February 02, 2012. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in an engineering mode.

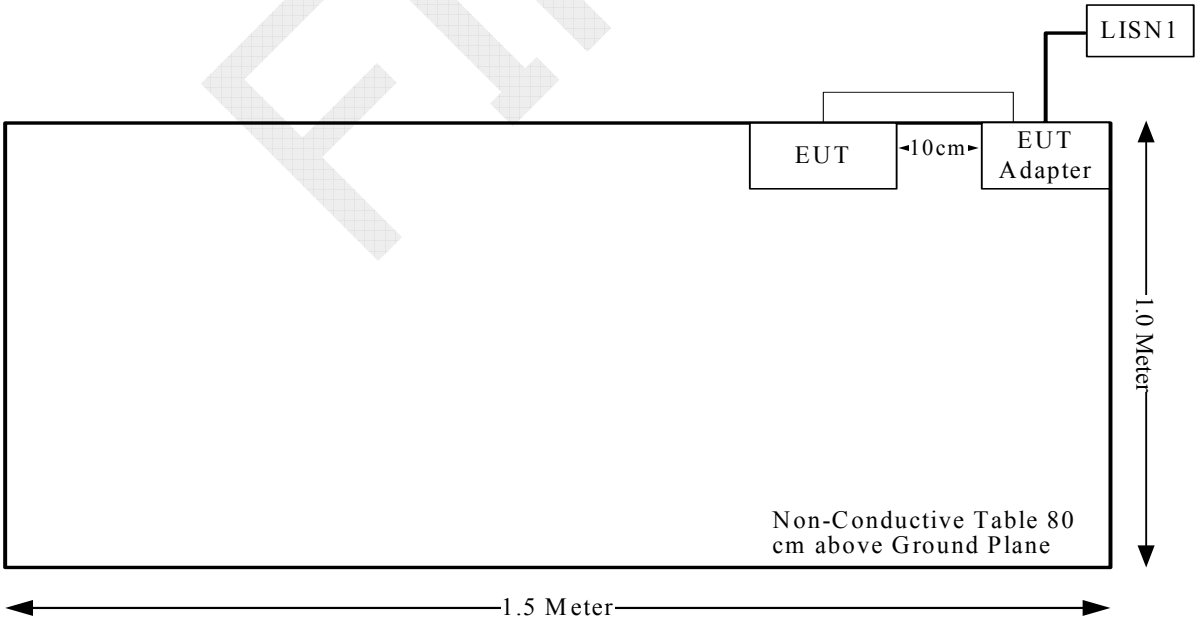
19 hopping channels are provided by manufacturer, and EUT was tested with low channel: 2410.875 MHz, middle channel: 2441.25MHz, and high channel: 2471.625MHz.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2410.875	11	2444.625
2	2414.25	12	2448
3	2417.625	13	2451.375
4	2421	14	2454.75
5	2424.375	15	2458.125
6	2427.75	16	2461.5
7	2431.125	17	2464.875
8	2434.5	18	2468.25
9	2438.875	19	2471.625
10	2441.25	/	/

Equipment Modifications

Use copper foil to cover the main board, please refer to the internal photos.

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §1.1307,§2.1091	Maximum Permissible Exposure	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 Test	Compliance
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliance
§15.247(a)(1)(iii)	Quantity of hopping channel Test	Compliance
§15.247(b)(1)	Peak Output Power Measurement	Compliance
§15.247(d)	Band Edges	Compliance

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

Applicable Standard

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

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

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/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;

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

Calculated Formulary:

Predication of MPE limit at a given distance
$S = PG/4\pi R^2$ = 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);

Calculated Data:

Frequency (MHz)	**Antenna Gain**		**Conducted Power**		**Evaluation Distance (cm)**	**Power Density (mW/cm^2)**	**MPE Limit (mW/cm^2)**
	(dBi)	**(numeric)**	**(dBm)**	**(mW)**			
2471.625	2	1.58	14.06	25.47	20	0.01	1.0

Result: The device meet FCC MPE at 20cm 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 use of a standard antenna jack or electrical connector is prohibited.

Antenna Connector Construction

The EUT has an external antenna that uses a unique coupling to it. The antenna gain is 2 dBi and fulfills the requirement of this section. Please refer to the EUT photos.

Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207

Measurement Uncertainty

Compliance or non- compliance with a disturbance limit shall be determined in the following manner：

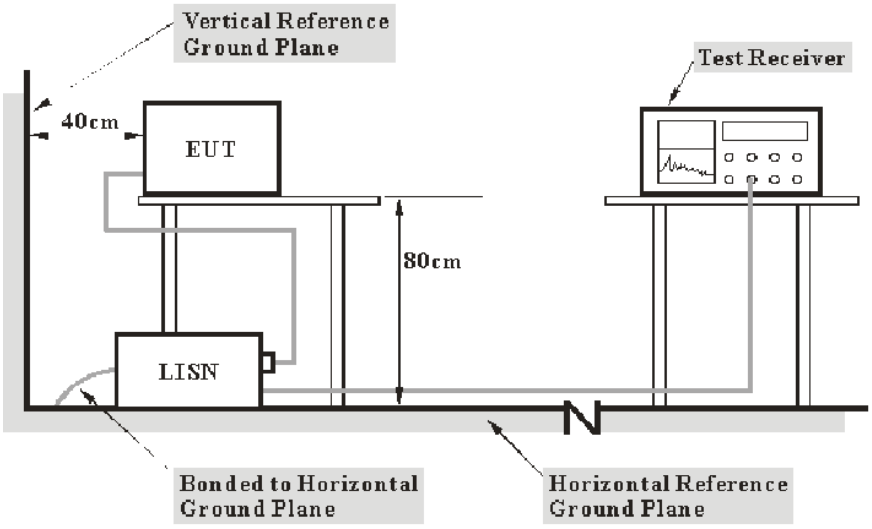
If U_{lab} is less than or equal to U_{cispr} of Table 1, then:
– compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
– non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.
If U_{lab} is greater than U_{cispr} of Table 1, then:
– compliance is deemed to occur if no measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit;
– non - compliance is deemed to occur if any measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit.

Based on CISPR 16-4-2: 2011, measurement uncertainty of conducted disturbance at mains port using AMN at Bay Area Compliance Laboratories Corp. (Dongguan) is 3.46 dB (150 kHz to 30 MHz).

Table 1 – Values of U_{cispr}

Measurement	U_{cispr}
Conducted disturbance at mains port using AMN (150 kHz to 30 MHz)	3.4 dB

EUT Setup



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

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

The adapter was connected to a 120 VAC/60 Hz power source or the EUT was connected to a 12 VAC/60Hz 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 or EUT 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.

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$V_C = V_R + A_C + VDF$
$C_f = A_C + VDF$

Herein,
V_C (cord. Reading): corrected voltage amplitude
V_R: reading voltage amplitude
A_c: attenuation caused by cable loss
VDF: voltage division factor of AMN
C_f: Correction Factor

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

Margin = Limit – Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCS 30	830245/006	2013-11-20	2014-11-20
R&S	L.I.S.N	ESH3-Z5	843331/015	2013-09-25	2014-09-25
R&S	Two-line V-network	ENV 216	3560.6550.12	2014-01-22	2015-01-22
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, 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:

11.0 at **1.082190 MHz** in the **Line** conducted mode

Test Data

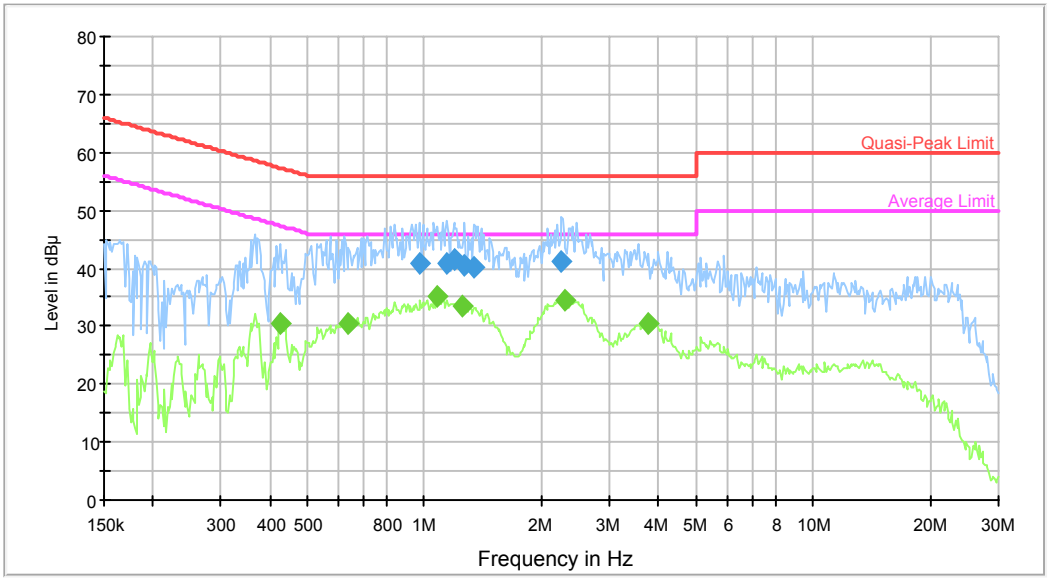
Environmental Conditions

Temperature:	30.4 °C
Relative Humidity:	57 %
ATM Pressure:	99.8kPa

The testing was performed by leon Chen on 2014-07-31.

Test Mode: Operating

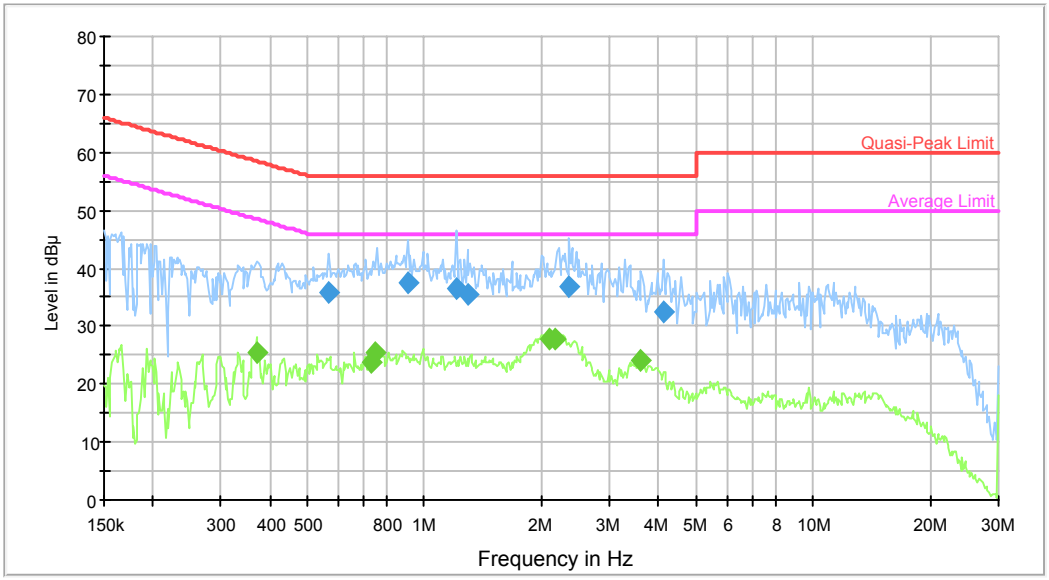
AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.967957	40.9	9.000	L1	10.5	15.1	56.0	Compliance
1.144267	40.9	9.000	L1	10.4	15.1	56.0	Compliance
1.190776	41.5	9.000	L1	10.4	14.5	56.0	Compliance
1.269154	40.4	9.000	L1	10.4	15.6	56.0	Compliance
1.341955	40.3	9.000	L1	10.4	15.7	56.0	Compliance
2.252540	41.1	9.000	L1	10.5	14.9	56.0	Compliance

Frequency (MHz)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)	Comment
0.426011	30.3	9.000	L1	10.6	17.0	47.3	Compliance
0.639600	30.5	9.000	L1	10.6	15.5	46.0	Compliance
1.082190	35.0	9.000	L1	10.4	11.0	46.0	Compliance
1.249088	33.6	9.000	L1	10.4	12.4	46.0	Compliance
2.307034	34.6	9.000	L1	10.5	11.4	46.0	Compliance
3.781003	30.4	9.000	L1	10.7	15.6	46.0	Compliance

AC120 V, 60 Hz, Neutral:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.567545	35.8	9.000	N	10.4	20.2	56.0	Compliance
0.908180	37.3	9.000	N	10.6	18.7	56.0	Compliance
1.209904	36.6	9.000	N	10.5	19.4	56.0	Compliance
1.289541	35.6	9.000	N	10.5	20.4	56.0	Compliance
2.362847	36.7	9.000	N	10.5	19.3	56.0	Compliance
4.127365	32.4	9.000	N	10.8	23.6	56.0	Compliance

Frequency (MHz)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)	Comment
0.369089	25.5	9.000	N	11.0	23.0	48.5	Compliance
0.726569	23.8	9.000	N	10.6	22.2	46.0	Compliance
0.750100	25.3	9.000	N	10.6	20.7	46.0	Compliance
2.096658	27.9	9.000	N	10.5	18.1	46.0	Compliance
2.181877	27.7	9.000	N	10.5	18.3	46.0	Compliance
3.604490	24.0	9.000	N	10.7	22.0	46.0	Compliance

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

Applicable Standard

FCC §15.247 (d); §15.209; §15.205;

Measurement Uncertainty

Compliance or non- compliance with a disturbance limit shall be determined in the following manner：

If U_{lab} is less than or equal to U_{cispr} of Table 2, then:
- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If U_{lab} is greater than U_{cispr} of Table 1, then:
- compliance is deemed to occur if no measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit;
- non - compliance is deemed to occur if any measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit.

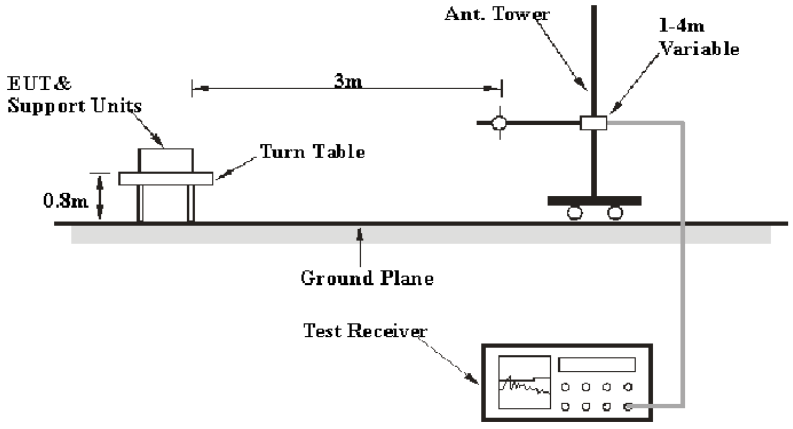
Based on CISPR 16-4-2: 2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:
30M~200MHz: 5.0 dB
200M~1GHz: 6.2 dB
1G~6GHz: 4.45 dB
6G~18GHz: 5.23 dB

Table 2 – Values of U_{cispr}

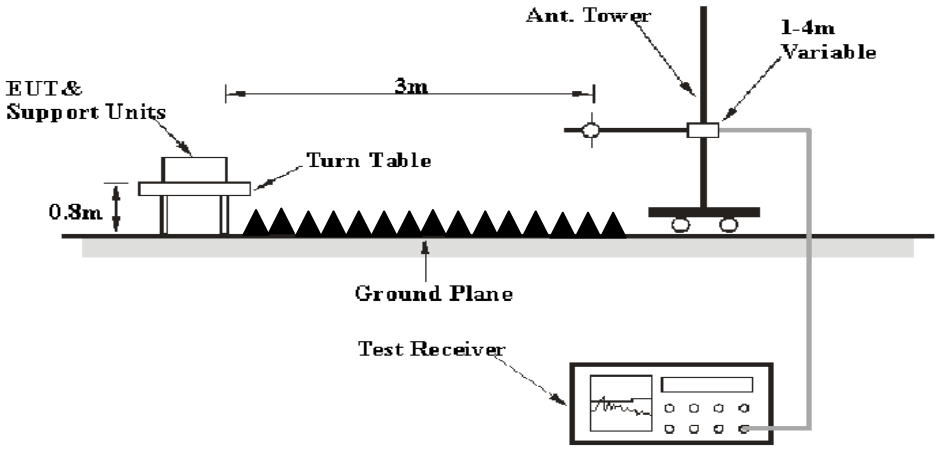
Measurement	U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters 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.

The adapter was connected to a 120 VAC/60 Hz power source or the EUT was connected to a 12VAC/60Hz 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	120 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 or EUT 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 - 1 GHz, peak and Average detection modes for frequencies above 1 GHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2014-05-09	2015-05-09
Sunol Sciences	Antenna	JB3	A060611-1	2011-09-06	2014-09-05
HP	Amplifier	8447E	2434A02181	2013-09-01	2014-09-01
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09
ETS LINDGREN	Horn Antenna	3115	000 527 35	2012-09-06	2015-09-06
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	2014-02-19	2015-02-19
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-01 1304	2014-06-16	2017-06-15
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2013-09-06	2014-09-06

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, 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:

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

0.49 dB at **2483.5 MHz** in the **Vertical** polarization

Test Data

Environmental Conditions

Temperature:	26.3 °C
Relative Humidity:	53 %
ATM Pressure:	100.8kPa

The testing was performed by leon Chen on 2014-08-23.

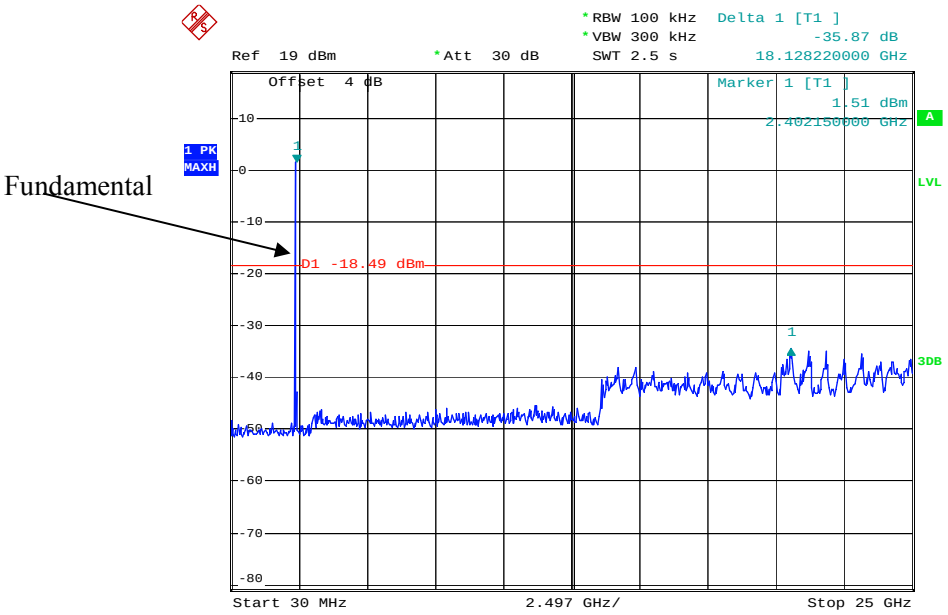
Test Mode: Transmitting

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	FCC 15.247	
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBμV/m)	Margin (dB)
Low Channel: 2410.875 MHz									
2410.875	67.33	PK	H	25.67	4.42	0.00	97.42	N/A	N/A
2410.875	62.36	AV	H	25.67	4.42	0.00	92.45	N/A	N/A
2410.875	77.85	PK	V	25.67	4.42	0.00	107.94	N/A	N/A
2410.875	72.96	AV	V	25.67	4.42	0.00	103.05	N/A	N/A
2390	30.15	PK	V	25.61	4.39	0.00	60.15	74.00	13.85
2390	15.2	AV	V	25.61	4.39	0.00	45.20	54.00	8.80
4821.75	40.81	PK	V	30.64	6.02	27.41	50.06	74.00	23.94
4821.75	29.37	AV	V	30.64	6.02	27.41	38.62	54.00	15.38
7232.625	31.12	PK	V	34.16	7.47	25.90	46.85	74.00	27.15
7232.625	19.54	AV	V	34.16	7.47	25.90	35.27	54.00	18.73
9643.5	29.64	PK	V	36.04	8.80	27.47	47.01	74.00	26.99
9643.5	17.1	AV	V	36.04	8.80	27.47	34.47	54.00	19.53
7810	30.78	PK	V	35.05	7.55	27.06	46.32	74.00	27.68
7810	17.84	AV	V	35.05	7.55	27.06	33.38	54.00	20.62
72	47.55	QP	V	8.55	1.05	21.41	35.74	40.00	4.26*
Middle Channel: 2441.25 MHz									
2441.25	67.74	PK	H	25.75	4.40	0.00	97.89	N/A	N/A
2441.25	62.97	AV	H	25.75	4.40	0.00	93.12	N/A	N/A
2441.25	79.4	PK	V	25.75	4.40	0.00	109.55	N/A	N/A
2441.25	74.44	AV	V	25.75	4.40	0.00	104.59	N/A	N/A
4882.5	41.08	PK	V	30.79	6.08	27.42	50.53	74.00	23.47
4882.5	29.96	AV	V	30.79	6.08	27.42	39.41	54.00	14.59
7323.75	31.29	PK	V	34.38	7.51	25.88	47.30	74.00	26.70
7323.75	19.63	AV	V	34.38	7.51	25.88	35.64	54.00	18.36
9765	29.46	PK	V	36.34	8.83	27.20	47.43	74.00	26.57
9765	16.78	AV	V	36.34	8.83	27.20	34.75	54.00	19.25
1915	36.23	PK	V	24.43	3.66	27.50	36.82	74.00	37.18
1915	23.76	AV	V	24.43	3.66	27.50	24.35	54.00	29.65
7810	30.79	PK	V	35.05	7.55	27.06	46.33	74.00	27.67
7810	17.08	AV	V	35.05	7.55	27.06	32.62	54.00	21.38
72	47.68	QP	V	8.55	1.05	21.41	35.87	40.00	4.13*
High Channel: 2471.625 MHz									
2471.625	67.28	PK	H	25.83	4.46	0.00	97.57	N/A	N/A
2471.625	62.1	AV	H	25.83	4.46	0.00	92.39	N/A	N/A
2471.625	80.01	PK	V	25.83	4.46	0.00	110.30	N/A	N/A
2471.625	74.89	AV	V	25.83	4.46	0.00	105.18	N/A	N/A
2483.5	39.11	PK	V	25.86	4.49	0.00	69.46	74.00	4.54*
2483.5	23.16	AV	V	25.86	4.49	0.00	53.51	54.00	0.49*
4943.25	41.36	PK	V	30.95	5.89	27.43	50.77	74.00	23.23
4943.25	29.74	AV	V	30.95	5.89	27.43	39.15	54.00	14.85
7414.875	31.03	PK	V	34.60	7.56	25.90	47.29	74.00	26.71
7414.875	19.61	AV	V	34.60	7.56	25.90	35.87	54.00	18.13
9886.5	29.46	PK	V	36.63	8.86	26.79	48.16	74.00	25.84
9886.5	17.25	AV	V	36.63	8.86	26.79	35.95	54.00	18.05
7810	30.86	PK	V	35.05	7.55	27.06	46.40	74.00	27.60
7810	17.27	AV	V	35.05	7.55	27.06	32.81	54.00	21.19
72	47.53	QP	V	8.55	1.05	21.41	35.72	40.00	4.28*

*Within measurement uncertainty!

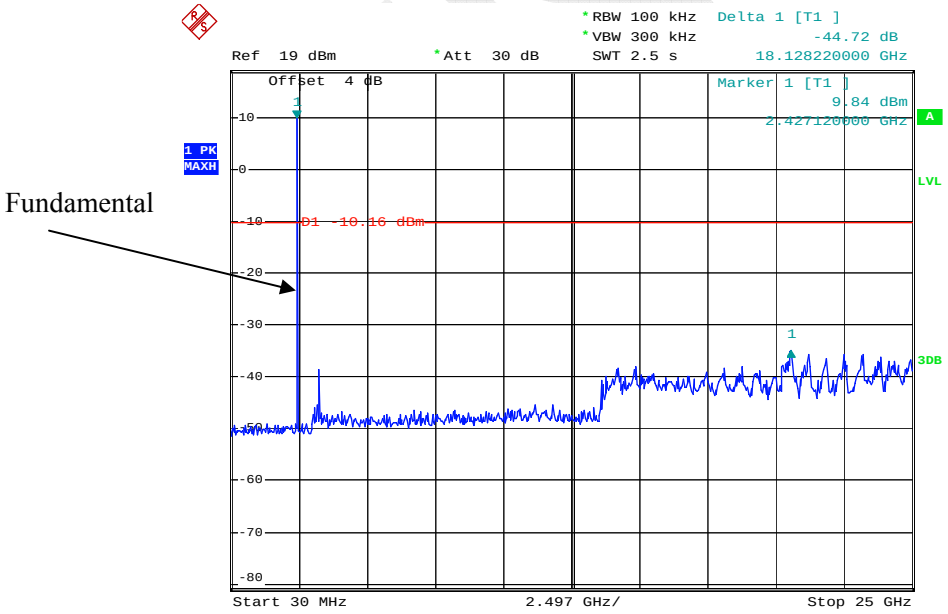
Conducted Spurious Emissions at Antenna Port

Low Channel



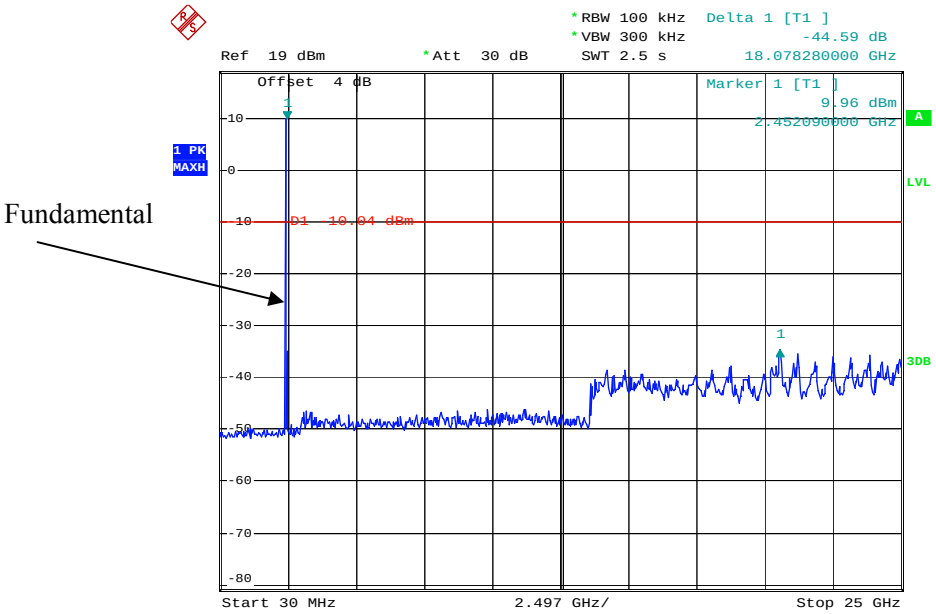
Date: 23.AUG.2014 10:26:15

Middle Channel



Date: 23.AUG.2014 10:36:27

High Channel



Date: 23.AUG.2014 10:27:38

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

Applicable Standard

Frequency hopping systems shall have hoping 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 2400-2483.50 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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09

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

Test Procedure

Set the EUT in transmitting mode, maxhold the trace, Allow it to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

Test Data

Environmental Conditions

Temperature:	29.5 °C
Relative Humidity:	65 %
ATM Pressure:	99.5 kappa

The testing was performed by leon Chen on 2014-08-08

Test Result: Compliance.

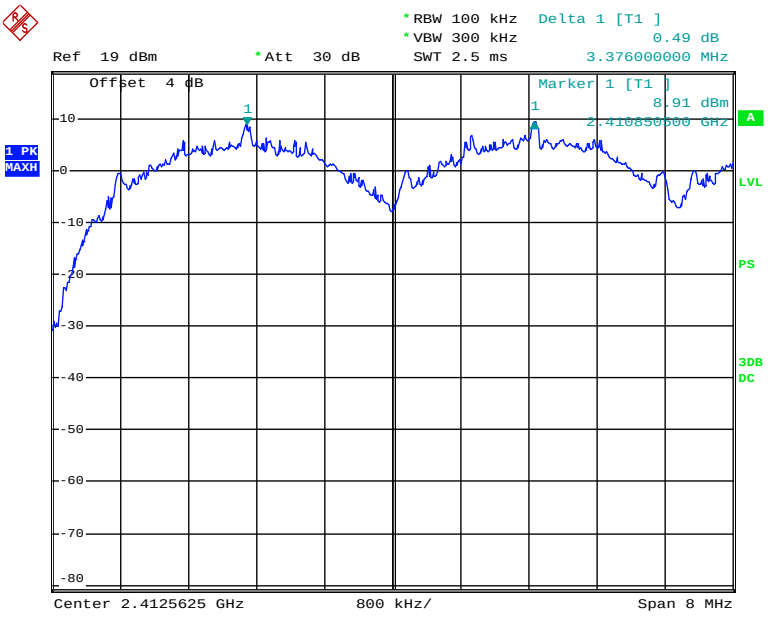
Please refer to following tables and plots

Test Mode: Transmitting

Channel	Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
Low	2410.875	3.376	2.464	Pass
Adjacent	2414.25			
Middle	2441.25	3.376	2.464	Pass
Adjacent	2444.625			
High	2471.625	3.392	2.464	Pass
Adjacent	2468.25			

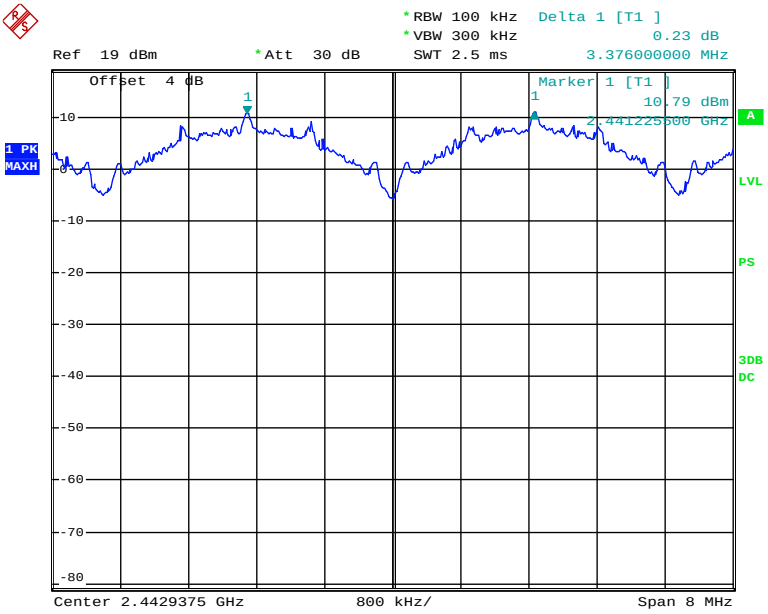
Note: Limit= (2/3) of 20 dB bandwidth

Low Channel



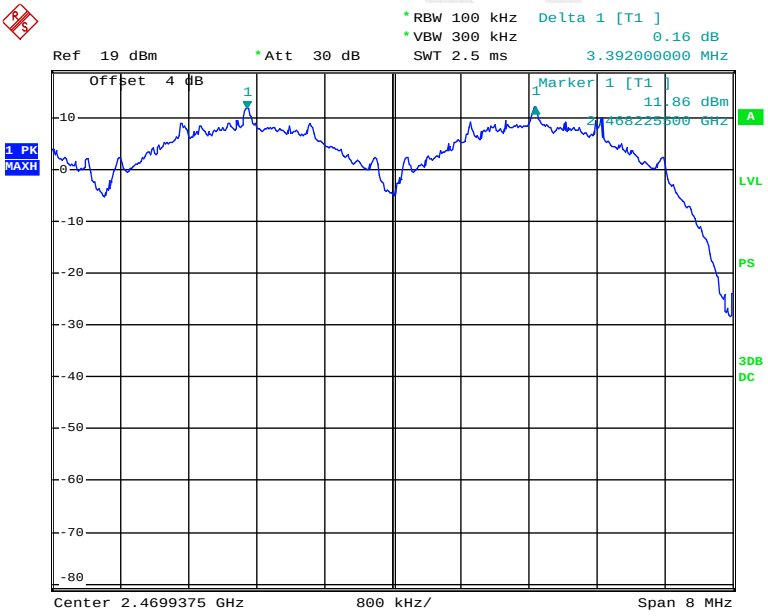
Date: 8.AUG.2014 03:46:45

Middle Channel



Date: 8.AUG.2014 04:00:06

High Channel



Date: 8.AUG.2014 04:06:04

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

Applicable Standard

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

Test Procedure

Set the EUT in transmitting mode, maxhold the trace, Allow it to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09

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

Test Data

Environmental Conditions

Temperature:	29.5 °C
Relative Humidity:	65 %
ATM Pressure:	99.5 kappa

The testing was performed by leon Chen on 2014-08-08

Test Result: Compliance.

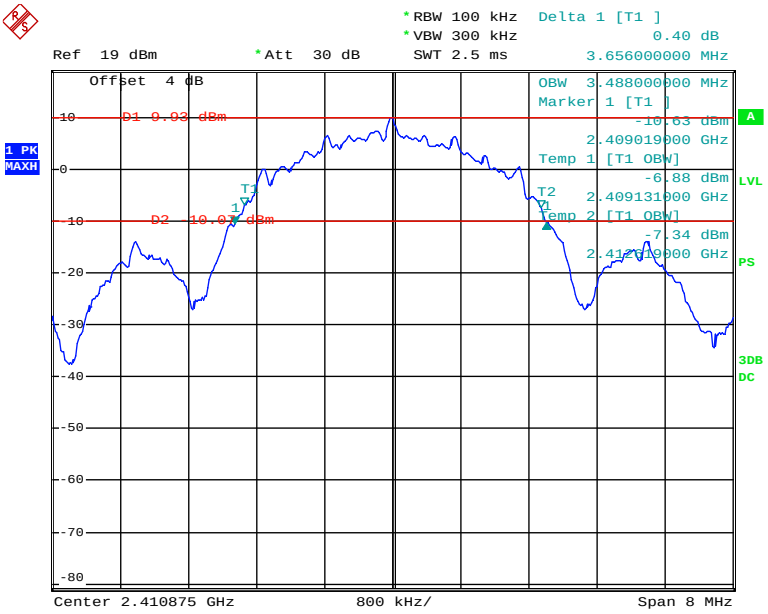
Please refer to following tables and plots

Test Mode: Transmitting

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
Low	2410.875	3.656
Middle	2441.25	3.696
High	2471.625	3.696

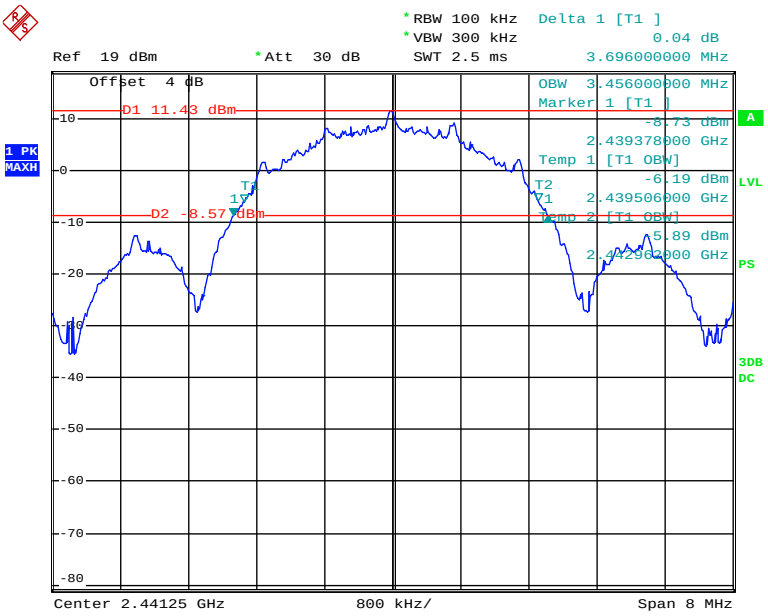
Please refer to the following plots.

Low Channel



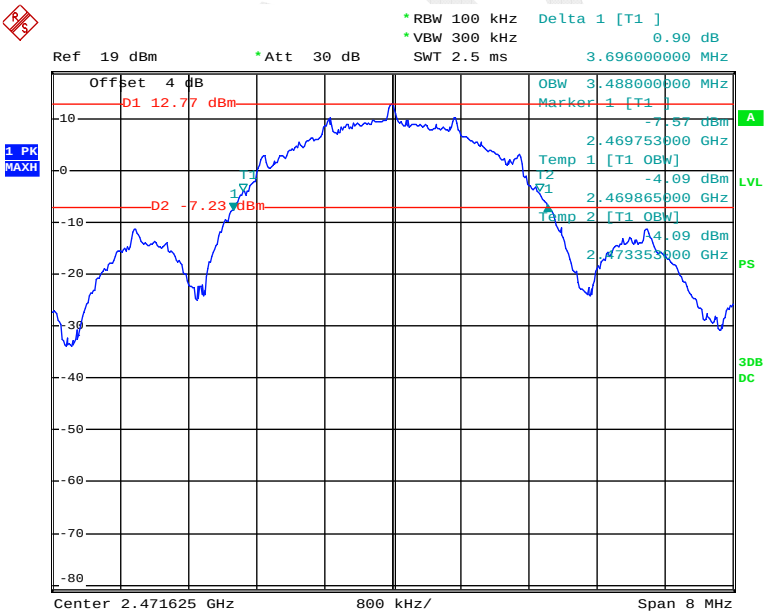
Date: 8.AUG.2014 03:08:01

Middle Channel



Date: 8.AUG.2014 03:09:53

High Channel



Date: 8.AUG.2014 03:09:12

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

Applicable Standard

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

Test Procedure

Set the EUT in hopping mode, maxhold the trace, allow it to stabilize.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09

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

Test Data

Environmental Conditions

Temperature:	29.5 °C
Relative Humidity:	65 %
ATM Pressure:	99.5 kappa

The testing was performed by leon Chen on 2014-08-08

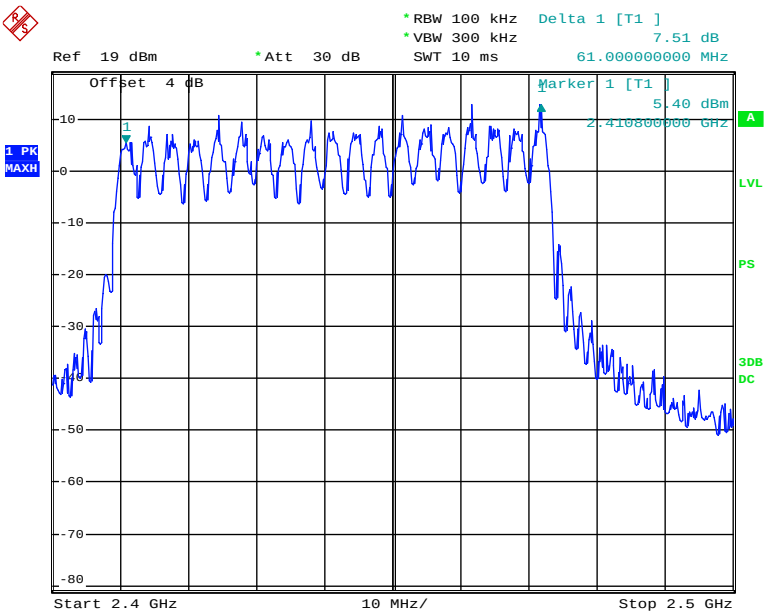
Test Result: Compliance.

Please refer to following tables and plots

Test Mode: Transmitting

Frequency Range (MHz)	Number of Hopping Channel	Limit
2400-2483.5	19	≥15

Number of Hopping Channels



Date: 8.AUG.2014 03:35:17

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 hopping mode; Spectrum SPAN was set as zero. Sweep time was set as necessary to capture the entire dwell time per hopping channel, the quantity of pulse was get from single sweep. In addition, the time of single pulse was tested.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09

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

Test Data

Environmental Conditions

Temperature:	29.5 °C
Relative Humidity:	65 %
ATM Pressure:	99.5 kappa

The testing was performed by leon Chen on 2014-08-08

Test Result: Compliance.

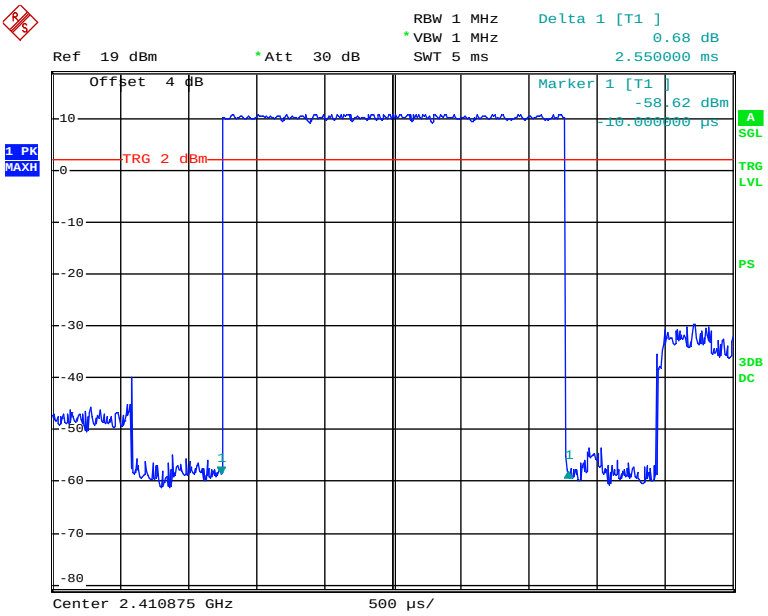
Please refer to following tables and plots

Test Mode: Transmitting

Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
Low	2.55	0.321	0.4	Pass
Middle	2.55	0.321	0.4	Pass
High	2.54	0.319	0.4	Pass

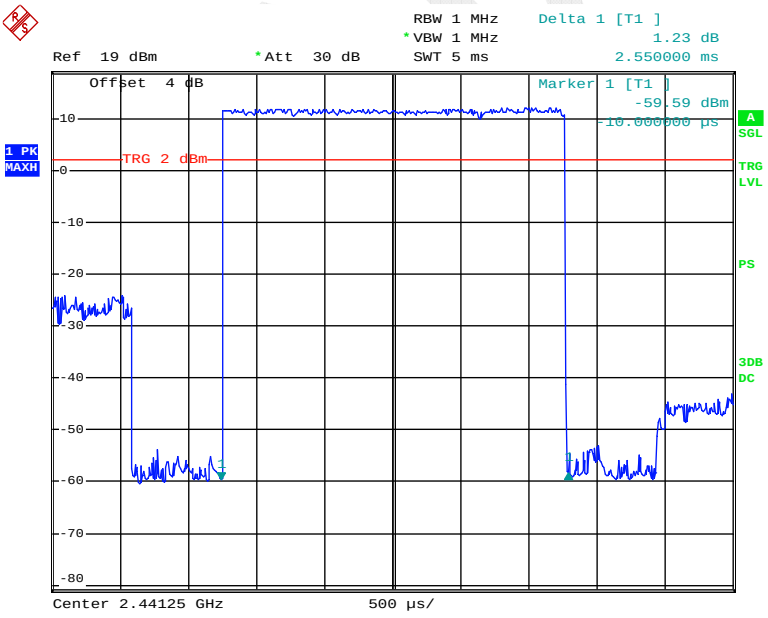
Note1: Dwell Time= Pulse Width* hopping rate/ hopping No.*hopping No.*0.4s.
Note2: Dwell Time= according to the hopping information provided by manufacturer, hopping rate = 1000/3.18, hopping No. = 19.

Low Channel



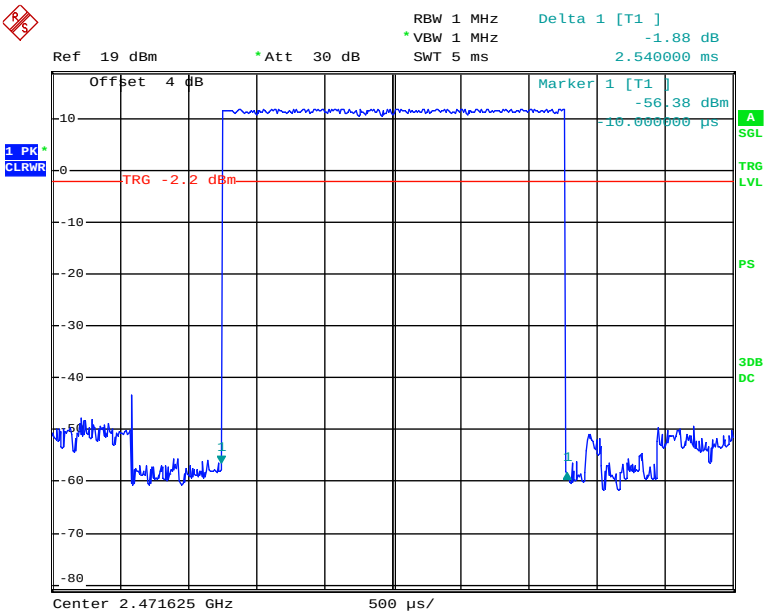
Date: 8.AUG.2014 04:39:54

Middle Channel



Date: 8.AUG.2014 04:40:19

High Channel



Date: 8.AUG.2014 04:18:12

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

Set the EUT in transmitting mode, maxhold the trace, Allow it to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09

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

Test Data

Environmental Conditions

Temperature:	29.5 °C
Relative Humidity:	65 %
ATM Pressure:	99.5 kappa

The testing was performed by leon Chen on 2014-08-08

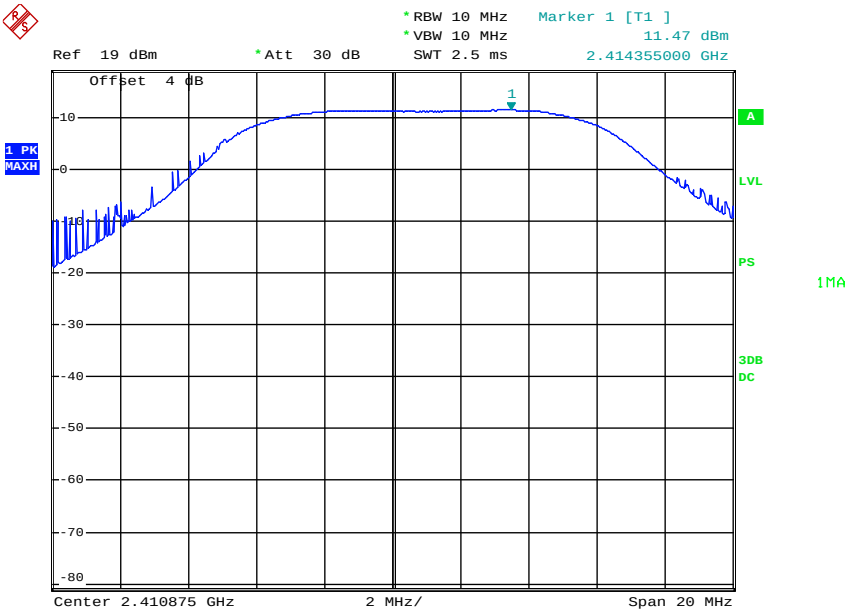
Test Result: Compliance.

Test Mode: Transmitting

Channel	Frequency (MHz)	Peak Output Power (dBm)	Limit (dBm)
Low	2410.875	11.47	20.97
Middle	2441.25	12.9	20.97
High	2471.625	14.06	20.97

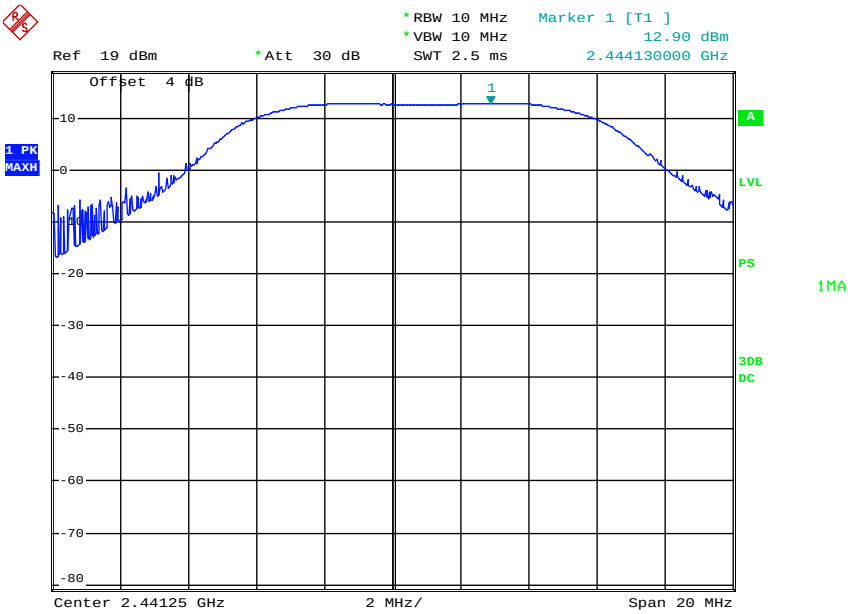
Note: The data above was tested in conducted mode.

Peak Output Power, Low Channel



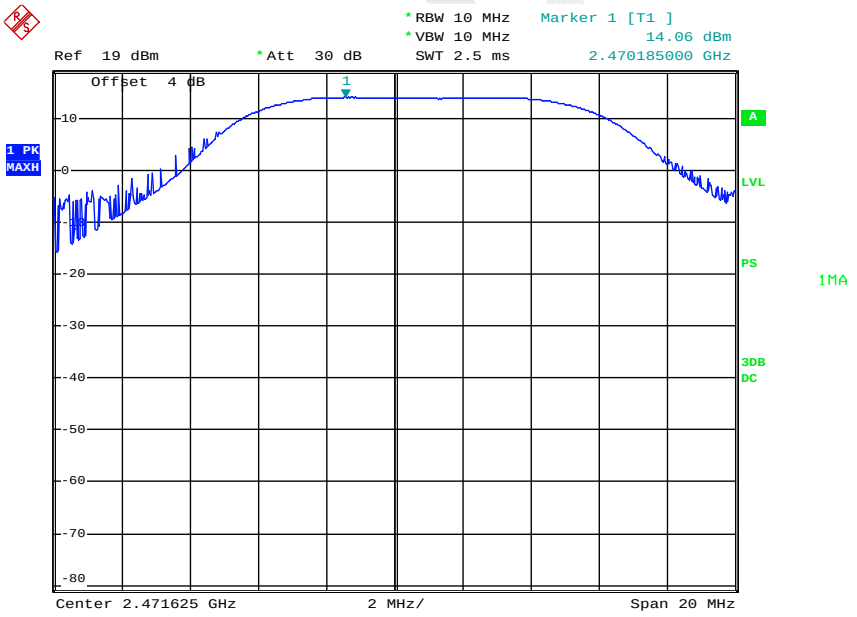
Date: 8.AUG.2014 03:11:28

Peak Output Power, Middle Channel



Date: 8.AUG.2014 03:11:10

Peak Output Power, High Channel



Date: 8.AUG.2014 03:11:49

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. Set RBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
2. 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.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09

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

Test Data

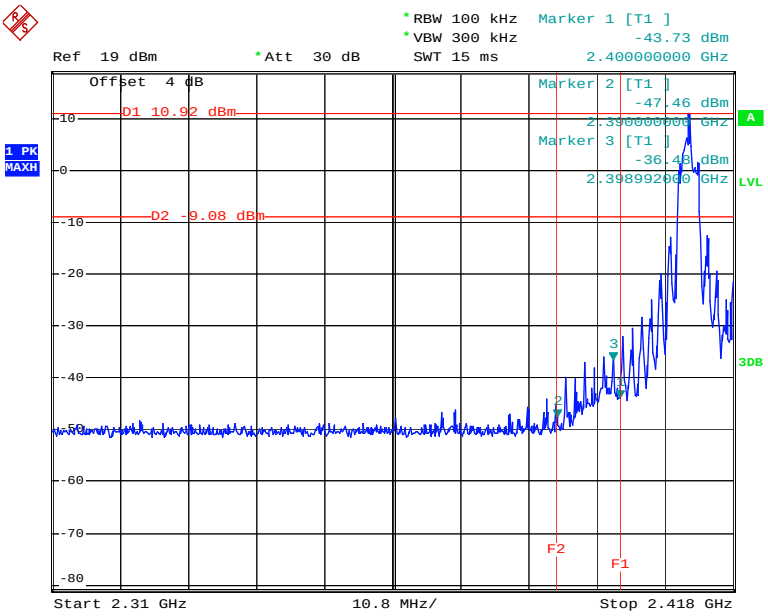
Environmental Conditions

Temperature:	29.4 °C
Relative Humidity:	59 %
ATM Pressure:	100.5kPa

The testing was performed by leon Chen on 2014-08-23.

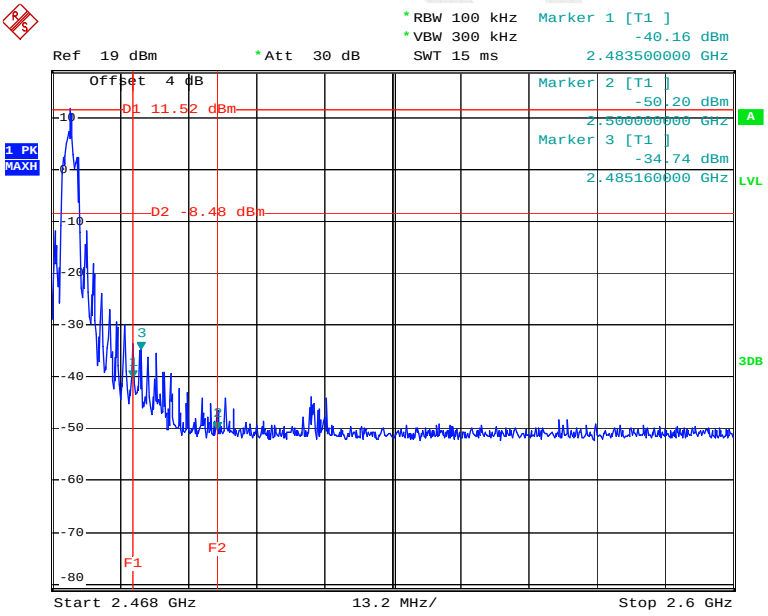
Test Result: Compliance

Band Edge, Left Side



Date: 23.AUG.2014 10:24:19

Band Edge, Right Side



Date: 23.AUG.2014 10:20:39

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